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THE MEASUREMENT AND CORRELATES OF WOMEN'S HEALTH CARE UTILIZATION

A thesis presented in partial fulfillment of
the requirements for the degree of

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in Psychology

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Gillian L Madison-Smith
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ABSTRACT

Andersen's Behavioural Model of Health Care Utilization was used to examine New Zealand women's use of six health care services. The model conceptualises health care utilization as a function of predisposing, enabling and need variables. Predisposing variables encompass the individual's characteristics which are present prior to the onset of illness that represents their propensity to use health services, for example, age. Enabling variables represent features affecting the means to obtain services, for example, income. Need variables represent the presence of illness, either self perceived or professionally diagnosed. Of the six services investigated in the present study, two were non-medical (use of disability and bed days) and four were medical (use of General Practitioners (GPs), health professionals, hospitals and prescription items). The study examined a geographically stratified sample of 964 women between the ages of 19 and 90 drawn from a range of New Zealand households. Five hypotheses were tested for each of the six health services. Incorporating new measures to capture the model's components, the first two hypotheses replicated the model by examining use of health services in terms of 'contact' and 'volume'. Contact focused on whether or not a service had been accessed, while volume focused on the amount of consumption that occurred over a defined catchment period. Predisposing and enabling characteristics were important predictors of contact; but need became more important when predicting ongoing service use. The last three hypotheses expanded the model by examining the effects of trauma and Post-Traumatic Stress Disorder (PTSD) on health care utilization. Traumatic events were associated with ongoing use of bed days and hospitals. PTSD was associated with use of bed days, hospitals, and GPs. Suggestions are made regarding future research in terms of overcoming research limitations and expanding the field. These included improving measures to capture needs for women of all ages as opposed to focusing on measures capturing chronic conditions best suited for the elderly, examination of service use in terms of episode events and suggested developments for the model incorporating reciprocal and feedback loops to account for traumatic events, PTSD, personal health habits and satisfaction with use of health services.

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More isn't always better Linus. Sometimes, it's just more.
- ***Julia Ormond*** *[SABRINA, Paramount Pictures, 1996]*

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CHAPTER ONE

EXAMINING WOMEN'S HEALTH

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1.1 Chapter preview

It has been said society can be judged on how it treats the old, the poor and the young. We have an ethical responsibility to provide affordable, efficient and accessible health care services for people regardless of age and socio-economic status. Because health services are one of the largest sectors in the economy they impact, for better or for worse, on all individuals in society. To achieve an integrated and effective health system, health research should focus on the delivery of an equitable health care system that provides for the needs of both men and women. However, although health care research should be examined from a comprehensive and systematic perspective, to date much research has primarily focused on men and precluded the needs of women (Chick & Pybus, 1988; Davidson et al., 1996; Kettel, 1996; Macran, Clarke, & Joshi, 1996; Rodin & Ickovics, 1990; Rollins, 1996; Tavris, 1993; Westbrook, 1995).

The present study is aimed at exploring the relationship between women's health, the events that impact on their lives and their use of health services. Specifically, the purpose is to characterise variables that predict women's use of different health services. In order to provide an overall insight into women and their patterns of health care utilization, this chapter briefly reviews the political, biological, social and economic issues that have historically influenced their health. A model capable of measuring how each of these areas affects women's use of health care services is then introduced. Andersen's *Behavioural Model of Health Care Utilization* has three components that determine the use of health services (Andersen, 1968; Andersen, 1995; Andersen & Newman, 1973). This chapter introduces these components[1] and discusses associated methodologic and research issues. It concludes with an illustration of how the present study will address the issues raised by critics. Finally, methods to expand the model are considered. These examine the effects that exposure to traumatic events and the onset of post traumatic stress disorder (PTSD) has on the use of health services.

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[1] Detailed research findings relating to each component are discussed in forthcoming chapters.

1.2 Why women's health?

Health care utilization is an important issue, but since women live longer than men (Statistics New Zealand, 1996) why focus specifically on *women?* Rodin and Ickovics (1990) provide several explanations why women's health should be brought to the forefront of the health agenda. Despite the fact that women live longer than men, they report more illness than men (Waldron, 1983). They also use more health services and prescription medications than men (Verbrugge, 1982). Certain health concerns such as gynaecologic issues are unique to women. Others, such as eating disorders, disproportionately affect women (Rodin & Ickovics, 1990). Psycho-social factors unique to women can have an adverse affect on women's health. These include multiple role burdens, integrating the dual domains of work and family and situations subjecting women to interpersonal violence, sexual discrimination and harassment (Rollins, 1996). Socio-cultural factors such as socio-economic status also affect women's health. Women have a lower socio-economic status than men and since poverty is related to morbidity, it compounds their ill-health (Rodin & Ickovics, 1990). Finally, women have frequently been excluded from research investigating health issues likely to affect them. These issues, discussed below, have guided the development of this research agenda. Because their trends and patterns are dynamic, ongoing research is required to examine the changing profiles of women's use of health services.

1.3 An historical perspective

The issue of women's health rose to a priority position in medical research after an international platform for recognition of gender differences was acknowledged during the United Nations 'Decade for Women: 1975 –1985'. The ensuing women's health movement achieved success in creating and implementing positive change and improving the course of health care for women (Davidson et al., 1996; Palmer & Short, 1989; Rollins, 1996). This perspective signalled a departure from the more 'traditional' avenues of gender health research where typical themes entailed comparisons between

men and women. In this sense, the common reference point depicted the male as the human norm. Tavris (1993) noted three comparative approaches where women were a) considered to be the opposite of men and inferior, b) considered the opposite of men and superior, or c) to be just like men. Tavris argued this led to the concept of 'normal' men and 'different' women. The aim of the present study is to contribute to the body of knowledge on women's health care and the intent is not to make extensive gender comparisons using either men or women as the 'normed' reference point.

1.3.1 Political

Despite a significant proportion of stakeholders in the business of health care being women, men have primarily made the decisions regarding the care of their health in terms of formulating national health care policy (Muller & Cocotas, 1988). According to these authors, the medical profession has focused largely on the needs of men and overlooked the specific needs of women. As a result, women have been excluded from much health care research guiding policy development (Rodin & Ickovics, 1990; Westbrook, 1995). Accordingly, the 'gender blindness' occurring in medical research infers that less is known about the needs of women than that of men (Payne, 1991). Westbrook provides a comprehensive summary of gender biased research that precludes female participants. Recently, this gender imbalance is diminishing as women increasingly participate in business decisions affecting their health (Muller & Cocotas, 1988). At present in New Zealand the Ministry of Health General Management Team consists of six principals, four of whom are women, including the most senior position (Dr Karen Poutasi is the Director General of Health). Women are being empowered to influence the medical profession and associated research. Further, their participation as respondents in health research is increasing (Muller & Cocotas, 1988). However, most health research makes a comparison between men and women. Relatively few have focused on women alone. Fewer still have focused on the specific issues determining women's use of health services; certainly comprehensive research examining socio-cultural and background factors influencing use is undocumented for New Zealand women. The present study will contribute to closing this gap by focusing solely on

women and identifying specific factors such as life events, income and physical needs that predict their use of health services. It will identify mutable factors that can be targeted for programme interventions aimed at improving the overall health of New Zealand women.

1.3.2 Biological

Historically, research into women's health has largely focused on reproduction. The genetic sex differences in the female's reproductive anatomy results in higher morbidity for women (Waldron, 1983) which impacts on their consumption of health services (Verbrugge, 1982). For example, the elevated rates of health care use amongst younger women have been attributed to their complex and demanding reproductive systems (Rodin & Ickovics, 1990). Waldron reported 79% of General Practitioner (GP)[2] visits by women aged 17 to 24 were associated with pregnancy, gynaecologic and breast examinations. As they reached 65 to 74 years of age (the 'young-old' age group)[3], their consumption of health services decreased.

Early research had an exaggerated focus on women's reproductive needs that overshadowed important requirements for other life-cycle phases such as hormonal adjustments after menopause (Chick & Pybus, 1988). Recently a more holistic view has emerged. Issues associated with ageing have become especially salient considering that women predominate the oldest age groups (Waldron, 1983). This has occurred to the extent where much health care research has resolutely concentrated on the elderly (Bazargan, Bazargan, & Baker, 1998; Evashwick, Rowe, Diehr, & Branch, 1984; Eve, 1988; Jewett, Hibbard, & Weeks, 1992; Millar, 1996; Wolinsky et al., 1989; Wolinsky & Johnson, 1991; Wolinsky & Johnson, 1992a). As a 'need' to engage in the use of health services, biological requirements only constitute one perspective and psycho-social elements have been identified as determinants of service use. Early studies found individuals with emotional problems exerted greater demands on the health system than other patients (Andersen, Francis, Lion, & Daughety, 1977), with a prevalence ranging

from 15 to 50% (Gardner, 1970). Romans-Clarkson, Walton, Dons, and Mullen (1990a) reported that GPs in New Zealand were responsible for the management of almost all psychiatric morbidity and Cheng (1992) found women used medical services to assuage loneliness and distress. To summarise, past research has primarily focused on two domains - the reproductive process and elderly health care utilization. In New Zealand, patterns of health care utilization are inadequately researched, as are its causes and consequences for women of all ages. The etiology of morbidity extends beyond a narrow conceptualisation restricted to biological factors and therefore additional need factors, such as distress and well-being, will be addressed by the present study.

1.3.3 Social

An important role of women in society is that of 'primary caregiver'. In New Zealand one in five women are unpaid volunteers in areas such as welfare, support and education. In 1991, 223,000 women spent time out of the work force looking after children and dependents (Statistics New Zealand, 1993). For women combining the role of primary caregiver with careers and families, these overlapping roles can lead to increased stress associated with poor health and diet, alcohol consumption and cigarette smoking (Brown-Rowat, Amsel, & Jeans, 1991; Facione, 1994; Spurlock, 1995). Elstad (1996) however, reported no harmful effects resulting from role overload.

Women are more vulnerable to sexual abuse and violence than are men (Statistics New Zealand, 1993). The prevalence of violence and therefore exposure to traumatic events is high in New Zealand. While homicides are more prevalent in the United States than in either New Zealand or Australia, these latter two countries had the highest reported rate of physical assault amongst 20 Westernised nations. Although an equivalent number of violent incidents for both men and women have been reported in the United States (Straus & Gelles, 1986), a New Zealand study found men were assaulted more frequently than women (Martin et al., 1998). Both studies, however, found women were particularly vulnerable to serious physical assault (most often inflicted by their male

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[2] Much research refers to General Practitioners as physicians. Therefore, the present study uses these two

counterparts) and were hospitalised more often due to their more serious injuries. In New Zealand, 96% of women seeking safety in a women's refuge reported their abusers to be men (Statistics New Zealand, 1993). In addition, the incident of rape and attempted rape has increased seven-fold over the past 22 years. Police have also reported a 19% increase in the number of domestic violence incidents between 1981 and 1992 (Statistics New Zealand, 1993).

Exposure to traumatic events has been linked to the onset of psychiatric morbidity, which itself has affected patterns of health care utilization. Carmen, Reiker and Mills (1984) linked traumatic events to psychiatric morbidity. They found female adults were more likely to be victims of family violence that made some, not all, victims vulnerable to psychiatric illness. Almost half of the patients diagnosed with psychiatric illness were victims of physical and sexual abuse. The Rand Corporation (Burnam et al., 1988) subsequently examined a community-based sample in Los Angeles. They found exposure to assault was associated with later onset of major depression, substance use and anxiety disorders. Kimerling and Calhoun (1994) reported sexual abuse and assault increased psychiatric morbidity, depression, fear, anxiety, sexual dysfunction and social adjustment. Further, childhood sexual assault has been identified as a factor affecting the physical and psychological health status of adult women (Fairbank, Schlenger, Saigh, & Davidson, 1995).

Several studies have established links between trauma, psychiatric morbidity and health care utilization. Golding, Stein, Siegal, Burnam and Sorenson (1988) established that sexual assault was associated with use of medical and mental health services indirectly through rates of psychiatric disorder. Using 2,560 randomly selected community participants, they showed victims exposed to assault were more likely to seek medical treatment. Further, victims exposed to childhood sexual abuse were more likely to seek mental health care. Kimerling and Calhoun (1994) found victims of sexual assault had increased use of medical services, a trend that increased over time. Cohen and Miller (1998) estimated that of the 4.1 million people in the United States seeking mental health treatment directly as a result of trauma, over half were adults who had either been

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terms interchangeably.

sexually abused as children or, as adults, had been abused several years earlier. According to Solomon and Davidson (1997) traumatic events have become so prevalent that most Americans will experience one over the course of their lives. They estimate 10% to 15% of victims exposed to crime will suffer from post traumatic stress disorder (PTSD) as a consequence. Cohen and Miller (1998) placed the cost of mental health care between $5.8 and $6.8 billion for victims of crime. In summary, adverse health outcomes resulting from traumatic events have been shown to impact on health care utilization. However, the extent to which traumatic events influence the use of health services by New Zealand women is not yet known. Given the prevalence of these events in New Zealand at least some impact is probable. This issue will be addressed by the present study.

1.3.4 Economic

Socio-economic status is closely related to morbidity (Rodin & Ickovics, 1990) and both employment status and level of income may affect a woman's health status (Elstad, 1996; Kandrack, Grant, & Segall, 1991). Traditionally, poverty rates are higher for women than for men (Rodin & Ickovics, 1990) because women have occupied jobs with designated lower pay than men even when responsibilities have been equal (Muller, 1986a). In New Zealand, the average total income of women is approximately 74% that of men (Statistics New Zealand, 1993) it is 60% in the United States; (Muller, 1986a) and 64% in Australia (Women's Policy Development Office, 1996). In 1996, the total annual median income for employed[3] males was $28,852 and $19,172 for employed females (Statistics New Zealand, 1996). However, the extent to which women's income, financial resources and socio-economic status determines their use of different health services in New Zealand is unclear.

In New Zealand, men dominate the full-time work force. Between the ages of 40 to 49, 62.1% of the workforce are males. The part-time workforce is dominated by females (70.5%) (Statistics New Zealand, 1996) ostensibly because living arrangements and

[3] The census data from Statistics New Zealand did not specify full or part time employment.

associated caregiver roles influence their occupational status. Devoting time to the role of primary caregiver deprives people of time to devote to full-time paid work[4]. The effects of both full and part-time employment are potentially important predictors in the use of health services. For example Waldron (1983), argued that since women work fewer hours than men they may have more free time to arrange physician visits. To date substantive empirical evidence indicates a similar trend in New Zealand women has not been documented. The present study will examine socio-economic status and its effect on women's use of medical and non-medical services.

1.3.5 Summary: women and health care

This summary of women's health has considered political, biological, social and economic contexts. Initially, health care research on women was viewed from a political platform and has only recently begun to be considered as a health agenda in its own right. Early research largely focused on the female reproductive functions and excluded women participants in important health research. Research is required in New Zealand from a holistic perspective that encompasses women of all ages. Finally and perhaps most importantly for New Zealand women, there is a requirement to explain factors that enable or impede their use of health services. These include factors existing prior to the onset of illness, factors affecting how treatment is obtained and their need for health care. Next, a theoretical model capable of examining these issues is introduced.

1.4 Andersen's Behavioural Model of Health Care Utilization

The *Behavioural Model of Health Care Utilization* (Andersen, 1968; Andersen & Newman, 1973; Andersen, 1995) is depicted in Figure 1. It is one of the most widely used models explaining health care utilization (Wolinsky & Johnson, 1991) and explains the use of health care services as a function of three components, depicted as

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[4] This is not to imply the value judgement that paid work is better than being a homemaker.

independent variables in Figure 1. The first component is *'predisposing'* variables (characteristics present prior to the onset of illness, e.g., demographics, social structure and health attitudes). The second is *'enabling'* variables (features facilitating how health services are obtained, e.g., family and community resources). The third is *'need'* (perception of illness). These components combine to explain the outcome measures, which is the consumption of different health services. Unlike the original source (Andersen 1968, 1995) these are represented in Figure 1 by the outcomes that will be examined in the present study. These will be outlined in section 1.4.2 and detailed in chapter 5.

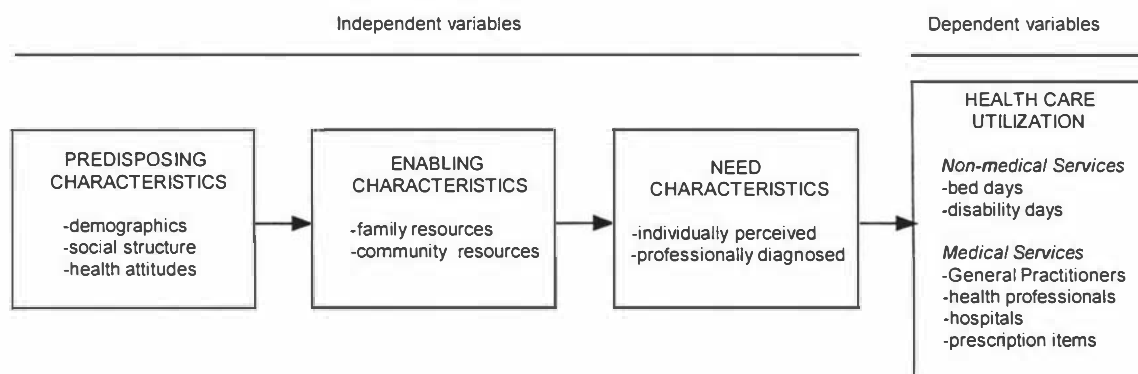

Figure 1. The Behavioural Model of Health Care Utilization (Andersen, 1968, 1995).

1.4.1 Independent variables (predictors of service use)

Predisposing characteristics are objective indicators that describe one's propensity to use a health service prior to the onset of illness (Andersen, 1968; Wolinsky & Arnold, 1988).

They represent a woman's demographic situation, such as age, marital status and living arrangements. They explain her social situation, by describing her employment status, education and ethnicity. Finally, they encompass her health beliefs, by describing how much she worries about her health and feels she is able to control it. Since predisposing characteristics capture the non-economic and non-medical components of a woman's

situation they represent the socio-cultural element of the model and are reviewed in chapter 2.

Enabling characteristics indicate available resources that facilitate or impede a woman's ability to obtain health care. The two original components were family resources (income, savings, health insurance, and welfare care) and community resources (physician-population ratio, hospital bed population ratio, residence and region) (Andersen, 1968). However, to examine initial contact and continued use over a period of time, Penchansky and Thomas (1981) suggested access could be examined through five categories. These were affordability, acceptability, accessibility, availability and accommodation. These categories have yet to be comprehensively applied to the model. Enabling variables and related findings are reviewed in chapter 3.

Regardless of a woman's predisposition or her ability to access care, she is unlikely to use a health service unless she perceives some type of need. Need is the stimulus for service utilization if predisposing and enabling variables are favourable (Wolinsky et al., 1983). They are represented by a woman's own perception of her health status (self-rated health) and professionally evaluated need (diagnosis of illness by a health professional). Need characteristics and related findings are reviewed in chapter 4.

1.4.2 Dependent variables (outcome variables)

Early models of health care utilization examined outcome in terms of monetary cost. The Behavioural Model of Health Care Utilization departed from this perspective and used as its outcome measure the actual consumption of health services over a defined catchment time (Andersen, 1968; Andersen & Newman, 1973). Health services are either non-medical or medical. Informal or *non-medical* services are generally obtained away from the formal medical system and are home based. These include disability days (days where normal activity is restricted due to ill-health) and bed days (days when women are confined to bed due to ill-health). Formal or m*edical* services refer to consultations with trained health professionals, habitually measured through use of

General Practitioners (GP) and hospitals (inpatient and outpatient visits, number of nights spent in hospital and the use of Accident and Emergency services). Measures typically include service *contact* (whether or not a service was used) or *volume* (how many services were used) over a defined catchment period of time. It is prudent for volume measures to exclude non-users from their analyses since they focus on the *amount* of consumption that has occurred (Wolinsky & Arnold, 1988). Health care utilization and related findings are reviewed in chapter 6.

1.4.3 Methodologic and research issues

The model has been referred to as the "... most widely used conceptual framework in the field" (Wolinsky & Johnson, 1991, p.345) as its three-tiered structure provides an elegant platform to describe use of health services. Since its conception, several changes have occurred. For example, the model was originally applied to families rather than individuals. This unit of analysis was initially characterised by Andersen as a strength although he subsequently acknowledged it was too broad-based and lacked sensitivity. Most researchers in the field have adopted the individual as the unit of analysis (Aday & Andersen, 1974; Andersen, 1995; Bazargan et al., 1998; Cafferata, 1987; Evashwick et al., 1984; Gulick, 1991; Millar, 1996; Stoller, 1982; Wolinsky & Arnold, 1988; Wolinsky et al., 1983; Wolinsky & Johnson, 1991). Other changes are pointed out over the five introductory chapters that examine each aspect of the model in detail.

Strengths

The model is able to describe complex relationships between individuals and their reasons for health care use. Each component makes an independent or unique contribution when explaining why people use health services (Andersen, 1968; Andersen, 1995). This extends beyond the simplistic assumption that people go to the doctor just because they are sick. While it is true that need does account for a substantial portion of the explained variance the model includes other important variables affecting health care utilization. For example, utilization has been shown to be

affected by belief in treatment (Strain, 1991), previous use (Eve, 1988) and stress and loneliness (Cheng, 1992). Further, it allows these different aspects to predict different types of utilization. For example, one would expect socio-cultural aspects to exhibit their greatest impact on contact measures. This is because contact implicitly deals with access, which is likely to vary as a function of the individual's different social structural characteristics, such as ethnicity and salience of one's health beliefs (Wolinsky & Arnold, 1988; Wolinsky & Coe, 1984). Health status and need are likely to exhibit their greatest impact on volume measures because the assumption has been made that a degree of access already exists (Andersen, 1968; Andersen, 1995; Wolinsky & Arnold, 1988).

Previous research has typically used large samples (Coulton & Frost, 1982; Eve, 1988; Jewett et al., 1992; Wolinsky & Johnson, 1991) often drawn randomly from community based samples (Golding et al., 1988). The model is well suited to identify the needs of both the general population (Andersen, 1968) and high-risk groups such as the elderly (Millar, 1996), Vietnam veterans (Withers, Flett, Long, & Chamberlain, 1997) and victims of sexual assault (Golding et al., 1988). This has enabled groups with special needs to be adequately represented. This is particularly pertinent within the context of the present study, as the focal point is on women.

Criticisms

A criticism of the model concerns volume analyses that use continuous outcome variables. These continuous variables only examine health care users and are almost always skewed. This occurs when only a few respondents use the service extensively[5] and the obtained data therefore violates the assumptions of normality required to examine linear relationships. These high users, termed 'statistical outliers' are adjusted into the group of moderate users either through transformation (Flett, Millar, Long, & MacDonald, 1997; Millar, 1996) or by truncating distributions (Wolinsky & Johnson, 1991). These adjustments reclassify heavy users as moderate users (Wolinsky & Coe, 1984) and increases the model's accuracy in predicting health care utilization. Thus, it appears the model is best suited toward analysing utilization patterns of medium users

[5] For example once a week over a 12-month catchment period.

and is less effective at investigating patterns associated with high users. However, it is argued here that the statistical problems of high users represented as statistical outliers is an artefact of the phenomena under study, rather than the model itself. That is, this is a measurement problem associated with *health care utilization* and would apply to any study examining realistic utilization patterns over a 12-month catchment period, regardless of whether or not Andersen's model was used.

A second criticism is that too much emphasis is placed on need characteristics at the expense of predisposing and enabling factors (Coulton & Frost, 1982; Mechanic, 1979; Wolinsky & Johnson, 1991). This is despite the latter two components making a unique contribution to the variance explaining service use. Predisposing and enabling variables typically account for less variance than has need (Coulton & Frost, 1982; Evashwick et al., 1984; Strain, 1991; Wolinsky, 1978; Wolinsky et al., 1983). Total explained variance has ranged from 1% (Wolinsky, 1978) to 35% (Millar, 1996) which is arguably too low to adequately explain utilization.

The issue of additional indicators has been periodically advocated. Although Wolinsky et al. (1989) and Wolinsky and Johnson (1991) argued that refining or adding to the number of predisposing, enabling and need variables would not necessarily increase the explained variance, using additional variables Millar (1996) explained 32% for elderly men and women's use of GPs (as opposed to Wolinsky's 17%). Over time, additional characteristics have included past use of health services (Eve, 1988); health attitudes such as worries and control (Strain, 1991); psycho-social variables such as loneliness and distress (Cheng, 1992) and health beliefs, waiting room time and satisfaction (Gribben, 1993). Although satisfaction is a complex issue yet to be fully explored within the context of the model, it has been found to impact on health care utilization (Zastowny, Roghmann, & Cafferata, 1989). Andersen himself admitted that satisfaction is an issue worthy of further research (Andersen, 1995). New outcome measures for the model are also feasible and do not need to be restricted to mainstream health providers. Allied health professional providers could also be examined. Strain (1991) suggested allied health services are becoming more accessible and are perhaps being substituted for mainstream medical professionals that have dominated previous research. For

example, with the onset of lower back pain, people may contact a physiotherapist instead of their GP. This could decrease use of medical services (e.g., GPs) and perhaps even non-medical services (e.g., reduce number of required bed or disability days). The present study will take these issues into account and examine a range of additional outcome measures.

Much research has been confined to elderly samples of both sexes (Cafferata, 1987; Coulton & Frost, 1982; Evashwick et al., 1984; Millar, 1996; Nelson, 1993; Stoller, 1982; Strain, 1991; Wolinsky, Callahan, Fitzgerald, & Johnson, 1992c; Wolinsky et al., 1983; Wolinsky, Culler, Callahan, & Johnson, 1994; Wolinsky & Johnson, 1991; Wolinsky & Johnson, 1992b). The few exceptions that have exclusively examined women have either been focused on the elderly (Cheng, 1992; Eve, 1988), or comparatively small non-random samples of younger women (de Silva, 1997). The model has yet to be applied to a large sample of non-institutionalized women in New Zealand encompassing both young and old women. This will be addressed within the context of the present study with specific reference to a household sample of New Zealand women.

A further weakness of the model is that thus far, it has failed to take into account the extent to which traumatic events impact on the use of health services. Traumatic events are becoming more prevalent in Western society (Solomon & Davidson, 1997). Flett et al. (1997) report five recent studies using different methodologies which indicate that at some stage, 64% to 84% of people have been exposed to a potentially traumatic event. Several studies link traumatic events, illness and health care use. Koss et al. (1994) found criminal victimization a strong predictor of current health status. They surveyed 2,291 women and found that as the severity of the crime increased, so too did their subsequent use of medical services. Walker et al. (1992) reported that sexual assault among women was highly associated with both poor physical health and increased health care utilization, as did Kimerling and Calhoun (1994). Given the increasing prevalence of traumatic events, Flett et al. argued that exposure to traumatic events warranted inclusion in any framework used to investigate and predict the use of health care services. The present study includes the measurement of traumatic events to

determine their impact on health care utilization after taking into account the effects of predisposing, enabling and need characteristics.

In summary, the model has indicated that people use health services for reasons extending beyond a simple need. Health beliefs, life events, availability of services and effect of potentially traumatic events all influence health care utilization. What is not clear is the extent to which predisposing, enabling and need characteristics uniquely contribute to the use of medical and non-medical services by New Zealand women and the effect that additional indicators could have in explaining their use of health care services.

1.5 Relation to this thesis

Using additional measures of predisposing, enabling and need characteristics the present study will replicate and extend the Behavioural Model of Health Care Utilization. First, contact with medical and non-medical health services will be examined to determine whether or not services were used. Secondly, volume measures will examine how many services were used. Importantly, the present study predictors will comprise an extended array of indicators such as effect of life events, satisfaction, social contacts and psychological indicators. Outcome measures will incorporate both non-medical and medical services, including allied health professionals and use of pharmaceuticals. This will provide an overview of health care utilisation for a geographically stratified sample of New Zealand women. Specifically, it will examine the extent to which predisposing, enabling and need characteristics predict these women's use of health services and profile both users and non-users. This will provide a detailed indication of which women are receiving health services and why.

After the model has been replicated, it will be expanded to determine the extent to which traumatic events affects women's patterns of health care utilization. Trauma will be examined in terms of cumulative trauma (i.e., overall effect of trauma) as well as different types of trauma (e.g., sexual abuse, assault, accidents, disasters and death or

injury to a loved one). Finally, the psychological effects of exposure to traumatic events manifested in the form of post traumatic stress disorder (PTSD) will be examined. Effects of trauma will be considered after the *significant* predisposing, enabling and need characteristics that were identified in the volume analyses have been taken into account when examining each health service.

1.6 Chapter overview

Women's health is affected by political, social, economic and biological factors. The extent to which these factors impact on their use of health services can be examined using a comprehensive behavioural model (Andersen, 1968; Andersen, 1995; Andersen & Newman, 1973; Wolinsky & Johnson, 1991). The Behavioural Model of Health Care Utilization is a comprehensive framework that explains health care utilization as a function of predisposing, enabling need characteristics. Outcome measures represent the actual use of medical and non-medical services. The model extends beyond the narrow concept that utilization occurs solely because women are sick. It enables influential socio-cultural and background factors to be taken into account. Criticisms have asserted it has accounted for relatively low amounts of the total variance and over-emphasises the importance of need variables.

The present study will provide a comprehensive overview of health services used by New Zealand women. It will examine the extent to which they use health services over a defined catchment period of time. Applying measures that extend the model it will profile both users and non-users for an array of health services. Non-medical services will be represented by use of disability and bed days. Medical services will be represented by use of GPs, hospitals, prescription items and allied health professionals such as social workers, counsellors and physiotherapists. The present study will also examine the effects of trauma and PTSD on the use of these services.

Next, chapter 2 examines the first non-medical dimension of Andersen's model. Termed predisposing variables, they represent an individual's propensity to use health

services prior to the onset of an illness episode. A principal directive of the present study is to determine the extent to which predisposing characteristics predict health service utilization for New Zealand women.

CHAPTER TWO

PREDISPOSING CHARACTERISTICS, WOMEN AND UTILIZATION

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2.1 Chapter preview

The aim of this thesis is to identify predictors of health care utilization for New Zealand women. Chapter 1 reviewed the historical context of women's health and introduced a model appropriate to examine their use of health services. The Behavioural Model Of Health Care Utilization explains health care utilization as a function of predisposing, enabling and need characteristics. This chapter reviews predisposing characteristics; the first non-medical dimension. They use demographic variables, social structure and health beliefs to predict a person's propensity to use health services. These are characteristics an individual possesses prior to the onset of illness (Wolinsky & Arnold, 1988). Historically, predisposing characteristics have explained small amounts of variance in health service use (Andersen, 1968). The present study argues that using more appropriate predictors to measure predisposing characteristics will improve the predictive power of the model and explain more variance in the use of health services.

2.2 Demographics

Demographics reflect an individual's propensity to use health services (Andersen & Newman, 1973). Propensity toward use can be measured by gender, martial status and living arrangements.

2.2.1 Gender

The sex differential in mortality and morbidity is reflected both in health status and use of health services. In Western Societies, women live longer than men (Statistics New Zealand, 1996) yet report more symptoms and sickness than do men (Macran et al., 1996; Verbrugge & Steiner, 1981). In other words, men have higher mortality but women have higher morbidity. Women also use health services more often than men (Macran et al., 1996; Rollins, 1996; Verbrugge, 1982). In Canada, a large-scale study drawn from a random community sample found women reported more visits to the

doctor than did men. A significant predictor of medical utilization was gender rather than health status (Kandrack et al., 1991). In New Zealand, the Social Policy Survey in 1983 found 80% of women and 67% of men had received health care in one form during the past 12-months (Statistics New Zealand, 1993). Women consume a greater number of diagnostic services (Verbrugge & Steiner, 1981), more general health services (Stoller, 1982), are more likely to visit a private physician (Nelson, 1993; Wan, 1982) and use more preventative services (Waldron, 1983). Women take more disability days (Kandrack et al., 1991; Waldron, 1983) and stay in treatment longer than men (Rollins, 1996).

There are several reasons why health care utilization rates are higher for women. Socialised into a self-reliant attitude of 'stoic denial' (Rodin & Ickovics, 1990), men are more likely to ignore minor somatic illness (Umberson, 1992; Waldron, 1976). In contrast, women may be more in tune with their bodies and are more sensitive to their symptoms. They therefore engage in more preventive consultations (Waldron, 1976) and consequently use more prescription items (Rodin & Ickovics, 1990). Moreover, for younger women, the female reproductive system has been identified as a dominant reason to regularly visit the doctor. In the United States, 79% of physician visits for females aged between 15 - 24 years of age are associated with gynaecologic examinations and pregnancy (Waldron, 1983). These data emphasize the fact that women are significant consumers of a variety of health care services. However, emerging research suggests these patterns of health care utilization are changing. For example, by excluding consultations relating to menstrual problems, childbirth and menopause, Popay, Bartley and Owen (1993) reported similar health care utilization patterns between men and women. More recently, MacIntyre, Hunt and Sweeting (1996) suggested two methodological problems that may have unjustly exaggerated reports of elevated morbidity. Firstly, small but statistically significant differences have been found in very large studies; secondly, symptom checklists include symptoms of depression. As women report more depression than men (Matt, Dean, Wang, & Wood, 1992) this may have falsely indicated women have higher morbidity and relatively worse health than men. To summarise, it is important to identify specific predictors of health care use for women as they are principal consumers of health services.

2.2.2 Age

As the population ages, people over the age of 65 are becoming disproportionate consumers of health services (Haug, 1981; Hibbard & Pope, 1986; Wolinsky et al., 1983). In 1984, the elderly averaged 6.1 physician contacts as opposed to 4.1 by adults aged 45-65. They averaged more hospital admissions, longer lengths of stay and occupied 90 % of long term care beds in the United States (Evashwick et al., 1984). In 1986, 11% of the population was aged 65 and over, yet this group consumed 30% of all health care dollars (Hibbard & Pope, 1986). A 1991 study showed that elderly Americans, representing just one eighth of the population, account for more than one third of total health expenditure (Wolinsky & Johnson, 1991). Statistical projections indicate the trend will continue and that by the year 2040 the elderly will account for 27% of total physician visits, compared with 15% in 1980 (Rice & Feldman, 1983). As the aged population increases there will be a growing demand for diminishing resources for delivery of health services. This is an especially salient issue for women as they dominate the elderly age group.

As people age, their utilization patterns change. Amongst younger women, health care consultations are primarily associated with gynecologic, pregnancy, genitourinary system and breast problems. Then, as women reach menopause their consumption of health services decreases (Waldron, 1983). They take fewer bed disability days, have less physician and hospital contacts and have shorter hospitalisation stays (Wolinsky & Johnson, 1991). Their decreased utilization is attributed to the lessening demand made by their reproductive systems (Waldron, 1983). As women reach the young old (65-74 years) and the old-old age groups (75 and over) their utilization patterns change again. For the young-old, non-medical health care for the elderly occurs in almost one fourth of American households and collectively costs these relatives approximately $2 billion a month of their own money (Peterson, 1997). By the time people reach the old-old age group they have become increasingly frail. They are less able to rely on non-medical health and self-care services and once again turn towards professional health systems for assistance (Wolinsky & Johnson, 1991).

Despite a general consensus regarding different utilization patterns for the different age groups, there are ambiguities in the literature attributing health care utilization to age. Age has been associated with utilization of disability days (Cafferata, 1987), bed days (Wolinsky & Johnson, 1991), GP contact (Nelson, 1993), overnight hospital stays (Eve, 1988; Wolinsky & Coe, 1984), use of emergency rooms (Bazargan, Bazargan, & Baker, 1998) and home help (Evashwick et al., 1984). In contrast, several studies have found age has no effect on use of health services. These include Coulton and Frost (1982), Kandrack et al. (1991), Millar (1996), Strain (1991), Wolinsky et al. (1983). Aside from Kandrack et al.(1991) who examined all age groups and Eve (1988), who examined elderly women, each of these studies focused on elderly men and women. Further, they all measured age as a continuous variable in terms of actual years. This suggests these contradictory findings are not due to different methods of measurement or examination of different samples.

To summarise, the elderly population is increasing and as it does chronic illness will, most probably, become more prevalent. Although there is a general consensus that health care utilization patterns differ amongst the different age groups, the literature examining links between age and health care utilization is ambiguous and inconsistent. It is unlikely these ambiguities exist due to the methods used to measure age. However, it is possible that a third variable, such as increase in prevalence and severity of illness, could affect both age and utilization. Furthermore, to date no research has examined the association between age and a use of health services taking women's illness and needs into account.

2.2.3 Marital status

Previous research has identified a link between marital status and health status. According to Verbrugge (1979) women appear more sensitive to marital status than men and their health is more adversely affected by marital dissolution. However, separated, divorced, widowed and never married men and women have poorer health than their married counterparts (Verbrugge, 1979) and this difference in health status is reflected in their health care utilization patterns. In comparison to the non-married, married

people use fewer medical services and have shorter hospital stays (Evashwick et al., 1984; Verbrugge, 1979). Verbrugge found two reasons explained this finding. First, married people are 'selected' for their good health. Secondly, married people have different 'illness behaviours' that make them appear more healthy. Family responsibilities and opportunities for home care deter use of medical services, reduce readiness to take time off work and reduce lengthy hospital stays. Married people have less flexible daily schedules and less free time than the non-married; consequently, it is more difficult for the married to find the time to consult health services.

Despite the different utilization patterns between the married and non-married, as a predisposing variable within the context of Andersen's model, marital status has not consistently predicted use of health services. Although marital status has been associated with use of physicians (Wolinsky & Coe, 1984), ambulatory and home care services (Evashwick et al., 1984), several studies have found opposing findings, e.g., Cafferata (1987), Eve (1988), Kandrack et al. (1991) and Strain (1991).

Cafferata (1987) suggested that it was living arrangements and not marital status that affected the use of health services. She investigated these links on a sample drawn from a randomly selected civilian population of 4,560 elderly people aged 65 and over. After controlling for living arrangements, Cafferata found marital status (never married, currently married, separated, or widowed) had no effect on use of disability days, physician visits or hospital admissions. It was the presence of living with others and *not* just being married that influenced health care utilization. Elderly people living alone used more bed days and less physician visits. Thus influential others in the household and not just spouses make lay judgments regarding whether or not a condition is severe enough to warrant the use of health services.

Within the New Zealand population the effects of marital status and living arrangements on use of health services are unknown. Given that women are more sensitive to marital status and that marital status affects both health and illness behaviours (Verbrugge, 1979), the present study will assess the influence that marital status has on the use of health services. The effect that living alone exerts on health care utilization will also be

examined, as the advent of blended families, defacto relationships and shared living arrangements to facilitate economic concerns are becoming increasingly prevalent.

2.2.4 Summary: demographics

Nested within the dimension of predisposing characteristics, demographic variables examine the effect that gender, age, marital status and living arrangements have on health care utilization. Women are the principal consumers of health services. In comparison with men, they report more morbidity and use more health services despite a lower mortality rate. Because women and men have different health and illness behaviours, depending on their age and marital status, their health care utilization patterns differ.

Although demographic variables are relatively easy to measure, their precise influence on health care utilization is less evident due to spurious third variables associated with both the demographic variables and use of health services. For example, both age and use of health services are associated with increased somatic and chronic conditions. The advantage of Andersen's model is that it allows examination of the direct effects of demographics on use. It also permits examination of indirect effects, that is the effect of demographic variables after third variables such as health status have been taken into account.

2.3 Social structure

Social structure reflects an individual's relative life cycle position (Wolinsky & Johnson, 1991). It is measured by social contact, occupation and employment status, education and ethnicity.

2.3.1 Social contact

Findings on the effects of social contact on health care utilization are mixed. Coulton and Frost (1982) examined social isolation in a community sample of men and women aged 65 and over. Social isolation was measured as index of social contacts. Isolated people used less GP and less mental health services over a 12-month catchment period. Coulton and Frost (1982) interpreted this unexpected finding as an indication the socially isolated have weak links and minimal ties to community agencies providing health services. In contrast, Cheng (1992) examined loneliness in women as a proxy measure of social contact. Through its impact on health and somatisation, being lonely and distressed increased the use of physician visits. She concluded that older women use physicians as a substitute for sparse social contacts, thus utilization of the medical sector appeared to cater to both physical and psycho-social needs.

Wolinsky and Johnson (1991) used the presence of a telephone as a proxy indicator of access to social support networks. The presence of a telephone significantly increased physician contact but had no effect on hospital contact or volume. Like Wolinsky and Johnson (1991), Nelson (1993) found the telephone also impacted on health care utilization. She examined 5,095 non-institutionalized men and women over the age of 75, measuring social contact by speaking on the phone, living alone, number of living siblings or children, getting together with relatives and friends and attending church. People who spoke to *relatives* on the phone, or went to church, had more physician contact. People who spoke to *friends* on the phone, lived alone, or did not attended church, had more physician visits. Nelson (1993) suggested that for women, speaking on the phone to friends might be a sufficient substitute for ongoing professional help. She also found church attendance was consistently associated with use of several services: people who went to church had higher rates of physician contact, but less overall physician visits, hospital visits and hospital contact.

Together, these studies (Cheng, 1992; Coulton & Frost, 1982; Nelson, 1993; Wolinsky & Johnson, 1991) provide plausible evidence that social contacts impact on health care utilization. However, despite examining similar elderly populations, their findings are

inconsistent. The present study will address this inconsistency and attempt to clarify these ambiguities using a sample of women that extends beyond just the elderly.

2.3.2 Occupation and employment status

A general trend exists in the literature indicating the unemployed tend to use more health services. Davis (1986b) reported that New Zealand women not in the paid workforce went to the GP more often than women in paid employment. Wolinsky et al. (1989) reported a comparable trend for unemployed Anglo-Americans although the relationship failed to reach a level of statistical significance. Kandrack et al. (1991) found no difference in the number of physician visits between the employed and unemployed. The trend for the unemployed was to have a higher number of visits. A similar trend was observed as a significant relationship by Nelson (1993) who found the unemployed had a significantly higher volume of physician visits. Nelson's (1993) significant finding is related to sample size; although both Kandrack et al. (1991) and Nelson (1993) drew samples from non-institutionalized populations. Nelson (1993) had a larger sample (N=5,095) of elderly men and women, while the smaller sample (N=524) examined by Kandrack et al. (1991), included men and women of all ages[1]. Note these studies drew comparisons between men and women, not employed and unemployed women.

Two studies (Nelson, 1993; Strain, 1991) have examined the effects of employment on health care utilization within the context of Andersen's model. Although both examined elderly men and women from community samples they report mixed findings. Strain (1991) found employed people used more physician visits, in contrast, Nelson (1993) found the employed had less physician visits. Both studies found employment had no effect on hospital stays and Nelson (1993), who had also examined GP contact, found employment had no effect for GP contact.

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[1] With large samples even small effects become statistically significant (Tabachnick & Fidel, 1989).

In summary, few studies have examined the effects of paid employment on health care utilization. Paid employment is a less well researched variable because previous health care utilization studies have principally focused on the elderly, the majority of whom are retired. The few studies reporting effects of paid employment have reported inconsistent findings. They have principally been conducted in the United States. In New Zealand there are no studies reporting the effects of employment status on women's health care utilization. The present study will address these issues and determine their impact on health care utilization.

2.3.3 Education

As with the literature relating to social contact and employment status, the literature reporting the effects of education on health care utilization are mixed. However, education appears to affect different health services in different ways. Early evidence suggested people with higher educational attainment are more likely to a) consult a dentist, b) consult a physician, c) have pre-natal visits, d) have shorter intervals in-between visits and e) have a regular source of care (Andersen, Lion, & Anderson, 1976).

The relationship between education, GP contact and use of non-medical services has not been widely investigated. However, both Wolinsky and Johnson (1991) and Nelson, (1993) found education had no effect on GP contact. Cafferata (1987) found men and women with higher qualifications took fewer bed days. The remaining health care literature focuses on frequency of GP visits and hospital stays over varying lengths of time.

The relationship between education and GP volume has been examined more often; however, it is not entirely clear how to interpret these contradictory findings. Bazargan et al. (1998), Cafferata (1987) Wolinsky and Johnson (1991) report men and women with higher education have more visits. In contrast, Evashwick et al. (1984) found that the highly educated had fewer visits. Nelson (1993) reported education had no effect on frequency of GP visits, as did Coulton and Frost (1982), Eve (1988), and Strain (1991).

However, the trend reported by Eve suggested the better educated had more visits, while the trends for Strain (1991) and Coulton and Frost (1982) suggested the better educated had fewer visits. There are two possible reasons for the contradictory findings for people with higher education. Highly educated people have a standard of education that may have armed them with an awareness and knowledge of illness; accordingly, they consult physicians on a regular basis. Alternatively, highly educated people may have a higher knowledge of health issues and, therefore, engage in a healthier lifestyle resulting in less physician visits.

The evidence regarding hospital utilization is more clear cut. Levels of educational attainment appear to have little effect on hospital stays. No effect was found between education and use of Accident and Emergency services (Bazargan et al., 1998), or hospital admissions (Bazargan et al., 1998; Cafferata, 1987; Evashwick et al., 1984; Eve, 1988; Nelson, 1993). Although statistical significance was not attained for these studies, the overall trend suggested that better educated people used less hospital services (Bazargan et al., 1998; Evashwick et al., 1984; Eve, 1988; Strain, 1991). Apart from Eve who examined 1,894 elderly women aged between 68 and 73, these studies examined both men and women.

Thus, education appears to affect GP volume more so than hospital utilization. The literature consistently reports that frequent users of hospitals have lower educational attainment. It is possible these trends will extend to New Zealand women. Results regarding frequent use of GPs are inconsistent. These issues remain unresolved in the literature and require clarification when describing New Zealand women's use of medical services.

2.3.4 Ethnicity

Unlike education, discussed above, ethnicity is a consistent predictor of health care utilization. Most studies have examined ethnic minorities in the United States e.g., Bazargan et al. (1998), Keith and Jones (1990) and Wolinsky et al. (1989). Few studies

in New Zealand have investigated the effect of ethnicity in terms of Andersen's model for Maori and South-Pacific islanders.

Davis (1986a) noted that ill-health was twice as high in Maoris males as in non-Maori males and argued although absolute levels of professional contact were higher for Maori they were low in terms of relative need. In a field study that collected data from 9,500 patient records for Maori and non-Maori males, Davis (1986a) reported the mortality rate for Maori was 50% higher than those who were non-Maori. Their rates of utilization were between 50 – 100% higher than their non-Maori counterparts; double when the condition was serious. He found that employed Maori males had at least one more physician contact per annum than unemployed Maori males. He subsequently reported a similar trend for women (Davis, 1987a). Maori women visited the doctor 30% more than non-Maori women, especially for high risk conditions associated with elevated mortality rates.

In contrast to (Davis, 1987a) who examined frequencies of utilization, Millar (1996) examined ethnicity in the context of Andersen's model. She found Maori used less GP visits, health professionals and prescription items. Millar attributed lower utilization rates to demographic and enabling characteristics, such as living in the country, not having a telephone, car or health insurance and a low income. She concluded ethnicity itself was not the cause of utilization rates. The effects of ethnicity occur in a social, political and historical context; it is these and cultural factors which influence utilization. For this reason, ethnicity is a good predictor of health care services. Unfortunately, detailed analyses of the effects of ethnicity are beyond the scope of this thesis. The relationship between Andersen's model and health care utilization for New Zealand Maori is currently being examined by Hirini (1998).

2.3.5 Life events

Research findings on the effect that life events have on health care utilization are contradictory. Millar (1996) found no evidence that life events consistently predicted health care utilization for elderly men and women. Following Jewett et al. (1992),

Millar (1996) argued that because certain life events are manifested as mental stress they should be conceptualised within the Andersen model as a function of need rather than predisposing characteristics. Examined as a need variable, life events failed to impact on an elderly sample's use of GPs, prescription items, health professionals or bed days (Millar, 1996). However, considered as a predisposing characteristic life events significantly predicted health care use in a general population sample (Flett et al., 1997), even after accounting for the effects of need and traumatic events. For this reason life events are considered as predisposing characteristics in the present study. Furthermore, life events occur within a social context. For example, the death of a partner or spouse, or loss of a job represent social contexts that can negatively impact on one's health. Life events are considered predisposing also because they deliberately avoid referring to illness or symptoms of distress (Koss, Woodruff, & Koss, 1990).

In a random sample of 96 females attending a health center, Gortmaker, Eckenrode and Gore (1982) found exposure to stressful life events the best single predictor of utilization. The theory linking life events with health care utilization advocates that as stressful life events accumulate, they have a negative impact that can, for example, increase depression (Tesser & Beach, 1998). In turn, this can affect health care utilization. Thus, life events could have in indirect effect on health care utilization through the onset of depression. The advantage of the Andersen's model is that it allows examination of this relationship to determine if life events influence health care utilization after need, specifically depression, has been taken into account. To summarise, life events will be classified as a predisposing characteristic within the context of the present study. Its direct relationship with health care utilization will be examined as will its indirect relationship through need.

2.3.6 Summary: social structure

Embedded within the predisposing element of Andersen's model, social structure is comprised of social contacts, occupation, employment status, education, ethnicity and life events. Each of these variables has been examined in relation to varying health services. The health literature examining these variables is largely contradictory,

despite being conducted on populations of elderly men and women residing in the United States. As would be expected within a multi-variate model, taken in isolation each of these variables do not account for a great deal of variance, but they have been identified by varying studies as significant predictors of health care utilization. Given this, they are worthy of inclusion in research that investigates their effects on women's health care utilization patterns and will therefore be included in the present study.

2.4 Health beliefs

Health beliefs are attitudes that can ultimately affect one's health status (Andersen, 1968; Andersen & Newman, 1973; Strain, 1991). A person's opinion about health influences their inclination to engage or avoid health services. Individuals who believe in the efficacy of medicine may seek treatment sooner and more frequently than someone sceptical of treatment (Andersen, 1968; Andersen & Newman, 1973). Health beliefs are represented by the extent to which an individual worries about their health and their perceived level of health control.

2.4.1 Health worry

A relatively uniform trend appears evident in the relationship between worry and the use of health services - people who worry tend to use more health services. Cafferata (1987) and Wolinsky and Johnson (1991) found this trend existed for use of bed days, GP visits and hospital stays. Wolinsky and Johnson (1991) found a similar trend for GP contact. Millar (1996) corroborated these findings and reported that regardless of actual health status, worried people had more GP visits and bought more prescription items. She also found the 'worried-well' tended to access more allied health professionals. Withers, Flett, Long and Chamberlain (1997) also investigated the effects of health worries. They reported that worried Vietnam veterans and their partners used more GP visits. However, worry appeared to have little influence over use of bed days and hospitals for either the veterans or their partners.

Apart from Withers et al. (1997), the above studies focused on elderly populations of both sexes. Their sample encompassed 14 female partners under the age of 39. It is unlikely that these 14 women adequately reflect the effects that health worries have on health care utilization for all New Zealand women. Consequently, this effect remains largely undocumented. Wolinsky and Johnson (1991) pointed out that establishing a relationship between health worries and use of physician and hospital utilization indicated the importance of health beliefs in general and health worries in particular when examining a persons propensity to utilize health services. Health worries will therefore be included in the present study to determine if these trends extend to New Zealand women of all ages.

2.4.2 Health control

Like health worries, health control is a less well researched variable within the context of Andersen's model. Strain (1991) proposed health control be conceptualised as either internal (health outcomes are due to one's self) or external (due to chance). Health control, however, did not appear to have a relationship with use of hospitals (Wolinsky et al., 1983; Wolinsky & Johnson, 1991), bed days (Millar, 1996; Wolinsky & Johnson, 1991), health professionals and prescription items (Millar, 1996). The failure to find significant effects of health control on use of physician visits by Wolinsky et al. (1983), Wolinsky and Johnson (1991) and (Millar, 1996) is contrasted by findings from Strain (1991), Withers et al. (1997) and Bazargan et al. (1998). Strain identified a weak relationship, indicating that the elderly with high external control (i.e., chance) had more GP visits. Withers et al. (1997) identified a significant effect for partners of Vietnam veterans suggesting the more control they felt they had over their health, the more they frequented the doctor. In contrast, Bazargan et al. (1998) found African Americans with less control use GPs more often. It is not entirely clear how to interpret these mixed findings or suggest a probable trend for New Zealand women. Women who have control could use more services because they feel they are able to influence their health status. Alternatively, women who have control could use fewer services because they feel it pointless to engage in external help. The ambiguities in the

literature will be addressed by the present study, which will include health control to determine its effect on women's use of health services.

2.4.3 Satisfaction

The relationship between satisfaction and health care utilization is an extensive and complex field, examined in terms of specific medical visits, episodic encounters covering a range of visits within one episode of illness and overall contact with the health care system. A complex review of the satisfaction literature, its theories, correlates and impact on illness behaviour is beyond the scope of this thesis.

According to Marshall, Hays, Sherbourne, & Wells (1993) satisfaction can be conceptualised as either uni or multi-dimensional. Uni-dimensional theories tap into a global perception of care using dichotomous statements, for example 'I am /not satisfied with the medical care I receive'. While this overarching construct minimises respondent burden (Marshall et al., 1993), typically these items have poor reliability coefficients (Ware, Davies-Avery, & Stewart, 1978). More commonly, satisfaction is conceptualised as a multi-dimensional construct capturing complexities associated with the diverse aspects of medical care. Hulka, Zyzanski, Cassek, and Thompson (1970) confirmed professional competence, personal qualities and cost/convenience to be the three major factors that constitute satisfaction. Ware et al. (1978) reviewed 111 theoretical and empirical articles covering the 25 years prior to 1976. They advocated eight principal dimensions, these being art of care; technical quality of care; accessibility / convenience; finances; physical environment; availability; continuity of care and efficacy / outcomes of care. Subsequent higher order factor analytic studies confirmed four major attitudinal factors: physician conduct, availability of services, continuity/convenience and access mechanisms (Like & Zyzanski, 1987). Weiss (1988) advocated that patient characteristics such as marital status, age, sex, ethnicity and education were also related to satisfaction.

Research investigating the relationship between satisfaction and health care utilization has treated satisfaction as either an antecedent (predictor) or consequence (outcome)

variable. Roghmann, Hengst and Zastowny (1979) considered it as an antecedent, claiming that satisfaction brings people to use health services: if the situation is satisfactory, compliance results and satisfaction increases (Zastowny, Roghmann, & Cafferata, 1989). It is an antecedent when dissatisfied people stay away from care, sceptical about the efficacy of treatment after interaction with a provider (Zastowny et al., 1989). These authors examined the effects of satisfaction on health care utilization by interviewing 400 people in their homes from the two poorest areas of town, the 'rest of the city' and families from the suburbs. Controlling for demographic, health and social characteristics the effects of satisfaction were examined on utilization of both clinics and private physicians. Satisfaction had no effect on either health service. However, after performing separate regressions on five different providers, satisfaction was found to have a significant effect. Although the different types of providers were never properly identified, for one provider (Provider B) satisfaction accounted for 25% of the variance.

Several of Zastowny et al's. (1989) demographic and social characteristics equated to the predisposing characteristics in Andersen's model. However, measures of need[2] were omitted from the analysis, making it difficult to determine if satisfaction had the same effect after accounting for perceived levels of illness. Inclusion of satisfaction as a predisposing characteristics examined within the context of Andersen's model would be able to answer this. Using Andersen's model, satisfaction has been examined as an outcome variable (Andersen, 1995), where the level of satisfaction was found to increase relative to the amount of health services consumed. Satisfaction, therefore, has the potential to influence health care utilization. Thus, since its effect as a significant predictor in the use of health services may contribute to the explained variance, it will be examined in the present study.

2.4.4 Summary: health beliefs

In summary, a person's opinions and beliefs about their health have been shown to influence their treatment-seeking behaviour. In general, health beliefs have been shown

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[2] see chapter 4.

to consistently influence patterns of health care utilization, although their effects vary on different health services. Individuals who place greater value on health have different utilization patterns than those who attach lower value. Worried individuals generally use more health services. Overall, health beliefs typically explain small amounts of the variance in Andersen's model but they are significant predictors as people's different health beliefs, values and attitudes result in different utilization patterns.

2.5 Summary: predisposing characteristics

Predisposing characteristics encompass demographics, social structure and health beliefs. This dimension is useful to predict contact with health services (Wolinsky & Arnold, 1988) as they are characteristics a person has prior to the onset of illness that reflects their propensity to obtain treatment. The presence of predisposing characteristics is a necessary but not a sufficient condition to result in the use of health services. That is, many predisposing characteristics, such as age, marital status or health control, are not in themselves a direct reason for accessing health care (Andersen & Newman, 1973). However, their intimate relationship to health and illness results in different illnesses and propensity to seek health care.

Although predisposing characteristics tend to account for less variance than need, their inclusion in examination of health care utilization research is relevant for two specific reasons. Firstly, if predisposing characteristics are the primary predictors of health care utilization their dominance may signal the health care system is inequitable. In an equitable health system, health care is distributed primarily according to medical need. Because demographic variables are closely correlated with health and illness, they are an important base for the distribution of health care. However, social structure and health beliefs should have a minimum influence on the use of health services because allocation of care on the basis of education or ethnicity is contrary to a system distributing equitable care based on need (Andersen & Newman, 1973). Examination of predisposing characteristics is therefore a useful indicator of the health care system, as well as revealing an underlying reasons why women use health services.

Secondly, if analyses reveal that a specific group does not have equitable access to health services, the predisposing component of the model contains elements that could be targeted for programmatic interventions. These interventions could be aimed at changing treatment-seeking behaviours either for individuals obtaining care unnecessarily, or individuals requiring care but who are not receiving it. Demographic variables have low mutability and are not easily incorporated into policy aimed at initiating change. However, social structure, e.g., education, could be incorporated into long term policy goals. Health beliefs, e.g., control, could be included in short term policy planning aimed at achieving social change that adjusts the health system to optimise distribution of health care.

2.6 Chapter overview

This chapter has examined the health care utilization literature relating to the first non-medical tier in Andersen's model, that of predisposing characteristics. These indicate the personal characteristics a person has towards using health care before they become ill. The variables themselves are not considered the reason to use health services, instead, they reflect differences in inclination toward use of health services. Predisposing characteristics are represented by demographics, social structure and health beliefs. Next, chapter 3 reviews the second non-medical dimension. Enabling characteristics originally consisted of personal and community resources (Andersen, 1968). However, chapter 3 presents a revised taxonomy for examining these subcomponents.

CHAPTER THREE

ENABLING CHARACTERISTICS, WOMEN AND UTILIZATION

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3.1 Chapter preview

Previous chapters have examined women's health in relation to the Behavioural Model of Health Care Utilization. Chapter 3 reviews the second non-medical dimension of this model, that of enabling characteristics. Enabling characteristics are the means by which people obtain health care. These features were originally conceptualised as familial (personal resources available to pay for care such as insurance, welfare and income) and community resources (availability of medical services) (Andersen, 1968; Andersen, 1995; Andersen & Newman, 1973). Penchansky and Thomas (1981) have refined the concept of enabling characteristics by devising a taxonomy of five areas based upon, but not identical to, Anderson's original enabling characteristics. Despite refining the categories describing how individuals obtain health care, the framework has yet to be fully applied within the context of Andersen's model. It is their taxonomy that this chapter examines and their taxonomy that the present study will apply to the Andersen model.

3.2 Affordability (ability to pay)

Affordability relates to a person's ability to pay for health services. It encompasses the cost of doctors' fees, personal income, health insurance and government subsidy schemes. Government subsidies such as Medicare in Australia and the Community Services Card in New Zealand facilitate access by helping to remove financial barriers to health care. The New Zealand health system is termed a 'public health system' because certain health and support systems are government funded. These include GPs, accident and emergency services, well-child and adolescent services and family planning services. In 1998, people are not charged for selected primary care services if their income ranges between NZ$17,769 for a single person living with others to NZ$47,385 or less for a family of six or more. People whose earnings fall within these categories meet the eligibility criteria for a Community Services Card which subsidises GP visits by $15; ensures the maximum costs for a prescription item is $3 and allows free home based support. For people not eligible for government subsidies, the health

care system in New Zealand is termed 'user pays'. Under this system, the patient pays out of their own pocket for the cost of health services when they consult with a health provider (fee for service). Alternatively, they may belong to a contribution scheme whereby their private health insurance plan pays for the cost of the services they obtain.

The literature consistently reports that access and health care utilization is affected by the cost of care. Where medical services are free or heavily subsidised by the government, utilization increases (Enthoven, 1984; Freeman & Corey, 1993; Newhouse et al., 1981; Wolinsky & Johnson, 1991). In the United States, the Rand Corporation extensively investigated the effects of insurance on use of health services (Newhouse et al., 1981). The Rand Health Insurance Experiment used a longitudinal design to investigate financial barriers to access and utilization over a six-year period. Five different insurance plans were assigned to a randomised-controlled trial of over 7,700 individuals in six sites across the United States. Empirical results indicated that high utilization was evident in families where services were either free or the cost of insurance minimal (Newhouse et al., 1981).

A subsequent study (Wolinsky & Johnson, 1991) examined a household sample of approximately 4,000 elderly adults to determine effects of private insurance. Private insurance increased physician contact, but not how often physicians were used over a 12-month catchment period. However, people with a government subsidised Medicaid card were more likely to have hospital and physician contact, have more physician visits and use more home help than those without a subsidy. Health insurance and government subsidies have also been examined in terms of follow-up care. Two studies conducted on subsamples of the Rand Health Insurance Experiment revealed health insurance affected the initial decision to seek treatment (i.e., contact) as well as follow-up care (Buchanan, Keeler, Rolph, & Holmer, 1991; Freeman & Corey, 1993). Freeman and Corey (1993) investigated follow-up care using a subsample of 6,000 to 11,000 elderly adults. Adults eligible for government subsidies had utilization rates twice as high as uninsured people who had to pay out of their own pockets. Further, adults were more likely to be hospitalised if they had private insurance. They concluded that private insurance did not provide the same access to initial care as government subsidies did,

but insurance did facilitate hospitalisation after the decision had been made to seek care in terms of follow-up and maintenance care.

Empirical research investigating the effects of health insurance on health care utilization is less well documented in New Zealand. Recently, however, Millar (1996) found that uninsured elderly men and women used more prescription items than those who were insured. Subsequent New Zealand research (Withers et al., 1997) investigated a community sample of 287 female partners of Vietnam veterans and found that women with medical insurance had more GP visits than those without. Women who take out health insurance may be concerned about their health and are therefore more predisposed to initiate GP contact, for maintenance and prevention, as well as being able to afford follow-up treatment.

The literature consistently reports that income affects health status, as a higher income provides access to better housing and more nutritious food (Rodin & Ickovics, 1990). However, the direct effects of income on health care utilization are less clear. Theoretically in countries such as New Zealand, Australia and Canada financial barriers created by low incomes are eliminated by government subsidies. Yet not all empirical findings corroborate this argument. The Ontario Health Study (Rosenberg & Hanlon, 1996) examined approximately 30,000 individuals representative of that region's adult population to determine the effect of income on utilization. Utilization between different income groups varied even though the state system removed the barrier of cost. People with fewer financial resources engaged in less preventative behaviour and used more accident and emergency services. They also had less GP and specialist contact. The inverse was found for people with high incomes. The authors concluded those with a high income had better health due to higher standards of housing and nutrition. Thus, income appears to have an indirect effect on health care utilization through its direct effect on health status. The Andersen model is able to examine these individual relationships and they will be addressed by the present study.

To date, however, mixed findings have been reported when examining the relationship between income and health care utilization within the context of Andersen's framework.

Coulton and Frost (1982) examined 1,834 non-institutionalized men and women over the age of 65 and found income had no significant effect on either ambulatory care (GP visits), mental health services or home help. By contrast, a longitudinal study examined a nationally representative sample of 1,894 non-institutionalized elderly women (Eve, 1988). Women in the greatest financial need and in the poorest health were most likely to put off care, while women with higher incomes had more physician visits. Eve introduced two proxy indicators for income: the subjective estimate of adequate income and satisfaction with one's standard of living. Women with insufficient income who were dissatisfied with their standard of living had more physician visits, hospital episodes and hospital nights. Eve (1988) concluded that older women lacking in financial resources were less likely to receive adequate health care.

Finally, affordability is represented by doctors' fees. While some New Zealand studies are consistent with United States epidemiological studies and report that high physician fees restrict access, others report no association. Walton, Romans-Clarkson and Mullen (1988) investigated improvements that women wished to see in health care services and found 11.4% of their sample considered the cost of doctors' fees too high. Several other New Zealand studies found people did not consult their GP because of the cost. These include 25% of a sample in Auckland (West & Harris, 1978); 6% of women in Invercargill (Burt & Cooper, 1983) and a decrease of 19.4% of child consultations in Otago that were attributed to financial barriers (Clarkson & Lafferty, 1984). While Walton et al.'s study examined doctors' fees in relation to satisfaction, Gribben (1992, 1993) examined fees in relation to both satisfaction and utilization. No significant relationship between doctors' fees and GP utilization was identified, despite 30% of respondents claiming that fees prevented them from consulting their GP (Gribben, 1992). He explained this inconsistency by claiming "a tendency for answers to the direct question to reflect dissatisfaction with charges rather than actual effects on utilization" (p. 455). He later reported that low satisfaction with fees did not result in less utilization (Gribben, 1993). Both studies were confined to certain aspects of enabling characteristics and were not carried out within the full context of Andersen's model. This limits the validity of the findings since variables such as health insurance and need were not fully represented. Gribben (1992) acknowledged the sample was

flawed and partially attributed this to the fact that the data collection had taken place over the Christmas holiday period. Therefore, generalisation of his results to the New Zealand population should be applied with caution.

To summarise, the more people have to pay for health care the less of it they use. Findings regarding government subsidies are mixed and only some report that reducing the cost of health care results in people using more services. Health insurance affects the decision to seek care and follow-up care for use of physician visits and hospitalisation over a defined catchment period. Low-income earners often use more services, report dissatisfaction with their way of life and report they are less able to get along on their income. The effects of doctors' fees on women's use of services are unclear; however, high fees are more likely to result in lower utilization. To date, the issue of affordability encompassing government subsidies, health insurance, income (objective and subjective) and doctors' fees has yet to be examined in relation to women within the full context of Andersen's model. These issues will be addressed by the present study.

3.3 Acceptability (patient attitude toward provider characteristics)

Acceptability reflects the patient's attitude towards the provider's personal characteristics by drawing a comparison between the patient's preferences and existing provider conditions (Penchansky & Thomas, 1981). Typical indicators of acceptability include patient reactions to the provider's gender, ethnicity, age and political affiliation. For example, women may not wish to consult with a male physician, nor one of a different religious orientation. The proxy indicators of a regular source of care, associated length of time and previous use of service all indicate acceptability.

GP gender, commonly examined in relation to satisfaction, is less often considered as a predictor of health care utilization. Very few New Zealand studies have linked GP gender to health care utilization. Millar (1996) found GP gender significantly predicted the number of bed days taken by the elderly, specifically, more bed days were taken if

the doctor was male. However, Millar (1996) interpreted this relationship cautiously, as 91% of GPs in her sample were male and the inclusion of GP gender in the regression analysis was therefore borderline. Examining health care utilization as an aggregate indicator representing use of GPs, hospitals, health professionals and prescription items, Flett et al. (1997) also found GP gender a significant predictor. This time, utilization was more likely to take place if the provider was a female. Interpreted cautiously, these findings indicate that the elderly use more medical services if the GP is a female and take more bed days when the GP is a male. This may reflect either different consultation styles or different response strategies: male GPs may recommend more rest in bed while female GPs may recommend more follow-up consultations. In a study that controlled for physician and patient gender, Bertakis et al. (1995) examined the influence of physician gender on 250 male and female patients. Patients were randomly assigned to a physician if they failed to state a specific gender preference for their GP. Patients were more pleased with female than male physicians and female physicians devoted 36% more time to preventative services. These issues warrant further examination within the framework of Andersen's model for New Zealand women.

Originally classified within the familial subcompenent of enabling characteristics (Andersen, 1968), a *regular source of care* has been regarded as a measure of both accessibility (Aday Andersen, & Fleming, 1980) and acceptability (Snider, 1980b). This latter classification views a regular source of care as indicating acceptance between provider and patient. Having a regular source of care has been associated with increased use of health services by Andersen and Aday (1978); Aday et al (1980); Evashwick (1984); Taylor (1975) and Wolinsky et al. (1983). Wolinsky et al. (1983) examined 401 non-institutionalized elderly individuals over the age of 65. People with a regular source of care were more likely to contact a doctor and use them more often. People without a regular source of care used more emergency room visits. They concluded that a regular source of care had a large effect on preventative behaviours; findings similar to those of Andersen and Laake (1983) and a later study conducted by Wolinsky and Coe (1984).

A further aspect of acceptability is *length of time seeing doctor,* which refers to the period of time that a patient has been consulting the same provider (not the minutes taken up during a consultation). In an attempt to determine access factors affecting GP utilization in New Zealand, Gribben (1992) conducted a survey examining the enabling characteristics of accessibility, availability and accommodation. His sample consisted of 290 adult respondents randomly selected from the general and Maori electoral rolls in South Auckland. Adults who had been going to their present doctor for a longer time were low users (length of time and frequency were not specified), while people who had been seeing their present doctor for a short period of time were high users. The reasons for these differences were not clarified. However, people who consult the same GP may do so for preventive treatment and therefore have lower overall utilization rates, while those with a regular source of care for a shorter period of time may have failed to engage in preventive behaviour resulting in a poor health status. In turn, they may have a greater need and present with more severe symptoms resulting in increased utilization. Gribben (1992) did not explain these contradictory findings and these explanations are purely speculative. They require clarification and will therefore be addressed by the present study. In summary, acceptability is represented by three indicators: GP gender, regular source of care and length of time with that GP. To date, findings have focused on the elderly using samples of both sex. To date, few studies in the United States and none in New Zealand have examined national samples of women to determine how acceptability impacts on the use of health services. The present study will address this issue and examine the effects of acceptability on women's use of health services.

3.4 Accessibility (geographic location of supply)

The third construct in Penchansky and Thomas' (1981) framework of enabling characteristics is accessibility. This is defined as the geographic location of service providers and the impact that distance places on consumers and their travel time. The effect that *mode of transportation* has on health service utilization is unclear. From one perspective, people inconvenienced by transport are less likely to consult a physician as they are literally less able to get to a doctor (Stoller, 1982). In contrast, Evashwick et al.

(1984) reported that elderly men and women with transport problems used more physician, hospital, home nursing and care services. They explained these discrepant findings in terms of need – that is, people who used more services were sicker and therefore found mobility and transportation more of a problem than healthy individuals. Finally, Gribben (1992) failed to identify a significant relationship between transportation and utilization. These conflicting results suggest that further investigation is required to identify if mode of transportation is a significant predictor in women's use of health services.

Accessibility is also measured by *geographic stability*. A person is considered geographically stable if they have lived at the same address for five or more years. These people are likely to use more health services as they have had time to develop a knowledge of available services and have possibly established stable relationships with specific providers (Snider, 1980b). However, Wolinsky and Johnson (1991) and Gribben (1992) found no significant effect for residential stability on physician or hospital contact. In New Zealand, examination of geographic stability is influenced by current health policy (Ministry of Health, 1996). The total area of New Zealand is 268,680 square kilometres[1]. For the 3.5 million people inhabiting this area, the New Zealand government has set geographic access criteria for primary care services (including GPs and accident and emergency services) requiring regional health authorities to ensure that primary care services are within 30 minutes travelling time for 90 % of people. Primary care services must be within three hours travelling time for 99 % of people within their regional area (Ministry of Health, 1996). Given the relative ease of access within this documented framework, geographic stability is not considered important enough for examination with in a New Zealand context. It is therefore precluded from the present study and accessibility will be represented only by mode of transport.

[1] Comparatively the size of Colorado.

3.5 Availability (same day availability)

Availability is defined in terms of an adequate supply of providers. This category, originally nested within Andersen's community dimension, refers to volume of service in relation to consumer demand (Andersen, 1968; Penchansky & Thomas, 1981). Evidence has consistently shown that utilization is higher in areas where there is a concentration of service providers (Aguirre et al., as cited in Wolinsky & Johnson, 1991; Andersen et al., 1983; Malcolm & Clayton, 1988; Wolinsky & Johnson, 1991). In the absence of data detailing provider-population ratio, a sufficient proxy measure is *convenience of appointment* as patients able to obtain a convenient appointment are likely to live in areas with a higher physician-patient ratio. Walton et al. (1988) examined 1,516 women randomly selected from the electoral rolls of Dunedin, Otago and Clutha[2]. Their results indicated New Zealand women in these areas were dissatisfied with the amount of time it took to get an appointment with a specialist after they had been referred by a GP. However, the authors did not examine the effect that elapsed time had on the women's utilization rates for GP, hospital clinics and surgical operations. Gribben (1992) found no significant relationship between GP utilization and appointments arranged on the same or the next day. Despite this study, the relationship between appointment delay and use of medical and non-medical services remains largely unexplored within the context of Andersen's model. Although it seems likely that convenient appointments would increase health care utilization, the extent to which they explain the use of health services is unknown and will be addressed by the present study.

3.6 Accommodation (waiting room time)

The final enabling category within the Penchansky and Thomas (1981) framework is accommodation. This refers to the provider's organisational resources designed to

[2] A region in the South Island, New Zealand.

accommodate the needs of clients. Typical aspects include hours of operation, walk in facilities, appointment systems and the length of time a person spends in the waiting room. This latter variable has been examined in terms of satisfaction and utilization. Penchansky and Thomas (1981) found that the longer people had to wait, the more dissatisfied they became, although they made no investigation of the effect this had on utilization rates. Likewise, Walton et al. (1988) found that for both rural and urban women in New Zealand the amount of time spent waiting in hospitals and doctor's surgeries was of concern to them. Just over 5% of respondents in their sample of 1,516 women felt it restricted access to their GPs. Again, the effect that waiting room time had on utilization rates was not examined. It was, however, examined by Hibbard and Pope (1986). Their population of 2,603 adults enrolled at a United States Health Maintenance Organisation (HMO) found adults aged less than 50 were sufficiently bothered by waiting time to let it reduce their utilization rates. A subsequent New Zealand study (Gribben, 1992) showed a significant relationship between utilization and waiting room time. Although Gribben explained in his discussion that "the average time in the waiting room was a determinant of utilization in the regression model" (p. 455) the exact nature of the relationship was not made clear[3]. Gribben (1992) failed to expand on his findings. His second study (Gribben, 1993) identified waiting room time as the third most significant source of dissatisfaction with GPs. Although Gribben is one of the few researchers to have applied selected aspects of Andersen's model to a New Zealand adult population he used the same sample for both studies and collected the data at a time of year[4] resulting in a sample bias. Only a limited selection of specific variables was applied within the context of Andersen's model; probably a function of pragmatic concerns associated with data collection. As a result, the impact that accommodation has on the health care utilization behaviour of New Zealand women needs to be fully examined and their relationships clarified.

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[3] Gribben (1992) did not provide unstandardised beta coefficients describing the direction of the relationship, and did not explain the finding in the text.

[4] Gribben (1992, 1993) collected the data over the Christmas season when many people were away on holiday.

3.7 Chapter overview

Chapter 3 has examined factors that enable women to obtain health care. Evidence suggested the apparent discrepancy between findings has related more to variable classification rather than methods of measurement because much research has examined the same variables under different names. Here a framework has been presented that eliminates much confusion regarding their classification. Variables nested within Andersen's original familial and community subcomponents have been merged into Penchansky and Thomas' (1981) five dimensional framework. The five categories; affordability, acceptability, accessibility, availability and accommodation afford a sensitive 'fit' between provider characteristics and consumer expectations as they encompass a wide range of variables. Although the five categories are separated at a conceptual level, they are likely to be related. For example, accessibility could influence both accommodation (a patient may leave before seeing a doctor if their delay in the waiting room means missing their last bus) and affordability (the patient not only has to pay for doctor's fee but transportation costs to get there).

The aim of the present research is to apply Penchansky and Thomas' (1981) framework to Andersen's model. Applied in this context, enabling variables may account for more variance explaining women's use of health services. A clear distinction will be drawn between the variables to determine their unique contribution in explaining the use of health services by New Zealand women. However, regardless of a person's enabling resources that facilitate access, contact will not be made with a health professional unless the individual feels a need to do so. Next, chapter 4 discusses need in terms of individual perception and professional diagnosis.

CHAPTER FOUR

NEED CHARACTERISTICS, WOMEN AND UTILIZATION

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4.1 Chapter preview

Previous chapters have reviewed the issue of women and health care and introduced Andersen's Behavioural Model of Health Care Utilization. Chapters 2 and 3 reviewed the model's non-medical dimensions of predisposing and enabling characteristics. Although predisposing and enabling characteristics are important, their presence alone will not result in the use of health services. That is, an individual or trained professional must perceive some illness or need, or utilization will not occur. Need, therefore, is a key dimension and is reviewed in Chapter 4. Two strategies assess this medical component. The first is the individual's subjective assessment regarding their health status. The second is more objective, where a trained professional makes a diagnosis of need.

4.2 Self rated health

Self-rated health indicates whether the individual perceives their health as being good or poor (Stoller, 1982; Wolinsky & Arnold, 1988). It has been measured both on a rating scale (Evashwick et al., 1984; Jewett et al. 1992; Wolinsky et al. 1992c; Wolinsky & Johnson, 1991) and as a single dichotomous item (Cafferata, 1987; Wolinsky et al., 1989; Wolinsky & Johnson, 1992a). According to Wolinsky and Arnold, the dichotomous measure is preferred since rating scales are unable to clearly distinguish between poor and good health. The dichotomous measure, a seemingly simple global measure of self-rated health has consistently captured the individual's recognition that something is not right with their health. Self-rated health has strong validity because the seriousness attached to either somatic or psychological symptoms is a personal evaluation (Wolinsky & Arnold, 1988). Further, it has been characterised as the strongest predictor of physician visits for women in both the young-old[1] and old-old[2] age groups (Hibbard & Pope, 1986) and for both blacks and whites (Keith & Jones, 1990).

[1] 65-74 years of age.
[2] 75 years of age and over.

In general, people who feel in poor health tend to use more health services (Andersen & Newman, 1973; Strain, 1991; Wolinsky & Arnold, 1988; Wolinsky et al., 1983; Wolinsky & Johnson, 1991). Self-rated health also reliably predicts morbidity and mortality for both men and women, although perceptions of poor health appear more prevalent for women than for men (Wolinsky & Johnson, 1992b). Rodin and McAvey (1992) conducted a longitudinal study on 251 elderly men and women over the age of 65 to detect factors associated with perceived health. A decline in perceived health was associated with increases in new illnesses, physician visits and a worsening of pre-existing conditions. In summary, the individual's perception regarding their health status is a subjective measure. It consistently predicts that people who perceive their health as poor use more health services.

4.3 Physical health

Measures of physical health comprise physical or somatic symptoms, chronic symptoms and activities of daily living and bodily functioning. Like self-rated health, somatic symptoms and one's level of physical functioning are significant predictors of health care utilization.

Somatic or *physical symptoms* are typically acute aspects of physical ailments. Examples include muscle or joint pain. Somatic symptoms are seminal determinants of health care utilization. In one study, Barsky et al. (1986) found somatic or physical symptoms alone explained 13% (of 46%) for use of GP visits, laboratory tests and hospitalization. Somatic symptoms can be measured with the Pennebaker Inventory of Limbic Languidness (PILL) scale (Pennebaker, 1982). Three New Zealand studies that use the PILL within the context of Andersen's model have reported consistent findings. A high number of physical symptoms have been associated with the elderly's use of health professionals (Millar, 1996), bed days taken by Vietnam veterans (Withers et al., 1997) and an aggregate measure of health services (Flett et al., 1997), even after predisposing and enabling variables had been taken into account. These findings suggest a probable link between poor physical symptoms and elevated levels of utilization for

New Zealand women. As a consistent predictor of health care utilization, physical symptoms will be included in the present study and the extent to which they impact on women's use of health services will be addressed.

Chronic symptoms are physical ailments consistently present in an individual for a period of three or more months. Marcus and Siegal (1982) examined the impact of chronic symptoms on the use of medical services. Women were 11% more likely than men to report using health services for chronic rather than acute illnesses. Traditionally, chronic symptoms have not been examined within the context of Andersen's model (Cafferata, 1987; Coulton & Frost, 1982; Evashwick et al., 1984; Eve, 1988; Nelson, 1993; Wolinsky & Arnold, 1988; Wolinsky et al., 1983; Wolinsky & Johnson, 1991). Usually identified by professional diagnosis, chronic symptoms are commonly measured on a checklist such as that developed by Belloc et al. (1971) and have consistently predicted use of health services. Men and women with a higher number of chronic ailments have been shown to use GPs more often (Millar, 1996; Withers et al., 1997), more prescription items (Millar, 1996) and more services overall (Flett et al., 1997). Since chronic symptoms are long term ailments they are useful predictors of prescription item use, as this form of health care is often associated with long term treatment.

Limitations in daily living refer to daily activities that are restricted due to ill-health. They range from basic activities such as personal care, household activities such as meal preparation, to advanced activities such as managing money. These needs can be measured by the Activities of Daily Living (ADL) scale (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963), which was later refined by Wolinsky and Johnson (1991) into the Instrumental Activities of Daily Living (IADL). A literature exists which consistently links restricted activities to elevated use of health services, including GP contact (Bazargan et al., 1998; Nelson, 1993; Wolinsky & Johnson, 1991), GPs volume (Evashwick et al., 1984; Millar, 1996; Nelson, 1993; Wolinsky & Johnson, 1991), hospital stays (Evashwick et al., 1984; Nelson, 1993; Wolinsky & Johnson, 1991) and frequent use of bed and disability days (Wolinsky & Johnson, 1991). The principal strength shared by these studies is that each used a non-institutionalized community

sample. However, they all used elderly men and women over the age of 60, somewhat compromising external validity when generalising to women of all ages.

Functional limitations refer to restrictions placed upon upper and lower body functioning. Lower body limitations refer to walking varying distances, standing and lifting, whereas upper body limitations refer to reaching, grasping and sitting. This aspect of physical health is measured by disability scales devised by Nagi (1976), later modified by Wolinsky and Johnson (1991). Like restricted daily activities, physical health status consistently predicts use for a range of services. They are amongst the most reliable determinants of medical utilization (Barsky et al., 1986; Gortmaker et al., 1982), possibly due to the seriousness the individual attaches to their own physical symptoms (Millar, 1996).

Notable researchers in the field such as Andersen (1968), Cheng (1992), Evashwick, et al. (1984), Eve (1988), Nelson (1993), Stoller (1982), Strain (1991), Wolinsky et al. (1989), Wolinsky and Arnold (1988), Wolinsky and Coe (1984), and Wolinsky and Johnson (1991) have all noted the importance that somatic symptoms have in predicting health care utilization, where people reporting more serious symptoms tend to use more health services. The physical dimension of health status will be represented in the present study by measures tapping somatic and chronic symptoms, activities of daily living and bodily functioning.

4.4 Mental health

The World Health Organisation defines health as a state of physical, mental and social well-being, not simply an absence of physical disease (WHO, 1948). The Rand Corporation (Veit & Ware, 1983) has studied mental health at length as part of the Rand Health Insurance Experiment. These authors alleged that a precise measurement of mental health should include measures of both distress and well-being. Using a sample of 5,089 non-institutionalized males and females aged between 13 and 69 years, Veit and Ware concluded the dimensions of distress comprised anxiety, depression and loss of

behavioural and emotional control. Well-being comprised general positive affect and emotional ties.

Many studies, discussed below, have linked distress to increased health care utilization. These studies have a common theoretical sequelae which advocates that distress causes illness (either somatic or psychological) which results in higher rates of service utilization. For example, Tessler, Mechanic and Diamond (1976) reported the presence of distress significantly predicted both physician contact and frequency of use, because distressed people are more sick. They found that distressed people disproportionately used medical services and had a higher propensity to seek medical care. Their prospective research design comprised household interviews with 339 men and women from two industrial firms who were eligible for 'prepaid' health care. This eliminated effects potentially associated with restricted finances. After controlling for socio-demographic, attitudinal and health status data, the results suggested that treatment-seeking behaviour was a coping mechanism for the distressed.

A subsequent study (Andersen et al., 1977) found psychological illness accounted for a large proportion of GP visits and prescriptive medications. They claimed individuals with emotional problems made greater demands on both these services. Using the Beck Depression Inventory, Halgin, Weaver, Edell and Spencer (1987) linked student's depression to elevated use of professional health services. Friedman and West (1987) investigated 116 Veterans, 98% of whom were men. Their results indicated that high users of psychiatric care were more chronically psychiatrically disabled. Manning and Wells (1992) using a non-elderly, civilian, general population reported similar results. They found 'increases in psychological distress significantly increased probability of any service use' (p.546). Van Hermert, Bakker, Vandenbroucke and Valkenberg (1993) examined psychological distress as a long term predictor of medical utilization. The relationship between distress and frequent utilization of GPs and prescription items was confirmed in a general population of 826 women. However, after nine years, distress did not predict use of GPs for women who had failed to use physicians at the time of initial measurement. Several studies allege that those individuals who report prior use of medical services have a more favourable attitude towards seeking help (Halgin et al.,

1987) and it is these individuals who have used a variety of medical services (Friedman & West, 1987). Halgin et al. explained depressed individuals with a history of treatment seeking behaviour were likely to use more services due to their experience and knowledge. This further indicates that regular source of care (an enabling characteristic) is a worthy inclusion in multivariate studies investigating health care utilization.

In contrast to the above studies, Barsky et al. (1986), Berkanovic and Hurwicz, (1989), Berkanovic, Hurwicz and Landsverk (1988), and Coulton and Frost (1982) did not identify a link between depression and utilization. Examining a population of non-institutionalized elderly adults, Coulton and Frost found that it was the physical level of impairment, rather than distress, which significantly predicted use of medical services. The correlation between distress and somatic symptoms was not reported, thereby making it difficult to determine if effects of distress, manifested as somatic symptoms, were being masked. Barsky et al. (1986) pointed out that depression did not predict use of services as it was often cloaked in a mantle of somatic complaints. Thus, depression was manifested as somatic symptoms that were themselves strong predictors of utilization. Using a community sample, Berkanovic et al. (1988) cite supporting evidence. They found highly distressed respondents reported more illness but not utilization and were unlikely to seek unnecessary care. They claimed distress was expressed through somatic complaints that individuals have learned to channel into illnesses recognised as diseases. Subsequently, using a clinical sample of elderly men and women, Berkanovic and Hurwicz (1989) found distress was unrelated to both patient initiated GP visits and frequency of GP visits.

Manning and Wells (1992) explained that the mixed findings of previous studies relating to distress and utilization were likely to be a result of different measures tapping into mental health dimensions. To address this issue they included well-being, a less commonly researched variable, into their study. Using data from the Rand Health Insurance Experiment, they examined a civilian sample of 4,829 adults and children. As reported above, they found psychological distress increased the probability of health care utilization. They also identified an interactive effect between distress, well-being and use of medical services and reported that "for a given level of psychological distress,

those patients who use services have a greater psychological well-being" (p. 550). Thus, regardless of the level of distress, a person with higher well-being used more services, while those with lower levels of well-being used fewer services. This inferred that a psychologically well person was able to identify when they were experiencing psychological distress and seek help appropriately. Thus, psychological well-being indicated ability to respond to distress by seeking help.

In summary, effects of distress on utilization appear to vary depending on the sample and the measures used. Measures of well-being warrant inclusion in utilization studies to further determine its effect on utilization within the general population. The extent to which these issues are prevalent amongst women in New Zealand are unknown and will be addressed by the present study within the context of Andersen's model.

4.5 Traumatic events and PTSD

Specific traumatic events and mental health status

Traumatic events are becoming increasingly prevalent in Western communities. The United States Bureau of Statistics has reported that 83% of the United States population will experience a violent crime at some point in their lives (Norris & Kaniasty, 1994). In a national probability household sample Resnick, Kilpatrick, Dansky, Saunders and Best (1993) reported that 68.9% of American women had experienced a traumatic event of some nature. Traumatic events are defined as circumstances involving direct threat of death or serious personal injury, or witnessing threatened death or serious injury (American Psychiatric Association, 1994). They are events producing symptoms of traumatic stress and can range from personal assault, threat of death, rape, extreme injury, witnessing a severe injury, mutilation or grotesque death, harm inflicted on a loved one, natural or accidental disasters and war related experiences. These events are quantitatively classified as traumatic regardless of whether or not an individual perceives the event as traumatic. However, not all events meeting this criterion will be perceived by the individual as traumatic. Breslau, Davis, Andreski and Peterson (1991) argued that an individual's perception is critical in determining what does and what does

not constitute a traumatic circumstance. When two individuals experience the same event one may find it traumatic, the other may not. It is the perceptions of the individual that determine whether the event is defined as stressful or not (Green, 1990).

A large body of literature has linked traumatic events to adverse health status where effects are both wide ranging and long term. Victims with a history of childhood abuse report more adult psychopathology than non-victims (Mullen, Romans-Clarkson, Martin, & Anderson, 1989; Mullen et al., 1988). Further, exposure to rape or assault has a long lasting adverse effect on physical and mental health. Burnam et al., (1988) conducted a cross sectional probability survey of 3,132 households representing two Los Angeles communities. Their sophisticated matched-case control sample allowed comparisons between assaulted and non-assaulted victims. Victims of sexual assault had more psychological disorders within 12-months of their attack. Assault was also associated with a prevalence of depression and substance abuse. An extension of this same study drawing on a community population reported that personal consequences of sexual assault for both men and women included psychological distress, physical trauma and lifestyle disruption (Golding et al, 1988).

Kimerling and Calhoun (1994) conducted further examination of the links between traumatic events and health status. They found an association between stressful life events and impaired physical health. Their non-clinical matched comparison study of over 200 women compared assault victims with non-assault victims. Victims of sexual assault experienced fear, anxiety, depression, sexual dysfunction and problems in social adjustment. Although statistical significance was not attained, victims had higher adverse psychological scores, perceived their health as worse and scored higher on measures of current illness. Frequently, injuries were not sustained from the traumatic event but occurred later from somatic and psychophysiological reactions to severe stress. The authors surmised that as assault victims had poorer health they were likely to seek treatment in greater numbers than non-victims. Victims also sought more medical, but not psychological, services than non-victims did in the year after being assaulted.

Multiple traumas and mental health status

The studies reviewed above have a common theme – each has examined a single type of traumatic event. However, what is not clear from prior research is the extent to which experiences of multiple trauma affects the use of health services. The relationship between post trauma psychopathology and multiple traumas was examined by Vrana and Lauterbach (1994) using 440 university undergraduates. Traumatic events were classified into 13 categories, including combat, fire, accidents, assault, abuse or any event considered so traumatic the individual was unable to discuss it. Approximately 33% of respondents had experienced 4 or more traumatic events. The more traumas an individual had experienced, the higher was his/her level of depression, anxiety and PTSD. Vrana and Lauterbach's focus on gender differences indicated they were able to identify susceptible 'at risk' groups. Females were more likely to have been raped or abused and 53% reported these events as the most traumatic in their lives.

Turner and Lloyd (1995) also reported adverse consequences to mental health following exposure to multiple traumas. Their sample comprised 1,393 adult residents of metropolitan Toronto aged between 15 and 55 years. They confirmed that after exposure to trauma, psychological distress and psychiatric disorders were likely to develop. This was especially likely if victims had a history of psychiatric disorders or substance abuse. Importantly, as lifetime experience of trauma accumulated, the onset of psychological distress and psychiatric disorders was likely to become more prevalent. Turner and Lloyd, however, did not include measures of health care utilization. Although Vrana and Lauterbach (1994) examined university students and Turner and Lloyd examined a community population, both studies suggest that the more traumas experienced by an individual, the higher the possibility that psychological disorders will develop. One limitation for both these studies is that neither examined the effects of multiple traumas on health care utilization. Further, neither controlled for demographic or attitudinal effects on use of health services. It seems feasible that exposure to multiple traumas adversely affects health which results in use of more health services. The effects of both specific and multiple traumas have yet to fully examined within the context of

Andersen's model. The relationship between traumatic events and health care utilization are examined next.

Traumatic events and health care utilization

After examining the relationship between trauma and health status, the focus shifts to examine the relationship between exposure to trauma and health care utilization. Burnam et al. (1988) reported individuals with a history of childhood abuse were more likely to use health services as adults. To determine if exposure to trauma led to use of more health services indirectly after the development of psychiatric disorders, Golding et al. (1988) examined 3,132 men and women from two Los Angeles mental health catchment areas. Uniquely incorporating elements of Andersen's model, current levels of service utilization were compared between assaulted and non-assaulted victims. Golding et al. combined 19 individual *mental* health services into one aggregate 'mental health' outcome variable and three *medical* services into one aggregate 'medical service' outcome variable. Respondents with a history of sexual assault were nearly twice as likely as the non-assaulted to use mental health services[3]. Assaulted respondents were significantly more likely than the non-assaulted to have a physical health visit. After controlling for predisposing variables of age, gender and ethnicity, sexual assault was associated with a greater use of medical and mental health services. Golding et al. used logistic regression to model the effects of sexual assault on use of medical and mental health services, but did not report variance associated with the individual blocks. Their results allow the conclusion to be drawn that one particular type of traumatic event (sexual assault) adversely affects health and results in elevated service use.

Crimes other than sexual assault have psychological effects impacting on health care utilization. The relationship between traumatic events and increased use of health services has been reported for assault (Norris, Kaniasty, & Scheer, 1990), criminal victimization (Koss, Woodruff, & Koss, 1990), abuse (Kimerling & Calhoun, 1994), and natural disasters (Bennett, 1968). These studies imply that as traumatic events increase in severity, so too does use of health services. Rynearson (1995) compared treatment versus non-treatment seeking behaviour for adults after a loved one had been murdered.

[3] Statistical significance was reached for women, but not for men.

Although the sample was self selected, individuals who chose to seek treatment had elevated grief and trauma scores. Further, a history of childhood sexual abuse was associated with the decision to engage in treatment. Norris and Kaniasty (1994) cite several studies pointing to a sliding scale of impact severity for rape, assault, robbery and property crime victims respectively. Their own data corroborated that different types of traumatic events have a sliding scale of impact. That is, victims of violent crime exhibited more severe depression, anxiety and somatisation than property crime victims who, in turn, were more symptomatic than non-victims. In an earlier study examining frequency of health service use amongst crime victims, Norris et al. (1990) found the proportion of violent crime victims using mental health services was three times as high as the proportion of property crime victims. The strongest correlate of service use was the presence of violence in the commission of the crime. This suggests that violent crimes are more psychologically disturbing than non-violent crimes.

Traumatic events and PTSD

Much recent research has focused on one specific health outcome associated with traumatic events. Post traumatic stress disorder (PTSD) is a specific health outcome that occurs only after the experience of a traumatic event. It was first identified after long term stress reactions appeared in war veterans (MacDonald, 1996) and has now become the primary diagnostic category for psychiatric causalities after exposure to trauma. The first criterion in diagnosing PTSD is exposure to a stressor or event that is regarded as sufficiently traumatic. This unique feature distinguishes PTSD from other anxiety, depressive or psychiatric disorders. The second criterion for diagnosis is re-experiencing the trauma. The third is avoidance behaviour and numbing of responsiveness. The final three criterion are increased arousal manifested as hostility, rage or anger; prevalence of symptoms for longer than one month and impairment in social or occupational areas of functioning (MacDonald, 1996). PTSD has been diagnosed as a consequence for various traumatic events including war (Long, Chamberlain, & Vincent, 1992) crime (Koss et al, 1990) sexual assault and abuse (Kimerling & Calhoun, 1994) and death of a loved one (Rynearson, 1995).

As the number of traumatic events has increased in Western communities, so too has the presence of PTSD. It was at first thought to be present in only 1% of a community sample (Helzer, Robins, & McEvoy, 1987) but recent evidence indicates a more pervasive presence after exposure to trauma. PTSD has been reported present amongst 12.3% (Resnick et al., 1993) and 9.2% (Breslau et al., 1991) of the overall population base; present in 17.95% cases of civilian trauma (Resnick et al., 1993) and present in 25.8% (Resnick et al., 1993), 23.6% (Breslau et al., 1991) and 27.8% (Kilpatrick, Saunders, Best, & Von, 1987) amongst victims of crime. This indicates the onset of PTSD varies according to crime specificity. Rates of PTSD appear significantly higher after exposure to traumatic events incorporating rape and physical assault (Norris, 1992; Breslau et al., 1991). PTSD has been shown to affect rates and type of health care utilization. Long et al. (1992) surveyed 573 male Vietnam war veterans to assess their mental health status and use of medical and non--medical services. Veterans suffering from PTSD had poorer physical and mental health, poorer self-rated health, took more bed days and reported more contact with health care providers.

Golding et al. (1988) suggested that victims' use of medical and psychological services was mediated primarily by distress. This implies that regardless of the crime experienced, it was the presence or absence of distress that determined whether or not health services were used. Friedman and Schnurr (1995b) have applied a similar argument to the relationship between PTSD and health status. They argued that PTSD mediates the relationship between trauma and health. This would suggest that it is the development of PTSD that impacts adversely on health and that exposure to trauma is not sufficient within itself. Logically extending this argument examines the relationship between trauma, PTSD and health care utilization. It is argued here that PTSD may mediate traumatic events and health care utilization. Thus, it is not exposure to a traumatic event that determines health care utilization, but rather whether or not PTSD develops after the trauma. People who develop PTSD are likely to use more services, while those who fail to develop PTSD may require fewer services. Although exposure to trauma is important, the critical factor determining victims' health care utilization is the presence or absence of PTSD.

Much research has focused on the traumatic events, health outcomes and treatment seeking behaviour in clinical samples. Only a few studies such as Golding et al. (1988) and Burnam et al. (1988) have examined their prevalence in community samples. The literature suggests a strong link between traumatic events, PTSD and health. It has not however, examined the extent to which each of these variables impact on the use of both medical and non-medical services after taking into account an extended array of predisposing and enabling variables. The literature suggests that exposure to a variety of traumatic events adversely affects health. Frequently, this results in greater use of health services. Most extant research has followed the aetiology of one type of traumatic event such as homicide (Rynearson, 1995), or sexual assault (Kimerling & Calhoun, 1994). Only a few studies such as such as Vrana and Lauterbach (1994) and Turner and Lloyd, (1995) have examined the effect that exposure to multiple events has had on health care utilization. Fewer still have examined these effects in relation to PTSD. Within the context of Andersen's model, the extent to which traumatic events and PTSD affect the use of health services has not been examined. Further, the extent to which traumatic events and PTSD will affect service use after controlling for significant predisposing, enabling and need variables is unknown. The extent to which PTSD could mediate the use of medical and non-medical services has not been examined. The present study will take these issues into account and address them for a non-institutionalized sample of New Zealand women of all ages.

4.6 Chapter overview

Need characteristics represent the medical aspect of the Behavioural Model of Health Care Utilization, focusing on either a physical or mental requirement for treatment. Individually perceived needs are reliant on self judgement and incorporate measures of self-rated health and physical restrictions such as bodily functions and daily activities. Professionally evaluated needs arise from diagnosis by a health professional. These are measured with indicators of chronic conditions and illnesses. Indicators of mental aspects of need include measures of psychological well-being and distress. Need has commonly accounted for most variance explaining use of medical and non-medical

services (Hibbard & Pope, 1986; Millar, 1996; Wan, 1982; Wolinsky & Johnson, 1991). Examining the effects that predisposing, enabling and need characteristics have on health care utilization has the advantage of determining whether or not a health care system is characterised as equitable. A system is characterised as equitable when need explains the most variance, because it means that those who need help are acquiring it. When predisposing and enabling characteristics explain most variance, it means economic and socio-cultural aspects are determining whether or not health services are obtained (Aday & Andersen, 1974; Andersen, 1968; Andersen & Newman, 1973; Wolinsky & Johnson, 1991).

Traumatic events are becoming more prevalent in today's society. Women in particular are victims of sexual assault and abuse. Such events have been linked to adverse health outcomes such as physical and somatic health problems and psychiatric disorders. For victims, health care utilization and treatment seeking behaviours appear more likely if the victims have either a history of abuse or have sought treatment in the past. This suggests the impact of traumatic events are long lasting and can be investigated by examining effects of cumulative traumatic events on health, PTSD and health care utilization. The relationship between exposure to cumulative trauma, development or absence of PTSD and health care utilization has yet to be examined for a community sample of New Zealand women. Friedman and Schnurr (1995b) identified PTSD as a mediating variable between traumatic events and health. It is possible that PTSD is a mediating variable between traumatic events and medical utilization. This would suggest that it is not exposure to trauma that affects treatment seeking behaviour, but rather the development or absence of PTSD. These relationships remain unexplored amongst New Zealand women and will be addressed by the present study.

In summary, chapter 4 has discussed the final dimension of independent variables in Andersen's behavioural model. This is the medical aspect of need. Next, chapter 5 reviews health care utilization, conceptualised as either non-medical or medical care. These form the dependent variables representing the model outcomes.

CHAPTER FIVE

HEALTH CARE UTILIZATION

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5.1 Chapter preview

Previous chapters have examined women's health within the context of the Behavioural Model of Health Care Utilization. The independent variables are represented by the non-medical elements of predisposing and enabling characteristics (reviewed in chapters 2 and 3) and the medical element of need (reviewed in chapter 4). Chapter 5 reviews the dependent variables, represented by the dimensions of health care utilization. The primary outcome of interest in the model is the actual use of health services. Andersen (1968) described these in terms of discretionary and non-discretionary behaviours and later by Wolinsky et al. (1983) as the use of informal (non-medical) and formal (medical) services. The unit of analysis employed to examine health care utilization has two primary dimensions. These are 'contact' and 'volume'.

5.2 Contact vs volume analyses

The first method used to examine health care determines whether or not *contact* has been established with a service. Contact simply reflects whether or not an individual used a particular service during a defined catchment period (Millar, 1996; Wolinsky & Johnson, 1991). Habitually, contact analyses entail a dichotomous response to an item such as "Did you consult a GP within the past 12-months?" Because contact measures focus on access to the service rather than the amount of consumption, socio-cultural and background factors are likely to demonstrate their greatest impact on contact measures (Wolinsky & Arnold, 1988).

The second approach measures how many times a service was used over the defined catchment period. *Volume* analyses determine the number of visits that have occurred during the preceding year. Since these measures focus on consumption levels, the assumption is made that a degree of access already exists. In these cases, health status and characteristics of the health care delivery system are likely to demonstrate their greatest impact on volume measures (Wolinsky & Arnold, 1988).

Wolinsky and Arnold (1988) argue that it is prudent to employ both contact and volume measures for each type of service under study. Further, because volume measures implicitly assume a degree of access already exists, these analyses should be restricted to those who have made contact. "It is, after all, only logical to exclude non-users from the analysis when the question is how much utilization has occurred. The question of whether utilization occurred, of course, is addressed in the analysis by the contact measures." (p.87).

The extent to which services are used is dependent upon the judgement of the individual or their medical professional. Discretionary behaviour is often exercised to initiate health care utilization (Wolinsky et al., 1989) and is explanatory of service contact. Discretionary behaviour is motivated by an individual's self-judgement, present when the individual uses their own 'discretion' to decide whether or not to use a service. Predisposing and enabling characteristics are useful predictors of discretionary health care behaviours as they are influenced by personal health beliefs, their financial status and knowledge of available health services. Conversely, non-discretionary behaviour occurs when the health care provider assigns treatment on the basis of need regardless of the individual's values or beliefs. Because use is primarily determined by need, non-discretionary behaviour is most often associated with volume analyses and occurs after the individual has used discretion to make contact with the service. At this point, the physician acts as a 'fiduciary agent' for the individual as the patient entrusts decisions regarding their hospitalisation and follow-up treatment to the physician's professional diagnoses (Wolinsky et al., 1989).

Health care utilization was split into informal and formal services by Wolinsky et al. (1983). Their theoretical basis was underpinned by Mechanic's (1979) argument that certain services (e.g., bed disability days) were not a measure of need but behavioural responses to the individual's perceived illness. Mechanic argued that non-medical services such as 'bed-days' or 'cutback days' were a form of self-treatment and therefore a legitimate form of health care utilization. Wolinsky et al. agreed with this argument and labelled measures of non-medical utilization 'informal'. Services

involving a health professional were labelled 'formal'. The present study refers to these as non-medical and medical services respectively.

5.3 Use of non-medical services

As stated above, non-medical services are a proxy indicator of health care utilization as they are legitimately perceived to be a form of self-treatment. They embody services used outside the realm of the formal health care system. Such services usually take place within the home environment and include disability or cutback days (cutting back on normal activities), bed days (days spent in bed due to ill-health), having meals home-delivered and visiting nurse services. These services are less well researched in the literature than their formal counterpart.

A consistent indicator of non-medical services is self-rated health. Individuals who perceive their health as poor have been found to take more bed days (Wolinsky & Johnson, 1991) and report their daily activities were more restricted (Cafferata, 1987). Both these studies used elderly samples of non-institutionalized men and women over the age of 65. Cafferata, however, noted the presence of others in the household increased the use of bed days. This finding was replicated by Millar (1996) who also established poor self-rated health, GP gender and cost of GP fees predicted bed day utilization. The Andersen model has explained 26% (Wolinsky et al., 1983), 25% (Wolinsky & Johnson) and 18% of the variance explaining the use of bed days (Millar, 1996). For disability or cutback days the model has explained 29% of the variance (Wolinsky et al., 1983).

In examining use of non-medical services, three studies have established need accounts for more variance than predisposing and enabling characteristics. Need has explained 27% (of 29%) variance for disability days and 25% (of 26%) of variance for bed days (Wolinsky et al., 1983); 13% (of 25%) of variance for volume of bed days (Wolinsky & Johnson, 1991) and 10 (of 18%) for volume of bed days (Millar, 1996). Although these

studies used samples drawn from non-institutionalized community populations, all were elderly men and women over the age of 65.

It is possible that need has been reflected as the primary predictor for use of non-medical services while predisposing and enabling characteristics have been inadequately represented.
For example, Wolinsky et al. (1983) found enabling characteristics did not contribute to the explained variance of informal services. However, Wolinsky et al. (1983) did not measure mode of transport, which may have affected a person's decision to stay in bed rather than go to a physician's office. A person may have decided to stay at home rather than spend an hour in the waiting room. Or, unable to get an appointment that day, a person elects to stay in bed, perhaps seeing the physician the next day, or putting off care altogether. There is no way of knowing the effects of these enabling characteristics, as Wolinsky et al. omitted these measures. To fully examine the effects of predisposing, enabling and need characteristics on women's use of non-medical services more sensitive measures need to be applied to women of all age groups. The issue of transport will be addressed by the present study.

5.4 Use of medical services

Medical services reflect any service obtained formally within the health care system. The most common of these is physician (or GP) utilization. As with non-medical services, different indictors predict the use of medical services. For example, perceived health is a significant predictor in the use of frequent physician visits as those who judged themselves as healthy use the doctor less (Strain, 1991; Wolinsky et al., 1983). Enabling characteristics are also important; for example Wolinsky et al. reported having a regular doctor consistently predicted medical utilization. Moreover, Stoller (1982) reported that the inconvenience of getting to a physician's office (accessibility) significantly predicted contact but not volume of visits. In contrast, insurance (affordability) and regular source of care (acceptability) were significant in predicting

volume but not contact. Stoller (1982) also reported need played a greater role in predicting volume rather than contact utilization.

A second medical service is hospitalisation. With this service, volume utilization is usually reliant upon non-discretionary behaviour. Hospital utilization is derived from the use of inpatient or outpatient services, nights spent in hospital, daily admission and use of accident and emergency services. Strain (1991), Wolinsky et al. (1983) and Wolinsky and Johnson (1991) all reported the amount of time spent in hospital was affected by restricted daily activities. Strain (1991) also reported men were more likely than women to be hospitalised since they tended to present with more severe symptoms, often a function of delayed treatment-seeking behaviour. Again these studies were conducted on elderly participants aged 60 or over.

Most research of medical services has focused on use of physicians, hospitals and in some cases, dentists. Utilization patterns for an array of allied health professionals remains undocumented. Allied health professionals are those such as psychologists, physiotherapists, occupational therapists, chiropractors, counsellors, social workers and naturopaths. In examining physician, hospital and 'other' services, Strain (1991) summed an index of medical specialists, pharmacists and home care into an aggregate dependent variable labelled 'overall use'. Significant predictors of this aggregate 'overall use' outcome were primarily chronic health and limitation of activities (i.e., need). Strain's treatment of this aggregate outcome was followed by Millar (1996) who summed a variety of medical and non-medical providers into an aggregate measure representing health professionals used by elderly New Zealanders. Using Andersen's model, Millar was able to explain 25% of total variance. In this case, need did not account for most explained variance (only 8% in comparison to the 17% contributed by predisposing and enabling characteristics) and elicited only one significant predictor – chronic health conditions. Five significant predisposing characteristics were identified: ethnicity, educational attainment and presence of a phone, drinking alcohol and worrying about one's health. No significant enabling characteristics were identified. It is difficult to tell if the effects present in this elderly sample would generalise to women of all ages. To date the effects of predisposing, enabling and need characteristics

accounting for the use of allied health services by women of all ages is unknown. The present study will address this issue and examine the extent to which predisposing, enabling and need characteristics account for women's use of health professionals.

Use of pharmaceuticals or prescription items can be perceived as use of a medical service. There are two reasons for this. First, a patient would not be advised, nor gain permission, to use a prescription item without first having consulted a medical professional. Secondly, a patient is unable to physically obtain the medication without using a trained health professional in the form of a pharmacist. Although women use more prescription items than men (Rodin & Ickovics, 1990), the effect of predisposing, enabling and need characteristics on their use of prescription items has rarely been documented. One related study (Kandrack, et al., 1991) documented medication consumed on the day of their data collection but failed to distinguish between over the counter and prescription items. Their indicator may further be considered unstable as it represented a short catchment period - just the day on which the data was collected. A more stable indicator would be to examine medication taken over a longer period of a year.

Following the suggestion by Kandrack, et al. (1991) Millar (1996) examined pharmaceuticals within the context of Andersen's model. She asked participants in her sample of 354 elderly New Zealand men and women how many prescription items were consumed over a 12-month period. The model fitted the data explaining use of prescription items very well, accounting for 41% of total explained variance. Need explained 32% of the variance; where lower body limitations, chronic conditions and self-rated health were significant predictors. Predisposing and enabling characteristics explained a further 3% of the variance. Millar (1996) concluded that use of prescription items should be considered a unique extension of service utilization. Following this argument, the present study will determine the extent to which predisposing, enabling and need characteristics explain the use of prescription items for New Zealand women of all ages.

5.5 Chapter overview

Dependent or outcome variables represent the final tier in the Behavioural Model of Health Care Utilization. This chapter has reviewed an array of non-medical and medical services. Non-medical services comprise illness behaviours used by an individual outside the formal realm of the health care system. These behaviours conceptualise forms of self-treatment such as taking a bed or disability day. Other examples of non-medical services are home help, meal delivery and home nursing services. Medical services typically encompass use of GPs, hospitals and two less typical measures, other health professionals and prescription items. Both non-medical and medical services are examined in terms of *contact* or *volume* over a specified period of time. Contact analyses indicate whether or not a service has been used, while volume indicates the level of consumption. Volume measures assume a degree of access has already been obtained and should preclude non-users from their analysis as the question is how much utilization has occurred.

The extent to which predisposing, enabling and need characteristics affects use of non-medical and medical services by women drawn from all age groups has not been comprehensively documented. Most research has been confined to elderly samples concentrated in the United States. With the exception of Millar's (1996) study, indicators used to represent health care use have explained arguably low amounts of overall variance. More diverse indicators in terms of both independent and dependent variables could improve the predictive power of the model.

To conclude, four principal themes have emerged from the literature reviewed throughout the first five chapters. Firstly, the predisposing, enabling and need characteristics accounting for the utilization patterns of New Zealand women are unknown. Secondly, the predictability of the model might be improved using an expanded array of sensitive measures. Thirdly, the effect of satisfaction on utilization is unexplained. Finally, the relationship between PTSD, traumatic events and health care utilization is unclear. These themes will be addressed by the present study. They are presented and discussed in chapter 6 which provides the rationale and call for research.

CHAPTER SIX

RATIONALE AND CALL FOR RESEARCH

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6.1 Chapter preview

Previous chapters have examined women and health care and established the Behavioural Model of Health Care Utilization as an appropriate theoretical base from which to examine women's patterns of service utilization. Independent variables in the model comprise predisposing, enabling and need characteristics reviewed in chapters 2, 3 and 4 respectively. The dependent variable, the actual use of different health services, was reviewed in chapter 5. Chapter 6 summarises these chapters and provides an overview of the model. It outlines areas yet to be investigated in the current body of literature. These form the platform for the research questions addressed by the present study. Objectives and hypotheses are summarised and presented accordingly.

6.2 Summary of the model

Within New Zealand the health care utilization patterns of women ranging from 20 to 90 years of age remains largely unexplained. An appropriate theoretical model to examine these patterns is the Behavioural Model of Health Care Utilization (Andersen, 1968; Andersen & Newman, 1973; Wolinsky & Johnson, 1991). The model (as depicted in Figure one, p. 11) defines use of health services as a function of predisposing, enabling and need characteristics.

Abstracted from the proposition that characteristics present prior to the onset of illness affect health care use (Wolinsky & Johnson, 1991), predisposing characteristics represent the sociocultural element of the model. Demographics tap women's relative life style position, measured by age, marital status and whether or not they live alone. Social structure is represented by assessing the lifestyle into which women have become socialised, such as employment, education and ethnic origins. Health beliefs tap attitudes towards medical care, including health control and the extent to which health worries affect use of health services. Typically, people worried about their health use more services (Wolinsky & Johnson). It also affects use of medical, but not use of non-medical services (Millar, 1996). Two predisposing characteristics poorly represented in

the literature are satisfaction with health services and effect of life events on health care utilization.

Enabling characteristics are features facilitating the 'obtainability' of health services. A sensitive framework has been suggested that is composed of a) affordability (indicated by income, health insurance and government aid), b) acceptability (GP gender, regular source of care and length of time with one physician), c) accessibility (mode of transport), d) physician availability (appointment delays); and e) accommodation (length of time spent in waiting room) (Penchansky & Thomas, 1981). Enabling elements were originally thought to comprise personal and community resources (Andersen, 1968), however, Penchansky and Thomas's framework provides a more comprehensive representation of elements affecting how services are obtained.

The final subcomponent, need, typically accounts for most variance explaining use of health services. Perception of need is derived from judgements made either by the individual or a medical professional. The former is typically represented by a global measure of self-rated health and restrictions based on bodily functions and daily activities. The latter is a diagnosis of need based upon professional evaluation, measured by the presence of chronic conditions, somatic symptoms, distress and well-being. The extent to which the additional elements of traumatic events and PTSD affect women's use of health services has not yet been fully explored within the context of the behavioural model. Only one New Zealand study Flett et al. (1997) has examined their effects after controlling for predisposing, enabling and need characteristics. They did not find traumatic events significantly predicted health care utilization, possibly because their methodology represented health services as an aggregate measure that was not sensitive enough to detect the significance of trauma.

Overall, the model's primary concern is for the outcome measures. These refer to the medical and non-medical use of health services. Non-medical services such as bed days and disability days where activity is restricted embody a form of self-treatment. Medical services are habitually measured by GP and hospital use; medical services have been rarely measured in terms of health professionals and prescription items.

These dimensions represent the model in its entirety and are designed to describe the total variance accounting for use of a service. They provide the extent to which each block of predisposing, enabling or need variables makes a unique contribution that accounts for the use of that service. Finally, the model design affords identification of individual significant predisposing, enabling and need characteristics that predict the use of that specific service. Research utilizing this model has mainly been conducted in the United States on elderly samples of men and women.

6.3 Summary of arguments for objectives

Critics of the model have advocated the model has explained low amounts of variance. However, with the exception of a few studies such as Bazargan et al. (1998) and Millar (1996) most research has used restricted measures. Consequently, sociocultural aspects of predisposing characteristics have not been adequately represented. Enabling characteristics could be measured using a sensitive framework such as that proposed by Penchansky and Thomas (1981). Need characteristics could be more accurately represented using additional mental and physical indicators. Finally, health care services used could incorporate a wider array of allied health professionals and prescribed medications.

The introductory chapters highlight the paucity of research documenting the patterns of health care utilization for New Zealand women. The impact that predisposing, enabling and need characteristics have on health care utilization is unexplained and the amount of explained variance by these variables is also unknown. Further, the individual predisposing, enabling and need characteristics that predict use of medical and non-medical services are unknown. This applies to women who avoid use of health services, who have only one contact with health services and women who frequently consume health services over a specific catchment period. The overall effect of traumatic events on their health care utilization is unclear, as is the impact of different types of traumatic experiences. Finally, the effect of PTSD after exposure to traumatic events on health

care utilization is unclear. Historically, the sequelae of these elements suggests exposure to perceived trauma results in poorer health, which in turn leads to the use of more health services (Friedman & Schnurr, 1995b; Kimerling & Calhoun, 1994). For New Zealand women, the impact of PTSD on health care utilization after exposure to traumatic events has not been documented. Golding et al. (1988) identified distress as a mediating element between sexual assault and health care utilization; it is possible PTSD is a mediating variable between traumatic events and health care utilization. To date, this effect has yet to be documented. In summary, the present study is poised to focus on three primary questions:

1. What are the unique contribution of predisposing, enabling and need factors explained by the model for users and non-users of non-medical and medical services?

2. After identifying and controlling for the significant predictors of health care use identified by Andersen's model, what are the effects of overall traumatic events and different types of traumatic events on health care utilization?

3. After identifying and controlling for the significant predictors of health care use identified by Andersen's model and exposure to traumatic events, what is the effect of PTSD on health care utilization?

These three areas charter the objectives of the present study. Specific objectives and research questions are summarised overleaf.

6.4 Summary of objectives and research questions

Objective one: To provide a descriptive account of the nature and extent of recent health service utilization by a community sample of non-institutionalized New Zealand women.

Objective two: To replicate Andersen's model and determine the extent to which predisposing and enabling characteristics uniquely account for variance of use amongst users and non-users (contact) as well as those frequently consuming health services (volume).

Objective three: To expand Andersen's model and investigate the effect of trauma as a predictor of health care utilization. Specifically, after controlling for use of significant predisposing, enabling and need characteristics, what are the unique effects of:

1) different types of traumatic events on health care utilization?
2) total number of traumatic events on health care utilization?
3) after exposure to trauma, what is the effect of PTSD on health care utilization?

6.5 Summary of hypotheses

Five hypotheses were developed pertaining to objectives two and three. Each hypothesis was applied to the six health services under examination (use of bed days, disability days, GPs, health professionals, hospitals and prescription items).

Hypothesis one

Amongst users and non-users for both medical and non-medical services, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

Hypothesis two

Amongst users only need will make a greater contribution to the explained variance than either predisposing or enabling characteristics.

Hypothesis three

The inclusion of traumatic events as an aggregate measure will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

Hypothesis four

Different types of traumatic events will significantly predict the use of health services above and beyond the significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

Hypothesis five

PTSD will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two) after controlling for total number of traumatic events (as in hypothesis three).

6.6 Chapter overview

This rationale and call for research has reviewed the Behavioural Model of Health Care Utilization and identified several seminal issues. It is possible the predictive ability of the model could be improved using additional and more appropriate sets of measures for each dimension. The impact that certain elements have on health care utilization by New Zealand women is unexplained. These are the unique effects of the predisposing, enabling and need dimensions; exposure to a variety of traumatic incidents and effect of PTSD. The purpose of the present study is to investigate these issues. In doing so, three objectives and five hypotheses were identified. Chapter 7 reviews the research design, participants, procedures and measures utilized to accomplish these aims.

CHAPTER SEVEN

METHODOLOGY

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7.1 Chapter preview

This methodology chapter describes the research design, respondents and measures used in the present study. The measures were sourced from a diverse selection of health care utilization research. They are designed to relate to the different stages of the model under examination.

7.2 Design

Data was gathered by a cross sectional survey that was ethnically and geographically stratified. It encompassed both men and women. The research reported in this thesis forms a unique and original contribution to the substantive study of Flett et al., (1997).

7.3 Respondents and sampling procedure

Data was collected from the North Island, the South Island and Waiheke Island in New Zealand. Other off shore islands, on shore islands, waterways and inlets were excluded. The research was aimed at women over 18 years of age living within permanent, private dwellings. These were defined in terms of the New Zealand Census. The Census identifies dwellings fitting this description to be a separate house; two or more houses or flats joined together; a flat or house joined to a business, shop, bach, crib or hut (precluding those attached to work camps) that are used as private dwellings. Private dwellings not included were temporary dwellings such as caravans, cabins, tents, motor camps and boats. All non-private dwellings such as hotels, motels, guesthouses, boarding houses, homes for the elderly, hostels, motor camps, hospitals, barracks and prisons were also excluded.

Sample design – geographical coverage

Stage one in the sampling process involved development of a survey frame delineating geographic areas to identify census meshblocks. A meshblock is a small geographical

statistical unit for which data can be collected and processed. They provide aggregation into larger statistical units such as area units, territorial local authorities and regions.

Sample design – stratification

Stage two in the sampling process involved geographic stratification in accordance with population density. Within the density categories of low, medium and high further stratification allowed identification of main and secondary urban and rural areas. This type of stratification enhanced the ability to reflect the diversity of respondent behaviour related to cultural factors and geographic location.

Sample design – sampling stages.

Stage three in the sampling process used a three tiered cluster design to select individual participants. *Primary sampling* took place at the meshblock level. Equal numbers of meshblocks were randomly sampled from each density strata. Within each of these strata equal numbers were sampled from each location defined as urban or rural. Each of these meshblocks was sampled using computer generated random numbers capable of uniquely identifying a meshblock. Every number generated identified one and only one of the 33,050 meshblocks within the sample frame. The probability of selection for each meshblock was in direct proportion to the population within the meshblock. In order to ensure adequate representation, the sample was deliberately designed to yield disproportionately large sub samples of Maori and rural respondents. This ensured the experiences of these groups were documented with a greater degree of statistical reliability than would be the case had their representation simply reflected their true proportion within in the New Zealand population. The unequal probability of selection was necessary to ensure a certain number of interviews were gained within each meshblock.

The second stage, referred to as *secondary sampling,* took place at the local level. Each meshblock was exactly described according to the streets, side of street and the portion of street that belonged to the meshblock. Every third permanent, private occupied dwelling from a starting point within the meshblock was eligible for selection.

The third stage was designed to identify *individual respondents* and took place at the household level. Within each dwelling all eligible respondents (men and women aged 18 and over) were identified and listed in descending order of age onto a sampling grid. The respondent who was to be asked for an interview was the person whose name fell alongside a predetermined indicator. In the event of non-contact, three calls were made to each dwelling before substitution of a new dwelling. In total, 150 meshblocks were sampled and ten interviews conducted in each. The following list indicates the number of meshblocks per geographical area; Auckland (23), Bay of Plenty (28), Canterbury (7), Gisborne (16), Hawkes Bay (7), Manawatu / Wanganui (8), Nelson / Marlborough (2), Northland (16), Otago (4), Southland (3), Taranaki (50), Waikato (19), Wellington (10) and West Coast (2).

The sample size of 1500 men and women was stratified to yield 750 urban interviews and 750 rural interviews. Approximately one third were Maori respondents. Of the 3562 attempted contacts, 972 were not eligible, did not reply, or were unavailable for interview. Of the remaining 2,590 contacts, 1,090 refused to be interviewed, giving a valid response rate of 58%. The overall response rate including those that were ineligible or unavailable was 42%. This resulted in a pool of 964 female respondents available for the present study, comprising 64% of the total sample.

7.4 Procedure

After sourcing a range of measures adapted from previous health care utilization research an interview schedule was constructed. Two pilot studies were conducted which resulted in several modifications to the interview schedule design. The final schedule was successfully shortened and the interview process simplified.

Over a three-month period trained data collectors from the National Research Bureau (NRB) conducted structured interviews. The interviewer recorded the participants' responses during an interview lasting between 45 – 60 minutes conducted in the individual's own home. The interviews conformed to the New Zealand Psychological

Society's ethical guidelines. Respondents were provided with detailed information regarding the nature of the study, their rights and the researcher's responsibilities. Participants were advised their responses were anonymous and confidential, that they were not obligated to answer any of the interview questions and they could discontinue participation at any point. They were advised of procedures providing feedback from the study on conclusion of the research.

7.5 Measures

7.5.1 Predisposing characteristics

Sociodemographic factors were identified based on questions derived from the 1986 New Zealand Census (New Zealand Department of Statistics, 1996), yielding information regarding respondents' *age, marital status*, *educational qualifications, paid employment status* and *ethnicity*.

Questions regarding *social contacts* were derived from two sources. Household composition was based on questions derived from Cafferata (1987) and recoded as per Wolinsky and Johnson (1991) into a dichotomous variable indicating whether or not a person lived alone. A comprehensive picture of actual social contacts was derived from Nelson (1993). A total score of actual social contacts was identified by summing scores from three yes / no items indicating contacts that had occurred over the past two weeks. These were speaking on the telephone with family and friends, getting together with family or friends and going to church. Following reasoning provided by Wolinsky and Johnson (1991), the presence of a telephone was included as a predisposing rather than an enabling variable, as the presence of a telephone predisposes the use of social support mechanisms.

As advocated by Wolinsky and Johnson (1991) attitudinal health beliefs pertaining to *degree of worry* about health was measured in response to a single 'yes/no' item. The amount of *health control* respondents perceived they had over their health was also

measured by a single item, recorded on a numerically anchored likert scale ranging from a 'great deal' (1) to 'none' (4).

GP satisfaction was assessed by a scale derived from Robbins et al. (1993) using a shortened version of an 18 item scale developed by the Rand Corporation (Ware, Davies-Avery, & Stewart, 1978). The shortened measure comprised eight items that formed the basis for two subscales. The subscales tapped into general satisfaction and satisfaction with quality and competence of care and service (Robbins et al., 1993). Responses to each item were recorded on a numerically anchored likert scale ranging from 'strongly agree' to 'strongly disagree' and sanctioned an option for 'don't know'. Scores from the two subscales were summed to provide a total satisfaction score. In the present study the standardised alphas were 0.86 for the general satisfaction subscale, 0.89 for the quality and competence subscale and 0.92 for the total (summed) satisfaction subscale (n=861).

A *life events* scale constructed specifically for the larger trauma study (Flett et al., 1997) indicated if respondents had experienced any of 20 life events during the preceding 12 months. The scale was developed from research by Rubio and Lubin (1986) who established a link between life events and mental health service use. The scale incorporated both positive and negative life stressors indicated in response to 'yes/no' items. The 20 events included personal and family health, death of a partner or spouse, parenthood, retirement, personal and family legal problems, moving house and major financial difficulties or improvements. For the present study, life events are nested within the predisposing context, a departure from the approach considered by Jewett et al. (1992) who advocated life events as a need characteristic. As items in the *life events scale* are psychosocial factors that reflect the individual's social situation they cannot be removed from the social context and are thus considered to be predisposing characteristics.

7.5.2 Enabling characteristics

In line with Gribben (1992), *affordability* was measured by assessing how often the cost of *doctors fees* prevented respondents consulting medical professionals. Participants responded to a numerically anchored likert scale ranging from 'not at all' (1) to 'often' (4). They were asked to respond to two 'yes / no' items indicating whether or not they had *private health insurance* (Wolinsky & Johnson, 1991; Wolinsky & Johnson, 1992a) and a *community services card.* A community services card provides govemment subsidies for use of health services to low income individuals. Income itself was assessed both objectively and subjectively (Eve & Friedsam, 1980). Objective income was measured as actual *annual personal income* before tax. Subjective assessment regarding the respondents' perception of income adequacy was assessed with two items using a numerically anchored 4-point likert scale. These were '*satisfaction with overall standard of living*' item where anchors ranged from 'very dissatisfied' (1) to 'very satisfied' (4) and an '*ability to manage on current income*' item where anchors ranged from 'cant make ends meet (1) to 'always have money left over' (4).

Acceptability was assessed by asking respondents to indicate whether they had a *regular doctor* (Wolinsky & Coe, 1984), their *GP's gender* and the actual *length of time* they had been consulting this physician. Accessibility, availability and accommodation were all sourced from Gribben (1992). *Accessibility* was assessed by asking respondents to document the most common *mode of transportation* they used to get to the surgery. Transport options included private vehicle, walking, bus, taxi, bike, courtesy vehicle, work or company vehicle, motor bike, scooter and other. *Availability* was assessed by recording the number of days a respondent had to wait before an *appointment time* became available. *Accommodation* was assessed by recording the actual number of minutes a woman usually spent in the *waiting room* after arriving for her scheduled appointment.

7.5.3 Need characteristics

Self-rated health (self-assessment) utilized a single item derived from the 1992-93 Household Health Survey (Statistics New Zealand and Ministry of Health, 1993). Similar to items used by Gribben (1992) and Wolinsky and Johnson (1991), respondents were asked to provide an assessment of their overall health state. This single item initially used a 4-point scale to rate one's self perceived health as excellent, good, not so good or poor. Similar items have been used successfully in previous New Zealand research of Vietnam War veterans, United Nations peacekeepers and their partners (MacDonald, Chamberlain, Long, & Mirfin, 1996a; MacDonald, Chamberlain, Long, & Mirfin, 1996b) and military personnel (Alpass, Long, MacDonald, & Chamberlain, 1996). Following arguments by Wolinsky and Arnold (1988) and Millar (1996) this 4-point item was dichotomised as 'poor' or 'fail' versus 'excellent' or 'good' to fully maximise the effects of the categorical contrasts. Despite its relative simplicity, the individual's self-rated perceptions of their health has been shown to relate to physician ratings of health (LaRue, Bank, Jravik, & Hetland, 1979), to intellectual functioning in older adults (Perlmutter & Nyquist, 1990) and to be predictive of mortality (Idler & Kasl, 1991).

The experience of common *physical sensations and symptoms* was assessed with a scaled developed specifically for the larger trauma study (Flett, Millar, Long, & MacDonald, 1997) originally derived from the Pennebaker Inventory of Limbic Languidness (PILL) (Pennebaker, 1982). A 5-point scale recorded responses ranging from 'not at all' (1) to 'extremely'. The scale also sanctioned options for 'don't know' and 'refused. This revised version comprised 28 physical symptoms (the full version contained 54 items). The items yielded a composite reflection for a range of somatic symptoms and complaints experienced by the respondent over the period of one month. High scores on the original inventory were associated with a higher number of physician visits and high workplace absenteeism (Pennebaker, 1982). For the purposes of the current research this original scale was revised to preclude items that consistently correlated highly with other items across each data set (Alpass et al., 1996; MacDonald et al., 1996a). Particular items were reworded to simplify these items. For example,

'acne and pimples on face' and 'acne and pimples other than face' were modified into a single item 'acne or pimples'. 'Nose problems' replaced 'sneezing'; 'running nose'; 'congested nose' and 'bleeding nose'.

The Mental Health Inventory (MHI) developed by Veit and Ware (1983) tapped *psychological well-being* and *psychological distress.* Participants were asked how frequently they had experienced 38 conditions over the last month. Each item dealt with their feelings about various aspects of their lives (eg, felt loved and wanted, in firm control of behaviour and their thoughts and emotions relating to depression or anxiety). Responses were recorded on a numerically anchored 7-point scale ranging from 'all of the time' (1) to 'none of the time' (7). The standardised alpha was .92 for psychological well-being and .94 for psychological distress (Veit & Ware, 1983). In the present study which encompassed 964 female respondents, the standardised alpha for the well-being subscale was 0.89 (n=913); individual item-total correlations for the 14 items ranged from 0.23 to 0.67. The standardised alpha for the psychological distress subscale was 0.93 (n=935) and the individual item-total correlations for the 24 items ranged from 0.13 to 0.64.

An index of self-assessed *activity limitation* asked respondents to indicate which of their daily activities had been troublesome due to poor health. This scale was developed from the Activities of Daily Living Scale (ADL), (Katz et al., 1963) and the Duke University Centre for the study of Ageing and Human Development (1978) who designed Instrumental Activities of Daily Living Scale (IADL). Three subscales were summed to provide a composite score for activity limitations. The subscales were 1) *basic activities*, (five items) regarding personal care, including bathing, dressing, getting out of bed, walking and toileting, 2) *household activites*, (four items) regarding meal preparation, shopping, light and heavy housework and 3) *advanced activities*, (three items) regarding managing money, using the telephone and eating.

An index of self assessed *bodily limitations* was sourced from Wolinsky and Johnson (1991) who developed a scale based on Nagi's (1976) disability scale. This scale comprised two dimensions: those of upper and lower body functioning. Participants

indicated whether they had difficulty with *lower body limitations* by responding to five 'yes / no' items asking whether or not the person could walk half a kilometre, walk up ten steps without a rest, stand or be on their feet for two hours, if they could stoop, crouch or kneel and if they had difficulty lifting or carrying ten kilograms. Four 'yes / no' items related to *upper body limitations* and asked whether respondents had difficulty sitting for two hours, reaching up over their head, reaching out as if to shake hands and using fingers to grasp objects. As with activity limitations, these dimensions were treated as a composite total score.

The extent to which respondents suffered from common *chronic health problems* was assessed by a 17-item list. Conditions and ailments of this nature would originally have to have been professionally identified by a medical professional after the respondent had experienced the complaint for a period of over three months. This list was derived from two sources. The first was, Belloc et al. (1971) who used a checklist of serious medical conditions. The second was a checklist of common chronic health conditions acquired from the 1992-93 Household Health Survey (Statistics New Zealand and Ministry of Health, 1993). Answers were scored in response to 'yes / no' items that included ailments and conditions such as arthritis, rheumatism, diabetes, epilepsy, cancer and hearing impairment or loss.

Potentially *traumatic events* were assessed using the Traumatic Events Scale (TES) (Flett, et al., 1997) specifically developed to assess lifetime incident data on 12 potentially traumatic events. Events in the original scale included exposure to combat, child sexual abuse, adult sexual abuse, domestic assault, assault by a stranger, theft by force (robbery / mugging), motor vehicle accident, other accident, disasters and disaster precautions, traumatic death of a loved one and injury of a loved one. These were rated in response to 'yes / no' items. In the current study the first category, combat, was eliminated from analyses due to a poor response rate. To determine an overall *aggregate* measure of traumatic events[1] a 'total number of traumas' score was calculated. This was the total number of different traumas each individual reported experiencing (at least once) in their lifetime. The score ranged from zero traumas to

[1] Tested in hypothesis three.

eight different traumas but the score did not take account of multiple experiences of the same trauma. Means and standard deviations for trauma measures are reported in chapter 8. To determine *specific* types of potentially traumatic events[2], child sexual abuse and adult sexual abuse were combined to form the category 'Abuse'. 'Assault' comprised domestic assault, assault by a stranger and theft by force (robbery / mugging). 'Accidents' comprised motor vehicle and 'other accidents', 'Disasters' comprised natural disasters and disaster precautions and 'Death / injury to loved one' comprised traumatic death or injury to a loved one.

The Mississippi Scale for combat-related PTSD (M-PTSD) (Keane, Cadell, & Taylor, 1988a) was used to determine the levels of *post traumatic stress disorder* (PTSD) (Kulka & Schlenger, 1993; Kulka et al., 1991; McFall, Smith, Roszell, Tarver, & Malas, 1990; Watson, 1990; Watson et al., 1994). This 35 item self-report questionnaire was originally developed to identify the incidence of combat related PTSD in Vietnam War veterans. A version containing parallel content and format of the M-PTSD known as the Civilian Mississippi Scale has been adapted for use with civilian populations. Like the M-PTSD items in this scale reflect features associated with PTSD such as depression, suicidality and guilt as well as intrusive re-experiencing of the event, avoidance and emotional numbing (Vreven, Gudanowski, King, & King, 1995). Responses were scored on a numerically anchored 5-point likert scale ranging from never (1) to very frequently (5). The scale also sanctioned options for 'don't know' and 'refused'. A total score was obtained by summing across the scores on all items. Lower values indicated PTSD symptoms were not prevalent whereas higher values indicated the symptoms were present. A shortened 11-item version of the scale with a high internal consistency and a high correlation with the original scale has been documented (Fontana & Rosenheck, 1994) and a shortened civilian version containing less combat oriented item wording has also been developed (Keane, Cadell, & Taylor, 1988b). In the present study, PTSD symptoms were assessed with the short version of the Civilian Mississippi Scale, where the individual correlations for the 11 items ranged from -.075 to .366. The coefficient alpha for the current study was .754. Means and standard deviations are presented in chapter 8.

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[2] Tested in hypothesis four.

7.5.4 Health care utilization

Six health services were examined by using two types of items. The first used a dichotomous item to distinguish *'contact'* between users and non-users. Respondents were asked to respond 'yes' or 'no' as to whether or not they had used a particular service over a specific catchment period. Contact items included non-users of health services. Once a participant had indicated contact had occurred with a service, analysis shifted to focus on the 'volume' of consumption over the specific catchment period. Logically, non-users were excluded from analysis of these volume items. Both contact and volume items were examined for two types of non-medical services and four types of medical services.

Two non-medical services were investigated. These were bed days (Millar, 1996; Wolinsky & Johnson, 1991) and disability days (Wolinsky et al., 1983). Bed days refer to number of days spent in bed due to ill-health. Disability days refer to number of cutback days where activity is limited due to poor health. Medical services refer to *GP utilization*, (Andersen, 1968; Wolinsky & Johnson, 1991). To augment measurement of medical services respondents were asked about their use of other types of *health professionals.* Based on arguments forwarded by Strain (1991) respondents were asked to indicate from a list of 11 different professions those of whom they had visited in the last 12 months. This enabled assessment for a wider array of health professionals as the list comprised optometrists, chiropractors, psychologists, dentists or dental nurses, physiotherapists, psychiatrists, occupational therapists, counsellors, social workers, naturopaths or homeopaths and medical specialists other than a GP. Scores were summed into a scale indicating general use of health professionals over a period of one year. Three measures related to the *use of hospital* services: overnight admission, outpatient use and Accident and Emergency use. The initial intention was to assess each of these services individually. However, individually these categories did not contain sufficient N for separate analysis. These three services were summed into one 'aggregate' item representing hospital use. A contact measure was obtained by separating women who had not used any of the services from women who had used any of the hospital services once or more times. A volume measure was derived by counting

how many times any of the three services had been used. Finally, participants were asked how many *prescription items* they had purchased for themselves during the past 12 months, based on arguments asserted by Kandrack et al (1991). This question related to the number of items per prescription, rather than how many prescriptions they had received from the GP. This afforded a more sensitive measure because one prescription can generate more than one prescription item.

To summarise, the present study comprised 30 independent variables representing predisposing, enabling and need characteristics, seven variables representing traumatic events, one variable representing PTSD and six dependent variables representing use of non-medical and medical services. Contact items separated users from non-users. Volume items excluded non-users as it investigated levels of consumption amongst users by examining how frequently services were used.

7.6 Analysis overview

As summarised in section 6.5, the present study applies five hypotheses to six different health services. The first two hypotheses replicate the model. Hypothesis one investigates contact analyses between users and non-users. Hypothesis two investigates volume or frequency of use. Hypotheses three to five expand the model. Hypothesis three investigates the aggregate effects of traumatic events on use of health services and hypothesis four examines effects of specific traumatic events on use of health services. Finally, hypothesis five investigates the effects of PTSD on use of health services. Hypotheses two to five examine volume of use only amongst users identified in hypothesis one.

7.6.1 Rationale for statistical analyses

The appropriate statistic to investigate the hypotheses detailed in section 6.5 is hierarchical multiple regression modelling.

7.6.2 Distinction between Logistic and Ordinary Least Squares (OLS) regression

Prior to presenting the results it is appropriate to signal the use of appropriate statistical techniques. Hypothesis one examines contact with health services, thereby dichotomising users from non-users. Where the outcome variable is a discrete dichotomy, logistic regression is the standard and appropriate method of analysis (Hosmer & Lemeshow, 1989). As with other model building techniques (e.g., linear regression), the aim of logistic regression is to identify the most parsimonious model describing the relationship between an outcome variable and a set of predictor independent variables. However, unlike linear regression, which assumes a continuous dependent variable, logistic regression uses a binary or dichotomous dependent variable. Logistic regression is the general procedure that is the appropriate method of analysis to deal with dichotomous dependent variables on a sample with less than 1,000 cases (Tabachnick & Fidell, 1989; Wolinsky et al., 1989; Wolinsky et al., 1983; Wolinsky & Johnson, 1991). Wolinsky and Johnson have reported using OLS (Ordinary Least Squares) regressions on dichotomous dependent variables when analyses have over 1,000 cases. They have also advocated using OLS on dichotomous dependent variables if the dependent variable has a 25 / 75% split. Since no dependent variable in the present sample had over 1,000 cases (and two failed to reach the 25 / 75% split) the appropriate regression model for hypothesis one is logistic.

Hypotheses two to five examines volume of use only amongst women who have had previous contact with a specific service. For these hypotheses the outcome variable is continuous. They are the actual number of visits made over a specified catchment period. Continuous outcome variables of this nature are commonly analysed using OLS regression models (Hosmer & Lemeshow, 1989; Millar, 1996; Strain, 1991; Tabachnick & Fidel, 1989; Wolinsky & Arnold, 1988; Wolinsky & Johnson, 1991). Based on the assumption of linearity, OLS regressions require both independent and *dependent* variables to conform to the assumptions of normality. Independent variables were transformed for all five stages of hypothesis testing. However, dependent variables were only transformed for hypotheses two to five. The OLS regression technique is therefore the appropriate statistic for hypotheses two to five.

Logistic and OLS regressions require different statistics to describe their variance. For both logistic and OLS regressions, R-squared (R^2) and adjusted R^2 are the statistics used to describe proportions of explained variance accounted for by the model. However, explained variance is different between logistic (dichotomous) and OLS (continuous) regressions. For hypothesis one that dealt with contact (a binary outcome requiring logistic regression) use of each service is predicted using 29 independent variables. Therefore, the parameters of the model do not vary between the six dependent variables (or services). Unadjusted R^2 is thus the appropriate statistic to indicate Goodness of Fit. For logistic regression, the adjustment deals with the ratio of the Total Degrees of Freedom over the Residual Degrees of Freedom and describes a proportion of the *explainable* variation described by the model. As the Degrees of Freedom do not vary for the different contact analysis, unadjusted R^2 will be used in hypothesis one to a) indicate how well the data fits the model and b) to compare the amount of explained variance for contact between the different services. To summarise, for hypothesis one, R^2 is the appropriate statistic and as such will be referred to in the text. (D.I. Hedderley, personal communication, February 13, 1998; F.D. Wolinsky, personal communication, February 16, 1998).

Since hypotheses two to five deal with consumption of services they are restricted to those women where contact has already been established. This is referred to as volume analyses. Volume analyses have continuous dependent variables and therefore require OLS analysis. Hypothesis two identifies the significant model predictors that are subsequently used as the first step in hypothesis three to five. This means the number of cases and the number of parameters will vary between these hypotheses. Within OLS the 'adjustment' means it is not strictly a proportion any more; therefore the adjusted R^2 is appropriate to describe the variance when comparing models with different numbers of parameters. As some health services models in hypotheses three to five will have a higher number of explanatory variables a degrees of freedom problem will be represented, thus, the use of an R^2 measure is potentially misleading. In this case use of adjusted R^2 is the best option. Tabachnick and Fidel (1989) recommend use of adjusted R^2 because sample R fluctuates around the population value in a positive direction

adding to the magnitude. Adjusted R^2 scores account for this expected inflation and provide a more conservative estimate of the population value. Therefore, in stages two to five the appropriate statistic to describe variance is the adjusted R^2 score[3] (D.I.Hedderley, personal communication, February 13, 1998; F.D. Wolinsky, personal communication, February 16, 1998; Tabachnick & Fidel, 1989).

A final aspect worthy of consideration at this point is the statistical comparison between contact and volume analyses. Since the explained variance is different between logistic and OLS a direct comparison of R^2 or adjusted R^2 levels between the two types of regressions is not meaningful (F.D.Wolinsky, personal communication, February 16, 1998). A more important issue is whether there are differences in what predicts contact vs volume and what this might mean.

7.6.3 Statistics for reporting Logistic regressions

Each logistic regression in hypothesis one forces three blocks into the regression equation. The first block contains the variables for predisposing variables, while the second and third blocks contain enabling and need variables respectively. The first statistic to describe the logistic regression is R^2, which indicates how much variance is explained by a particular block. The second statistic is the Goodness of Fit (G^2) statistic that indicates the overall fit for each step of the model as well as for the completed model. In logistic regression the R^2 statistic explains the variance of the block, while the G^2 *improvement* statistic indicates the statistical significance of the block. 'The entry labelled *improvement* is the change in –2 Log Likelihood between successive steps of the model with a constant … the improvement chi square test is comparable to the F-change test in OLS multiple regression' (Norusis, 1994, p. 11). Thus for each block in the model statistical significance is explained by the G^2 improvement while the R^2

[3] Although statistically appropriate, use of the adjusted R^2 score has one disadvantage. Adjusted R2 has frequently been omitted from published literature (Cafferata, 1987; Cheng, 1992; Coulton & Frost, 1982; Evashwick, Rowe, Diehr, & Branch, 1984; Eve, 1988; Nelson, 1993; Stoller, 1982; Strain, 1991; Wenzle et al., 1995; Wolinsky, 1978; Wolinsky et al., 1989; Wolinsky et al., 1983; Wolinsky & Johnson, 1991) and only R2 reported, somewhat restricting comparisons. Despite this, the changing number of cases and parameters leaves no path for recourse other than use of the adjusted R2 statistic regarding variance describing volume.

statistic explains the unique variance that block has made to the model. Hosmer and Lemeshow (1989, p. 136) point out that 'because these are summary statistics they may not be very specific about the individual components'. Therefore it is important to note a block can be reported as non-significant, but the individual variables within that block that attain significance will still be reported.

The significance of individual predisposing, enabling and need variables within their respective blocks is assessed in logistic regression by adjusted odds ratios (AORs). AORs indicate the net change in the odds of contacting a service given a one–unit increase in the independent variable, adjusting for all of the other variables in the model. For example, when examining GP contact, if the AOR for 'health worries' is 2.35, the effect is higher than one. The non-statistical interpretation for an effect greater than one is that women worried about their health are more likely to contact their GP. If the AOR was exactly equivalent to one there would be same likelihood that worried women could fit into either the contact or non-contact group. If the AOR was less that one it would be interpreted that women who were not worried are more likely to contact their GP. Thus, AORs less than one indicate a reduction in the odds, AORs equivalent to one indicate no difference in the odds and those greater than one indicate an increase in the odds (Wolinsky, Callahan, Fitzgerald, & Johnson, 1992c; Wolinsky, Culler, Callahan, & Johnson, 1994). Adjusted odds ratios are therefore referred to in terms of probability and liklihood of people belonging to either group in the outcome variable. For example the dichotomous dependent variable of GP contact AORs indicate the difference in the odds (probability) between women who do and women who do not contact a GP.

Overleaf, Table 1 provides a summary overview of the research undertaken by the present study. It presents the order of entry for variables into the regression equation for each of the five hypotheses. Note the sequential ordering as each stage builds upon the findings from the previous stage.

Table 1 Overview of analyses: order of entry for variables into the regression equation for the five hypotheses

	Model replication		Model expansion			
			Hypothesis			
	1	2	3	4	5	Additional
Step	Contact	Volume	Total trauma	Specific trauma	PTSD	analyses
1	P[a]	P	Significant PEN variables	Significant PEN variables	Significant PEN variables	Significant PEN variables
2	E[b]	E	Traumatic events	Specific trauma	Traumatic events	Traumatic events PTSD
3	N[c]	N			PTSD	Interaction[d]

[a]Predisposing
[b]Enabling
[c]Need
[d]traumatic events x PTSD

7.6.4 Overview of results chapters

Chapter 8 accomplishes the first objective[4] by reporting preliminary results aimed at describing the sample statistically. The remaining results chapters report the hypothesis testing designed to accomplish objectives two[5] and three[6]. Each hypothesis was applied to each of the six health services. The analyses obtained from the hierarchical multiple regressions testing the five hypotheses as they apply to each service will be reported in chapters 9 to 13. To summarise:

Chapter 9 reports results from *hypothesis one* where it was predicted that amongst users and non-users for both medical non-medical services, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

[4] *Objective one:* To provide a descriptive account of the nature and extent of recent health service utilization by a community sample of noninstitutionalized New Zealand women.
[5] *Objective two*: To replicate the model to determine the extent to which predisposing and enabling characteristics uniquely account for health care utilization amongst New Zealand women.

Chapter 10 reports results from *hypothesis two* where it was predicted that amongst users only, need will make a greater contribution to the explained variance than either predisposing or enabling characteristics.

Chapter 11 reports results from *hypothesis three* where it was predicted that the inclusion of total traumatic events as an aggregate measure will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (identified in hypothesis two).

Chapter 12 reports results from *hypothesis four* where it was predicted that different types of traumatic events will significantly predict the use of health services above and beyond the significant predisposing, enabling and need predictors identified by the model (identified in hypothesis two).

Chapter 13 reports results from *hypothesis five* that stated PTSD would significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors (identified by the model in hypothesis two) after controlling for total number of traumatic events (as in hypothesis three).

7.7 Chapter overview

Chapter 7 reported the research design, respondents, measures and methodology used in the present study. It has provided an overview of the analyses, appropriate statistical techniques and outlined how the results will be reported in chapters 8 to 13.

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[6] *Objective three:* To expand the model and investigate the effect of trauma as a predictor of health care utilization.

CHAPTER EIGHT

RESULTS: THE SAMPLE DESCRIBED STATISTICALLY

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8.1 Chapter preview

This chapter accomplishes the first objective in the present study: it provides a descriptive account of the nature and extent of recent health service utilization by a community sample of non-institutionalized New Zealand women. Predisposing, enabling and need characteristics for these 964 women are described statistically. This is followed by a description of characteristics associated with trauma and finally, the health services used by these women.

8.2 Predisposing characteristics

A general overview of predisposing characteristics is presented in Table 2. Means, standard deviations and coding algorithms are presented. Data obtained from the women investigating predisposing characteristics are reported below.

Table 2 Means, standard deviations and coding algorithms for predisposing characteristics (N=964)

Predisposing characteristics	Mean	SD	Coding Algorithm
Age	43.830	16.300	Actual number of years
Marital status	0.592	0.492	0 = no, 1 = yes
Living alone	0.135	0.342	0 = no, 1 = yes
Social contacts	2.082	0.625	0 = none, 1 = 1 contact, 2 = 2 contacts, 3 = 3 contacts
Paid employment	0.423	0.494	0 = no, 1 = yes
Qualifications	2.384	1.680	7 item scale (1-7) 1 = no school qualifications, 2 = school certificate, 3 = 6th form, 4 = bursary/scholarship, 5 = trade /prof qualifications, 6 = undergrad degree, 7 = postgraduate degree
Ethnicity	1.382	0.486	1= NZ non-Maori, 2=NZ Maori
Telephone	0.861	0.346	0 = no, 1 = yes
Health worries	0.720	0.449	0 = no, 1 = yes
Health control	1.685	0.722	1 = great deal, 2 = some, 3 = hardly any, 4 = none
Life events	2.846	2.113	Actual number of events experienced
Satisfaction	30.448	6.797	Score from Visit-Specific Satisfaction Questionnaire (Min: 8, Max:40)

In contrast to the majority of health care utilization studies, which often focused on elderly men and women, the sample in the present study was designed to encompass adults of all ages. Their ages ranged from 19 to 90, with a mean age of 44 (SD =16.3). Approximately 20 % of women were under 30 years of age, 50% of women were under 40 and 79% were under 50 years of age. Most women (64%) were between 20 to 50 years of age. Table 3 presents the ages of the 964 female respondents in comparison with the New Zealand female population taken from the 1996 Census (New Zealand Department of Statistics, 1996). Apart from under-representing women aged 30 to 39, the remaining age ranges are relatively representative of the New Zealand population. Note that females under the age of 20 are under-represented as the present study focused on adults aged 19 and over.

Table 3 Age range: Comparison of sample (N=964) with NZ female population

	Sample		NZ Population
Years of age	**N**	**%**	**%**
Below 20	7	1	29
20-29	182	19	15
30-39	294	30	16
40-49	160	17	13
50-59	119	12	10
60-69	117	12	7
70-79	59	6	6
80-99	23	2	3

While 832 (86%) of women did not live alone, 130 (14%) women did. Fifty nine per cent (n=571) of women were married and lived with their partner, or partner and children. Only 3 married women lived alone. Out of the 964 women 393 (40%) were unmarried; of those, 161 (17%) had never been married, 124 (13%) were separated or divorced and 103 (11%) were widowed.

Social contacts that had occurred within the past two weeks were determined by speaking on the phone, meeting with relatives or friends, or attending church. Ninety two per cent (n = 883) of women had spoken on the phone and 92% had met with either relatives or friends. Church attendance occurred less often. Twenty five per cent of

women had attended church; 75% (n = 720) of women had not. Over half of the women in this sample (n = 556, or 58%) were not engaged in paid employment. Their educational levels, however, were similar to those of the New Zealand population. In comparison to the United States (US Census Bureau, 1997), New Zealand women are less well educated than their American counterparts (Statistics New Zealand, A.McLaren, personal communication, March 23, 1998), as shown in Table 4.

Table 4 Comparative educational attainment between sample statistics, NZ population and United States population

		%	
Educational attainment	**Sample**	**NZ**	**US**
No high school qualification	42	36	5
Have a high school qualification	33	51	53
Undergraduate degree	5	5	25
Postgraduate degree	1	2	6
Trade or professional qualification	14	22	[a]

[a] United States data unavailable

Eighty eight per cent of women in this sample were born in New Zealand, of these 551 were New Zealand non-Maori. Their mean age was 42. The youngest non-Maori in the sample was 19 and the oldest was 90 years of age. In this sample, 341 (35%) were New Zealand Maoris. In line with the sample construction, this represents an oversampling of Maori women. According to census data (New Zealand Department of Statistics, 1996) 16% of women in New Zealand are Maori or of Maori descent. The youngest Maori in the sample was 19 years of age and the oldest was 90. Their mean age was 39.

Twenty women refused to indicate the extent to which they felt they could control their health and how much they worried about their health. Of those who remained (n=944) most women (72%) were worried about their health. A weak correlation (r = -.156) existed between health worry and control, indicating that more worry is associated with less control. Crosstabs indicated that 343 'worried' women felt they had some control and 261 felt they had a great deal of control over their health. These data are presented in Table 5.

Table 5 Crosstab frequencies for health worry and health control

	Health worry		
Health control	**No**	**Yes**	**Row totals**
A great deal	157	261	418
Some	85	343	428
Very little	13	62	75
None	7	16	23
Column totals	262	682	944

Only 16 worried women felt they had no control over their health. There were 262 (27%) women who claimed they were not worried about their health. Of these 'unworried women', 157 felt they had a great deal of control; and 7 felt they had none. In summary, most women expressed some degree of concern over their health, but most women, whether or not they were worried, felt they were in control and able to influence their health.

The most common life event experienced over the preceding 12-months were problems associated with family health (36%), improved finances[1] (26%), death of a family member (26%), moving house (23%) and personal health problems (22%). The N for these data are presented in Table 6. The highest number of events experienced by any one woman was 11. Only 20% of women had experienced 5 or more events.

Most respondents were satisfied with the level of care they had received from their GP. Table 7 indicates most women felt their doctor could not have provided better service. They felt their GP was as thorough as he or she should have been and adequately explained ways to avoid illness or accidents. They agreed that the doctor encouraged regular examinations and felt their GPs were careful to check everything during examinations. General satisfaction and quality of service was highly correlated (r =.88).

[1] Improved finances were perceived as stressful when deciding how to handle or invest inheritances.

Table 6 Frequency of life events

Life events	N	%
Family health problems	345	35.8
Improved finances	253	26.2
Family member died	247	25.6
Moved house	220	22.8
Personal health problem	210	21.8
Financial problems	202	21.0
Change job	200	20.7
New member in house	148	15.4
Unemployed	136	14.1
Family left home	123	12.8
Family legal problems	108	11.2
Became pregnant	102	10.6
Got married	103	10.7
Separated / divorced	75	7.8
Birth adoption	67	7.0
Retired	63	6.5
Lost job	41	4.3
Legal problems	38	3.9
Reconciled	32	3.3
Spouse died	31	3.2

Table 7 GP satisfaction frequencies

	(1) Strongly disagree	(2) Disagree	(3) Unsure	(4) Agree	(5) Strongly agree		
General Satisfaction	**N**	**N**	**N**	**N**	**N**	**Mean**	**SD**
Could give better care	183	423	61	169	44	3.60	1.15
Things could be better	164	403	88	188	35	3.53	1.13
Very satisfied with care	15	64	70	423	307	1.92	0.93
Care is just about perfect	27	117	109	388	238	2.21	1.07
Quality of service							
Not thorough	218	436	72	128	26	3.78	1.06
Doesn't explain prevention	210	442	67	130	26	3.77	1.06
Encourages regular exams	19	103	64	421	628	2.06	1.02
Careful to check everything	20	99	93	415	219	2.11	1.01

8.3 Enabling characteristics

Table 8 presents a general overview of enabling characteristics and provides means, standard deviations and coding algorithms. Data obtained from the women investigating their enabling characteristics are reported below.

Inspection of features affecting the 'obtainability' of health services indicated 709 (74%) of women were uninsured. Fifty eight per cent, or 563 women in the sample, had a community services card that entitled them to government subsidies for GP visits, some hospital care (e.g., outpatient services) and prescription items. The mean income for this sample was NZ$16,096; which is slightly lower than the mean income of NZ$19,172 for employed females in New Zealand (New Zealand Department of Statistics, 1996). Only 7 women earned NZ$50,000 or more and 49% of women earned

Table 8 Means, standard deviations and coding algorithms for enabling characteristics (N=964)

Enabling characteristics	Mean	SD	Coding Algorithm
Health insurance	0.263	0.440	0 = no, 1 = yes
CS card	0.586	0.493	0 = no, 1 = yes
Satisfied in standard of living[a]	3.079	0.743	1 = very dissatisfied, 2 = very satisfied
Adequacy of income	2.431	0.850	1 = cant manage, 2 = just enough, 3 = little over, 4 = always extra
Fees limit access	1.734	0.105	0 = no, 1 = yes
Length of time seeing doctor[b]	3.143	1.104	1 = 1 yr, 2 = 1-2 yrs, 3 = 3-5 yrs, 4 = 5+yrs
Doctor gender	1.192	0.394	1 = male, 2 = female
Regular doctor	1.084	0.289	0 = no, 1 = yes
Transportation	1.205	0.404	1 = private vehicle, 2 = other
Access to vehicle	0.828	0.378	0 = no, 1 = yes
Appointment convenient	1.306	0.461	1 = convenient time, 2 = inconvenient time
Waiting room time	24.006	19.451	Actual number of minutes

[a] Logistic regression used a 4-item scale 1 = very dissatisfied, 4 = very satisfied
[b] Logistic regression used a 4-item scale 1 = not at all, 2 = occasionally, 3 = sometimes, 4 = often

under NZ$20,000. Despite this, 826 (85%) of women were satisfied with their standard of living and only 122 (13%) of women claimed they were unable to manage on their

income. Only 107 (11%) claimed they always had extra money left over and 322 (33%) claimed to have a little left over.

Twenty five per cent, or 242 women, felt that GP fees were expensive enough to limit their access. However, most 719 (75%) reported that GP fees did not stop them from accessing a physician. Most women attended a male GP, only 168 (17%) indicated their GP to be female. Almost all women 885 (91%) indicated they had a regular doctor. Inclusion in a regression equation for a dichotomous variable of this nature requires a maximum 90 / 10% split, otherwise it is considered to be a 'constant' variable (Tabachnick & Fidel, 1989). Constant variables do not meet the criteria for inclusion in multivariate analyses as they fail to distinguish between the two groups (ie both users and non-uses had a regular source of care making its inclusion redundant). Therefore, 'regular doctor', considered a constant, was excluded from further analyses. Half of the women had been attending the same GP for over five years (n=489 or 51%); 119 (12%) women had been seeing the same GP for less than 12-months, 125 (13%) of women for 1 to 2 years and 148 (15%) of women for 3 to 5 years. In terms of transport facilitating access to a doctor or physician, 790 (83%) of women had access to a vehicle and 754 (78%) of women took a private vehicle. Other forms of transport included walking (n=152 or 16%) and catching a bus (n=21 or 2%). Once inside the doctor's surgery, the mean time a woman spent in the waiting room was 24 minutes (SD = 19.45). Most women (n=639 or 66%) obtained appointments on the same day and this was considered 'convenient'. Just over 290 (30%) of women indicated appointments had been obtained at an inconvenient time.

8.4 Need characteristics

Table 9 presents a general overview of need characteristics by providing means, standard deviations and coding algorithms. Data obtained from the women investigating need characteristics are reported below.

Table 9 Means, standard deviations and coding algorithms for need characteristics (N=964)

Need characteristics	Mean	SD	Coding Algorithm
Self rated health	1.841	0.366	1 = poor, 2 = good
Physical symptoms	39.941	10.809	Composite score of number and severity, (Min: 28, Max:91)
Chronic symptoms	1.501	2.004	Actual number of chromic conditions (Min: 0, Max: 10)
Distress	58.319	25.165	Score from Mental Health Inventory (Min: 24, Max: 149)
Well-being	75.146	14.997	Score from Mental Health Inventory (Min: 20, Max: 98)
Activities of daily living	0.765	1.974	Composite score of basic, household, advanced (Min: 0, Max: 24)
Bodily functioning	1.361	2.060	Composite score of upper, lower limitations (Min: 0, Max: 9)

Overall, this sample of women perceived themselves to be healthy as 811 (84%) of women rated their health as good. Only 16% (153 women) judged their own health as poor. Given that the sample was not confined to the elderly, this finding is not surprising. The extent to which somatic or physical symptoms represented the presence of poor health was determined by summing the total number of physical symptoms from a checklist of 29 minor problems (e.g., toothache, acne, sore throat or stomach upset). Data indicated a mean of 39.9 (SD = 10.8). Physical symptoms were significantly correlated with health worry (r =.45) and self-rated health (r = -.43). Thus worried women who felt in poor health had elevated scores on the physical symptom checklist. Although statistical significance was not attained for age and income, older people reported more problems (r =.02) and had lower incomes (r = -.08).

Because most women thought themselves to be in good health it is not surprising that chronic conditions were not prevalent (mean = 1.50, SD = 2.0). Arthritis was the most common chronic ailment, followed by sight impairment, hypertension, asthma and hearing impairments (see Table 10). Statistics New Zealand (1993) report most common ailments as hearing loss (7% for females) and sight loss (6% for females). In the present study heart trouble was ranked 8th; hepatitis and liver trouble were the least common. Chronic health was significantly correlated with age, (r =.38); health worries (r =.16), income (r = -.127) and self-rated health (r = -.39). This indicated that women with chronic health conditions were a) older, b) more worried, c) had a lower income

and d) judged their own health as poor. These data supports research that lower income is associated with poorer health outcomes (Muller, 1986b).

Table 10 Chronic health conditions

	Chronic health condition	N	%
1	Arthritis	216	22.4
2	Sight impairment	207	21.5
3	Hypertension	189	19.6
4	Asthma	139	14.4
5	Hearing impairment	122	12.7
6	Other respiratory	108	11.2
7	Skin conditions	107	11.1
8	Heart trouble	75	7.8
9	Bowel disorder	51	5.3
10	Kidney condition	43	4.5
11	Diabetes	40	4.1
12	Stomach Ulcer	33	3.4
13	Hernia	29	3
14	Cancer	27	2.8
15	Epilepsy	22	2.3
16	Hepatitis	21	2.2
17	Chronic liver trouble	18	1.9

Using the Mental Health Inventory (MHI), originally developed by the Rand corporation (Manning & Wells, 1992; Veit & Ware, 1983), distress levels were measured by tapping into behavioural and emotional control, anxiety and depression. Scores ranged from a minimum of 24 to a maximum of 149 (mean = 58.31, SD = 25.16). Women with elevated scores indicative of depression were worried about their health (r =.34) and felt their health was poor (r = -.22). Younger women tended to be more distressed than older women (r = -.22). Women with lower incomes were more distressed (r = -.02), although statistical significance was not attained. Distress was highly correlated with well-being (r = -.714). Well-being was measured by tapping into general positive affect and emotional ties (Manning & Wells, 1992; Veit & Ware, 1983). Well-being scores ranged from 20 to 98 (mean = 75.146, SD = 14.99) and were significantly correlated with age (r =.15), health worries (r = -.22) and self-rated health (r =.19). As with

distress income appeared unrelated, failing to attain statistical significance (r =.15). Women with higher well-being scores (suggesting strong positive affect and strong emotional ties) were older and not worried about their status of their health, which they perceived as good. To summarise, distress and well-being were highly correlated; distressed women had poorer well-being. Younger women appeared more distressed. Older women had higher well-being scores, were not worried about their health and perceived it as positive. Finally, income appeared unrelated to measures of mental health[2].

Regarding daily activity, 485 (51%) of women reported their health did not restrict their daily activities. For 800 (83%) of women their daily basic activities (e.g., dressing) were not restricted and 788 (81%) of women were not restricted in their household activities (e.g., heavy housework). Ninety one per cent (n=881) of women reported no restriction for advanced activities (e.g., managing money). Women whose daily activites were restricted were older (r =.10) and had lower incomes (r = -.07). Restricted activities were significantly correlated with health worry (r = -.187) and self-rated health (r = -.42) thus, worried women who thought their health was poor experienced greater restrictions in their daily activities. Body functions that referred to movement of limbs shoulders, neck and spine (not performance of internal organs) showed a similar pattern. Fifty six per cent of women (n=537) had no limitations affecting how their body functioned; 455 (58%) reported no lower body limitations and 737 (77%) reported no upper bodily limitations. Most impaired women reported just one limitation (14% & 15% for lower and upper limitations respectively). Women whose health problems restricted how they functioned were a) older (r =.34), b) had lower incomes (r = -.13), c) were worried (r = 20) and d) felt in poor health (r =.46). In summary, the mean age for women in this sample was 43 so it is not surprising these women felt in good health. They reported few chronic health conditions, few physical or somatic problems and felt their health did not restrict either their daily activites or bodily functioning.

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[2] Note that 256 women declined to state their income resulting in a lower N for these correlations. This may account for their non-significance.

8.5 Trauma characteristics

Table 11 presents a general overview of trauma characteristics and provides means, standard deviations and coding algorithms. Trauma characteristics, described below, are represented by the total number of traumatic events experienced by an individual; different types of traumatic events and PTSD (post traumatic stress disorder).

Table 11 Means, standard deviations and coding algorithms for trauma characteristics (N=964)

Trauma characteristic	Mean	SD	Coding Algorithm
Total number of traumatic events	1.274	1.509	Actual number of traumatic events (Min: 0, Max, 8)
Sexual assault (child / adult)	0.183	0.387	0 = no, 1 = yes
Assault (family / stranger / robbery)	0.222	0.416	0 = no, 1 = yes
Accident (motor vehicle / other)	0.138	0.345	0 = no, 1 = yes
Disaster (natural or other)	0.105	0.037	0 = no, 1 = yes
Harm to loved one (death / injury)	0.400	0.490	0 = no, 1 = yes
PTSD	22.645	6.195	Actual PTSD score (Min: 11, Max: 49)

Table 12 shows that at some time in their life, most women have been exposed to a traumatic event. Thirty nine per cent (n=378) reported they had never experienced a traumatic event. Three women reported exposure to eight events and 83 women (9%) had experienced four or more traumatic events. These figures are lower than Resnick et al. (1993) who reported 68.9% of 4,008 women in a national household sample had experienced at least one type of traumatic event and Norris and Kaniasty (1994) who predicted that 83% of the United States population would at some stage be involved in a violent crime.

Specific traumatic events obtained from the Traumatic Events Scale originally encompassed 12 categories. These were combat, child sex abuse, adult sexual assault, assault by a family member, assault by a stranger, theft or robbery by force of threat, vehicle accident, occupational or other accident, disaster, preparation for disaster, death to a loved one and injury to a loved one. Because several categories had a low response rate, the 12 categories were combined. Respondents who fell into more that one original

Table 12 Total number of traumatic events (N=964)

No. of traumatic events	N	%
0	378	39.2
1	282	29.3
2	126	13.1
3	95	9.9
4	40	4.1
5	20	2.1
6	15	1.6
7	5	0.5
8	3	0.3

category were not counted twice, therefore the number of respondents in the recoded categories do not directly correspond to the original categories. Accordingly, in the recoded categories, combat (n=2) was eliminated. *'Abuse'* was derived from the categories 'child sexual abuse' and 'adult sexual abuse'. *'Assault'* was derived from 'domestic assault', 'assault by a stranger' and 'theft by force (robbery / mugging)'. *'Accidents'* was derived from 'motor vehicle' and 'other' accidents. *'Disasters'* was derived from 'disaster precautions' and 'disasters'. *'Death / injury to loved one'* was derived from 'traumatic death of a loved one' and 'injury to a loved one'. Number and percentages for women within each of the original 12 categories and the five recoded categories are reported in Table 13.

Harm inflicted on a loved one was the most prevalent traumatic event, experienced by 40% of women. Death to a loved one occurred more frequently than injury. Assault was the second most prevalent event, experienced by 22% of women. Assault by a family member was nearly twice as common than assault by a stranger. After assault, sexual abuse, accidents and disasters occurred most often.

Table 13 Specific traumatic events: recoded categories abstracted from 12 original TES categories (N=964)

Original category	No	Yes	Recoded category	No	Yes
Combat	960(99%)	2 (<1%)	Eliminated		
Childhood sexual abuse	830 (86%)	130 (14%)	Sexual assault (child / adult)	786 (82%)	176 (18%)
Adult sexual assault	869 (90%)	91 (9%)			
Assault by a family member	802 (83%)	159 (17%)	Assault (family/ stranger/ robbery)	748 (78%)	214 (22%)
Assault by a stranger	886 (92%)	75 (8%)			
Theft/robbery by force	929 (96%)	33 (4%)			
Accident (motor vehicle)	878 (91%)	84 (8%)	Accident (motor vehicle / other)	829 (86%)	133 (14%)
Accident (occupational/ other)	906 (94%)	56 (6%)			
Disaster	909 (94%)	53 (6%)	Disaster (natural or other)	861 (89%)	101 (11%)
Disaster precautions	904 (94%)	58 (6%)			
Loved one (traumatic death)	693 (71%)	269 (28%)	Harm to loved one (death / injury)	577 (60%)	385 (40%)
Loved one (traumatic injury)	742 (77%)	220 (23%)			

8.6 Health care utilization measures

Health care utilization is presented in Table 14 and indicates women's health care utilization patterns for the six health services under examination. In order of the most frequently used to the least frequently used, the six services are GPs, prescription items, health professionals, bed days, disability days and health services.

Table 14 Frequency of use for disability days, bed days, GPs, health professionals, hospitals and prescription items

	Service not used		Service was used		No response	
	N	%	N	%	N	%
GPs	143	15	816	85	959	0.5
Prescription items	203	21	748	78	951	1.3
Health professionals	287	30	675	70	962	0.2
Bed days	485	50	473	49	958	0.6
Disability days	496	52	464	48	960	0.4
Hospitals	648	67	314	33	962	0.2

Table 15 presents a general overview of the dependent variables and provides means, standard deviations and coding algorithms for the health care services.

Table 15 Means, standard deviations and coding algorithms for use of non-medical and medical services (N=964)

Health service used	Mean	SD	Coding Algorithm
Non-medical (informal) services			
Disability days contact	0.483	0.500	0 = no, 1 = yes
Disability days volume	14.959	24.882	Actual number of disability days (Min: 1, Max 92)
Bed days contact	0.494	0.500	0 = no, 1 = yes
Bed days volume	7.981	18.371	Actual number of bed days (Min: 1, Max 180)
Medical (formal) services			
GP contact	0.851	0.356	0 = no, 1 = yes
GP volume	5.996	7.759	Actual number of GP visits (Min: 1, Max: 100)
Health Professional contact	0.702	0.458	0 = no, 1 = yes
Health Professional volume	1.959	1.160	Actual number of health professional visits (Min 1, Max: 8)
Hospital contact	0.326	0.469	0 = used no services, 1 = used any (admission / A&E / outpatient)
Hospital volume	1.535	0.720	1=used any 1 service, 2=used any 2 services, 3= used 3 services
Prescription item contact	0.787	0.410	0= no, 1 = yes
Prescription items volume	2.914	1.137	1= 1-4 items, 2= 5-9 items, 3 = 10-14 items, 4 = 15+ items

Non-medical services were represented by disability days taken over a three-month period. Almost half the women in the sample (n=464, or 48%) took disability days. Women took an average of 14 disability days over three months (SD = 24.88). This misleading high mean is due to a heavily skewed distribution that ranged from 1 to 180 days. In fact, 82% of women took 7 or less bed days. In the long term (12-months) non-medical services were represented through use of bed days – the number of days poor health had confined a woman to bed. Again, the sample was evenly divided; 49% of women did take bed days; amongst these, the average was around 8 days (SD = 18.37). Again the distribution was heavily skewed; with a range of 1 to 92 approximately 70% of women took less than 10 bed days.

GPs were the most commonly used health service - most women (n=816, or 85%) had contacted a GP over the preceding 12-months. Amongst these women, GP volume ranged from 1 to 100, (mean = 5.9, SD = 7.57). Research indicated GP utilization is more prevalent amongst women in their reproductive years, then tapers after women reach menopause (Waldron, 1983). It increases as frail older women, unable to rely on their own non-medical forms of self-treatment, again become dependent on professional and medical referral systems (Wolinsky & Johnson, 1991). Data in the present study is segregated to represent these age groups. Elderly age groups were defined by Jewett et al. (1992) as the young-old (those 65 to 74 years of age) and the old-old (those over 75 years of age). Table 16 shows the relationship of age to GP utilization and is facilitated by summarising data to represent the first five (i.e., the mean) visits only.

Table 16 Crosstabs showing volume of GPs visits by age

	Number of GP visits					
	1	**2**	**3**	**4**	**5**	**Row total(N)**
15-44 (reproductive age)	63	100	74	46	30	313
45-64 (menopause)	38	35	26	33	10	142
65-74 (young-old)	6	7	7	22	11	53
75+ (old-old)	4	6	6	9	2	27
Column total (N)	111	148	113	110	53	535

These data indicate that utilization is higher amongst women under the age of 44. Most women under 44 visited their GP bi-annually. Utilization reduced after menopause then increased as women reach the young-old and old-old age groups. This is consistent with Waldron (1983) and these patterns are reflected in the number of women within each age group.

Table 17 shows 70% (or 675) women contacted at least one health professional. Amongst these women, the number of visits ranged from one (308 women) to eight consultations (2 women, or .2%). Health professionals were used less than GPs. Dentists were the most commonly used allied health professional, followed by medical specialists, optometrists and physiotherapists. Psychologists were utilized the least.

Table 17 Health professionals consulted over 12-months

Professional	N	%
Dentist	339	35.2
Medical specialist	308	32.0
Optician	193	20.0
Physiotherapist	154	6.0
Counselor	85	8.8
Naturopath	73	7.6
Social Worker	56	5.8
Chiropractor	53	5.5
Occupational Therapist	23	2.4
Psychiatrist	20	2.1
Psychologist	18	1.9

Table 18 shows utilization of hospital admissions (nights), outpatient services and Accident and Emergency services. These services were not used very often. Outpatient services were the most commonly used, followed by overnight admissions and accident and emergency services.

Table 18 Hospital utilization over 12-months

	N	
	Not used	Used
Hospital admissions (nights)	789	172
Outpatients	760	200
Accident and emergency	851	110

As stated in section 7.5.4 as individual categories, outpatient services, overnight admissions and accident and emergency did not contain sufficient N for separate analysis. They were summed into one 'aggregate' item representing overall hospital use. A contact measure was obtained by separating women who had not used any of the services from women who had used any of the hospital services one or more times. Counting how many times any of the three services had been used constituted the hospital volume measure. This composite measure showed 32%, or 304 women, had

used any one of these hospital services (mean = 1.53, SD =.720). One hundred and eighty eight women had used any one service, 84 had used any two services and 42 women had used any three services. This composite measure had greater power when regressed onto predisposing, enabling and need characteristics and it was this composite score that represented the dependent variable for use of hospital services.

Table 19 Prescription items utilized over 12-months

Prescription items	N	%
None	203	21
1-4x	395	41
5-10x	145	15
10-15	85	9
Over 15	123	13
No response	13	1
Total	964	100

The final medical service is the number of times prescription items had been used over a 12-month catchment period. Seventy seven per cent, or 748 women, had received a prescription over the past 12-months. Prescription items were significantly correlated with number of visits to the GP (r =.43) showing that the more often women consulted their GPs, the more prescriptions they received. Utilization of prescription items is reported in Table 19.

8.7 Chapter overview

By describing the nature and extent of health service utilization by a community sample of New Zealand women chapter 8 has achieved the first objective of the present study. The predisposing, enabling and need characteristics were described statistically, as was the prevalence of traumatic events the sample's use of non-medical and medical services. Chapter 9 reports the first set of results representing the outcomes for hypothesis testing.

CHAPTER NINE

RESULTS: HYPOTHESIS ONE (CONTACT)

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9.1 Chapter preview

9.1.1 Preview of results chapters

This chapter is the first of five to report the results from five stages of hypothesis testing. Each hypothesis was applied to the six health services. Analysis was undertaken in two main stages.

1. The first two hypotheses replicated the Andersen model. Results from the first hypothesis, that assessed contact with health services, are reported in this chapter. Results from hypothesis two, which assessed volume of health care utilization, are reported in chapter 10.
2 Hypotheses three to five expanded the model after controlling for the significant model predictors identified in hypothesis two. Hypothesis three assessed the aggregate (total) effect of traumatic events on service use. These results are reported in chapter 11. Hypothesis four examined effects of different traumatic events on use of health services. These results are reported in chapter 12. Results from hypothesis five that assessed the effects of PTSD on use of health services are reported in chapter 13. Chapter 14 is the final results chapter and summaries salient findings from chapters 9 to 13.

In each chapter, results are presented sequentially from use of non-medical (bed days and disability days) to use of medical services (GPs, health professionals, hospitals and prescription items). The findings for each hypothesis as they related to each service are summarised after each chapter. As noted in section 7.6.3 the logistic regressions will report the results pertaining to each block in order of entry into the equation. The R^2 statistic will state the amount of variance explained by that block. The G^2 improvement statistic will state whether or not the block has attained statistical significance. Regardless of whether or not the block is significant, due to the summary nature of the statistic (Hosmer & Lemeshow, 1989), significant variables within that block will be identified and the nature of their relationship to the dependent variable (i.e., health

service) explained. Finally, the results will be serially compared. This will indicate elimination or appearance of significance for variables after introduction of the next block. The section will conclude by stating whether the overall fit for the data was significant and the amount of variance it was able to explain.

9.2 Hypothesis one: ‘contact’

Hypothesis one examined ‘contact’ amongst users and non-users for bed days, disability days, GPs, health professionals, hospital utilization and use of prescription items.

9.3 Data screening for ‘contact’ analyses

Prior to multivariate analyses, all independent variables were assessed at the univariate level using conventional but conservative levels ($p<.001$) as recommended by Tabachnick and Fidel (1989). Life events and length of time spent in the waiting room were both positively skewed. Square root transformations markedly improved skewness. Satisfaction with standard of living and doctor fees limiting access was skewed to the point where logarithmic and square root transformations had no effect. To overcome their extreme skewness these two variables were dichotomised. Satisfaction with standard of living was recoded, where 0 = dissatisfied and 1 = satisfied with standard of living. Doctors fees limiting access was recoded, where 0 = no and 1 = yes (and was therefore reported as dichotomous when described statistically in chapter 8). For both variables these dichotomies met the accepted criteria of a 90 - 10% split required for inclusion in multivariate analysis. The length of time a woman had been seeing the same doctor and the variable for psychological well-being were both moderately negatively skewed; they were reflected and transformed appropriately. When negatively skewed variables are reflected before transformation, interpretation of scores becomes counterintuitive. Thus for well-being and length of time seeing doctor, tables report adjusted odds ratios reflecting the negative transformation of these variables to reduce skewness. For references in the text, however, signs are reversed for ease of interpretation. Physical symptoms, chronic conditions, psychological distress,

activities of daily living and bodily functioning had substantial skewness. Logarithmic transformations considerably reduced the skewness for these variables. Any tests of significance for all five stages of hypothesis testing were undertaken on transformed variables and are reported as such.

It was the original intent of this research to include a much broader array of variables, as indicated by the expansive discussion of predisposing, enabling and need characteristics in chapters 2, 3 and 4 respectively. However, a lower than expected response rate resulted in the following variables being recoded; household composition (originally categorised as alone / partner /single parent /partner and children /child at home /extended family /other adults /other relatives) was recoded as 'living alone[1]' (yes /no). A composite variable of social support was derived from telephone contact, social contact and church attendance. Again due to low numbers, the following variables were precluded from analyses; marital status[2] (never married, separated / divorced / widowed), main job (administrative /professional /technician /clerk /sales and service /agriculture and fisheries /trades /operators and assembly line /elementary), employment[3] (full time /part time /unemployed /retired /student /beneficiary /housewife /seasonal worker), hours worked per week, months spent in New Zealand and months resided in the same area. As the question regarding kin and non-kin supports was posed in such a manner as to make it difficult to distinguish siblings from children, this variable was also precluded. The variable income also elicited a low response; accordingly, the variables 'paid employment' and 'adequacy of income' were considered sufficient proxy measures and income was dropped from this and all other multivariate analyses. As stated in section 8.3, the variable 'having a regular doctor' was also excluded as Tabachnick and Fidell (1989) set the criteria for inclusion of dichotomous independent variables in a multivariate analysis at a 90 - 10% spilt. As 91% of women reported having a regular doctor this variable failed to meet this criteria.

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[1] 'Living alone' is described statistically in chapter nine.
[2] Marital status in the form of 'currently married' (yes / no) was retained.
[3] Employment in the form of 'paid employment' (yes / no) was retained.

9.4 Analysis of 'contact' measures

Hypothesis 1

Amongst users and non-users for both medical and non-medical services, predisposing and enabling characteristics will make a greater contribution to the explained variance over and above that contributed by need.

This hypothesis was examined using six hierarchical multiple regressions. Disability days, bed days, GPs, health professionals, hospitals and prescription items were regressed onto the independent variables representing predisposing, enabling and need characteristics. Since predisposing and enabling variables have indirect effects through need, it was desirable to obtain an estimate of the total effect of predisposing and then enabling characteristics (F.D. Wolinsky, personal communication, October 22, 1997). Thus the objective was to give as much credit to the predisposing and enabling elements of the model as possible (F.D. Wolinsky, personal communication, October 22, 1997). In order to assess this, the blocks of independent variables were entered serially into the model. This enabled a look at the total effect of the block of predisposing variables before decomposing them by serially introducing the distal effects of enabling and then need variables. Therefore the correct order of entry in the present study required predisposing variables to be entered on the first step, followed by enabling and finally need variables (F.D. Wolinsky, personal communication, October 22, 1997, (Wolinsky & Johnson, 1991). To summarise, hypothesis one used six logistic regressions to assess the effect of predisposing, enabling and need characteristics on the use of bed days, disability days, GPs, health professionals, hospitals and prescription items for 964 female respondents. The statistical package, SPSS/PC (Norusis, 1994) was used to evaluate the data and assess the relationships between the variables. For the following analyses an alpha level of .05 was set.

9.4.1 Disability days

The block of predisposing characteristics, entered first into the equation, made a statistically significant contribution to the model for the assessment of disability days[4] and explained 9% of the variance (R^2=.086, p<.001). Predisposing characteristics made a unique and significant contribution (G^2 improvement = 64, 11 df, p<.001) to disability day contact.

Entering predisposing characteristics in the first block controlled for these variables and allowed inspection of their significance without the effects of enabling and need characteristics. The AORs in Table 20 show significant predisposing predictors identified in Model 1 were ethnicity, having a phone, health worries and health control. Thus, women likely to have disability day contact were those predisposed to being a) New Zealand non-Maori (if the AOR was greater than one it would be interpreted as New Zealand Maoris who were more likely to take a disability day), b) having a working telephone c) being worried about their health and, d) having little control over their health[5]. Health worries had the largest effect (AOR = 2.350, p<.001), which indicated that worried women were twice as likely to have disability day contact.

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered on the second step and explained 11% of the variance (R^2 = .109, p>.001). Although the overall net effect of this block failed to reach statistical significance (G^2 improvement = 18, 11 df, p>.05), two significant predictors were identified. These were convenient appointments (AOR = .625, p<.01) and time spent in the waiting room (AOR = 1.123, p<.05). This suggested that women took disability days when appointments were convenient (possibly after being able to get in front of a GP who then advised a cutback day). Alternatively, long waiting room times also resulted in disability days (perhaps a form of self-treatment when a woman was not inclined to wait). After the addition of enabling characteristics the predisposing characteristics of ethnicity,

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[4] Disability days are described statistically in section 8.6

Table 20 Adjusted odds ratio obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on *disability days* (contact) taken over a 3-month period among New Zealand women (N=721)

	Models		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	0.993	0.995	0.990
Marital status	0.851	0.843	0.813
Living alone	1.039	1.004	1.002
Social contacts	1.099	1.103	1.112
Paid employment	0.982	0.994	1.168
Qualifications	1.077	1.105	1.148 *
Ethnicity	0.580 **	0.528 ***	0.508 **
Telephone	1.864 *	1.907 *	1.644
Health worries	2.350 ***	2.314 ***	1.281
Health control	1.245 *	1.238	1.057
Life events	1.245	1.272	1.060
Enabling Characteristics			
Health insurance		0.837	0.806
CS card		0.831	0.849
Satisfied in standard of living		0.792	1.057
Adequacy of income		0.950	1.042
Fees limit access		0.999	0.810
Length of time seeing doctor[a]		1.064	1.024
Doctor gender		0.929	0.844
Transportation		0.714	0.778
Access to vehicle		0.636	0.798
Appointment convenient		0.625 **	0.632 *
Waiting room time		1.123 *	1.094
Need Characteristics			
Self rated health			0.636
Physical symptoms			2.452 ***
Chronic symptoms			0.862
Well-being[b]			0.923
Distress			3.944
Activities of daily living			2.873 *
Bodily functioning			0.952
R2	.086	.109	.203
G^2 improvement	64 ***	18	80 ***
Intercept	-1.301	.285	-10.270
Model G^2, df	64, 11 ***	18, 11	80, 7 ***

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

[5] Coding algorithms for predisposing variables are reported in Table 2, section 8.2

telephone and health worries retained significance, however significance for health control diminished.

Need characteristics were entered on the third step of the equation after controlling for predisposing and enabling characteristics. Together with predisposing and enabling variables, need explained 20% of the variance (R^2 = .203, p<.001) for disability day contact. Like predisposing characteristics, need variables made a unique and significant contribution to the model (G^2 improvement = 80, 7 df, p<.001). The two significant need predictors were physical symptoms (AOR = 2.452, p<.001) and activities of daily living (AOR = 2.873, p<.001). This suggested women likely to take a cutback day had more physical problems and whose health restricted their daily activities.

Serially comparing the results obtained from Model 1 with those from Models 2 and 3 decomposed the effects of predisposing, then enabling characteristics on disability day contact. The introduction of enabling characteristics did not substantially diminish the relationship between predisposing characteristics and disability day contact. After the addition of enabling characteristics the predisposing characteristics of ethnicity, telephone and health worries retained significance although significance for health control was eliminated[6]. Controlling for the antecedents of predisposing characteristics diminished its consequence on disability day contact after need had been introduced. Entry of need characteristics reduced statistical significance for having a telephone, health worries and waiting room time. Ethnicity and convenience of appointments retained significance and educational attainment became significant.

To summarise the data investigating disability day contact, the blocks of predisposing and need characteristics made a significant contribution to the model. Enabling characteristics did not make a significant contribution. On the final step, five significant predictors were identified which distinguished groups of users from non-users. These were educational attainment, ethnicity, convenience of appointments, physical symptoms and activities of daily living. The overall fit of the final model was

[6] For logistic regression, changing significance for individual variables after forced entry of a new block is interpreted the same as OLS regressions.

significant (G^2 = 80, 7 df; $p<.05$) and these data explained 20% of the total variance (see Table 20).

9.4.2 Bed days

The block of predisposing characteristics, entered first into the equation, made a statistically significant contribution to the model for the assessment of bed days[7] and explained 9% of the variance (R^2=.088, $p<.001$). In the model assessing bed day contact the G^2 improvement statistic showed that the block of predisposing characteristics made a unique and significant contribution (G^2 improvement = 65, 11 df, $p<.001$).

Entering predisposing characteristics in the first block controlled for these variables and allowed inspection of their significance in isolation without the effects of enabling and need characteristics. The AORs in Table 21 indicated that significant predisposing predictors in Model 1 were age, paid employment, health worries and life events. Thus women predisposed to bed day contact were a) younger, b) had paid employment, c) were worried about their health and d) had experienced a greater number of life events[8]. As with disability days, health worries had the largest effect (AOR = 2.447, $p<.001$) on bed day contact.

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered on the second step and together with predisposing characteristics explained 10% of the variance (R^2 = .099, $p>.05$). The block of enabling characteristics failed to reach statistical significance (G^2 improvement = 9, 11 df, $p>.05$) on bed day contact. No significant enabling predictors were identified in Model 2. Need characteristics were entered on the third step of the equation after controlling for predisposing and enabling characteristics. Together, the three blocks explained 14% of the variance (R^2 = .136, $p<.001$) for bed day contact. Need variables made a unique and significant contribution to the model (G^2 improvement = 30, 7 df, $p<.001$). Only self-rated health

[7] Bed days are described statistically in section 8.6
[8] Coding algorithms for predisposing variables are reported in Table 2, section 8.2

(AOR = 0.439, p<.001) was a significant predictor. This suggested women who felt in poor health were twice as likely to have bed day contact.

Table 21 Adjusted odds ratio obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on *bed days* (contact) among New Zealand women (N=722)

	Models		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	0.985 *	0.984 *	0.977 **
Marital status	0.748	0.806	0.801
Living alone	0.866	0.915	0.951
Social contacts	1.263	1.303	1.369 *
Paid employment	1.437 *	1.474 *	1.650 **
Qualifications	0.973	0.992	1.008
Ethnicity	0.841	0.812	0.795
Telephone	1.490	1.597	1.459
Health worries	2.447 ***	2.456 ***	1.772 **
Health control	1.058	1.037	0.911
Life events	1.384 *	1.269	1.172
Enabling Characteristics			
Health insurance		1.102	1.099
CS card		1.141	1.159
Satisfied in standard of living		0.637	0.700
Adequacy of income		0.894	0.939
Fees limit access		1.116	0.996
Length of time seeing doctor[a]		0.960	0.938
Doctor gender		0.908	0.878
Transportation		1.014	1.057
Access to vehicle		0.948	1.106
Appointment convenient		0.887	0.905
Waiting room time		1.027	1.004
Need Characteristics			
Self rated health			0.439 **
Physical symptoms			8.385
Chronic symptoms			1.094
Well-being[b]			0.964
Distress			2.462
Activities of daily living			0.852
Bodily functioning			1.194
R2	.088	.099	.136
G^2 improvement	65 ***	09	30 ***
Intercept	-1.280	-.009	-2.770
Model G^2, df	65, 11 ***	9, 11	30, 7 ***

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

Serially comparing the results from Model 1 with Models 2 and 3 decomposed the effect that predisposing, then enabling characteristics had on bed day contact. The introduction of enabling characteristics did not substantially diminish the relationship between predisposing characteristics and bed day contact. At this stage, life events, became non-significant, although age, paid employment and health worries retained their significance. Their significance was also retained after need had been entered. Further, social contacts became significant (AOR = 1.369, $p<.001$). This suggested that the more social contact a woman had, the more likely she was to take a bed day.

To summarise the data investigating bed day contact, the blocks of predisposing and need characteristics made a significant contribution to the model. Enabling characteristics did not make a significant contribution. On the final step five significant predictors distinguished users from non-users. They suggested that bed day contact was more likely to occur by a) younger women, b) those with more social contacts, c) those in paid employment, d) women worried about their health and e) women who felt their health was poor. The overall fit of the final model was significant (G^2 = 30, 7 df; $p<.001$) and data explained 14% of the total variance. Table 21 documents these data.

9.4.3 GP utilization

GP contact[9] was the first medical service to be reviewed. The block of predisposing characteristics, entered first into the equation, made a statistically significant contribution to the model. They explained 5% of the variance (R^2=.052, $p<.001$). The G^2 improvement statistic indicated that the block of predisposing characteristics made a unique and significant contribution to GP contact (G^2 improvement = 37, 11 df, $p<.001$).

Entering predisposing characteristics in the first block controlled for these variables and allowed inspection of their significance in isolation without the effects of enabling and

[9] GP contact is described statistically in section 9.6

need characteristics. The AORs in Table 22 show significant predisposing predictors were for Model 1 were age, qualifications, health worries and life events. Women

Table 22 Adjusted odds ratio obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on *GP contact* among New Zealand women (N=721)

	Models		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	1.024 *	1.023 *	1.009
Marital status	1.335	1.395	1.431
Living alone	0.842	0.792	0.762
Social contacts	0.895	0.914	0.888
Paid employment	0.821	0.917	1.064
Qualifications	1.330 **	1.304 **	1.346 **
Ethnicity	0.775	0.798	0.756
Telephone	0.795	0.859	0.720
Health worries	2.334 ***	2.500 ***	1.771 *
Health control	0.908	0.915	0.820
Life events	1.631 *	1.467	1.392
Enabling Characteristics			
Health insurance		1.320	1.297
CS card		1.304	1.277
Satisfied in standard of living		0.713	0.731
Adequacy of income		1.021	1.091
Fees limit access		0.828	0.788
Length of time seeing doctor[a]		2.491 **	2.548 **
Doctor gender		0.949	0.940
Transportation		1.122	1.101
Access to vehicle		0.889	0.950
Appointment convenient		1.511	1.586
Waiting room time		0.873 *	0.842 *
Need Characteristics			
Self rated health			0.424
Physical symptoms			1.381
Chronic symptoms			3.015
Well-being[b]			0.972
Distress			2.247
Activities of daily living			0.882
Bodily functioning			1.870
R^2	.052	.073	.096
G^2 improvement	37 ***	16	16 *
Intercept	-.322	-.875	-.309
Model G^2, df	37, 11 ***	16,11	16, 7 *

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

predisposed to contacting a GP were a) older, b) had higher qualifications, c) were worried about their health and d) had experienced a greater number of life events. Health worries had the largest effect (AOR = 2.334, $p<.001$), which indicated worried women were just over twice as likely to contact a GP.

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered on the second step. Together with predisposing characteristics they explained 7% of the variance ($R^2 = .073$, $p>.05$). Although the overall net effect of this block failed to reach statistical significance (G^2 improvement = 37, 11 df, $p>.05$), Model 2 identified two significant predictors. The first was an acceptability variable. The length of time a woman had been seeing the same GP suggested that the longer a woman had been attending the same GP the more likely she was to have GP contact over the past 12 months. The second significant predictor was an accommodation variable - length of time spent in the waiting room. The AOR (.989, $p<.05$) indicated that women who had shorter waiting times were more likely to have GP contact.

Need characteristics were entered on the third step of the equation after controlling for predisposing and enabling characteristics and together with these variables explained 10% of the variance ($R^2 = .096$, $p<.05$). Although no one significant predictor was identified in this stage (see section 10.3), need characteristics as a whole did make a significant contribution to the model (G^2 improvement = 16, 7 df, $p<.05$).

Serially comparing the results obtained from Model 1 with those from Models 2 and 3 decomposed the effects of predisposing, then enabling characteristics on GP contact. The introduction of enabling characteristics did not substantially diminish the relationship between predisposing characteristics and GP contact; as age, educational attainment and health worries retained significance. However, significance for life events was eliminated. Controlling for the antecedents of predisposing characteristics did not diminish its consequences on GP contact after the introduction of need variables. The statistical significance for age was eliminated. The effect of being worried was substantially diminished, but did retain statistical significance (AOR = 1.771, $p<.05$). No substantive changes were evidenced for enabling characteristics. Only modest

change occurred for the two significant predictors and their significance levels remaining stable.

To summarise the data investigating GP contact, the blocks of predisposing and need characteristics made a significant contribution to the model. Enabling characteristics did not make a significant contribution. On the final step, four significant predictors were identified which distinguished groups of users from non-users. These suggested women likely to have GP contact were those who a) had higher educational qualifications, b) were worried, c) had been seeing the doctor over a longer period of time and d) didn't have to wait long in the waiting room. The overall fit of these data to the final model was significant (G^2 = 16, 7 df; $p<.05$) and explained 10% of the variance. Table 22 documents these data.

9.4.4 Health professionals

For health professionals[10], the block of predisposing characteristics entered first into the equation made a statistically significant contribution to the model and explained 8% of the variance (R^2=.078, $p<.001$). The G^2 improvement statistic indicated the block of predisposing characteristics made significant contribution (G^2 improvement = 58, 11 df, $p<.001$) to health professional contact.

Controlling for predisposing characteristics allowed inspection of their significance without the effects of enabling and need characteristics. The AORs for Model 1 (see Table 23) identified four significant predisposing predictors that distinguished users from non-users. These were age, qualifications, ethnicity and health worries. Women who were predisposed to contact health professionals were a) younger, b) had higher qualifications, c) were New Zealand non-Maori and d) were worried about their health. Health worries had the largest effect (AOR = 1.660, $p<.01$), which indicated that women were one and a half times more likely to contact a health professional if they were worried.

Table 23 Adjusted odds ratios obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on contact with *health professionals* among New Zealand women (N=724)

Predictors	Models 1	Models 2	Models 3
Predisposing Characteristics			
Age	0.985 *	0.987 *	0.981 *
Marital status	1.301	1.227	1.207
Living alone	1.431	1.641	1.608
Social contacts	1.166	1.148	1.133
Paid employment	1.310	1.208	1.361
Qualifications	1.182 **	1.188 *	1.214 **
Ethnicity	0.493 ***	0.482 ***	0.460 ***
Telephone	1.071	1.098	0.986
Health worries	1.660 **	1.603 *	1.189
Health control	1.005	0.988	0.883
Life events	1.057	1.128	1.046
Enabling Characteristics			
Health insurance		2.250 *	2.325 ***
CS card		1.114	1.122
Satisfied in standard of living		1.346	1.584
Adequacy of income		0.798	0.843
Fees limit access		1.622 *	1.577
Length of time seeing doctor[a]		1.155	1.126
Doctor gender		1.094	1.098
Transportation		0.447 *	0.450 **
Access to vehicle		0.825	0.898
Appointment convenient		0.908	0.917
Waiting room time		0.978	0.960
Need Characteristics			
Self rated health			0.663
Physical symptoms			1.292
Chronic symptoms			1.538
Well-being[b]			0.974
Distress			2.664
Activities of daily living			1.997
Bodily functioning			1.126
R2	0.078	0.116	0.135
G^2 improvement	58 ***	30 **	15 *
Intercept	1.706	1.737	0.788
Model G^2, df	58, 11 ***	30, 11 **	15, 7 *

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

[10] Health professional contact is described statistically in section 8.6

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered on the second step, prior to assessing the effects of need characteristics and accounted for 12% of the variance (R^2= .116, p<.001). The AORs for Model 2 identified three significant predictors. These suggested that women who had been more likely to contact health professionals were those who had health insurance (AOR = 2.250, p<.01), were restricted by GP fees (AOR = 1.622, p<.01)and used a private vehicle (AOR = 0.447, p<.01). Enabling characteristics made a unique and significant contribution to health professional contact (G^2 improvement = 30, 11df, p<.01).

Need characteristics were entered as the final block, after controlling for predisposing and enabling characteristics. Need explained 14% of the variance (R^2=.135, p<.05). Although no individual significant predictors were identified in this stage (Model 3), need characteristics as a whole did make a significant contribution to the model (G^2 improvement = 15, 7 df, p<.05).

Serially comparing the results obtained from Model 1 with those from Models 2 and 3 decomposed the effect of predisposing, then enabling characteristics on health professional contact. The introduction of need characteristics, diminished the effects of predisposing characteristics on health professional contact. Although the AOR for qualifications increased (AOR = 1.214, p<.01) the AOR for health worry became non-significant. The effect for ethnicity almost remained the same (AOR = 0.460, p<.001). For enabling characteristics the magnitude of the effect for health insurance increased slightly (AOR = 2.325, p<.01) but its statistical significance did not change.

To summarise health professional contact, predisposing, enabling and need characteristics each made unique and significant contributions to the model. On the final step, five significant predictors were identified. These were age, qualifications, ethnicity, health insurance and transportation and suggested that health professional contact was more likely amongst women who were a) younger, b) better educated, c) had health insurance d) used a private vehicle. The overall fit of the final model was significant (G^2 = 20, 7 df; p<.01) and explained 14% of the variance. Table 23 documents these data.

9.4.5 Hospital utilization

For hospitals, the block of predisposing characteristics entered first into the equation, made a statistically significant contribution to the model and explained 8% of the variance (R^2=.076, p<.001). The G^2 improvement statistic indicated that predisposing characteristics made a unique and significant contribution (G^2 improvement = 56, 11 df, p<.001) to hospital contact. The AORs in Model 1 identified four significant predisposing characteristics predicting hospital contact. These were paid employment, health worries, health control and life events. Thus, women predisposed to hospital contact were those who were a) not in paid employment, b) were worried about their health, c) had little health control and, d) had experienced more life. Life events had the largest effect (AOR = 2.261, p<.001) indicating that women who had experienced more life events were two and a half times more likely to have contacted a hospital over the past 12 months. These data are indicated in Table 24.

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered on the second step (Model 2). In conjunction with predisposing characteristics they accounted for 10% of explained variance . Although the overall net effect of this block failed to reach statistical significance (G^2 improvement = 17, 11 df, p>.05), Model 2 identified two significant enabling variables. Women were more likely to have hospital contact if they had a) a history of seeing the same doctor and b) if appointment times were convenient (usually the same day).

Need characteristics were entered as the final block after controlling for predisposing and enabling characteristics. Need explained 14% of the variance (R^2 = .142, p<.001). Model 3 identified three significant need predictors. Hospital contact was likely to occur if women had a) poor self-rated health (AOR = 0.476, p<.05), b) limited body functions (AOR = 3.028, p<.01) and c) low well-being[11]. Need characteristics made a significant contribution to the model (G^2 improvement = 36, 7 df, p<.001).

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[11] Data for well-being was transformed to refelct negative skew; text interpretations are thus counterintuitive to AOR direction.

Table 24 Adjusted odds ratio obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on contact with *hospitals* among New Zealand women (N=724)

Predictors	Models 1	Models 2	Models 3
Predisposing Characteristics			
Age	1.005	1.005	0.994
Marital status	0.883	0.886	0.914
Living alone	1.107	1.192	1.153
Social contacts	0.950	0.935	0.988
Paid employment	0.690 *	0.730	0.842
Qualifications	1.039	1.042	1.050
Ethnicity	0.857	0.787	0.782
Telephone	1.090	1.107	1.000
Health worries	1.863 **	1.863 **	1.282
Health control	1.356 **	1.367 **	1.179
Life events	2.261 ***	2.165 ***	2.186 ***
Enabling Characteristics			
Health insurance		0.962	0.958
CS card		1.292	1.297
Satisfied in standard of living		0.857	0.977
Adequacy of income		1.118	1.250
Fees limit access		1.032	0.922
Length of time seeing doctor[a]		1.723 *	1.809 *
Doctor gender		0.844	0.851
Transportation		1.186	1.291
Access to vehicle		1.567	1.949 *
Appointment convenient		0.629 *	0.592 **
Waiting room time		1.008	0.982
Need Characteristics			
Self rated health			0.476 *
Physical symptoms			2.830
Chronic symptoms			1.592
Well-being[b]			1.186 *
Distress			0.515
Activities of daily living			0.506
Bodily functioning			3.028 **
R2	0.076	0.097	0.142
G^2 improvement	56 ***	17	36 ***
Intercept	-3.064	-3.594	-3.589
Model G^2, df	56, 11 ***	17, 11	36, 7 ***

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

Serially comparing the results obtained from Model 1 with those from Models 2 and 3 decomposed the effect of predisposing, then enabling characteristics on hospital contact.

After the introduction of enabling characteristics the predisposing variable 'paid employment' became non-significant, despite an increase in magnitude (AOR = 0.730, p = .072). The AORs for the other predisposing variables in Model 2 also experienced only a modest change. With the introduction of need in Model 3, the relationship between predisposing characteristics and hospital contact substantively diminished. Need did not affect the significance of life events, however health worries and health control became non-significant. Modest changes were evidenced for enabling characteristics. Although the convenience of appointment times remained statistically significant, it too had a reduced magnitude (AOR = 0.592, $p<.01$). Vehicle access, became significant on this third step, (AOR = 1.949, $p<.05$), suggesting that women able to access a vehicle were more likely to have hospital contact.

To summarise hospital contact, only predisposing and need characteristics made a significant contribution to the model. Enabling characteristics did not make a significant contribution. On the final step, seven significant predictors were identified (life events, length of time seeing doctor, vehicle access, convenience of appointment, self-rated health well-being and bodily functioning). The fit of the final model was significant (G^2 = 31, 7 df; $p<.05$) and explained 14% of the variance. Table 24 documents these data.

9.4.6 Prescription items

For prescription items, the block of predisposing characteristics entered first into the equation made a statistically significant contribution to the model[12] and explained 5% of the variance (R^2=.053, $p<.001$). The G^2 improvement statistic indicated that predisposing characteristics made a unique and significant contribution (G^2 improvement = 58, 11 df, $p<.001$) to prescription item contact

Entering predisposing characteristics in the first block controlled for these variables and allowed inspection of their significance without the effects of enabling and need characteristics. As indicated by the AORs for Model 1 in Table 25, significant

Table 25 Adjusted odds ratio obtained from hierarchical logistic regression modeling on the effect of predisposing, enabling and need characteristics on whether or not *prescription items* were used by New Zealand women over a 12-month period (N=716)

Predictors	Models 1		2		3	
Predisposing Characteristics						
Age	1.012		1.012		0.990	
Marital status	0.868		0.997		0.965	
Living alone	1.100		1.173		1.128	
Social contacts	0.917		0.937		0.865	
Paid employment	0.780		0.919		1.088	
Qualifications	1.142	*	1.165	*	1.186	*
Ethnicity	0.866		0.777		0.693	
Telephone	1.445		1.577		1.411	
Health worries	2.516	***	2.531	***	2.063	***
Health control	1.030		1.017		0.904	
Life events	1.193		1.081		1.011	
Enabling Characteristics						
Health insurance			1.051		1.058	
CS card			1.639		1.555	
Satisfied in standard of living			1.152		1.152	
Adequacy of income			0.910		0.972	
Fees limit access			1.090		1.144	
Length of time seeing doctor[a]			1.361		1.390	
Doctor gender			1.079		1.159	
Transportation			1.456		1.399	
Access to vehicle			1.257		1.299	
Appointment convenient			0.777		0.752	
Waiting room time			0.975		0.961	
Need Characteristics						
Self rated health					0.502	
Physical symptoms					0.191	
Chronic symptoms					8.003	***
Well-being[b]					1.029	
Distress					0.533	
Activities of daily living					1.843	
Bodily functioning					1.986	
R^2	.053		.066		.110	
G^2 improvement	38	***	10		34	***
Intercept	-.189		-1.191		4.585	
Model G^2, df	38, 11	***	10, 11		34, 7	***

*p<.05, **p<.01, ***p<.001
[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR
[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

[12] Prescription item contact is described statistically in section 8.6

predisposing predictors were qualifications (AOR = 1.142, $p<.05$) and health worries, which had the largest effect (AOR = 2.516, $p<.05$). Thus, women predisposed to have use prescription items had a) higher qualifications and b) was worried about her health.

Having controlled for the effects of predisposing characteristics, enabling characteristics were entered in the second step (Model 2). They failed to reach statistical significance (G^2 improvement = 10, 11 df, $p>.05$) and no individual significant predictors were identified. Need characteristics were entered as the final block after controlling for predisposing and enabling characteristic. They explained 11% of the variance ($R^2 = .11$, $p<.001$) and indicated chronic conditions was the only significant need predictor (AOR = 1.376, $p<.001$). This suggested that women with a greater number of chronic health conditions were more likely to have used a prescription item. Need characteristics made a unique and significant contribution to the model (G^2 improvement = 34, 7 df, $p<.001$).

Serially comparing the results obtained from Model 1 with those from Models 2 and 3 decomposed the effect of predisposing, then enabling characteristics on contact with prescription items. The introduction of enabling characteristics had no meaningful impact on the relationship between predisposing characteristics and use of prescription items. This is indicated by minimal changes to the predisposing AORs in Model 2. After need was introduced in Model 3, inspection of the AORs for predisposing characteristics indicates the biggest reduction was for health worries (AOR = 2.063, $p<.001$). However, neither this nor any other changes were substantial. Similarly, only slight changes were evidenced for enabling characteristics after the introduction of need and no enabling variables became significant.

To summarise use of prescription items, only predisposing and need characteristics significantly contributed to the model. Enabling characteristics did not make a significant contribution. On the final step, three significant predictors were identified. These were qualifications, health worries and chronic conditions and suggested women more likely to use a prescription item were a) better educated, b) worried about their health and c) experienced chronic health conditions. The fit of the final model was

significant (G^2 = 34, 7 df; p<.05) and explained 11% of the variance. Table 25 documents these data.

9.5 Summary (contact)

This first set of analyses identified variables predicting whether or not New Zealand women were likely to have had 'contact' with a disability day, a bed day, GPs, health professionals, hospitals and prescription items. The objective was to determine if predisposing and enabling characteristics made unique and significant contributions to the model over and above need. Following Wolinsky and Johnson (1991) this was assessed by entering the blocks of independent variables (predisposing, enabling and need characteristics) serially into the model. This established the effects of predisposing variables and allowed assessment of their effects in isolation before decomposing them by serially introducing the distal effects of enabling and then need variables on the second and third steps respectively (F.D. Wolinsky, personal communication, February 16, 1998). The dichotomous dependent variables representing the health services enabled examination between service users and non-users through the use of logistic regression for the 964 female respondents.

Table 26 Summary table for contact P, E & N[a]: R^2 improvement obtained from each stage of hierarchical logistic regression modeling contact with health services for New Zealand women

	P		P & E		P E & N	
Health service contacted	**Predisposing increment**	**R^2**	**Enabling increment**	**R^2**	**Need increment**	**R^2**
Non-medical service						
Disability days	.086	.086***	.023	.109	.094	.203***
Bed days	.088	.088***	.011	.099	.037	.136***
Medical service						
GPs	.052	.052***	.021	.073	.023	.096*
Health professionals	.078	.078***	.038	.116**	.019	.135*
Hospitals	.076	.076***	.021	.097	.045	.142***
Prescription items	.053	.053***	.013	.066	.044	.110***

**p<.05, **p<.01, ***p<.001*
[a]P=predisposing, E=enabling, N=need

The focus of this summary is confined to three issues. The first is explained variance for each service. The second is the net contribution of each block to the overall fit of the final model. The third is to identification of significant predictors within each block.

Table 26 compares the explained variance for each service by displaying R^2 scores and their increments. This shows how much variance each block explains after their forced entry into the equation. The best fit was for disability days, where the model explained 20% of the variance (disability days, R^2= .203). This was followed by hospital contact, bed days and health professionals (each of which explained approximately 14% of the variance and prescription items (11% of the variance). The model fit the data least well for GP contact (only explaining 10% of the variance).

Table 26 also indicates that predisposing characteristics made a unique and significant contribution to the overall fit of the model for all six services. They explained most variance for non-medical services (approximately 9% for both disability days and bed days). Across all six services, a common significant predictor was health worries. Health worries was significant on the first two steps for all services, but failed to reach significance on the third step for disability days hospitals and health professionals. The direction of the adjusted odds ratios consistently indicated that the more worried a woman was, the more she was likely to have contacted the service. The largest effects were for use of bed days and prescription items. The second most consistent predictor was qualifications, reaching statistical significance in the final step for four of the six services (qualifications were not significant for bed days and hospital contact). The direction of the AORs indicated that for contact with GPs, health professionals and prescription items the more highly qualified a woman, the more likely she was to contact these services.

A review of G^2 improvement scores for enabling characteristics on the second step (Model 2) of the four types of medical services indicated this block was not as important in explaining variance as the predisposing variables. Enabling characteristics failed to make a unique and significant contribution for contact with disability days, bed days, GPs, hospitals and prescription items. They attained only attained statistical

Table 27 Summary table for contact measures: Adjusted odds ratios obtained from the final stage of hierarchical logistic regression modeling on measures of whether or not health services were contacted by New Zealand women[a]

	Measures of health services utilization					
	Non-medical services		Medical services			
Predictors	Disability days	Bed Days	GP contact	Health professionals	Hospital contact	Prescription items
Predisposing Characteristics						
Age	0.990	0.977 **	1.009	0.981 *	0.994	0.990
Marital status	0.813	0.801	1.431	1.207	0.914	0.965
Living alone	1.002	0.951	0.762	1.608	1.153	1.128
Social contacts	1.112	1.369 *	0.888	1.133	0.988	0.865
Paid employment	1.168	1.650 **	1.064	1.361	0.842	1.088
Qualifications	1.148 *	1.008	1.346 **	1.214 **	1.050	1.186 *
Ethnicity	0.508 **	0.795	0.756	0.460 ***	0.782	0.693
Telephone	1.644	1.459	0.720	0.986	1.000	1.411
Health worries	1.281	1.772 **	1.771 *	1.189	1.282	2.063 ***
Health control	1.057	0.911	0.820	0.883	1.179	0.904
Life events	1.060	1.172	1.392	1.046	2.186 ***	1.011
Enabling Characteristics						
Health insurance	0.806	1.099	1.297	2.325 ***	0.958	1.058
CS card	0.849	1.159	1.277	1.122	1.297	1.555
Satisfied in std of living	1.057	0.700	0.731	1.584	0.977	1.152
Adequacy of income	1.042	0.939	1.091	0.843	1.250	0.972
Fees limit access	0.810	0.996	0.788	1.577	0.922	1.144
Length of time seeing dr[a]	1.024	0.938	2.548 **	1.126	1.809 *	1.390
Doctor gender[b]	0.844	0.878	0.940	1.098	0.851	1.159
Transportation	0.778	1.057	1.101	0.450 **	1.291	1.399
Access to vehicle	0.798	1.106	0.950	0.898	1.949 *	1.299
Appointment convenient	0.632 *	0.905	1.586	0.917	0.592 **	0.752
Waiting room time	1.094	1.004	0.842 *	0.960	0.982	0.961
Need Characteristics						
Self rated health	0.636	0.439 **	0.424	0.663	0.476 *	0.502
Physical symptoms	2.452 ***	8.385	1.381	1.292	2.830	0.191
Chronic symptoms	0.862	1.094	3.015	1.538	1.592	8.003 ***
Well-being[b]	0.923	0.964	0.972	0.974	1.186 *	1.029
Distress	3.944	2.462	2.247	2.664	0.515	0.533
Activities of daily living	2.873 *	0.852	0.882	1.997	0.506	1.843
Bodily functioning	0.952	1.194	1.870	1.126	3.028 **	1.986
R2	.203	.136	.096	0.135	0.142	.110
Model G^2. df	80, 7 ***	30, 7 ***	16, 7 *	15, 7 *	36, 7 ***	34, 7 ***
Number of cases	721	722	721	724	724	716

*p<.05, **p<.01, ***p<.001

[a]Length of time seeing doctor transformed to reflect negative skew: text interpretations counterintuitive to AOR

[b]Well-being transformed to reflect negative skew: text interpretations counterintuitive to AOR

significance for use of health professionals (G^2 improvement = 22,9 df; p<.01, see Table 23). The most unique variance contributed by enabling characteristics was approximately 4% for health professionals (indicated by the enabling increment in Table 26). This summary table notes that enabling variables were significant for health professionals, but the point is that they did not greatly improve on the effects of predisposing variables.

For all services the introduction of need variables imposed moderate changes on enabling characteristics entered into the model. There was no single significant enabling predictor consistent across all six services (see Table 27).

Overall, women were more likely to have a cutback day if appointments were inconvenient, were likely to have contacted their GPs if they didn't have to wait long and had a long history of seeing that same physician. Women were more likely to use health professionals if they were insured and had used a private vehicle. Hospitals were more likely to be contacted if women could access a vehicle, including forms of public transport and could obtain a convenient appointment time and again had a long history of seeing the doctor. No significant enabling predictors were identified for use of prescription items or bed days.

A review of G^2 improvement scores for need characteristics on the third step (Model 3) indicated that need characteristics made a unique and significant contribution to the model for all medical services (see Table 26). Table 27 indicates that for GP and health professional utilization no individual significant individual need predictors were identified. Hospital contact was more likely for women who rated their health as poor and was three times more likely amongst women with bodily limitations. Women with chronic conditions were eight times more likely to use prescription items and three times more likely to use GPs. Women with physical or somatic symptoms were eight times more likely to take a bed day and five times[13] more likely to use prescription items.

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[13] 1 divided by AOR 0.191 equals 5.235, indicating contact is five times more likely.

9.6 Chapter overview

In summary, hypothesis one[14] was supported in full for use of health professionals (see Table 27). This indicates the importance of enabling characteristics in contacting non-essential health services. Although predisposing characteristics made a significant contribution to all services, enabling characteristics did not make a significant contribution for contact with bed days, disability days, GPs, hospitals and use of prescription items. Chapter 10 reports data from hypothesis two which predicted that *amongst users only, need will make a greater contribution to the explained variance than either predisposing or enabling characteristics.*

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[14] *Hypothesis one:* amongst users and non-users for each formal service, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

CHAPTER TEN

RESULTS: HYPOTHESIS TWO (VOLUME)

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10.1 Chapter preview

This is the second of five chapter reporting results from five stages of hypothesis testing. Chapter 10 reports findings from hypothesis two[1] which are concerned with the volume analyses. In contrast to the contact analyses which investigated whether or not a service had been used, the 'volume' analyses replicated the model to investigate the how often consumption occurred within a defined catchment period. Therefore, analyses were conducted only *amongst women who had established contact with the service* (as reported in hypothesis one). As in hypothesis one, results are presented sequentially, ranging from use of non-medical to use of medical services.

10.2 Hypothesis two: 'volume'

Hypothesis two examined 'volume' measures across the six services of disability days, bed days, GP, health professional, hospital utilization, prescription item utilization.

10.3 Data screening for 'volume' analyses

Prior to multivariate analyses variables were screened at the univariate level to determine whether they met the assumptions of normality required for multivariate analysis.

Independent variables

Independent variables were transformed as for stage one, reported in section 9.5.

Dependent variables

Unlike logistic regression, which does not require binary outcome variables to comply with the assumptions of normality, dependent variables for OLS regressions require

[1] *Hypothesis two:* amongst users only, need will make a greater contribution to the explained variance than either predisposing or enabling characteristics.

transformation. Due to the nature of the phenomenon under study, dependent variables are often positively skewed. This results when the majority of respondents from a sample report using a service a few times, such as once or twice a year, but a few respondents (perhaps due to chronic ailments) use the service more frequently. Noting this to be a common problem amongst health care variables when studying volume of physician visits, Wolinsky and Coe (1984) truncated the data at the percentile in the distribution where the tails became exceedingly flat, thus 13 or more visits were considered as 13 visits. This solution which has become commonly accepted in health care research (Eve, 1988; Millar, 1996; Withers et al., 1997; Wolinsky & Coe, 1984; Wolinsky & Johnson, 1991; Wolinsky & Johnson, 1992a) and applied to correct extreme positive skewness in the present study. The dependent variable for disability days was truncated at the 90th percentile (so that 50 more visits were statistically treated as 50 visits). Bed days, GP visits and health professional visits were all were truncated at the 95th percentile. This resulted in 24 or more bed days being statistically treated as 24 days, 20 or more GP visits being statistically treated as 20 visits and 4 or more health professional visits being statistically treated as 4 visits. Despite these corrections, disability days and bed days were still positively skewed. Skewness for disability days was corrected by square root transformation. Skewness for bed days was corrected by logarithmic transformation. These transformations were used from stages two to five for all further multivariate analyses investigating disability days. Bed days, GP and health professional utilization. The continuous volume variables for hospital use and prescription items were left untransformed for stages two to five as they conformed to the assumptions of normality at the univariate level.

10.4 Analysis of 'volume' measures

Hypothesis 2

Amongst users only, for each service, need will made a greater contribution to the variance than either predisposing or enabling characteristics.

To examine this hypothesis a series of hierarchical multiple regressions were conducted on the six health services under review. In order to test this and all remaining hypotheses ordinary least squares (OLS) regression analysis was used to estimate the parameters specified in the behavioural model. All of the statistical assumptions of OLS regression analysis were evaluated. Using conservative significance levels ($p < .001$), Mahalanobis distance established four multivariate outliers for disability days and bed days, five outliers for GP and hospital utilization, two outliers for health professional utilization and four outliers for the use of prescription items. These cases were deleted and the remaining cases retained for analysis. As with contact analyses, the order of entry for all volume analyses followed the rationale provided by Wolinsky and Johnson (1991). Predisposing variables were entered into the equation on the first step, followed by enabling variables on the second step and need variables on the third step.

10.4.1 Disability days

After deletion of four cases identified as multivariate outliers, 345 cases were retained for the analysis investigating volume of disability days. Table 28 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which disability days were utilized over a three-month period only amongst women who had reported taking a disability day in hypothesis one. As indicated by the beta coefficients in Table 28, significant predictors for predisposing variables entered on the first step were age, paid employment and health worries. The direction of the coefficients indicated that women who tended to take more bed days were a) older, b) not in paid employment and c) were worried about their health. Of these three significant variables, paid employment emerged as the strongest predictor ($\beta = -.206$ $p<.001$). No significant effects were found for marital status, living alone, social contacts, qualifications, ethnicity, telephone, health control and life events. The R^2 change statistic indicated that on this first step predisposing characteristics accounted for 14% of the variance and R was significantly different from zero at the end of the first step $\underline{F}$ (11, 333) = 4.964, $p<.001$. Predisposing characteristics made a unique and significant contribution to the model (R^2 change = .140, $p<.001$).

Table 28 Hierarchical multiple regression of predisposing, enabling and need characteristics on number of *disability days* taken over a 3-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=345)

	Steps		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	.133 *	.117	.011
Marital status	.034	.073	.050
Living alone	-.031	-.021	-.031
Social contacts	-.015	-.001	.001
Paid employment	-.206 ***	-.167 **	-.090
Qualifications	-.072	-.032	-.019
Ethnicity	.037	.006	-.003
Telephone	-.014	-.002	-.013
Health worries	.155 **	.153 **	.059
Health control	.085	.073	-.043
Life events	.050	.011	-.016
Enabling Characteristics			
Health insurance		-.018	-.006
CS card		.065	.052
Satisfied in standard of living		-.133 *	-.047
Adequacy of income		-.042	.032
Fees limit access		.022	.018
Length of time seeing doctor[a]		.047	.049
Doctor gender		.029	.029
Transportation		-.057	-.046
Access to vehicle		-.099	-.085
Appointment convenient		.001	-.037
Waiting room time		-.066	-.071
Need Characteristics			
Self rated health			-.198 ***
Physical symptoms			.136 *
Chronic symptoms			-.043
Well-being[b]			-.063
Distress			-.076
Activities of daily living			.305 ***
Bodily functioning			.090
R^2	.375	.428	.643
Total R^2	.140	.183	.414
Adjusted R^2	.112	.128	.360
R^2 change	.140 ***	.042	.230 ***
F	4.964 ***	3.295 ***	7.696 ***

*p<.05, **p<.01, ***p<.001.

[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation

[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

Having controlled for the effects of predisposing characteristics, enabling variables were entered on the second step. At this point, enabling characteristics did not make a significant contribution to the model (R^2 change = .042, p>.05). At the end of the second step, R was significantly different from zero F (11, 322) = 3.295, p<.001. Together, predisposing and enabling variables accounted for 13% of the explained variance (adjusted R^2 = .128).

Need characteristics were entered on the last step. Within this block, three significant predictors were detected as being significantly different from zero. These were self-rated health, physical symptoms and activities of daily living. The direction of the beta coefficients indicated that women who took more bed days were those who a) perceived their health as poor, b) had restricted daily activities, c) had more physical symptoms. Restricted activities of daily living emerged as the strongest predictor with the largest effect size (β = -.305, p<.001). In fact, activities of daily living emerged exhibited the greatest effect in comparison with all predisposing and enabling variables. At the end of the third step, R was significantly different from zero F (29, 315) = 7.696, p<.001 and together all variables accounted for 36% of the explained variance (adjusted R^2 = .360). At this point, need characteristics alone made a unique and significant contribution to the model of 23% (R^2 change = .230, p<.001), larger than the 14% contributed by predisposing characteristics and the 4% contributed by enabling characteristics.

Serially comparing the results from this third step decomposes the effects of predisposing, then enabling and finally need characteristics on use of disability days. The introduction of enabling characteristics into the equation did not substantially diminish the relationship between predisposing variables and the dependent variable. Age became non-significant and paid employment decreased in magnitude (β = -.167) but the overall impact of enabling characteristics on other predisposing variables was minimal. However, introduction of the need variables substantially affected the significance of both predisposing and enabling variables already in the equation. Continuing the downward trend evidenced in the 2nd step, paid employment became non-significant (β = -.090, p>.05) but still suggested women not in paid employment had more disability days. Health worries and satisfaction with standard of living also

became non-significant. This indicated the effects of health worries are mediated by need, so women who are worried may well have something to worry about (thus they are not the 'worried well' and do not worry unnecessarily).

To summarise the data investigating disability days, only the effects of predisposing and need characteristics were statistically significant (see Table 34). Need characteristics explained most of the variance (23%), followed by predisposing characteristics (14%). The addition of enabling characteristics, which contributed 4% to the explained variance (R^2 change = .042, p>.05), was not statistically significant. On the final step, need mediated the effects of the significant predisposing and enabling variables identified in steps one and two. Only need characteristics were significant predictors on the final step. These were self-rated health, activities of daily living and physical symptoms (see Table 28). Women who a) perceived their health as poor, b) who exhibited physical symptoms and c) whose daily activities were restricted took disability days more often. The overall fit of these data to the model was significant $\underline{F}$ (29,315) = 7.696, p<.001 and explained 36% (adjusted R^2 = .360) of variance accounting for the volume of disability days taken over a three-month period.

10.4.2 Bed days

After deletion of four cases identified as multivariate outliers, 327 cases were retained for the analysis investigating consumption of bed days. Table 29 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which bed days were taken over a 12-month period only amongst women who had previously reported having taken a bed day (identified in hypothesis one). The beta coefficients in Table 29 indicate health worries and health control were the two significant predictors for predisposing variables. More bed days were taken by women who were a) worried about their health and b) felt they had little control over their health. Health control was the strongest predictor (β = .148, p<.001). No significant effects were identified for age, marital status, living alone, social contacts, paid employment, qualifications, ethnicity, telephone and life events. R was significantly different from zero at the end of the first

Table 29 Hierarchical multiple regression of predisposing, enabling and need characteristics on number of *bed days* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=327)

Predictors	Steps 1	Steps 2	Steps 3
Predisposing Characteristics			
Age	.075	.066	-.025
Marital status	-.058	-.014	.008
Living alone	-.025	-.027	.014
Social contacts	-.004	.012	-.019
Paid employment	-.102	-.084	-.044
Qualifications	-.042	-.037	-.033
Ethnicity	.041	.050	.032
Telephone	.072	.075	.052
Health worries	.144 *	.164 **	.068
Health control	.148 **	.131 *	.043
Life events	.101	.057	.042
Enabling Characteristics			
Health insurance		-.016	-.001
CS card		-.055	-.042
Satisfied in standard of living		-.014	.001
Adequacy of income		-.122	-.071
Fees limit access		.026	.007
Length of time seeing doctor[a]		.075	.051
Doctor gender		-.093	-.080
Transportation		-.004	.022
Access to vehicle		-.087	-.051
Appointment convenient		-.014	-.027
Waiting room time		-.119 *	-.141 *
Need Characteristics			
Self rated health			-.152 *
Physical symptoms			.113
Chronic symptoms			.035
Well-being[b]			-.040
Distress			.060
Activities of daily living			.003
Bodily functioning			.121
R	.311	.376	.480
Total R^2	.096	.141	.230
Adjusted R^2	.065	.079	.155
R^2 ***change***	.096 ***	.044	.088 ***
F(	3.071 ***	2.282 ***	3.066 ***

*p<.05, **p<.01, ***p<.001.
[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation
[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

step F (11, 315) = 3.071, $p<.001$ and predisposing characteristics made a unique and significant contribution to the model (R^2 change = .096, $p<.001$) explaining 10% of the variance.

Having controlled for the effects of predisposing characteristics, enabling variables were entered on the second step. They did not make a significant contribution to the model (R^2 change = .044, $p>.05$). At the end of the second step, R was significantly different from zero F (11, 304) = 2.282, $p<.001$. Together, predisposing and enabling variables accounted for 8% of the explained variance (adjusted R^2 = .079).

Need characteristics were entered on the last step. Within this block, the only significant predictor to emerge was that of self-rated health (β =-.152, $p<.05$). The direction of the beta coefficient indicated that women who rated their health as poor took more bed days Self-rated health emerged as the strongest predictor with the largest effect size of all the predisposing, enabling and need variables. At the end of the third step, R was significantly different from zero F (29, 297) = 3.066, $p<.001$ and together all variables accounted for 16% of the explained variance (adjusted R^2 = .155). At this point, the block of need characteristics made a unique and significant contribution to the model of 9% (R^2 change = .088, $p<.001$).

Serially comparing the results from this third step decomposed the effects of predisposing, enabling and finally need characteristics on bed days (see Table 29). The introduction of enabling characteristics into the equation did not substantially diminish the relationship between predisposing variables and use of bed days. Both health worries and health control retained statistical significance. Introduction of need variables substantially affected the significance of predisposing characteristics but not enabling characteristics. Both health worries and health control became non-significant. This indicated that health worries and health control are mediated through need. Thus health worries and control directly contribute to an increased number of bed days partially through their relationship with need characteristics (principally self-rated health).

To summarise the data investigating frequency of bed days, only the effects of predisposing and need characteristics were statistically significant (see Table 34). Predisposing characteristics explained most of the variance (10%), followed by need characteristics (9%). The addition of enabling characteristics contributed 4% to the explained variance (R^2 change = .044, p>.05), but was not statistically significant. On the final step, need mediated the effects of the significant predisposing variables but not significant enabling characteristics (that had been identified in steps one and two). Two significant predictors remained on the final step, these being waiting room time and self-rated health (see Table 35). Data suggested women who a) felt their health was poor and b) who did not have to wait long in the doctor's waiting room took bed days more often. The overall fit of these data to the model was significant F (29,297) = 3.066, p<.001 and overall these data explained 15% (adjusted R^2 = .155) of variance accounting for the volume of bed days taken over a three-month period.

10.4.3 GP utilization

After deletion of five cases identified as multivariate outliers, 604 cases were retained for the analysis investigating volume of GP utilization. Table 30 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which GPs were utilized over a12-month period only amongst women who reported prior contact (as identified in hypothesis one). As indicated by the beta coefficients in Table 30 significant predictors for predisposing variables were paid employment, health worries and life events. The direction of the coefficients indicated that GP utilization was more frequent for women who were a) not in paid employment, b) were worried about their health and c) who had experienced more life events over the 12 month catchment period. Health worries emerged as the strongest predictor (β = .165, p<.001). No significant effects were identified for age, marital status, living alone, social contacts, qualifications, ethnicity, telephone and health control. R was significantly different from zero at the end of the first step F (11, 592) = 4.533, p<.001. Finally, predisposing characteristics did make a unique and significant contribution of 8% to the model (R^2 change = .077, p<.001).

Table 30 Hierarchical multiple regression of predisposing, enabling and need characteristics on number of *GP visits* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=604)

	Steps		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	.039	.020	-.110 *
Marital status	.016	.061	.057
Living alone	.031	.032	.042
Social contacts	-.037	-.029	-.015
Paid employment	-.092 *	-.058	-.015
Qualifications	.035	.050	.066
Ethnicity	.076	.058	.039
Telephone	-.033	-.012	-.034
Health worries	.165 ***	.173 ***	.073
Health control	.047	.040	-.039
Life events	.130 **	.126 **	.116 **
Enabling Characteristics			
Health insurance		.081	.097 *
CS card		.109 *	.105 *
Satisfied in standard of living		-.027	.006
Adequacy of income		-.006	.038
Fees limit access		.053	-.066
Length of time seeing doctor[a]		.074	.062
Doctor gender		-.066	-.058
Transportation		.018	.038
Access to vehicle		-.087	-.036
Appointment convenient		-.015	-.017
Waiting room time		-.037	-.059
Need Characteristics			
Self rated health			-.300 ***
Physical symptoms			.012
Chronic symptoms			.101 *
Well-being[b]			.051
Distress			.007
Activities of daily living			-.009
Bodily functioning			.087
R	.278	.330	.480
Total R^2	.077	.109	.231
Adjusted R^2	.060	.075	.192
R^2 change	.077 ***	.031 *	.122 ***
F	4.533 ***	3.230 ***	5.953 ***

*p<.05, **p<.01, ***p<.001.

[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation

[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

Having controlled for the effects of predisposing characteristics, enabling variables were entered on the second step. In contrast to disability days and bed days, enabling characteristics made a significant contribution to the model of 3% (R^2 change = .031, p<.05). Having a community services card was a significant predictor (β = .109, p<.05) which indicated that women with community services card went to the GP more often. At the end of the second step, R was significantly different from zero F (11, 581) = 3.230, p<.001 and together predisposing and enabling variables accounted for 8% of the explained variance (adjusted R^2 = .075).

Need characteristics were entered on the last step. Within this block, two significant predictors were detected as being significantly different from zero. These were self-rated health and chronic conditions. The direction of the beta coefficients indicated that women who used the GP more frequently were those who a) felt their health was poor and b) had more chronic conditions. Self-rated health emerged as the strongest predictor amongst all variables in the equation (β = -.300, p<.001). At the end of the third step, R was significantly different from zero F (29, 574) = 5.953, p<.001 and together all variables accounted for 19% of the explained variance (adjusted R^2 = .192). At this point, need characteristics alone made a unique and significant contribution to the model of 12% (R^2 change = .122, p<.05).

Serially comparing the results from this third step indicates the decomposition of the effects of predisposing, then enabling and finally need characteristics on GP utilization (see Table 30). The introduction of enabling characteristics into the equation did not substantially diminish the relationship between predisposing variables and frequency of GP use. Although the effect of being in paid employment became non-significant the impact on other predisposing variables was minimal. Health worries increased slightly (β = .175, p<.001) and life events dropped slightly (β = .126, p<.01). Introduction of the need variables substantially affected the significance of variables already in the equation. Continuing the downward trend evidenced in the 2nd step, health worries just lost its significance (β = .073, p=.081). This suggested that health worries were mediated by need and that health worries directly affected the number of visits made to the GP both on its own and partially through the its relationship with need

characteristics. Two variables increased significance on this third step. These were health insurance (β = .097, $p<.05$) and age (β = -.110, $p<.05$) suggesting that after accounting for need, younger women and insured women had more frequent use.

To summarise the data investigating volume of GP utilization, the net effects of predisposing, enabling and need characteristics were all statistically significant (see Table 34). Need explained most of the variance (12%), followed by predisposing (8%) and finally need characteristics (3%). On the final step, six significant predictors were identified (age, life events, health insurance, community services card, self-rated health and chronic conditions – see Table 30). This suggested women who frequently used the GP were a) younger, b) had experienced more life events, c) had health insurance, d) had a community services card, e) perceived their health as poor and f) reported more chronic health conditions. The overall fit of these data to the model was significant F (29, 574) = 5.953, $p<.001$. Overall these data explained 19% of variance accounting for GP utilization over a 12 month catchment period.

10.4.4 Health professionals

After deletion of five cases identified as multivariate outliers, 515 cases were retained for the analysis investigating frequency of health professional utilization by New Zealand women. Table 31 reports standardised regression coefficients, R, adjusted R^2 and R^2 change indicating the extent to which health professionals were utilized over a 12-month period only amongst women who reported prior contact with a health professional (identified in hypothesis one). As indicated by the beta coefficients in Table 31 three significant predisposing predictors identified in the first step were health worries, health control and having a telephone. The direction of the coefficients indicated that women who used health professional were those who a) had a phone, b) worried about their health and c) felt they had control over their health. Health worries emerged as the strongest predictor (β = .145, $p<.001$). No significant effects were found for age, marital status, living alone, social contacts, paid employment, qualifications,

Table 31 Hierarchical multiple regression of predisposing, enabling and need characteristics on use of *health professionals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=515)

		Steps	
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	-.020	.003	.007
Marital status	-.031	-.079	-.082
Living alone	-.008	-.008	-.033
Social contacts	.039	.038	.023
Paid employment	.025	.020	.077
Qualifications	.025	-.004	.026
Ethnicity	-.031	-.013	-.002
Telephone	.131 **	.132 **	.103 *
Health worries	.147 **	.151 ***	.048
Health control	.125 **	.130 **	.069
Life events	.063	.045	.004
Enabling Characteristics			
Health insurance		.072	.084
CS card		-.149 *	-.136 *
Satisfied in standard of living		-.065	-.005
Adequacy of income		-.127 **	-.083
Fees limit access		-.045	-.067
Length of time seeing doctor[a]		.096 **	.082
Doctor gender		.056	.060
Transportation		-.038	-.026
Access to vehicle		-.044	-.028
Appointment convenient		-.040	-.039
Waiting room time		.049	.036
Need Characteristics			
Self rated health			-.024
Physical symptoms			-.013
Chronic symptoms			-.014
Well-being[b]			-.035
Distress			.222 **
Activities of daily living			.189 **
Bodily functioning			.063
R	.265	.374	.445
Total R^2	.070	.120	.198
Adjusted R^2	.049	.081	.150
R^2 change	.070 ***	.050 **	.077 ***
F	3.455 ***	3.074 ***	4.136 ***

*p<.05, **p<.01, ***p<.001.

[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation

[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

ethnicity and life events. On this first step the block of predisposing characteristics made a unique and significant contribution to the model of 8% (R^2 change = .082, p<.001), where adjusted R^2 = .049.

On the second step, enabling variables made a unique and significant contribution to the model (R^2 change = .050, p<.05) and identified three significant predictors. These were a) length of time seeing the doctor, b) community services card and c) adequate income. Beta coefficients suggested frequent use occurred for women who a) did not have a community service card, b) whose income was not adequate and c) who had been consulting the same physician for a longer period of time. It is possible that women who have a history of seeking treatment from physicians have a propensity to seek treatment from other providers. At the end of the second step, R was significantly different from zero $\underline{F}$ (22,492) = 3.074, p<.001 and together predisposing and enabling variables accounted for 8% of the explained variance (adjusted R^2 = .081).

The addition of need characteristics on the last step identified two significant predictors, psychological distress and activities of daily living. The direction of the beta coefficients indicated that women who used more health professionals had a) elevated levels of distress and b) had restricted daily activities. Distress emerged as the strongest predictor amongst all variables, with the largest effect size (β = -.214, p<.001). Need variables made a unique and significant contribution to the overall model of 8% (R^2 change = .077, p<.001).

Serially comparing the results on the third step decomposed the effects of predisposing, then enabling and finally need characteristics on GP utilization (see Table 31). The introduction of enabling characteristics had minimal impact on predisposing variables; for example, effect sizes for having a telephone, health worries and health control only increased slightly at the third decimal place. The introduction of the need variables substantively affected the significance of variables already in the equation. Health worries, health control, adequacy of income and length of time seeing the doctor became non-significant although the direction of their effects remained the same. This indicated that when taking need into account, more health professional were used by women who

had a) a telephone, b) were without a community services card, c) were distressed and d) had restricted daily activities.

To summarise the data investigating volume of health professional utilization , the net effects of predisposing, enabling and need characteristics were all statistically significant (see Table 34). Predisposing and need variables explained similar amounts of the variance (almost 8% apiece). Enabling characteristics explained 5% of the variance. On the final step, four significant predictors were identified (having a telephone, not having community services card, being distressed and having restricted daily activities – see Table 31). The overall fit of these data to the final model was significant $\underline{F}$ (29,485) = 4.136, $p<.001$ and overall these data explained 15% of variance accounting for the volume of health professional use over a 12-month period.

10.4.5 Hospital utilization

After deletion of two cases identified as multivariate outliers, 241 cases were retained for the analysis investigating volume of hospital use. Table 32 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which hospitals were utilized over a 12 month catchment period only amongst women who had reported prior hospital contact (identified in hypothesis one). As indicated by the beta coefficients in Table 32 significant predictors for predisposing variables entered on the first step were qualifications, health worries and life events. The direction of the coefficients indicated that hospital services were used more frequently by women who had a) fewer qualifications, b) health worries and c) had experienced more life events. Life events was the strongest predictor (β = .167, $p<.05$) and no significant effects were identified for age, marital status, living alone, social contacts, paid employment, ethnicity, having a telephone and health control. The R^2 change statistic indicated that on this first step predisposing characteristics accounted for 11% of the variance. and made a unique and significant net contribution to the model (R^2 change = .107, $p<.01$). R was significantly different from zero at the end of the first step $\underline{F}$ (11, 229) = 2.634, $p<.01$.

Table 32 Hierarchical multiple regression of predisposing, enabling and need characteristics on use of *hospitals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=241)

	Steps		
Predictors	**1**	**2**	**3**
Predisposing Characteristics			
Age	.104	.128	-.037
Marital status	.072	.102	.101
Living alone	-.025	-.027	.017
Social contacts	-.018	-.023	-.025
Paid employment	-.053	-.017	.047
Qualifications	-.141 *	-.104	-.088
Ethnicity	.131	.118	.077
Telephone	.038	.038	.012
Health worries	.144 *	.128	.061
Health control	.048	.032	-.019
Life events	.167 *	.166	.155
Enabling Characteristics			
Health insurance		.063	.085
CS card		.103	.115
Satisfied in standard of living		-.026	-.041
Adequacy of income		.002	.016
Fees limit access		.045	.052
Length of time seeing doctor[a]		.049	.030
Doctor gender		.111	.139 *
Transportation		-.081	-.071
Access to vehicle		-.101	-.070
Appointment convenient		-.072	-.098
Waiting room time		.002	-.008
Need characteristics			
Self rated health			-.117
Physical symptoms			-.057
Chronic symptoms			.227 *
Well-being[b]			-.102
Distress			.091
Activities of daily living			.048
Bodily functioning			.012
R	.335	.387	.453
Total R^2	.112	.150	.205
Adjusted R^2	.064	.069	.096
R^2 change	.112 **	.037	.055 *
F	2.634 **	1.751 *	1.885 **

*p<.05, **p<.01, ***p<.001.
[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation
[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

Having controlled for the effects of predisposing characteristics, enabling variables were entered on the second step. No individual significant predictors were identified within this block. Enabling characteristics did not make a unique and significant contribution to the model (R^2 change = .037, p = .556). Despite the absence of individual significant predictors, at the end of the second step R was significantly different from zero F (22,218) = 1.751, p<.05. Together predisposing and enabling variables accounted for 6% of the explained variance (adjusted R^2 = .064).

Need characteristics were entered on the last step. Within this block, chronic conditions were detected as being significantly different from zero. The direction of the beta coefficients indicated that women with more chronic conditions used hospitals with increasing frequency. Chronic conditions had the biggest effect size of all variables (β = 227, p<.05) . At the end of the third step, R was significantly different from zero F (29,1.88) = 1.88, p<.01 and together all variables accounted for 10% of the explained variance (adjusted R^2 = .096). Need characteristics made a unique and significant contribution to the model of 5% (R^2 change = .055, p<.05).

Serially comparing the results from this third step decomposes the effects of predisposing, then enabling and finally need characteristics on hospital utilization (see Table 32). The introduction of enabling characteristics into the equation impacted on the relationship between predisposing characteristics and hospital use. Educational qualifications, health worries and life events became non-significant. This suggested that health worries, education and life events were mediated in part through the enabling entered in step two. Thus as well as influencing the number of hospital visits these predisposing variables contribute to increased use partially through their relationship with enabling characteristics. Introduction of the need variables also affected the significance of variables already in the equation. On this final step, GP gender attained statistical significance (β = .139, p<.05). This indicated need acted as a supressor on GP gender and that with the addition of the need variables, physician sex directly influenced hospital use.

To summarise the data investigating volume of hospital use, the blocks of predisposing and need characteristics were statistically significant (see Table 34). Predisposing characteristics explained most of the variance (11%), followed by need (5%). Enabling characteristics contributed 4% to the explained variance but was not statistically significant (R^2 change = .037, p=.556). On the final step, two significant predictors were identified (doctor gender and chronic conditions, see Table 32). These indicated hospital services were frequently used by women who a) preferred a female doctor and b) had more chronic complaints. The overall fit of these data to the model was significant $\underline{F}$ (29,211) = 1.885, p<.01 and overall these data accounted for 10% of variance explaining use of hospital over a 12 month catchment period.

10.4.6 Prescription items

After deletion of four cases identified as multivariate outliers, 565 cases were retained for the analysis investigating women's use of prescription items over the course of 12 months. Table 33 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which prescription items were utilized amongst women who had reported prior contact (identified in hypothesis one). As indicated by the beta coefficients in Table 33 significant predictors for predisposing variables entered on the first step were age, paid employment, health worries and health control. The direction of beta weights suggested that frequent users of prescription items were women who were a) older, b) not in paid employment, c) had health worries and d) had little health control. The largest effect size was for age (β = .149, p<.01). The R^2 change statistic indicated that on this first step predisposing characteristics made a unique and significant contribution to the model and accounted for a whopping 22% of the variance (R^2 change = .218, p<.001). R was significantly different from zero at the end of the first step $\underline{F}$ (11, 553) = 14.086, p<.001.

Table 33 Hierarchical multiple regression of predisposing, enabling and need characteristics on number of *prescription items* used over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=565)

Predictors	Steps 1	Steps 2	Steps 3
Predisposing Characteristics			
Age	.308 ***	.291 ***	.149 **
Marital status	-.004	.009	.000
Living alone	-.023	-.013	-.013
Social contacts	-.138	-.054	-.047
Paid employment	-.065 ***	-.120 **	-.065
Qualifications	-.059	-.035	-.017
Ethnicity	.072	.066	.041
Telephone	.077	.167 *	.055
Health worries	.163 ***	.094 ***	.056
Health control	.162 ***	.157 ***	.063
Life events	.008	-.018	-.062
Enabling Characteristics			
Health insurance		-.021	-.022
CS card		.031	.014
Satisfied in standard of living		-.094 *	-.036
Adequacy of income		-.042	-.002
Fees limit access		-.058	-.073 *
Length of time seeing doctor[a]		.062	.056
Doctor gender		-.035	-.027
Transportation		-.025	-.012
Access to vehicle		-.026	.005
Appointment convenient		-.038	-.041
Waiting room time		.000	-.025
Need Characteristics			
Self rated health			-.221 ***
Physical symptoms			.009
Chronic symptoms			.179 ***
Well-being[b]			-.021
Distress			.115 *
Activities of daily living			.112 *
Bodily functioning			.031
R	.467	.489	.617
Total R^2	.218	.239	.381
Adjusted R^2	.203	.208	.347
R^2 change	.218 ***	.020	.142 ***
F	14.080 ***	7.750 ***	11.370 ***

*p<.05, **p<.01, ***p<.001.
[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation
[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

Having controlled for the effects of predisposing characteristics, enabling variables were entered on the second step. Enabling characteristics did not make a significant contribution (R^2 change = .020, p = .207). At the end of the second step, R was significantly different from zero F (22,542) = 7.750, p<.001 and together predisposing and enabling variables accounted for 21% of the explained variance (adjusted R^2 = .208).

Need characteristics were entered on the last step. Within this block, four predictors were detected as being significantly different from zero. These were self-rated health, chronic conditions, psychological distress and activities of daily living. The direction of the beta coefficients indicated that frequent users of prescription items were women who a) had poor self-rated health, b) had more chronic conditions, c) had higher distress scores and c) had restricted daily activities. At this point, need characteristics alone made a unique and significant contribution to the model and contributed 14% of the explained variance (R^2 change = .142, p<.001). At the end of the third step, R was significantly different from zero F (29,535) = 11.373, p<.001 and together all variables accounted for 35% of the explained variance (adjusted R^2 = .347).

Serially comparing the results from this third step decomposed the effects of predisposing, then enabling and finally need characteristics on use of prescription items. The introduction of enabling characteristics into the equation did not substantially diminish the relationship between predisposing variables already in the equation and the use of prescription items. No predisposing variables lost their significance and although having a telephone became significant (β = .167, p<.05) the impact on other predisposing variables was minimal. The introduction of need substantially affected the significance of variables already in the equation. Paid employment, having a telephone, health worries, health control and satisfaction with standard of living all became non-significant. This suggested that these predisposing and enabling variables were mediated in part through the need variables entered on step three. Therefore, their contribution toward frequent use of prescription items was partially influenced through their relationship with need characteristics. On the third step GP fees (β = -.073, p<.05) became significant which suggested a suppression effect; i.e., with the addition of the

need variables the restriction of doctor fees was lifted allowing it to attain significance in explaining use of prescription items.

To summarise the data investigating how often prescription items were used, only the net effects of predisposing and need characteristics were statistically significant (see Table 34). Predisposing characteristics explained most of the variance (22%), followed by need (14%). The addition of enabling characteristics was not statistically significant. On the final step, six significant predictors were identified (age, fees, self-rated health, chronic conditions, psychological distress and activities of daily living – see Table 33). The overall fit of these data to the model was significant $\underline{F}$ (29,535) = 11.373, p<.001 and explained 35% of the variance accounting for use of prescription items over a 12 month catchment period.

10.4.7 Satisfaction effects

To determine the effects of satisfaction on the four types of formal services a series of OLS regressions were conducted. Satisfaction was entered as part of the first block of predisposing characteristics. Satisfaction did not make a further contribution to the explained variance and significance was not attained for disability days (β = .000, p=.985), bed days (β = .085, p=.122), GPs (β = .031, p=.448), health professionals (β = .040, p=.369), hospitals (β = .028, p=.673), or prescription items (β = .011, p=.759)

10.5 Summary (volume)

These analyses identified predictors showing often New Zealand women took disability and bed days, used their GP, health professionals, hospitals and prescription items. The objective was to determine if need made a greater contribution to the explained variance than either predisposing or enabling characteristics. The six health services were represented as continuous dependent variables that allowed assessment of their relationship with the independent variables using OLS regression technique. As with hypothesis one, following Wolinsky and Johnson (1991), predisposing characteristics

were entered into the equation first followed by enabling and finally need characteristics. Serial entry in this order followed these authors' sequential explanatory pattern to assess the effects of enabling and need variables after assessing the effects of predisposing characteristics in isolation.

This summary focuses on two issues. The first is the net contribution of each block to the model, assessed by the R^2 change score on their respective entry levels and the extent to the model explained total variance for each service (see Table 34). The second is the identification of significant predictors within each block on the final step (see Table 35).

Table 34 Summary table for volume P, E & N[a]: R^2 change (adjusted increments) and adjusted R^2 obtained from each stage from hierarchical OLS regression modeling of health services utilized by New Zealand women

	P		P & E		P Enabling & N	
Health service contacted	Adjusted Predisposing increment	Adjusted R^2	Adjusted Enabling increment	Adjusted R^2	Adjusted Need increment	Adjusted R^2
Non-medical service						
Disability days	.112***	.112	.016	.128	.232***	.360
Bed days	.065***	.065	.014	.079	.071***	.155
Medical service						
GPs	.060***	.060	.015*	.075	.115***	.192
Health professionals	.049***	.049	.032**	.081	.069**	.150
Hospitals	.069***	.069	.005	.064	.027*	.096
Prescription items	.203***	.203	.005	.208	.139*	.347*

*p<.05, **p<.01, ***p<.001
[a]P=predisposing, E=enabling, N=need

Table 34 summarises the extent to which the individual blocks of predisposing, enabling and need characteristics uniquely contributed to the variance (indicated by the adjusted increments) and presents overall variance explained by each type of service. For each service, the R^2 change scores on the first step showed that predisposing characteristics made a unique and significant contribution to the overall fit of the model. Need characteristics explained more variance than predisposing for disability days, bed days, GPs and health professionals. For disability days, need explained 23% as opposed to predisposing's 11%. For GP use need explained 12% as opposed to predisposing's 6%

Table 35 Summary table for *volume* measures: Standardised coefficients, R, adjusted R^2 and R^2 change obtained from the final stage of the Hierarchical Regression modeling on measures of health services for New Zealand women.

	Measures of health services utilization					
	Non-medical services		Medical services			
Predictors	Disability days	Bed days	GP utilization	Health professionals	Hospital utilization	Prescrip-tion items
Predisposing Characteristics						
Age	.011	-.025	-.110 *	.007	-.037	.149 **
Marital status	.050	.008	.057	-.082	.101	.000
Living alone	-.031	.014	.042	-.033	.017	-.013
Social contacts	.001	-.019	-.015	.023	-.025	-.047
Paid employment	-.090	-.044	-.015	.077	.047	-.065
Qualifications	-.019	-.033	.066	.026	-.088	-.017
Ethnicity	-.003	.032	.039	-.002	.077	.041
Telephone	-.013	.052	-.034	.103 *	.012	.055
Health worries	.059	.068	.073	.048	.061	.056
Health control	-.043	.043	-.039	.069	-.019	.063
Life events	-.016	.042	.116 **	.004	.155	-.062
Enabling Characteristics						
Health insurance	-.006	-.001	.097 *	.084	.085	-.022
CS card	.052	-.042	.105 *	-.136 *	.115	.014
Satisfied in std of living	-.047	.001	.006	-.005	-.041	-.036
Adequacy of income	.032	-.071	.038	-.083	.016	-.002
Fees limit access	.018	.007	-.066	-.067	.052	-.073 *
Length of time seeing dr[a]	.049	.051	.062	.082	.030	.056
Doctor gender	.029	-.080	-.058	.060	.139 *	-.027
Transportation	-.046	.022	.038	-.026	-.071	-.012
Access to vehicle	-.085	-.051	-.036	-.028	-.070	.005
Appointment convenient	-.037	-.027	-.017	-.039	-.098	-.041
Waiting room time	-.071	-.141 *	-.059	.036	-.008	-.025
Need Characteristics						
Self rated health	-.198 ***	-.152 *	-.300 ***	-.024	-.117	-.221 ***
Physical symptoms	.136 *	.113	.012	-.013	-.057	.009
Chronic symptoms	-.043	.035	.101 *	-.014	.227 *	.179 ***
Well-being[a]	-.063	-.040	-.050	-.035	-.102	-.021
Distress	-.076	.060	.007	.222 **	.091	.115 *
Activities of daily living	.305 ***	.003	-.009	.189 **	.048	.112 *
Bodily functioning	.090	.121	.087	.063	.012	.031
R	.643	.480	.480	.445	.453	.617
Total R^2	.414	.230	.231	.198	.205	.381
Adjusted R^2	.360	.155	.192	.150	.096	.347
F	7.70 ***	3.07 ***	5.95 ***	4.14 ***	1.89 **	11.37 ***
Number of cases	345	327	604	515	241	565

*p<.05, **p<.01, ***p<.001.
[a]Length of time seeing doctor transformed to reflect negative skew: sign reversed to ease text interpretation
[b]Well-being transformed to reflect negative skew: sign reversed to ease text interpretation

and for health professionals need explained 7% as opposed to the 5% explained by predisposing characteristics. With regards to individual significant predictors, health

worries was significant on the first step for all six services and significant on the second step for five services (hospital use was the exception). This indicates that on its own, health worries are associated with how often services are used, but its importance diminishes after taking need variables into account. The third step for all volume analyses are summarised in Table 35.

A review of adjusted R^2 increment scores on the second step indicated that enabling characteristics were not as important as either predisposing or need characteristics. For health professionals enabling characteristics contributed 3% of the variance, for the remaining health services they contributed approximately 1% to the explained variance. The majority of significant predictors were fiscally related – possession of a community services card, fees and adequacy of income and the proxy income indicator of satisfaction in standard of living. The exception was hospital use, where GP gender was identified as significant on the final step; however, no significant enabling predictors were identified for hospital use on the second step.

A review of adjusted increments on the third step indicated that need made a significant contribution to each service (see Table 34). Table 35 shows women with poor self-rated health used more health services. Chronic conditions were identified as significant in predicting use of GPs, hospitals and prescription items. As the number of chronic conditions increased use became more frequent. Activities of daily living predicted use of disability days, health professionals and prescription items. Well-being did not influence use of any health service. Need explained less variance than predisposing characteristics did for ongoing use of hospitals and prescription items.

In summary, hypothesis two[2] was supported for disability days, bed days, GPs and health professionals (see Table 34). Predisposing characteristics made a significant contribution to all six services. It explained more of the variance than need variables for the use of bed days, hospitals and prescription items. Enabling characteristics were less important for volume analyses and only significant contributed to use of GPs and health

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[2] *Hypothesis two*: amongst users only, need will make a greater contribution to the explained variance than either predisposing or enabling characteristics

professionals. Need variables explained more variance than predisposing and enabling characteristics for disability days, bed days, GPs and health professionals.

The model explained 36% of the variance for disability days, 16% for bed days, 19% for GP utilization, 15% for health professional utilization, 10% for hospital utilization and 35% for use of prescription items. Finally, no evidence was found identifying satisfaction as a significant predictor for any of the services.

10.6 Chapter overview

This chapter has reported the data analysed for hypothesis two[3] as it applied to each of the six health services. This hypothesis was supported for use of disability days, bed days, GPs and health professionals (see Table 34). Although predisposing characteristics made a significant contribution to all six services, enabling characteristics did not make a significant contribution for use of bed days, disability days, hospitals and prescription items. Chapter 11 reports analysis of the data to test hypothesis three which predicted *that the inclusion of traumatic events as an aggregate measure will significantly predictu the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).*

[3] *Hypothesis two:* amongst users only, need will make a greater contribution to the explained variance than either predisposing or enabling characteristics.

CHAPTER ELEVEN

RESULTS: HYPOTHESIS THREE (OVERALL TRAUMA)

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11.1 Chapter preview

This chapter is the third of five chapters reporting results from five stages of hypothesis testing. Chapter 11 reports the findings from hypothesis three[1] which are concerned with the overall effect that trauma has on women's patterns of health care utilization. In contrast to the first two hypotheses where six health services were regressed onto 29 independent variables (30 including satisfaction) hypotheses three to five departed from model replication and moved to expand the model. To examine this hypothesis, six OLS regressions were conducted that controlled for *significant* model predictors that had been identified for each service by entering them in the first step. A score representing total, or overall, trauma was entered on the second step. Thus, not all 29 independent variables were forced into the regression equation. Using only the significant predictors identified in the second hypothesis served two purposes. Firstly, it streamlined the model's structure, as use of fewer variables optimised parsimony. Secondly it afforded the advantage of gaining a higher response rate (variables missing data resulted in a lower N during hypotheses one and two). As in hypotheses one and two, results in chapter 11 are presented sequentially and range from use of non-medical to use of medical services.

11.2 Hypothesis three: 'overall traumatic events'

Hypothesis three examined the effect of overall traumatic events on health care utilization. The aim of this hypothesis was to establish if these events accounted for significant variance in health care utilization over and above significant predisposing, enabling and need variables identified for each health service in hypothesis two.

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[1] *Hypothesis three:* the inclusion of traumatic events as an aggregate measure will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in stage two).

11.3 Data screening for 'traumatic events'

Prior to multivariate analyses, variables were screened at the univariate level to determine whether they met the assumptions of normality required for multivariate analysis.

Independent variables

Independent variables from the model (termed model predictors) were transformed as for stages one and two, reported in section 9.5. Assessment of the aggregate number of traumas referred to the total number of traumatic events each individual reported experiencing at least once in their lifetime. The score ranged from 0 to 8, (mean = 1.274, SD = 1.509) and did not take into account multiple experiences of the trauma.

Dependent variables

Transformation of dependent variables remained unchanged from stage two, reported in section 10.3.

11.4 Analysis of 'traumatic events'

Hypothesis 3

The inclusion of trauma as an aggregate measure will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by model (in hypothesis two).

Stage three examined this hypothesis amongst women who had reported prior contact with a service (as in hypothesis two). A series of OLS hierarchical multiple regressions were applied. For each service, significant predisposing, enabling and need characteristics identified in hypothesis two (i.e., significant model predictors) were entered in the first step of the regression equation. The aggregate score representing total traumatic events was entered on the second step. Results are reported below.

11.4.1 Disability days

Checks for multivariate outliers identified five cases that fell outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted, resulting in a total of 453 cases retained for analysis. Hypothesis two had identified three significant predictors on the final step of the model for women who had taken a disability day. These three predictors (self-rated health, physical symptoms and activities of daily living) were entered into the equation on step one (see Table 36). All three variables were statistically significant, indicating disability days were taken by women who had a) poor self-rated health, b) many physical problems and c) had restricted daily activites. Adjusted R^2 scores indicated these model predictors accounted for 34% of the variance and R was significantly different from zero at the end of the first step F (3,449) = 80.705, p<.001.

Table 36 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which aggregate traumatic events affected use of disability days taken over a three-month period.

Table 36 Hierarchical multiple regression of effect of significant model predictors and traumatic events on number of *disability days* taken over a 3-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=453)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Self rated health	-.218 ***	-.220 ***
Physical symptoms	.110 *	.104 *
Activities of daily living	.383 ***	.381 ***
Traumatic events		.020
R	.519	.592
Total R^2	.350	.350
Adjusted R^2	.345	.344
R^2 change	.350 ***	.000
F	80.705 ***	60.497 ***

*p<.05, **p<.01, ***p<.001.

Having controlled for the effects of significant model predictors the aggregate score for exposure to traumatic events was entered on the second step. The total number of traumatic events did not significantly predict frequency of disability days taken (β = 020, p=.604). The significance of the model predictors remained stable. At the end of the second step, R was significantly different from zero F (4,448) = 60.497, p<.001 and all variables explained 34% of the variance (adjusted R^2 = .344).

To summarise, significant model predictors (poor self-rated health, physical problems and restricted daily activities) explained 34% of the variance for use of disability days. Total traumatic events did not make a significant and unique contribution to the use of disability days.

11.4.2 Bed days

Checks for multivariate outliers identified three cases that fell outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted, resulting in a total of 443 cases retained for analysis. Hypothesis two had identified two significant predictors from Andersen's model on the final step of the regression for women who had taken a bed day over the past 12 months. These two predictors (waiting room time and self-rated health) were entered into the equation on step one. Self-rated health attained significance, while waiting room time did not (see Table 37) indicating women with poor self-rated health took more bed days. Adjusted R^2 scores indicated that on this first step the model predictors accounted for 11% of the variance and R was significantly different from zero at the end of the first step F (2,440) = 26.990, p<.001.

Having controlled for the effects of significant model predictors the aggregate score for exposure to traumatic events was entered on the second step. Exposure to traumatic events was a significant predictor in the ongoing use of bed days taken over a 12-month period (β = .169, p<.001). Traumatic events made a unique and significant contribution to the model (R^2 change =.028, p<.001). The significance of the model predictors remained stable on the second step. At the end of the second step, R was significantly

different from zero F (3, 439) = 23.305, $p<.001$ and all variables explained 13% of the variance (adjusted $R^2 = .131$).

Table 37 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which exposure to traumatic events affected use of bed days taken over a 12-month period.

Table 37 Hierarchical multiple regression of effect of significant model predictors and traumatic events on number of *bed days* taken over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=443)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Waiting room time	.016	-.003
Self rated health	-.330 ***	-.317 ***
Traumatic events		.169 ***
R	.330	.370
Total R^2	.109	.137
Adjusted R^2	.105	.131
R^2 change	.109 ***	.028 ***
F	26.990 ***	23.303 ***

*p<.05, **p<.01, ***p<.001.

To summarise use of bed days for hypothesis three, predictors from the model explained 11% of the variance. Exposure to traumatic events was a significant predictor in the use of bed days and contributed a further 3% to the variance.

11.4.3 GP utilization

Checks for multivariate outliers identified three cases that fell outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted, resulting in a total of 783 cases retained for analysis. Hypothesis two had identified six significant predictors from Andersen's model on the final step of the regression for women who had used GPs over the past 12 months. These six predictors (age, life events, health insurance,

community services card, self-rated health and chronic symptoms) were entered into the equation on step one. Life events, self-rated health and chronic symptoms attained significance, while age, community services card and health insurance did not (see Table 38). Beta weights indicated use was more common amongst women who a) had experienced more life events, b) had poor self-rated health and c) experienced a high number of chronic symptoms. The adjusted R^2 indicated that on this first step, predisposing, enabling and need characteristics accounted for 17% of the variance and R was significantly different from zero at the end of the first step F (6,776) = 27.666, p<.001.

Table 38 Hierarchical multiple regression of effect of significant model predictors and traumatic events on number of *GP visits* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=783)

	Step	
Predictors	1	2
Significant model predictors		
Age	-.057	-.057
Life events	.128 ***	.129 ***
Health insurance	.046	.046
CS card	.065	.065
Self rated health	-.335 ***	-.335 ***
Chronic symptoms	.113 **	.113 **
Traumatic events		.000
R	.419	.419
Total R^2	.176	.176
Adjusted R^2	.169	.168
R^2 change	.176 ***	.000
F	27.666* ***	23.683 ***

*P<. 05, **p<. 01, ***p<. 001.

Having controlled for the effects of significant predisposing, enabling and need characteristics the aggregate score representing exposure to traumatic events was entered on the second step. Exposure to traumatic events did not significantly predict frequency of GP use. The significance of the predisposing, enabling and need variables remained stable for all variables. At the end of the second step, R was significantly different from zero F (7,775) = 23.683, p<. 001 and all variables explained 17% of variance (adjusted R^2 = .168).

To summarise GP utilization for hypothesis three, significant predisposing, enabling and need characteristics explained 17% of the variance. Total traumatic events did not make a significant and unique contribution to the use of GP services.

11.4.4 Health professionals

Checks for multivariate outliers identified five cases that fell outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted, resulting in 668 cases retained for analysis. Hypothesis two had identified four significant predictors from the model on the final step of the regression for women who had used a health professional over the past 12 months. These four predictors (telephone, community services card, psychological distress and activities of daily living) were entered into the equation on step one. All predictors attained significance (see Table 39), indicating use for women who a) had a telephone, b) did not have a community services card, c) were distressed and d) had restricted daily activities. Adjusted R^2 indicated step predisposing, enabling and need characteristics accounted for 15% of the variance and R was significantly different from zero at the end of the first step $\underline{F}$ (4,663) = 30.343, p<. 001.

Having controlled for the effects of significant predisposing, enabling and need characteristics the aggregate score representing exposure to traumatic events was entered on the second step. Traumatic events almost attained statistical significance predicting use of health professionals (adjusted R^2 = .004, p = .0536). The significance of the predisposing, enabling and need variables remained stable. At the end of the second step, R was significantly different from zero $\underline{F}$ (5,662) = 25.112, p<. 001 and all variables explained 15% of the variance (adjusted R^2 = .154).

Table 39 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which exposure to traumatic events affected use of health professionals over a 12-month period only amongst women who had reported prior contact (identified in hypothesis one).

Table 39 Hierarchical multiple regression of effect of significant model predictors and traumatic events on use of *health professionals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=668)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Telephone	.113 **	.116 **
CS card	-.127 ***	-.133 ***
Distress	.218 ***	.203 ***
Activities of daily living	.255 ***	.251 ***
Traumatic events		.072 [a]
R	.393	.399
Total R2	.154	.159
Adjusted R2	.149	.153
R^2 change	.154 ***	.004 [b]
F (	30.343 ***	25.112 ***

[a] p=:0537
[b] R^2 change p=.0537
*p<.05, **p<.01, ***p<.001.

To summarise use of health professionals for hypothesis three, significant model predictors of not having a community services card, having a telephone, being distressed and having restricted daily activities explained 15% of the variance. Exposure to traumatic events did not make a significant and unique contribution to the use of health professionals, nor did it add to the explained variance. However, statistical significance was almost attained (β = .072, p = .053) for traumatic events when predicting use of health professionals.

11.4.5 Hospital utilization

Checks for multivariate outliers identified one case that fell outside the criteria for inclusion set by Mahalanobis distance. This case was deleted, resulting in a total of 288 cases being retained for analysis. Stage two had identified two significant predictors from Andersen's model on the final step of the regression for women who had used a hospital (i.e., had either been admitted, or had used the outpatient or accident and emergency service) over the past 12 months. These two predictors (GP gender and

chronic symptoms) were entered into the equation on step one, where both predictors attained significance (see Table 40). As in stage two, data indicated frequency of hospital use for women who a) reported elevated chronic symptoms and b) who went to female physicians. The adjusted R^2 indicated on this first step Andersen's model predictors accounted for 6% of the variance and R was significantly different from zero at the end of the first step F (2,285) = 9.967, p<.001.

Table 40 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which exposure to traumatic events affected use of hospitals over a 12-month period only amongst women reporting prior contact (identified in stage one).

Table 40 Hierarchical multiple regression of effect of significant model predictors and traumatic events on use of *hospitals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=288)

Predictors	Step 1	Step 2
Significant model predictors		
Doctor gender	.127 *	.139 *
Chronic symptoms	.235 ***	.241 ***
Traumatic events		.140 *
R	.255	.291
Total R^2	.065	.084
Adjusted R^2	.058	.075
R^2 change	.065 ***	.019 *
F	9.967 ***	8.760 ***

*p<.05, **p<.01, ***p<.001.

Having controlled for the effects of significant model predictors the aggregate score for exposure to traumatic events was entered on the second step. Exposure to traumatic events significantly predicted the use of hospitals (β = .140, p<.05). Traumatic events made a unique and significant contribution to the model (R^2 change =.019, p<.05). The significance of the model predictors remained stable on the second step. At the end of the second step, R was significantly different from zero F (3,284)= 8.760, p<.001 and all variables explained 7% of the variance (adjusted R^2 = .0.75, p<.05).

To summarise hospital use for hypothesis three, significant model predictors (GP gender and chronic conditions) explained 6% of the variance. Exposure to total traumatic events predicted use of hospitals and contributed 2% to the explained variance.

11.4.6 Prescription items

Checks for multivariate outliers identified three cases that fell outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted, resulting in 741 cases being retained for analysis. Hypothesis two had identified six significant predictors from Andersen's model on the final step of the regression for women who had used prescription items over the past 12 months. These six predictors (age, fees limiting access, self-rated health, chronic symptoms, psychological distress and activities of daily living) were entered into the equation on step one. With the exception of fees, all predictors attained significance (see Table 41). Prescription items were used more often by women who were a) older, b) had poor self-rated health, c) elevated depression scores, d) more chronic symptoms and e) restricted daily activities. The adjusted R^2 indicated on this first step Andersen's model predictors accounted for 32% of the variance and R was significantly different from zero at the end of the first step $\underline{F}$ (6,734) = 60,090, p<.001.

Having controlled for the effects of significant predisposing, enabling and need characteristics the aggregate score representing traumatic events was entered on the second step. Exposure to traumatic events did not significantly predict use of prescription items. The significance of the predisposing, enabling and need variables remained stable. At the end of the second step, R was significantly different from zero $\underline{F}$ (7,733) = 51.437, p<.001 and together all variables explained 32% of the explained variance (adjusted R^2 = .323).

Table 41 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which traumatic events affected use of prescription items over 12 months (identified in stage one).

Table 41 Hierarchical multiple regression of effect of significant model predictors and traumatic events on number of *prescription items* used by New Zealand women over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change (N=741)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Age	.150 ***	.150 ***
Fees limit access	-.062	-.061
Self rated health	-.218 ***	-.218 ***
Chronic symptoms	.206 ***	.206 ***
Distress	.091 **	.091 **
Activities of daily living	.196 ***	.197 ***
Traumatic events		-.002
R	.573	.573
Total R^2	.329	.329
Adjusted R^2	.323	.323
R^2 change	.329 ***	.001
F	60.090 ***	51.347 ***

*P<. 05, **p<. 01, ***p<. 001.

To summarise use of prescription items for hypothesis three, significant predisposing, enabling and need characteristics explained 32% of the variance. Total traumatic events did not make a significant and unique contribution to the use of prescription items.

11.5 Summary (traumatic events)

This third stage of analysis examined whether exposure to traumatic events (represented by an aggregate score for traumatic events) predicted the use of six health services over and above significant predictors identified by Andersen's model in hypothesis two. Significant model predictors identified in stage two were entered into the OLS regression equation on step one and the aggregate score representing the sum of traumatic events was entered on step two. Table 42 summarises overall R^2, adjusted R^2 scores and R^2 increments for all six services.

Table 42 R^2 change (increments) obtained from each stage, overall R^2 and adjusted R^2 from hierarchical OLS regression modeling of model predictors and traumatic events on health services utilized by New Zealand women

	Model predictors	Traumatic Events	Final (2nd) Step	
Health service	R^2 change (increments)		Overall R^2	Adjusted R^2
Non-medical service				
Disability days	.350***	.000	.350	.344
Bed days	.109***	.028***	.137	.131
Medical service				
GPs	.176*	.000	.176	.168
Health professionals	.176*	.004[a]	.159	.153
Hospitals	.065*	.019*	.084	.075
Prescription items	.329*	.001	.329	.323

[a] Significant F Change .0537
*p<.05, **p<.01, ***p<.001.

For each service, the predisposing, enabling and need predictors made a unique and significant contribution to the model. Note there was no evidence that traumatic events introduced a mediating effect between the model predictors and service use. The key finding to note here is that as an aggregate measure, exposure to traumatic events significantly predicted use of bed days and hospitals. Further, significance was almost attained for a third service, that of health professionals (p= .072, p=.0536).

11.6 Chapter overview

This chapter has reported data from hypothesis three. Hypothesis three was supported for utilization of bed days and hospitals. Next, chapter 12 reports analysis of the data to test hypothesis four which predicted *that different types of traumatic events will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).*

CHAPTER TWELVE

RESULTS: HYPOTHESIS FOUR (SPECIFIC TRAUMA)

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12.1 Chapter preview

This is the fourth of five chapters reporting results from five stages of hypothesis testing. Chapter 12 reports the findings from hypothesis four[1] which investigates the effect of specific trauma on women's patterns of health care utilization. To examine this hypothesis, six OLS regressions were conducted that controlled for *significant* model predictors by entering them in the first step and five different types of traumatic events were entered on the second step. As with hypothesis three, hypothesis four departs from replicating the model's original structure by regressing the six health services only onto significant predisposing, enabling and need predictors identified in hypothesis two. The reasoning for this is presented in section 11.1. As in chapters 9, 10 and 11 results for hypothesis four are presented sequentially ranging from use of non-medical to medical services.

12.2 Hypothesis four: 'specific' types of trauma

Hypothesis four examined the effect of specific types of trauma on health care utilization. The overall aim of this hypothesis was to establish if particular traumatic events accounted for significant variance in health care utilization over and above that accounted for by predisposing, enabling and need variables. It also aimed to identify which events were more important in predicting the use of health care services.

[1] *Hypothesis four*: different types of traumatic events will significantly predict the use of health services above and beyond the significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

12.3 Data screening for 'specific' types of trauma

Independent variables

Independent variables from Andersen's model (termed model predictors) were transformed as for hypotheses one and two, reported in section 9.5.

Specific types of potentially traumatic events were assessed by the Traumatic Events Scale (TES). Due to a low number of responses within the 12 potentially traumatic event categories, the TES was recoded into 5 categories (see Table 13). As explained in section 8.5, child sexual abuse and adult sexual abuse were combined to form the category *'Abuse'*. Domestic assault, assault by a stranger, theft by force (robbery / mugging) were combined to form the category *'Assault'*. Motor vehicle and other accidents were combined to form the category *'Accidents'*. Disasters and disaster precautions were combined to form the category *'Disasters'*. Traumatic death of a loved one and injury to a loved one were combined to form the category *'Death / injury to loved one'*. Each category was scored in terms of whether respondents had 'ever' experienced such an event; the N for each category is reported in Table 13.

Dependent variables

Transformation of dependent variables remained unchanged from hypothesis two, reported in section 10.3.

12.4 Analysis of 'specific' types of trauma

Hypothesis 4

Different types of traumatic events will be significant predictors in the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

To examine this hypothesis a series of OLS hierarchical multiple regressions were conducted. As in hypothesis three, predisposing, enabling and need characteristics that

had been identified as significant on the final step of the analyses in hypothesis two were entered on the first step. The specific types of traumatic events were entered on the second step.

12.4.1 Disability days

Checks for multivariate outliers identified one case that fell outside the criteria for inclusion set by Mahalanobis distance. The case was deleted, resulting in a total of 455 cases retained for analysis. Data conformed to the assumptions of normality as no other assumption was meaningfully violated. Table 43 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which specific traumatic events affected use of disability days only amongst women who had reported prior

Table 43 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on number of *disability days taken* over a 3-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=455)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Self rated health	-.218 ***	-.224 ***
Physical symptoms	.125 **	.109 *
Activities of daily living	.378 ***	.365 ***
Type of traumatic event		
Sexual abuse		.020
Assault		.019
Accident		.079 *
Disaster		-.059
Death / injury to loved one		-.023
R	.593	.602
Total R^2	.352	.363
Adjusted R^2	.347	.351
R^2 change	.352 ***	.011
F	81.663 ***	31.799 ***

*p<.05, **p<.01, ***p<.001.

contact with disability days (as reported in hypothesis one). As indicated by the beta coefficients in Table 43 significant predictors for predisposing, enabling and need variables entered on the first step indicated use was more likely for women who reported a) poor were self-rated health, b) more physical symptoms and c) were restricted in their daily activities. The adjusted R^2 indicated these variables accounted for 35% of the variance. R was significantly different from zero at the end of the first step F (3,451) = 81.663, p<.001.

Having controlled for the effects of significant model predictors, specific traumatic events were entered on the second step. The category 'accidents' was identified as a significant predictor in the use of disability days (β =.079, p<.05). The remaining traumatic events (sexual abuse, assault, disasters and death / injury to a loved one) were not identified as significant predictors in the use of disability days. Overall, specific traumatic events did not make a significant contribution (R^2 change = .011, p = .166). At the end of the second step, the significance of the predisposing, enabling and need variables remained stable. R was significantly different from zero F (8,446) = 31,799, p<.001 and all variables explained 35% of the variance (adjusted R^2 = .351).

To summarise hypothesis four data examining the effect of specific traumas on disability days, significant model predictors explained 35% of the variance. Exposure to traumatic accidents significantly predicted the use of disability days, however, as a group specific traumatic event did not contribute to the variance explaining use of disability days.

12.4.2 Bed days

Checks for multivariate outliers identified one case that fell outside the criteria for inclusion set by Mahalanobis distance. The case was deleted, resulting in a total of 446 cases retained for analysis. Data conformed to the assumptions of normality as no other assumption was meaningfully violated. Table 44 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which specific traumatic

events affected use of bed days over a 12 period amongst women who previously reported taking a bed day. The adjusted R^2 indicated that on their own, predisposing, enabling and need characteristics accounted for 10% of the variance. R was significantly different from zero at the end of the first step F (2,443) = 25.850, p<.001. As indicated by the beta coefficients in Table 44 the only significant predictor on step one was self-rated health, indicating women who felt in poor health took more bed days.

Having controlled for the effects of significant model predictors, specific traumatic events were entered on the second step. Specific traumatic events significantly predicted use of bed days (R^2 change = .042, p<.001). Assault was identified as the single significant event category predicting use of bed days (β = .165, p<.001). At the end of the second step, the significance of the model predictors remained stable. R was significantly different from zero F (7,438) = 10.700, p<.001 and all variables explained 13% of the variance (adjusted R^2 = .133).

Table 44 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on number of *bed days* taken over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=446)

Predictors	**Step** 1	2
Significant model predictors		
Waiting room time	.011	-.015
Self rated health	-.323 ***	-.301 ***
Type of traumatic event		
Sexual abuse		.073
Assault		.165 ***
Accident		.040
Disaster		-.043
Death / injury to loved one		-.005
R	.323	.383
Total R^2	.104	.147
Adjusted R^2	.100	.133
R^2 change	.104 ***	.042 ***
F	25.850 ***	10.700 ***

*p<.05, **p<.01, ***p<.001.

To summarise hypothesis four data examining effect of specific traumas on use of bed days, significant model predictors explained 10% of the variance. Specific traumatic events made a unique and significant contribution of 4% (R^2 change = .042, p<.001). Within this block, assault was identified as a significant predictor in the use of bed days.

12.4.3 GP utilization

Checks for multivariate outliers identified one case that fell outside the criteria for inclusion set by Mahalanobis distance. The case was deleted, resulting in a total of 785 cases being retained for analysis. No other assumptions of normality were meaningfully violated. Table 45 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which specific traumatic events affected GP utilization over a 12

Table 45 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on number of *GP visits* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=785)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Age	-.056	-.055
Life events	.121 **	.125 **
Health insurance	.041	.041
CS card	.068	.067
Self rated health	-.329 ***	-.328 ***
Chronic symptoms	.110 **	.112 **
Type of traumatic event		
Sexual abuse		.009
Assault		-.001
Accident		.008
Disaster		-.023
Death / injury to loved one		-.028
R	.410	.412
Total R^2	.168	.170
Adjusted R^2	.162	.158
R^2 change	.168 ***	.001
F	26.340 ***	14.140 ***

*p<.05, **p<.01, ***p<.001.

month catchment period only amongst women who had previously contacted their GP (as in hypothesis two). The adjusted R^2 indicated that on their own, predisposing, enabling and need characteristics accounted for 16% of the variance. R was significantly different from zero at the end of the first step F (6,778) = 26.340, p<.001. As indicated by the beta coefficients in Table 45 significant predictors for predisposing, enabling and need variables entered on the first step indicated use was more common amongst women who a) had experienced more life events, b) had poor self-rated health and c) more chronic conditions.

Having controlled for the effects of significant predisposing, enabling and need characteristics specific traumatic events were entered on the second step. No specific type of traumatic event was identified as a significant predictor in the use of GPs. Trauma did not make a significant specific contribution (R^2 change = .001, p = .936). At the end of the second step, the significance of the predisposing, enabling and need variables remained stable. R was significantly different from zero F (11,773) = 14.415, p<.001 and all variables explained 16% of the variance (adjusted R^2 = .158).

To summarise hypothesis four data which examined the effect of specific traumas on GP utilization, predisposing, enabling and need characteristics explained 16% of the variance. Specific types of traumatic events did not explain any more of the variance and was not a significant and unique predictor in the use of GP services.

12.4.4 Health professionals

Checks for multivariate outliers identified one case that fell outside the criteria for inclusion set by Mahalanobis distance. The case was deleted, resulting in a total of 670 cases retained for analysis. No other assumptions of normality were meaningfully violated. Table 46 reports standardised regression coefficients, R, adjusted R^2 and R^2

change for the extent to which specific traumatic events affected health professional utilization over a 12 month catchment period (only amongst women reporting prior

Table 46 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on use of *health professionals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=670)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Telephone	.113 *	.116 *
CS card	-.128 *	-.136 *
Distress	.217 *	.193 *
Activities of daily living	.254 *	.255 *
Type of traumatic event		
Sexual abuse		.055
Assault		.048
Accident		-.020
Disaster		-.012
Death / injury to loved one		.019
R	.392	.400
Total R^2	.154	.160
Adjusted R^2	.148	.149
R^2 change	.154 *	.006
F	30.268 *	14.049 *

*p<.05, **p<.01, ***p<.001.

contact, as in hypothesis two). The adjusted R^2 indicated that on their own, predisposing, enabling and need characteristics accounted for 15% of the variance (adjusted $R^2 = .148$). R was significantly different from zero at the end of the first step F (4,665) = 30.268, $p<.001$. As indicated by the beta coefficients in Table 46 all predisposing, enabling and need variables entered on the first step were significant predictors. They indicated use of health professionals was more likely for women who had a) a telephone, b) were without a community services card, c) were distressed and d) had restricted daily activities.

Having controlled for the effects of significant predisposing, enabling and need characteristics specific traumatic events were entered on the second step. No specific

type of traumatic event was identified as a significant predictor of health professional use. These variables did not make a significant specific contribution (R^2 change = .006, p = .379). At the end of the second step, the significance of the predisposing, enabling and need variables remained stable. R was significantly different from zero F (9,660) = 14.049, p<.001 and all variables explained 15% of the explained variance (adjusted R^2 = .149).

To summarise hypothesis four data which examined the effect of specific traumas on health professional utilization, predisposing, enabling and need characteristics explained 15% of the variance. Specific types of traumatic events did not explain any more of the variance and was not a significant or unique predictor in the use of health professionals.

12.4.5 Hospital utilization

Checks for multivariate outliers revealed all cases conformed to the criteria for inclusion set by Mahalanobis distance. No cases were deleted from the analysis, resulting in a total of 289 cases retained for analysis. No assumptions of normality were meaningfully violated. Table 47 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which specific traumatic events affected hospital use over a 12-month period (only amongst women reporting prior use as in hypothesis two). The beta coefficients in Table 47 indicate health professional utilization was more common for women who a) used female doctors and b) had more chronic conditions. The adjusted R^2 indicated that these variables accounted for 6% of the variance (adjusted R^2 = .060). R was significantly different from zero at the end of the first step F (2,286) = 10.217, p<.001.

Having controlled for their effects specific traumatic events were entered on the second step. No specific type of traumatic event was identified as a significant predictor of hospital use. These variables did not make a significant specific contribution (R^2 change = .023, p = .197). At the end of the second step, the significance for GP gender and chronic conditions remained stable. R was significantly different from zero F

(7,281) = 3.998, $p<.001$ and all variables explained 7% of the explained variance (adjusted $R^2 = .067$).

Table 47 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on use of *hospitals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=289)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Doctor gender	.128 *	.130 *
Chronic symptoms	.236 *	.244 *
Type of traumatic event		
Sexual abuse		-.033
Assault		.068
Accident		.111
Disaster		.011
Death / injury to loved one		.046
R	.258	.300
Total R^2	.066	.090
Adjusted R^2	.060	.067
R^2 change	.066 *	.023
F	10.217 *	3.998 *

*p<.05, **p<.01, ***p<.001.

To summarise hypothesis four data that examined the effect of specific traumas on hospital utilization, the model predictors explained 6% of the variance. Specific types of traumatic events contribute further to the explained variance and did not significantly predict hospital utilization.

12.4.6 Prescription items

Checks for multivariate outliers identified two cases that fell outside the criteria for inclusion set by Mahalanobis distance. The cases were deleted, resulting in a total of 742 cases being retained for analysis. No other assumptions of normality were meaningfully violated. Table 48 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which specific traumatic events affected prescription item use over a 12-month period (only amongst women reporting prior

contact, as in hypothesis two). The adjusted R^2 indicated that on their own, predisposing, enabling and need characteristics accounted for 32% of the variance (adjusted R^2 = .320). R was significantly different from zero at the end of the first step F (6,735) = 59.164, p<.001. As indicated by the beta coefficients in Table 48 all predisposing, enabling and need variables entered on the first step were significant predictors. Beta weights for these variables suggested prescription items were used more frequently by women who were a) older, b) were not limited by GP fees, c) had poor self-rated health, d) reported higher psychological distress and e) had restricted daily activities.

Table 48 Hierarchical multiple regression of effect of significant model predictors and different types of traumatic events on number of *prescription items* used by New Zealand women over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change (N=742)

	Step	
Predictors	**1**	**2**
Significant model predictors		
Age	.158 *	.163 *
Fees limit access	-.063 *	-.063
Self rated health	-.220 *	-.220 *
Chronic symptoms	.191 *	.191 *
Distress	.087 *	.088 *
Activities of daily living	.201 *	.201 *
Type of traumatic event		
Sexual abuse		.003
Assault		-.010
Accident		.013
Disaster		-.034
Death / injury to loved one		.025
R	.570	.572
Total R^2	.325	.327
Adjusted R^2	.320	.317
R^2 change	.325 *	.001
F	59.164 *	32.311 *

*p<.05, **p<.01, ***p<.001.

Having controlled for the effects of significant predisposing, enabling and need characteristics the specific traumatic events were entered on the second step. No specific type of traumatic event was identified as a significant predictor of prescription item use. These variables did not make a significant specific contribution (R^2 change =

.001, p = .859). Apart from fees limiting access, the significance of the model predictors remained stable at the end of the second step. This indicated a mediating effect between specific trauma and GP fees. R was significantly different from zero F (11,730) = 32.311, p<.001 and all variables explained 32% of the explained variance (adjusted R^2 = .317).

To summarise hypothesis four data examining effect of specific traumatic events on use of prescription items, the model predictors explained 32% of the variance. Specific types of traumatic events did not contribute further to the explained variance and did not significantly predict use of health professionals.

12.5 Summary (specific types of trauma)

Hypothesis four investigated the effects of specific traumatic events on women's use of health services. The six health services were regressed onto significant model predictors (identified for each service in hypothesis two) on the first step and specific traumatic events on the second step. As in hypotheses two and three analyses were confined to those women who reported previously using the service.

Table 49 R^2 change (increments) obtained from each stage, overall R^2 and adjusted R^2 from hierarchical OLS regression modeling of model predictors and specific events on health services utilized by New Zealand women

Health service	Model predictors	Specific events	Final (2nd) step	
	R^2 change (increments)		Overall R^2	Adjusted R^2
Non-medical services				
Disability days	.352***	.011[a]	.363	.351
Bed days	.104***	.042***[b]	.147	.133
Medical services				
GPs	.168***	.001	.170	.158
Health professionals	.154*	.006	.160	.149
Hospitals	.066*	.023	.090	.067
Prescription items	.325*	.001	.327	.317

[a] 'accident' was the significant category (β=.079*)
[b] 'assault' was the significant category (β=.165***)
*p<.05, **p<.01, ***p<.001.

Table 49 summarises overall R^2, adjusted R^2 scores and R^2 increments for all six services. Specific traumatic events only affected use of non-medical services and made a significant contribution to the variance explaining use of bed days, where 'assault' was the significant predictor. Although significance for specific traumatic events was not attained when predicting use of disability days, for this service 'accidents' significantly predicted of this form of self-treatment. For each service, predisposing, enabling and need predictors accounted for most of the explained variance and retained their significance after specific traumatic event were entered on the second step. The key finding is that specific traumatic events affected use of non-medical and medical services differently and appeared more important in predicting use of non-medical services.

12.6 Chapter overview

In summary, this chapter reports data from hypothesis four[2] which investigated effects of specific traumatic events on use of six health services. Hypothesis four was supported for use of bed days (assault was identified as the single significant predictor). Although significance was not attained for any other service, accidents significantly predicted use of disability days. Next, chapter 13 reports data from hypothesis five which predicted that *PTSD will be a significant predictor of the use of health services above and beyond significant predisposing, enabling and need predictors identified by Andersen's model after controlling for total number of traumatic events.*

[2] *Hypothesis four: different* types of traumatic events will significantly predict the use of health services above and beyond the significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

CHAPTER THIRTEEN

RESULTS: HYPOTHESIS FIVE (PTSD)

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13.1 Chapter preview

This is the last of five chapters reporting results from five stages of hypothesis testing. Chapter 13 documents findings from hypothesis five[1], which examined the effect of PTSD on women's health care utilization. This was examined using six OLS regressions that controlled for *significant* model predictors and the overall effect of traumatic events. *Significant* model predictors were entered on the first step and the total number of traumatic events was entered on the second step (as in hypothesis three). The aggregate score of traumatic events was chosen to represent trauma (as in hypothesis three) since significance appeared more prevalent when trauma was represented as an aggregate score rather than specific types of trauma. PTSD was entered on the third and final step. Finally a set of six OLS regressions was conducted to assess any interactive effects of PTSD and traumatic events on health care utilization. As for hypotheses three and four[2] the model departs from Andersen's original structure by regressing the six health services only onto *significant* predisposing, enabling and need predictors originally identified for each service by hypothesis two. As reported previously, results in this chapter are presented sequentially ranging from use of non-medical services to use of medical services.

13.2 Stage five: 'Traumatic events and PTSD'

Hypothesis five examined the effect of PTSD on health care use. The aim was to establish if PTSD accounted for significant variance in health care utilization while controlling for effects of predisposing, enabling and need variables, as well as exposure to traumatic events.

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[1] *Hypothesis five:* PTSD will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two) after controlling for total number of traumatic events (as in hypothesis three).

[2] See chapters 12 and 13.

13.3 Data screening for 'traumatic events and PTSD'

Independent variables

Independent variables from Andersen's model (termed model predictors) were transformed as for stages one and two (reported in section 9.5). Traumatic events were represented as the aggregate number of potentially traumatic events a woman had been exposed to at least once in their lifetime (as reported in hypothesis three, section 11.3) and did not take into account multiple experiences of the trauma.

PTSD was represented by the total score on the short version of the Civilian Mississippi Scale (Mean = 1.274, SD = 1.509). Checks for normality established PTSD had substantial negative skewness. Logarithmic transformations considerably reduced skewness. The log of PTSD was used for this and all analyses.

Dependent variables

Transformation of dependent variables remained unchanged from stage two, reported in section 10.3.

13.4 Analysis of 'traumatic events and PTSD'

Hypothesis 5

PTSD will be a significant predictor of the use of medical services above and beyond significant predictors identified by Andersen's model and total number of traumatic events.

To examine this hypothesis an OLS hierarchical multiple regression was applied to each health services. The first two steps in hypothesis five are identical to those in hypothesis three. Significant predisposing, enabling and need characteristics (identified on the final step by hypothesis two) were entered on the first step. The aggregate score[3]

[3] Total traumatic events were selected rather than specific types of trauma. This was because total traumatic events elicited two significant findings (bed days and hospital use); where as specific traumatic only identified bed days as significant.

representing total traumatic events was entered on the second step (as in hypothesis three). The fundamental difference separating this fifth stage from the third stage is the entry of PTSD on the third step. Note that because significance for the first two steps of these analyses are identical to those reported in hypothesis three, results reported here pertain only to the third and final step. Results for additional analyses assessing the interactive effects of PTSD and traumatic events on health care utilization are presented at the end of the chapter.

13.4.1 Disability days

Checks for multivariate outliers detected three cases falling outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted and a total of 451 cases were retained for analysis. Assumption testing for normality detected no meaningful violations. Table 50 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which PTSD affected disability days taken over a three-month period only amongst women who reported taking a disability days (as in hypothesis two).

After controlling for significant model predictors and the total number of traumatic events, PTSD was entered on the third step. No significant relationship was identified between PTSD as use of disability days (see Table 50). PTSD did not significantly predict use of disability days (β = -.035, p>.05), nor did it make a significant contribution to the model (R^2 change = .000, p>.05). The adjusted R^2 on the third step indicated that the model predictors, total number of traumatic events and PTSD accounted for 35% of the variance (adjusted R^2 = .344). At the end of the third step R was significantly different from zero F (5,445) = 48.334, p<.001. There was no evidence that PTSD mediated the effect of trauma on use of disability days. That is, with the introduction of PTSD, the size and direction of significance for all preceding variables in the equation remained stable. These data are reported in Table 50.

Table 50 Hierarchical multiple regression of effect of significant model predictors, traumatic events and PTSD on number of *disability days* taken over a 3-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=451)

	Step		
Predictors	**1**	**2**	**3**
Significant model predictors			
Self rated health	-.217 ***	-.218 ***	-.214 ***
Physical symptoms	.111 *	.106 *	.121 *
Activities of daily living	.385 ***	.383 ***	.387 ***
Traumatic events		.015	.025
PTSD			-.035
R	.529	.592	.593
Total R^2	.350	.351	.351
Adjusted R^2	.346	.345	.344
R^2 ***change***	.350 ***	.000	.000
F	80.531 ***	60.323	48.334 ***

*p<.05, **p<.01, ***p<.001.

13.4.2 Bed days

Checks for multivariate outliers detected one case that fell outside the criteria for inclusion set by Mahalanobis distance. This case was deleted and a total of 438 cases were retained for analysis. Assumption testing for normality detected no meaningful violations. Table 51 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which PTSD affected the number of bed days taken over a 12 month catchment period only amongst women who previously reported taking a bed day (as in hypothesis two). After controlling for significant predisposing, enabling and need variables as well as the total number of traumatic events (as in hypothesis three), PTSD was entered on the third step. A significant relationship was identified between PTSD and use of bed days (see Table 52). That is, PTSD significantly predicted use of bed days (β = .141, p<.01). The direction of the beta weight indicated that the higher a woman's PTSD score, the more bed days she took. PTSD made a significant contribution to the model (R^2 change = .0.17, p<.01). The adjusted R^2 on the third step indicated that all variables in the equation accounted for 15% of the variance (adjusted

R^2 = .147). At the end of the third step, R was significantly different from zero F (4,443) = 19.938, p<.001.

There was evidence that PTSD mediated the effect of trauma on use of bed days. With the introduction of PTSD, the statistical significance for traumatic events (β = .174, p<.001 on step two) became less significant on step three (β = .123, p<.01). This data suggested that the impact of traumatic events on use of bed days might operate at least in part through the effects of trauma on PTSD. These data are reported in Table 52.

Table 51 Hierarchical multiple regression of effect of significant model predictors and traumatic events and PTSD on number of *bed days* taken over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=438)

	Step		
Predictors	**1**	**2**	**3**
Significant model predictors			
Waiting room time	.021	.000	-.011
Self rated health	-.329 ***	-.317 ***	-.304 ***
Traumatic events		.174 ***	.123 **
PTSD			.141 **
R	.329	.372	.394
Total R2	.108	.138	.155
Adjusted R2	.104	.132	.147
R^2 change	.108 ***	.138 ***	.017 **
F	26.548 ***	23.261 ***	19.938 ***

*p<.05, **p<.01, ***p<.001.

13.4.3 GP utilization

Checks for multivariate outliers did not detect any cases falling outside the criteria for inclusion set by Mahalanobis distance. No cases were deleted and a total of 771 cases were used in the analysis. Table 52 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which PTSD affected GP utilization over a 12 month catchment period only amongst women who reported prior contact with their

GP (as in hypothesis two). After controlling for significant predisposing, enabling and need variables as well as the total number of traumatic events, PTSD was entered on the third step. A significant relationship was identified between PTSD and GP utilization (see Table 52). That is, PTSD significantly predicted use of GPs ($\beta = .073$, $p<.05$). PTSD made a significant contribution to the model (R^2 change = .004, $p<.05$) and the beta weight indicated that the higher a woman's PTSD score, the more she consulted her GP. The adjusted R^2 on the third step indicated that all variables accounted for 17% of the variance (adjusted $R^2 = .171$). At the end of the third step, R was significantly different from zero F (8,762) = 20.924, $p<.001$. There was no evidence that PTSD mediated the effect of trauma on use of GPs. These data are reported in Table 52.

Table 52 Hierarchical multiple regression of effect of significant model predictors, traumatic events and PTSD on number of *GP visits* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=771)

	Step		
Predictors	**1**	**2**	**3**
Significant model predictors			
Age	-.059	-.062	-.054
Life events	.127 ***	.132 ***	.122 **
Health insurance	.043	.043	.046
CS card	.059	.059	.053
Self rated health	-.335 ***	-.335 ***	-.324 ***
Chronic symptoms	.117 **	.120 **	.116 **
Traumatic event		-.020	-0.039
PTSD			.073 *
R	.418	.419	.424
Total R2	.175	.175	.180
Adjusted R2	.169	.168	.171
R^2 change	.175 ***	.001	.004 *
F (	27.108 ***	23.260 ***	20.924 ***

*p<.05, **p<.01, ***p<.001.

13.4.4 Health professionals

Checks for multivariate outliers detected five cases falling outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted and 657 cases were

retained for analysis. Assumption testing for normality detected no meaningful violations. Table 53 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which PTSD affected health professional utilization over a 12 month catchment period only amongst women who had previously contacted a health professional (as in hypothesis two). After controlling for significant model predictors and the total number of traumatic events, PTSD was entered on the third step.

Table 53 Hierarchical multiple regression of effect of significant model predictors, traumatic events and PTSD on use of *health professionals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=657)

	Step		
Predictors	**1**	**2**	**3**
Significant model predictors			
Telephone	.107 **	.110 **	.111 **
CS card	-.129 ***	-.134 ***	-.137 ***
Distress	.218 ***	.204 ***	.178 ***
Activities of daily living	.263 ***	.259 ***	.257 ***
Traumatic events		.059	.051
PTSD			.045
R	.397	.401	.403
Total R2	.158	.161	.162
Adjusted R2	.153	.154	.154
R^2 change	.158 ***	.003	.001
F (	30.628 ***	25.052 ***	21.019 ***

*p<.05, **p<.01, ***p<.001.

No significant relationship was identified between PTSD and health professional utilization (see Table 53). PTSD did not significantly predict use of health professionals (β = .045, p=.349). PTSD did not make a significant contribution to the model, nor did it explain any more of the variance (R^2 change = .001). The adjusted R^2 on the third step indicated that together, all variables accounted for 15% of the variance (adjusted R^2 = .154). At the end of the third step, R was significantly different from zero F (6,650) = 21.019, p<.001. There was no evidence that PTSD mediated the effect of trauma on use of health professionals. With the introduction of PTSD the size and direction of

significance for all preceding variables in the equation remained stable. These data are reported in Table 53.

13.4.5 Hospital utilization

Checks for multivariate outliers detected one case that fell outside the criteria for inclusion set by Mahalanobis distance. This case was deleted and 284 cases were retained for analysis. Assumption testing for normality detected no meaningful violations. Table 54 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which PTSD affected hospital utilization over a 12 month

Table 54 Hierarchical multiple regression of effect of significant model predictors, traumatic events and PTSD on use of *hospitals* over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women (N=284)

	Step		
Predictors	**1**	**2**	**3**
Significant model predictors			
Doctor gender	.127 *	.129 *	.133 *
Chronic symptoms	.234 ***	.241 ***	.224 ***
Traumatic Events		.140 *	.091
PTSD			.138 *
R	.253	.289	.316
Total R^2	.064	.083	.100
Adjusted R^2	.057	.074	.087
R^2 ***change***	.064 ***	.019 *	.016 *
F	9.680 ***	8.539 ***	7.787 ***

*p<.05, **p<.01, ***p<.001.

catchment period only amongst women who had previously contacted a hospital (as in hypothesis two). After controlling for doctor gender and chronic conditions on step one and the total number of traumatic events on step two, PTSD was entered on the third step. A significant relationship was identified between PTSD and hospital utilization (see Table 54). PTSD significantly predicted use of hospitals (β = .138, p<.05). As indicated by the beta coefficients, women with elevated PTSD scores used hospital

services more frequently than those with lower PTSD scores. PTSD made a significant contribution to the model (R^2 change = .016, $p<.05$). The adjusted R^2 on the third step indicated that combined, doctor gender, chronic conditions; total number of traumatic events and PTSD accounted for 9% of the variance (adjusted R^2 = .087). At the end of the third step, R was significantly different from zero F (4,279) = 7.787 $p<.001$.

There was evidence that PTSD mediated the effect of trauma on use of hospitals. With the introduction of PTSD, the statistical significance for traumatic events (β = .140, $p<.05$ on step two) became non-significant on step three (β = .091, p=.136). This data suggested that the impact of traumatic events on hospital use might operate at least in part through the effects of trauma on PTSD. These data are reported in Table 54.

13.4.6 Prescription items

Checks for multivariate outliers detected five cases falling outside the criteria for inclusion set by Mahalanobis distance. These cases were deleted and 728 cases were retained for analysis. Assumption testing for normality detected no meaningful violations. Table 55 reports standardised regression coefficients, R, adjusted $R^2$and R^2 change for the extent to which PTSD affected use of prescription items over a 12 month catchment period. After controlling for significant model predictors and the total number of traumatic events, PTSD was entered on the third step. No significant relationship was identified between PTSD and use of prescription items (see Table 55). PTSD did not significantly predict use of prescription items. PTSD did not make a significant contribution to the model, nor did it explain any more of the variance (R^2 change = .016). The adjusted R^2 on the third step indicated that all variables accounted for 32% of the variance (adjusted R^2 = .320). At the end of the third step, R was significantly different from zero F (8,719) = 43 .847, $p<.001$. There was no evidence that PTSD mediated the effect of trauma on use of prescription items. That is, with the introduction of PTSD, the size and direction of significance for all preceding variables in the equation remained stable. These data are reported in Table 55.

Table 55 Hierarchical multiple regression of effect of significant model predictors, traumatic events and PTSD on number of *prescription items* used by New Zealand women over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change (N=728)

	Step		
Predictors	1	2	3
Significant model predictors			
Age	.160 ***	.160 ***	.160 ***
Fees limit access	-.061	-.060	-.057
Self rated health	-.220 ***	-.220 ***	-.221 ***
Chronic symptoms	.189 ***	.189 ***	.190 ***
Distress	.096 **	.096 **	.114 **
Activities of daily living	.199 ***	.199 ***	.201 ***
Traumatic events		.000	.006
PTSD			-.032
R	.572	.571	.572
Total R^2	.327	.327	.328
Adjusted R^2	.321	.320	.320
R^2 ***change***	.327 ***	.000	.000
F	58.512 ***	50.083 ***	43.874 ***

*p<.05, **p<.01, ***p<.001.

13.5 Additional analyses (interaction effects)

The above analyses identified PTSD as a significant predictor in the use of three services (use of bed days, GPs and hospitals). A PTSD mediation effect of the relationship between trauma and use of bed days and hospitals was identified. To further explore how PTSD, in conjunction with exposure to trauma, influences health care utilization further investigative analyses were undertaken. These were aimed at examining the interactive effects of PTSD and traumatic events on health care use. These interactive effects were examined using six OLS regressions. Significant model predictors were entered (as in hypothesis five) on the first step. Aggregate traumatic events *and* PTSD were entered on the second step. Finally, the interactive effect (Traumatic Events x PTSD) was entered on the third step. This interactive effect proved to be non-significant for use of disability days (β = .056, p=.214), GPs (β = .008, p=.822), health professionals (β = .070, p=.068), hospitals (β = .047, p=.483) and

prescription items (β = .002, p=.951). However, the PTSD x Trauma interaction for use of bed days proved significant and details of this analysis are presented below.

13.5.1 Bed days (interactive effects)

After deletion of ten cases identified as multivariate outliers, 431 cases were retained for the analysis investigating interactive effects of PTSD and traumatic events on use of bed days. Table 56 reports standardised regression coefficients, R, adjusted R^2 and R^2 change for the extent to which interactive effects impacted on use of disability days over a 12 month only amongst women previously reporting use of bed days (as in hypothesis two).

Table 56 Hierarchical multiple regression of effect of significant model predictors and traumatic events, PTSD and their interaction on number of *bed days* taken over a 12-month period showing standardised regression coefficients, R, adjusted R^2 and R^2 change for New Zealand women, (N=431)

Predictors	**Step 1**	**Step 2**	**Step 3**
Significant model predictors			
Waiting room time	.024	-.005	-.003
Self rated health	-.323 ***	-.302 ***	-.303 ***
Trauma indicators			
Traumatic events		.116 *	.074
PTSD		.143 **	.138 **
Interaction effect			
Traumatic events X PTSD			.101 *
R	.324	.387	.398
Total R^2	.105	.150	.158
Adjusted R^2	.100	.142	.148
R^2 ***change***	.105 ***	.045 ***	.008 *
F	25.116 ***	18.829 ***	16.032 ***

*p<.05, **p<.01, ***p<.001.

The two significant model predictors identified in hypothesis two (self-rated health and waiting room time) were entered on step one. As indicated by the beta coefficients in Table 56 self-rated health was a significant predictor on this step (consistent with

hypothesis three, four and five). Again, women perceiving themselves to be in poor health used more bed days. The R^2 change statistic indicated that on this first step the model predictors accounted for 10% of the variance and R was significantly different from zero at the end of the first step $\underline{F}$ (2,428) = 25.116, $p<.001$. The model predictors made a unique and significant contribution to the model (R^2 change = .105, $p<.001$).

Having controlled for the effects of self-rated health and waiting room time, aggregate traumatic events and PTSD were entered on the second step. Significant main effects were identified for both traumatic events (β = .116, $p<.05$) and PTSD (β = .143, $p<.001$). The direction of the beta coefficient indicated that bed days were taken more often by women who had a) been exposed to more traumatic events and b) high PTSD scores. Together, these variables made a significant contribution to the model (R^2 change = .045, $p<.001$). At the end of the second step, R was significantly different from zero $\underline{F}$ (4,426) = 18.829, $p<.001$ and together traumatic events and PTSD accounted for 5% of the explained variance (adjusted R^2 = .045).

The interactive effect (traumatic events x PTSD) was entered on the last step. This interactive effect emerged as a significant predictor in the use of bed days (β =-.101, $p<.05$). At the end of the third step, R was significantly different from zero $\underline{F}$ (5,425) = 16.032, $p<.001$ and together all variables accounted for 15% of the explained variance (adjusted R^2 = .148). At this point, the interactive effect made a small but significant contribution to the model (R^2 change = .008, $p<.05$).

Serially comparing the results from this third step decomposes the effects of the model predictors, trauma and PTSD and finally their interactive effects on the use of bed days. The introduction of traumatic events and PTSD did not substantially diminish the relationship between model variables already in the equation and the dependent variable. Self-rated health maintained its significance on the second step. However, the introduction of the interactive effect substantially affected traumatic events but not PTSD. Thus there was evidence that the interaction mediated the effect of trauma on use of bed days. With the introduction of the interaction, the statistical significance for traumatic events (β = .070, $p<.05$ on step two) became non-significant on step three (β =

.074, p>.05). This data suggested that the impact of traumatic events on use of bed days may operate at least in part through the interactive effects of trauma x PTSD. These data are reported in Table 56.

To summarise the data investigating frequency of bed days, the effects of traumatic events, PTSD and their interactive effect (traumatic events x PTSD) were statistically significant (see Table 56). Model characteristics, principally self-rated health, explained most of the variance (10%). The addition of PTSD and traumatic events contributed 5% to the explained variance. On the final step, their interactive effect (traumatic events x PTSD) contributed less than 1%. Significant predictors remained on the final step were self-rated health PTSD and the interaction effect. Traumatic events lost significance on the final step. Finally, a t-test was conducted post hoc to determine the difference between the means (see Appendix F).

13.6 Summary (traumatic events and PTSD)

This fifth and final hypothesis examined whether PTSD predicted use of health services after controlling for significant model predictors and overall trauma. Significant predisposing, enabling and need variables identified in hypothesis two (only amongst women who had previously used that service) were entered on step one. The sum of total traumatic events was entered on step two. PTSD was entered on the third step. Table 57 summarises overall R^2, adjusted R^2 scores and R^2 increments for all six services.

For each service significance for predisposing, enabling and need predictors remained stable across all three steps in the equation. The introduction of traumatic events did not diminish their relationship with the different types of services. As in hypothesis three, traumatic events emerged as a significant predictor for use of bed days and hospitals.

Table 57 R^2 change (increments) obtained from each stage, overall R^2 and adjusted R^2 from hierarchical OLS regression modeling of model predictors, traumatic events and PTSD on health services utilized by New Zealand women

	Model Predictors	Traumatic Events	PTSD	Final (3rd) step	
Health service	**R^2 change (increments)**			**Overall R^2**	**Adjusted R2**
Non-medical services					
Disability days	.350***	.000	.000	.351	.344
Bed days	.108***	.138***	.017**	.155	.147
Medical services					
GPs	.157***	.001	.004*	.180	.171
Health professionals	.158***	.003	.001	.162	.154
Hospitals	.064***	.019*	.016*	.100	.038
Prescription items	.327***	.000	.000	.328	.320

*p<.05, **p<.01, ***p<.001.

There was no evidence that traumatic events introduced a mediating effect between significant model predictors and use of health services.

The first key finding to note here deals with the introduction of PTSD. PTSD significantly predicted use of bed days, GPs and hospitals, but not use of disability days, health professionals or prescription items. There was some evidence that PTSD mediated the relationship between trauma and use of hospitals and bed days.

The second key finding related to the interaction effect (traumatic events x PTSD) which significantly predicted use of bed days. Here, the model predictors (principally self-rated health) remained significant even after traumatic events and PTSD had been introduced. They accounted for approximately 10% of the explained variance. Traumatic events and PTSD also significantly predicted use of bed days, accounting for approximately 5% of the variance. The interaction effect (traumatic events x PTSD) emerged as a significant predictor in the use of bed days and suggested (albeit tentatively) that the relationship between traumatic events and use of bed days may vary as a function of levels of PTSD.

13.7 Chapter overview

In summary, this chapter reported data from hypothesis five[4], which examined the effect of trauma and PTSD on use of six health services. Hypothesis five was supported for use of bed days, GP and hospital use. Additional analyses revealed the interaction between traumatic events and PTSD emerged as a significant predictor in the use of bed days only. Next, chapter 14 briefly summaries the salient findings for the five hypothesis, reported in chapters 9 to 13 respectively.

[4]. *Hypothesis five:* PTSD will significantly predict the use of medical services above and beyond significant predictors identified by the model (in hypothesis two) and total number of traumatic events (as in hypothesis three).

CHAPTER FOURTEEN

SUMMARY OF SALIENT FINDINGS

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14.1 Chapter preview

This chapter summarises the salient findings for the five hypotheses. Each hypothesis was tested on use of disability days, bed days, GPs, health professionals, hospitals and prescription items. Results supporting each hypothesis as they relate to each health service are presented in Table 58 at the end of the chapter.

14.2 Hypothesis one: (contact)

Hypothesis one
Amongst users and non-users for both non-medical and medical services, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

Hypothesis one used six logistic regressions to replicate Andersen's Behavioural Model of Health Care Utilization to examine whether or not contact with a service had occurred. Dependent variables (i.e., health services) were regressed onto predisposing characteristics in step one, enabling characteristics in step two and need characteristics in step three.

The results supported hypothesis one for contact with health professionals (see Table 58). Results did not support the hypothesis for contact with disability days, bed days, GPs, hospitals and prescription items.

Predisposing and need characteristics were significant for all six services. Enabling characteristics were only significant in predicting contact with health professionals. Disability days explained the most variance (20%). Results for stage one were reported in chapter 9.

14.3 Hypothesis two: (volume)

Hypothesis two

Amongst users only, need will make a greater contribution to the explained variance then either predisposing or enabling characteristics.

Hypothesis two used six Ordinary Least Squares (OLS) regressions to replicate Andersen's Behavioural Model of Health Care Utilization in order to examine how often health services were consumed. Because analyses focused on consumption of health services, measures were restricted to those who had made contact[1]. The dependent variables (i.e., health services) were regressed onto predisposing characteristics in step one, enabling characteristics in step two and need characteristics in step three.

The results supported hypothesis two for use of disability days, bed days, GPs and health professionals (see Table 58). Results did not support the hypothesis for use of hospitals and prescription items. Predisposing and need characteristics were significant for all six services. Enabling characteristics were significant in predicting ongoing use of GPs and health professionals. The model best fit volume data for use of disability days (36%) and prescription items (35%).

Six additional OLS regressions examined satisfaction entered on the first step with predisposing characteristics. Satisfaction was not a significant main effect for any health service and did not contribute further to the explained variance for any services.

To summarise hypothesis two, need significantly predicted use of all six services. It was more influential than predisposing characteristics in explaining use of disability days, bed days, GPs and health professionals. Predisposing characteristics appeared more influential regarding use of hospitals and prescription items. Enabling characteristics influenced how often women used GPs and health professionals. Results for hypothesis two were reported in chapter 10.

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[1] Non-users were excluded from analyses where the question examined '*how much utilization had occurred?*' This was the case for hypotheses two to five.

14.4 Hypothesis three: (overall trauma)

Hypothesis three

The inclusion of traumatic events as an aggregate measure will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

Six OLS regressions examined the overall effect of traumatic events amongst women reporting prior use of health services (as in stage two). Andersen's model was expanded by regressing the dependent variables onto significant predisposing, enabling and need (identified in stage two) on step one. An aggregate score representing exposure to traumatic events was entered on step two.

Results supported hypothesis three for use of bed days and hospitals (see Table 58). Results did not support this hypothesis for use of disability days, GPs, health professionals and prescription items.

Exposure to trauma predicted use for bed days and hospitals and statistical significance was almost attained for use of health professionals. Significant model predictors identified in stage two explained most of the variance and maintained their significance after the introduction of traumatic events on step two. Results for hypothesis three were reported in chapter 11.

14.5 Hypothesis four ('specific' traumatic events)

Hypothesis four

Different types of traumatic events will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two).

Six OLS regressions examined the effect of specific traumatic events only amongst women who had previously contacted a service (as in hypothesis two). Andersen's model was expanded by regressing the dependent variables onto *significant* predisposing, enabling and need variables (identified in hypothesis two) on step one. Exposure to specific traumatic events was entered on step two.

Results supported hypothesis three for use of bed days (see Table 58). Results did not support this hypothesis for use of disability days, GPs, health professionals, hospitals and prescription items.

The model predictors retained significance for every service. For bed days, assault emerged as the significant category predicting use. Accidents emerged as the significant predictor in the use of disability days, although as a block 'specific traumatic events' was non-significant. No significant predictors emerged for any of the medical services. Results for stage four were reported in chapter 12.

14.6 Hypothesis five: (overall trauma and PTSD)

Hypothesis five

PTSD will significantly predict the use of health services above and beyond significant predisposing, enabling and need predictors identified by the model (in hypothesis two) after controlling for total number of traumatic events (as in hypothesis three).

Six OLS regressions examined the effect of PTSD amongst users only (as in hypotheses two to four). The model was expanded by regressing dependent variables onto the *significant* predisposing, enabling and need variables (identified in hypothesis two) on step one. An aggregate score representing exposure to traumatic events was entered on step two[2] (as in hypothesis three). PTSD was entered on step three.

Results supported hypothesis five for use of bed days, GPs and hospitals (see Table 58). Results did not support the hypothesis for use of disability days, health professionals and prescription items.

PTSD significantly predicted use of bed days, GPs and hospitals. It explained approximately 1 to 2% of the variance. Women reporting elevated PTSD scores used these services more frequently. Significant model predictors retained their significance and continued to explain most of the variance. There was evidence that PTSD mediated the relationship between trauma and use of bed days and hospitals. That is, with the introduction of PTSD on the third step, traumatic events became less significant for bed days and non-significant for hospitals.

[2] Total traumatic events were selected rather than specific types of trauma. This was because total traumatic events elicited two significant findings (bed days and hospital use); where as specific traumatic only identified bed days as significant.

14.6.1 Additional analyses: interaction effects and bed days

Further investigative statistical analyses were conducted to assess interaction effects of traumatic events x PTSD on use health services. Six OLS regressions regressed the dependent variables onto the *significant* model predictors (identified in stage two) in the first step. The aggregate score representing total exposure to traumatic events (as in stage four) and PTSD were entered in step two. Their interaction effect (traumatic events x PTSD) was entered in step three.

The interaction effect did not significantly predict the use of disability days, GPs, health professionals, hospitals and prescription items. However, it did predict use of bed days. After introducing the interaction, traumatic events became non-significant on step three. There was no effect for PTSD. This suggests the impact of traumatic events on bed days may operate at least in part through the interaction effect. After exposure to traumatic events, the development or absence of PTSD affected the number of bed days taken. Results for hypothesis five were reported in chapter 13.

Below Table 58 presents a summary of results that support each hypothesis as they relate to the individual health services.

Table 58 Summary of health services: results that supported each hypothesis

	Hypothesis					
	1 contact	2 volume	3 overall trauma	4 specific trauma	5 PTSD	IXN
Non-medical services						
Disability days		✓				
Bed days		✓	✓	✓	✓	✓
Medical services						
GPs		✓			✓	
Health professionals	✓	✓				
Hospitals			✓		✓	
Prescription items						

14.7 Chapter overview

This chapter has summarised the salient findings for each hypothesis when applied to use of disability days, bed days, GPs, health professionals, hospitals and prescription items. Chapter 15 is the final chapter in the thesis. It discusses the implications of these findings and constitutes four stages. The first refers to model replication by discussing implications of the results in terms of contact and volume. The second deals with model expansion and reviews effects of trauma and PTSD. The third identifies research limitations and provides recommendation for future research. The final stage summarises and concludes the present study.

CHAPTER FIFTEEN

DISCUSSION

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15.1 Chapter preview

Using Andersen's Behavioural Model of Health Care Utilization this research provides a comprehensive profile of women's use health services. Four services represent commonly accepted standards of health care measurement: use of disability and bed days, GPs and hospitals. The remaining two services in the present study, use of health professionals and prescription items, are less comprehensively researched outcomes within the context of the model. Traditional predictors of predisposing, enabling and need characteristics were included, as were the additional variables of traumatic events, specific types of traumatic events and PTSD. The discussion that follows summarises the results obtained from the logistic and OLS regression analyses. It shadows the order in which hypotheses were presented in the results chapters. Salient themes to emerge are 1) the overall explained variance in comparison to the health care literature, 2) the relative impact of individual predisposing, enabling and need characteristics 3) the description of user and non-user profiles for each health service, 4) the effect of traumatic events and PTSD on use of services, 5) the implications for women's use of health services and 6) limitations of the present research and potential avenues for future research. Finally, overall conclusions are drawn.

15.2 The model replicated: contact and volume

This section of the discussion examines the implications for hypothesis one and two where the model was replicated. Hypothesis one examined *contact,* which determined whether or not health services were used over a specific catchment period of time. Contact implicitly deals with access, so it was expected that socio-cultural and background factors would be influential in the decision to use a health service[1]. Thus, the purpose of the first hypothesis was to determine whether predisposing and enabling characteristics made a unique and significant contribution to the variance over and above that made by need.

---

[1] See section 2.5.

Hypothesis two examined *volume*, which determined how often services had been used over a specific catchment period of time. Since focusing on the ongoing consumption of health services assumes that a level of access already exists, analysis was restricted to those who had made contact. Non-users were excluded from hypothesis two and all further analyses. Hypothesis two investigated the possibility that amongst users only, need would make a greater contribution to the explained variance than either predisposing or enabling characteristics.

The purpose of both hypotheses one and two was to give as much credit as possible to the predisposing and enabling elements of the model because "...predisposing and enabling factors have indirect effects on use through their direct effects on health status" (Wolinsky & Arnold, 1988 p.93). Consequently, the order in which the blocks of variables were brought into the model was critical. It was desirable to obtain an estimate of the total effect of predisposing and enabling characteristics as individual entities, because of their indirect effects through need. That is, the aim was to look at the total effect of predisposing variables and then begin decomposing them by serially introducing the more distal effects of the enabling and then need variables. From a practical applied aspect, predisposing and enabling characteristics are often more mutable than need and can therefore be the target of intervention programmes aimed at improving the health care of women. Moreover, the extent to which they influence health care utilization is indicative of the extent to which a health care system is deemed equitable.[2]

The section discussing replication of the model revolves around three themes. Firstly, it compares the how the model explains overall use of health care utilization with the findings of other notable health researchers. Secondly, it focuses on the impact that salient individual predisposing, enabling and need variables had on use of health services. Thirdly, this section profiles women who avoid the use of health services and contrasts them with women who are frequent users of health services.

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[2] See section 2.5.

15.2.1 Overall fit (R^2: non-medical vs. medical)

The first theme to emerge from the analysis concerns the extent to which the model explains overall use of health care utilization. Table 59 summarises the variance explained by the model in the present study and compares the results with past studies that have examined Andersen's model. It also notes the populations used by each of the studies. Each study examined non-institutionalized populations of elderly men and women, with the exception of Eve (1988) who examined elderly women and Hibbard and Pope (1986) who examined men and women of varying ages. The present study is also an exception, examining just women aged 19 and over. Note the underlined percentages in bold. These highlight which study explained the highest variance after applying Andersen's model to a specific health service.

As noted in section 7.6.2, the explained variance is different between logistic and OLS regression, so a direct comparison between the contact and volume R^2 statistics, represented above as percentages, is not meaningful. Consequently, direct comparisons suggesting, for example, that the model explains volume disability days better than contact disability days, are not made. However, comparisons can made between the contact studies and volume studies can be compared with the other volume studies.

The contact analyses of the model best explain use of non-medical services, a finding consistent with Nelson (1993) and Wolinsky and Johnson (1991). The volume analyses of the model explain use of non-medical and medical utilization equally well. One issue that warrants consideration is the measurement of the dependent variables. Health professionals and hospitals combined several services into an 'aggregate' variable. The number of health professionals consulted refers to how *many* of these services were used, rather than how often one specific service was used. Hospital services (accident and emergency, outpatient and admissions) were combined into an aggregate measure as the individual services had low utilization rates, somewhat compromising accuracy and precision in the final outcome variable. Speculation can only be drawn on the possible outcomes if respondent numbers had been adequate to examine these services individually.

Table 59 Comparison of health care studies: populations examined and total variance explained by the Andersen model

	Present study	Bargazan et al. (1998)	Cafferata (1987)	Coulton & Frost (1982)	Evashwick et al (1984)	Eve (1988)	Hibbard & Pope (1986)	Millar (1996)	Nelson (1993)	Strain (1991)	Stoller (1982)	Wolinsky et al (1983)	Wolinsky & Coe (1984)	Wolinsky & Johnson (1991)
Elderly population		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Men and Women		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Women only	✓					✓								
Community sample	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Contact														
Non-medical services														
Disability days	**20%***													
Bed days	14%													**15%**
Medical services														
GPs	10%	**55%**							3%		13%			7%
Health professionals	**13%**													
Hospitals	14%	**26%**							7%					10%
Prescription items	**11%**													
Volume														
Non-medical services														
Disability days	**36%**		7%					18%				.29%		
Bed days	16%											**26%**		25%
Medical services														
GPs	19%		13%	12%	24%	24%	8%	**38%**	13%	24%	22%	23%	21%	17%
Health professionals	15%							**25%**				13%		
Hospitals	10%		11%		6%	11%			6%	**29%**			9%	
Prescription items	35%							**41%**						

* Underlined and bold percentages highlight the study that has explained the most variance for that health service

Aside from disability days where the present study explained more variance than previous studies for either contact or volume, Table 59 shows that overall, the model explained similar amounts of variance to previous studies. The one other exception is

the recent study by Bazargan et al. (1998), published after the measures had been chosen and the data gathered for the present study. This study explained more variance that any other published research, explaining 55% for use of GPs (as opposed to 10% in the present study) and 26% for hospital utilization (as opposed to 14% in the present study). While the results from the present study supports Wolinsky and Johnson's (1991) suggestion that the model has perhaps reached its optimal level and is unlikely to explain more variance regardless of new and refined measures, they sharply contrast the results found by Bazargan et al. (1998).

Bazargan et al. (1998) studied the elderly, included men and women, examined an ethnic minority (998 African Americans) and used a community sample. The authors used similar predisposing and enabling characteristics to previous studies and the present study, but used slightly different need measures. They included 13 measures for chronic illnesses. They attributed their substantial increases in explained variance to their method of statistical analysis, a logistic regression technique. However, using a similar technique the present study did not explain an equivalent amount of the variance. This draws attention to the difference in populations and measures. It is likely that New Zealand women, especially younger women, have different needs than elderly African American women and definitely different needs than elderly African American men. The extensive need measures used by Bazargan et al. (1998) appear to have adequately captured that specific population but may not necessarily be generalised to other populations.

To summarise, with the exception of disability days the measures have not increased the explained variance because they have not adequately captured the population under investigation. Using 13 chronic illnesses that appear specifically tailored to capture an elderly ethnic minority, Bazargan et al. (1998) used the Andersen model to increase variance explaining use of GPs and hospitals. The same may well be possible for New Zealand women if measures included variables specifically tailored for women in this country. In New Zealand, the most common illnesses for women are arthritis, sight impairment, hypertension and asthma (see Table 10). Moreover, Waldron (1983) reported 79% of GP consultations were associated with pregnancy, gynaecologic and

breast examinations (see section 1.3.2). Therefore, as well as the common illnesses mentioned above, specific items could be included such as requirements for mammograms, conception and contraception. Women could also be asked whether or not they were pregnant during the 12 months prior to data collection as this may have increased their contact with health professionals. Therefore including these more gender specific measures in the Andersen's model may well improve explained variance. Having reviewed the overall effect of the model on the data explaining contact, effects of predisposing, enabling and need characteristics are discussed next.

15.2.2 Predisposing characteristics

The discussion of predisposing characteristics has two separate sections. The first deals with the contribution that predisposing characteristics made as a block to the model. The second deals with the effects of individual predisposing characteristics.

Overall predisposing effects

As a block, predisposing characteristics significantly impacted on every service, regardless of whether they were being examined in the contact (see Table 26) or volume analyses (see Table 34). Regarding contact, predisposing characteristics contributed more to use of non-medical services than they did to medical services. They explained most variance for bed days (9%) and the least for GP contact (5%). Regarding volume, they contributed most variance for prescription items (22%) and least for health professionals (7%). Further, they made a greater impact than need for use of bed days, hospitals and prescription items. For the latter service, at the initial point of entry predisposing characteristics explained 22% of the variance as opposed to the 14% explained by need. The only similar study examining prescription use is Millar (1996), however; direct comparison of the extent to which predisposing characteristics explained use of prescription items is not possible. Unlike the present study where predisposing, then enabling and finally need were entered into the equation, Millar entered need into the regression equation on the first step followed by predisposing *and* enabling characteristics on the second step. With this methodological difference in

Table 60 Comparison of contact vs. volume predictors

	Measures of health services utilization					
	Non-medical services		Medical services			
Predictors	**Disability days**	**Bed days**	**GP utilization**	**Health professionals**	**Hospital utilization**	**Prescription items**
Predisposing Characteristics						
Age		contact	volume	contact		volume
Marital status						
Living alone						
Social contacts		contact				
Paid employment		contact				
Qualifications	contact		contact	contact		contact
Ethnicity	contact			contact		
Telephone				volume		
Health worries		contact	contact			contact
Health control						
Life events			volume		contact	
Enabling Characteristics						
Health insurance			volume	contact		
CS card			volume	volume		
Satisfied in std of living						
Adequacy of income						
Fees limit access						volume
Length of time seeing dr			contact		contact	
Doctor gender					volume	
Transportation				contact		
Access to vehicle					contact	
Appointment convenient	contact				contact	
Waiting room time			contact			
Need Characteristics						
Self rated health	volume	CV*	volume		contact	volume
Physical symptoms	CV					
Chronic symptoms			volume		volume	CV
Well-being					contact	
Distress				volume		volume
Activities of daily living	CV			volume		volume
Bodily functioning					contact	

*C=contact; V=volume

mind it is not possible to determine the R^2 change for predisposing characteristics alone, however, Millar described 35% of the overall variance for prescription item use, results consistent with the present study.

Individual predisposing effects

Table 60 summarises which predisposing characteristics were associated with use of different health services. It also compares which characteristics were associated with contact and which were associated with volume.

The first set of predisposing characteristics related to demographics. These included age, marital status and living arrangements. Although *age* in itself is not a reason to visit the doctor, it is associated with illness. As stated in section 2.2.2 Andersen's model was able to examine the effects of age in isolation and able to examine them after need had been taken into account. Overall, the effects of age remained stable except for GP contact (see Table 22), where need appeared to mediate the effect of age. Thus, on its own, age was associated with GP contact, but once need was accounted for, age became irrelevant. This suggests that the impact of age on GP contact may operate, at least in part, through the effects of age on need.

When examining the remaining health services, age was associated with use of four health services. Younger adults used GPs more often. This is not surprising considering that younger women frequently consult the doctor for ongoing contraceptive, reproductive and gynaecological problems (Waldron, 1983). Younger women were also more likely to take a bed day and contact a health professional, possibly on the advice of their GP, whom they often consulted. Older adults were more likely to use prescription items. The model suggested that chronic conditions were associated with both GP contact and volume (see Table 22 and 33) and that older women use prescription items associated with their chronic conditions. Use of disability days and hospitals, however, appears to be unrelated to age.

No significant association was identified between *marital status* and any health service. This supports the findings by Eve (1988), Kandrack et al. (1991) and Strain (1991).

This finding is surprising, given that Verbrugge (1979) found women were more sensitive to marital status than men. These findings counteract her explanation that married people are 'selected' for their good health and have different 'illness behaviours' that make them appear more healthy. Like Wolinsky and Johnson (1991) no effect was identified for *living alone*. This contrasts the findings by Cafferata (1987) who found that it was influential others in the household that influenced use of health services. Wolinsky and Johnson stated that these effects reflected different access to health care utilization. They claimed it was plausible that in the presence of detailed measures of access and social support the salience of these factors would diminish.

The findings encompassed in social structure support this argument, especially as an association was identified between s*ocial contacts* and whether or not a woman took a bed day. A similar effect was found for *paid employment*. That is, contact was more likely to occur if a woman was in paid employment, a trend evident for contact with all services, although only statistically significant bed days. Regarding volume, no statistically significant effects emerged, but trends suggested that women with no paid employment used more disability days, bed days, had more GP consultations and used more prescription items. Davis (1986b) found a similar trend and suggested employed women have a reduced opportunity to use health services, as employment imposes fixed obligations and time constraints. Employed women used more health professionals, indicating their ability to use more expensive health services.

A consistent trend was identified for *qualifications*. Qualifications influenced contact, but not volume. Highly qualified women were more likely to contact a GP, health professionals, have a disability day and use prescriptive medications at least once. A similar trend was consistent for the remaining 'contact' services (see Table 27) but was not evident for any volume analyses.

These findings are consistent with Stoller (1982) and Bazargan et al. (1998) who both identified a relationship between qualifications and contact with health care services. Stoller claimed education was the single most important variable predicting physician contact. In contrast, Nelson (1993) found no effect for contact and neither did Wolinsky

and Johnson (1991) who, like Andersen, Lion and Anderson (1976) and Cafferata (1987) found instead that qualifications were associated with ongoing use of health services. Wolinsky and Johnson (1991) proposed the effect implied a relationship between education and patient compliance, where ongoing use occurred because better educated people were aware of the advantages of complying with ongoing treatment.

The findings from the present study suggest a different pattern for women. Highly educated women may have a higher level of health awareness linked to the perception of their health status, which could result in contact with medical services. Thus, in tune with their bodies and aware of potentially harmful conditions, it is possible that preventative consultations are a function of qualifications. Thus, well qualified women may have contacted health services for preventative visits, which possibly reduced the requirement for ongoing or 'maintenance' utilization. As a result, qualifications have not been identified in the ongoing use of health services. This supports Haug (1981) who speculated higher educational levels might actually reduce utilization.

A statistically significant effect for *ethnicity* was identified for contact with disability days and health professionals. A similar trend was identified for contact with all health services: that is contact more likely for non-Maori women. Effects for ethnicity were absent from all volume analyses. This suggests one of two things. Non-Maori women may have been more sick and therefore required contact with a form of treatment. Alternatively, Maori women may have been just as sick, but unable to access health services due to less economic resources. Maori women may also be more culturally inclined to seek traditional forms of treatment administered by their 'whanau'[3], or more likely a 'tohanga'[4] or 'kuia'[5]. Further, Davis (1986a) and West and Harris (1980) suggested that ethnic differences existed in the subjective interpretation of health symptoms that affected patterns of health care utilization.

The presence of a *telephone* has a significant effect on the number of health professional consultations to take place over a 12-month catchment period. This suggests the

[3] 'Whanau' is the Maori word for extended family.
[4] 'Tohanga' is the Maori word for Spiritual and Medical healing.

telephone may serve as a proxy measure of access to health professionals. No consistent trend emerged for either the contact or the volume analyses.

Life events had a significant effect on two services: contact with hospitals and ongoing use of GPs. Overall, a uniform trend emerged (see Tables 27 and 35) which suggested that women who had been exposed to a higher number of life events were more likely to use a health service. These findings are consistent with Gortmaker et al. (1982) and Rubio and Lubin (1986). Gortmaker et al. (1982) found life events was the best predictor of future physician utilization, while Rubio and Lubin (1986) reported college students who sought treatment for depression and psychological distress had been exposed to more life events than students who did not require treatment.

This link between life events and ill-health was identified by Stone and Neale (1984) who found small daily hassles were associated with negative affect. Delongis, Folkman and Lazarus (1988) effectively examined this effect when they devised a scale to measure stress by way of small daily hassles. They argued measurement of daily hassles had harmful effects on mental and physical health major that were inadequately captured by measurement of major landmark events. Moreover, they argued that life events represented as daily hassles were more strongly related to mental health than life events represented as major traumatic events because minor stressors occur everyday and their harmful effects accumulate. Subsequently, Pillow et al. (1996) argued that effects of major life events on distress were mediated through the occurrence of minor life events. That is, exposure to an event such as divorce could result in more minor stressors such as increasing the burden of childcare and new financial difficulties. Together, these studies foreshadow the argument that the relationship between life events and health care utilization is more complex than measured in the present study. If the effects of life events on health care use operates through their effects on distress which in turn affects physical health, then the modeling of this effect in future studies could reflect this relationship. If this relationship is more complex as suggested here, this may account for the different effects that life events had on the different health services examined in the present study.

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[5] 'Kuia' is the Maori word for elderly women.

The final aspect of predisposing characteristics was health beliefs. Although no significant effect emerged for feeling in *control* over one's health, *health worries* had a significant impact on use of health services. Overall, worried women contacted and used more health services. Although this trend was consistent for all health services in terms of both contact and volume (see Tables 27 and 35), significant effects were only identified for contact with bed days, GPs and prescription items (see Table 60).

The findings were expected, considering that health worries have been associated with increased use of disability days (Cafferata, 1987), bed days (Wolinsky & Johnson, 1991), GPs (Cafferata, 1987; Millar, 1996; Wolinsky & Johnson, 1991), hospitals (Cafferata, 1987; Wolinsky & Johnson, 1991), health professionals and prescription items (Millar, 1996). Millar noted a possible relationship regarding communication between the physician and the patient – if the medical professional is a skilled communicator able to counter the *unnecessary* worries the result could be a reduction in unnecessary use of services. This is especially pertinent for women, considering that they use more health services than men (Rodin & Ickovics, 1990; Verbrugge, 1976a; Waldron, 1983).

For both contact and volume, health worries appeared as a significant predictor on the first step of the regression equation for every service. However, for certain services (contact with bed days, GPs and prescription items) worried women appear to place a demand on the system regardless of necessity warranted by need. For these services, health worries appeared as a significant predictor on the final step of the regression equation.

For all the remaining services, i.e., contact with disability days, health professionals and hospitals and all volume analyses, health worries was a significant predictor mediated by need. That is, when need was taken into account health worries became non-significant. The fact that health worries were a significant predictor yet diminished once need was in the equation may be interpreted to mean a) worry predicts use and b) the

effects of worry are mediated by need. Thus, worried women appeared concerned due to what they perceived to be a justifiable need.

One final predisposing characteristic worthy of brief mention at this point is the effect, or lack thereof, of *satisfaction*. Inclusion of satisfaction as a predisposing characteristics (indicating it to be present [or absent] prior to the onset of illness) failed to impact on use of any health service. Due to its complex nature satisfaction is a difficult variable to examine. For example, use of a service may improve a person's poor health resulting in high levels of satisfaction yet low utilization levels. Inversely, a person with unresolved ongoing health problems could have low satisfaction yet high utilization due to their ongoing condition. Satisfaction is also linked to provider characteristics, variables beyond the scope of the data presented within the boundaries of this thesis.

Summary: predisposing characteristics

Three salient issues emerge when summarising the overall effects of predisposing characteristics. First, as predicted in hypothesis one[6], predisposing characteristics made a significant and unique contribution for contact with all health services. Secondly, they explained an amount of variance comparative to prior research. The significant amount of variance that was accounted for indicated women used health services for reasons other than need (see Tables 26 and 34). Finally, predisposing characteristics contributed significantly to the use of both medical and non-medical services for both contact and volume analyses. They explained between 5% and 22% of the variance (see Tables 26 and 34). However, these variables became less important once need was taken into account, an issue discussed below. The impact of enabling characteristics are discussed next.

[6] *Hypothesis one:* Amongst users and non-users for both medical non-medical services, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

15.2.3 Enabling characteristics

Overall effect

Enabling characteristics had less impact on the use of health services than did predisposing characteristics. As a block, enabling characteristics made a significant contribution to the model for contact with health professionals (see Table 26) where they contributed 4% of the variance. These results compare with those of Wolinsky and Johnson (1991) who found enabling characteristics had less impact on contact with bed days, physicians and hospitals than predisposing and need characteristics. Similarly Bazargan et al. (1998) found enabling variables were less important when examining use of hospitals, emergency services and physician contact.

Regarding volume analyses, enabling characteristics made a significant contribution of 3% for ongoing use of GPs and 5% for ongoing use of health professionals (see Table 34). These findings are consistent with Wolinsky et al. (1983) who explained 5%, 3%,and 2% for GP visits, emergency room and hospital episodes respectively. Evashwick et al. (1984) were able to explain 6% for use of GP services and Wolinsky and Johnson (1991) explained 1% to 2 % of the variance for bed days, GP volume and use of hospitals.

Access and cost appeared to be influential factors facilitating initial contact with health services (e.g., counselors, physiotherapists and dentists). Enabling characteristics were not significant regarding contact with GPs, hospitals and prescription items and here a converse explanation may be applied. Initial contact with these services may have been considered so essential that access and cost were irrelevant. These individual effects are discussed below.

Individual effects

The first category within the Penchansky and Thomas (1981) framework was that of affordability. This was measured by health insurance, community services card, personal income and cost of doctors' fees.

In the present study, no direct effect was identified for *satisfaction with standard of living* and *adequacy of income*. However, *health insurance* had a significant effect on contact with health professionals and ongoing use of GPs. Women with health insurance were twice as likely to contact a health professional than those without. They were also more likely to have ongoing consultations with their GP more often over a 12-month period (see Table 60). Having a *community services card* had no effect on contact with any health service, but was associated with ongoing use of GPs and health professionals over 12-months. Women with a community services card used GPs, while women without one tended to use health professionals. This indicates that socio-economic variables played a significant role in women's use of medical services where payment to a health professional was involved. More specifically, services eligible for government subsidies (e.g., GPs) were used by women of lower economic standing. Services not eligible for government subsidies (e.g., health professionals) were used by women who could afford health insurance. These findings are consistent with Olaman (1997) who found that health professionals tend to be used by New Zealand women who were financially well off.

Attempting to isolate the effects of individual socio-economic variables in relation to the use of medical services is a difficult issue due to their interactive and often additive nature. Health insurance and community services cards are two such items as their presence or absence impact on a number of variables. For example, women with health insurance who can afford to contact health professionals probably enjoy the benefits of related socio-economic factors: their higher incomes enable them to enjoy better housing, more nutrition and leisure activites which benefit their health. Conversely, women who cannot afford insurance and professional health care may live in substandard housing, have poor nutrition and limited leisure activities: their impoverished living conditions may contribute to poorer health and a greater need for use of health services. This supports Rodin and Ickovics' (1990) arguments that socio-economic status is clearly related to morbidity. It also supports Wolinsky and Johnson (1991) who found that when elderly individuals became eligible for Medicaid[7] their

[7] Medicaid is a government subsidy for eligible Americans over the age of 65.

health care utilization increased. These individuals suffered greater ill-health. Further, Eve (1988) found elderly women more likely to put off care were those in greatest financial need and in the poorest health.

When cost is identified as a function of contact the existing status of fee-for-service in New Zealand can be interpreted as a barrier limiting women's contact with health services. Moreover, if the use of health services occurs as a function of out-of-pocket-cost to the individual this indicates the health care system may not be entirely equitable. Lack of insurance preventing access is a serious implication, especially if, as suggested by Slivinske and Fitch (1992), the extent to which people are insured is often underestimated. In contrast, the opposing argument considers that removing financial barriers to health care could potentially generate unnecessary use; an unwanted side effect in an economic and political climate where health policies are increasingly aimed at cost containment. This is particularly salient for women as their elevated use of health services in comparison to men is well documented.

An effect for the extent to which *fees limited access* was identified for ongoing use of prescription items. There was an absence of effect for contact with any health service. Despite 25% of women reporting that GP fees were expensive enough to limit their access, no statistically significant relationship was identified between GP fees and utilization. The lack of this significant effect could be interpreted as dissatisfaction with the fees, rather than a function of whether or not utilization actually occurred. Similarly, Gribben (1992) identified 30% of people in his sample of South Aucklanders who reported GP fees prevented them from consulting their GP. As in the present study, no statistically significant effect was found between GP fees and utilization.

The second Penchansky and Thomas (1981) category was <u>acceptability</u>. In the present study this was measured by the length of time a woman had been consulting the same doctor and doctor gender. The *length of time* a woman had been consulting the same doctor was associated with GP and hospital use contact. A woman was two and a half times more likely to contact her GP and almost twice as likely to have contact with a hospital service if she had been consulting the same doctor over a long period of time.

These findings dispute those by Gribben (1992) who reported people who had been going to the doctor for a long period of time were low users, while those who had been seeing the doctor for a short period of time were high users. The findings from the present study seem more feasible, where women with an established relationship with a GP are aware of how to access both the GP and the hospital.

GP gender had a significant effect on frequent use of hospitals. The trend indicated women consulted female doctors. These findings are supported by a growing amount of literature that supports the idea that some people (mostly women) have a specific gender preference when it comes to health providers. Women tend to prefer female GPs (Bensing, Brink-Muinen, & de Bakker, 1993; Bertakis, Helms, Callahan, Azari, & Robbins, 1995; Kerssens, Bensing, & Andela, 1997), especially when intimate examinations have to be performed (Brink-Muinen, 1997). The findings in the present study suggest that GP gender appears unimportant when women consult health providers in the short term (i.e., contact), but it becomes important for ongoing consumption when the amount of contact increases.

The third category in Penchansky and Thomas' (1981) framework of enabling characteristics was accessibility, which referred to an individual's ability to physically get to a health service. Mode of *transportation* had a significant effect for contact with health professionals. That is, contact was more likely to occur if a woman used a private vehicle. However, *access to a vehicle* (coded as yes / no) was significant for contact with hospitals. This suggests that women with the financial means to own their own vehicle contacted health professionals, while women with access to any form of vehicle, including buses, had contacted the hospital. The finding suggests that transport is only influential in the initial decision to use health services and that once it has been established that ongoing utilization is required, means of transportation becomes less important.

The fourth category for enabling characteristics was availability. Whether or not an *appointment was convenient* had a significant effect for contact with disability days and hospitals. Women who obtained convenient appointments were more likely to contact a

hospital and take a disability day. Although statistical significance was not obtained, women were less likely to contact a GP or use them frequently if the appointment time was inconvenient.

The final category was accommodation. Time spent in the *waiting room* had a significant effect for contact with GPs. As expected, women who had shorter waiting room times were likely to have contact with GPs and take more bed days, possibly on the recommendation of their GP. Thus Andersen's (1995) suggestion that enabling characteristics include organizational factors appears warranted, as inclusion of convenience of appointments significantly predicted contact with disability days and hospitals, while waiting room time significantly predicted GP contact. This latter finding is consistent with Gribben (1992) who also reported waiting room time predicted use of GPs.

Summary: enabling characteristics

Enabling characteristics contributed less to the overall model than either predisposing or need characteristics. This now appears to be the case across a variety of samples: such as the elderly (Wolinsky & Johnson, 1991), ethnic minorities (Bazargan et al., 1998) and as indicated by the present study, women of all ages.

Hypothesis one[8] predicted that enabling characteristics would make a unique contribution to the use of medical and non-medical services. This hypothesis was supported only for contact with health professionals, where the most important components appeared to be presence of health insurance reducing out of pocket costs for non-essential services and ease of access in terms of private transportation.

The results from the present study show that enabling characteristics also made a unique contribution for ongoing use of GPs and health professionals. The mixed findings regarding the significance of enabling characteristics for frequency of use are subject to a variety of explanations. It is possible enabling characteristics were non-significant for

ongoing use of hospitals and prescription items because these services are non-discretionary. Hospitals (e.g., Accident and Emergencies) treat severe conditions and certain prescriptions provide ongoing medication for chronic conditions. Both these services are associated with little choice thus making access and cost less important. It is also possible that enabling characteristics were significant for GPs and health professionals because they *are* discretionary. That is, after one or more contacts with the GP or health professional, a woman may have gained sufficient information to assess her health status to the point where access and cost became deciding factors influencing the decision regarding maintenance of that relationship.

15.2.4 Need characteristics

Overall effect

Need made a statistically significant and substantial contribution to the overall explained variance for each health services, irrespective of contact or volume. This expected finding is consistent with much research (Aday et al., 1980; Bazargan et al., 1998; Cafferata, 1987; Coulton & Frost, 1982; Evashwick, et al., 1984; Eve, 1988; Stoller, 1982; Wan, 1982; Wolinsky & Arnold, 1988; Wolinsky et al., 1983; Wolinsky & Coe, 1984; Wolinsky & Johnson, 1991).

Table 26 shows need contributed the highest variance for contact with disability days. For the remaining services, the majority of the variance was explained by predisposing characteristics. Table 34 shows need contributed the highest variance regarding ongoing use of disability days, bed days, GPs and health professionals. For use of hospitals and prescription items, predisposing characteristics explained most of the variance. A review of Table 35 adds weight to the argument that need alone is insufficient to provide an explanation of health care utilization.

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[8] *Hypothesis one:* Amongst users and non-users for both medical non-medical services, predisposing and enabling characteristics will make a unique significant contribution to the variance over and above that contributed by need.

Individual effects

No individual need variables were evident for contact with either GPs or health professionals. It is possible this finding was a direct result of the method of analysis in which the nature of the logistic regression model masks the significance of individual predictors in the overall process of determining the block's contribution to goodness of fit with the dependent variable.

The effects of *self-rated health* were entirely consistent with prior expectations. The overall trend to emerge suggested women who felt in poor health overall used more health services. Self-rated health was associated taking a bed day or contacting a hospital. For volume analyses, it was associated with ongoing use of disability days, bed days, GPs and prescription items. Visits to health professionals was the only health service that did not attain significance for either contact or volume (see Table 60).

These findings are comparable to Millar (1996) who found poor self-rated health was associated with ongoing use of bed days and prescription items. Withers et al. (1997) identified a similar association for bed days and GP visits for both Vietnam veterans and their partners, however, hospital contact was only associated with Vietnam veterans. In the present study self-rated health emerged as the strongest predictor for ongoing use of GPs and prescription items (see Table 35), findings similar to Hibbard and Pope (1986) who studied women and Keith and Jones (1990) who examined ethnic minorities. Collectively, these findings suggests self-rated health captures the individual's recognition that something is not right with their health. In conjunction with Millar (1996) findings from the present study provide support and clarify Wolinsky and Arnold's (1988) argument that the optimal measure for self-rated health is a dichotomous item that clearly distinguished between good and poor health. To summarise, women who perceive their health as poor use a range of health services more often.

The existence of *physical symptoms* was associated with disability days for both contact and volume analyses. Women with a high number of physical symptoms were two and a half times more likely than women reporting few physical symptoms to take a

disability day. No significant association was noted for any other health service. One reason why women with a high number of physical symptoms take disability days can be drawn from the literature exploring sex differentials. While men avoid treatment seeking behaviour and ignore somatic illnesses the opposite is true for women. Women appear to be more in tune with their bodies and more often report their physical symptoms and restrict their usual activities due to illness (Waldron, 1983). They also make more use of preventative services (Rodin & Ickovics, 1990) and, moreover, experience ongoing symptoms associated with their regular menstrual cycle. Therefore, the relationship between cutback days and physical symptoms appears to be a function of symptom awareness and conservative treatment seeking behaviour.

Physical symptoms appear to be less pervasive than *chronic symptoms.* These are illnesses that have been present for over three months, more often than not diagnosed by a medical professional. *Chronic symptoms* had significant effects for contact with prescription items, ongoing use of GPs, hospitals and prescription items. Women with chronic conditions were eight times more likely to have used a prescription item at least once than women without chronic conditions (see Table 27). As with physical symptoms, the more chronic conditions a woman had, the more she used doctors and hospitals. These findings replicate Millar (1996) who also found an association between chronic symptoms, GP visits and use of prescription items. The findings from both these studies suggest that women's higher rates of doctor visits contributed substantially to consumption of prescription items (Waldron, 1983).

Well-being had a significant effect on contact with hospitals. Women with lower well-being scores were more likely to have contact with a hospital. *Distress* was associated with ongoing use of health professionals and prescription items. This suggests that distressed women use an ongoing prescriptive medication to counteract their distress or depression, or seek ongoing treatment from a specialist health professional. Although statistical significance was attained for use of health professionals only, the overall trend for all six services tentatively implies they were used by women reporting higher levels of distress. Again these results are consistent with the literature (Manning & Wells, 1992; Roghmann & Haggerty, 1972; Tessler et al., 1976; van Hermert, Bakker,

Vandenbroucke, & Valkenberg, 1993), indicating that elevated rates of utilization amongst depressed women is not an uncommon finding. Thus, it appears apparent that women with lower levels of well-being and higher levels of distress seek specialist health care.

Women reporting their health affected their *daily activities* were more likely to take a disability days and have ongoing use of disability days, health professionals and prescription items. Use of health professionals may have been in the form of ongoing physical therapy from a specialist such as a physiotherapist or chiropractor. Finally, b*odily functioning* had a significant effect on one service. Women who reported problems with bodily functioning were more likely to have contact with hospitals.

Summary: need characteristics

Despite acknowledging the importance of need, one major discrepancy between the results of this study and prior research such as that by Hibbard and Pope (1986), Jewett et al. (1992) and Wolinsky and Johnson (1991) is that need did not completely drive the system. Predisposing characteristics accounted for more variance than need for contact with bed days, GPs, health professionals, hospitals and prescription items and was almost equivalent for disability days. These data challenge the dominance of need in explaining contact with medical and non-medical services and suggest that contact is partially driven by illness but the critical factor for women is their socio-cultural context and their health beliefs. In this respect important emerging trends indicated contact occurred for women who were a) better educated, b) non-Maori, c) worried about their health and d) had experienced more life events. It is therefore logical to surmise that these predisposing factors affected their perceived need and influenced their contact with both medical and non-medical services. Only one other study has reported similar findings; Bazargan et al. (1998) reported predisposing and enabling characteristics dominated need characteristics for use of emergency services.

15.2.5 Profile of non-users

As in the present study, previous researchers have focused on providing information regarding people who make contact with health care services (Nelson, 1993; Stoller, 1982; Wolinsky & Johnson, 1991). To extend the body of health literature, the present study has uniquely profiled women who have *avoided* contact with health services. This purposely serves to identify influential determinants which may ultimately provide a basis for designing policy interventions aimed at modifying women's utilization behaviours. Accordingly, Table 61 provides a summary profile of women who are less likely to have contacted any form of health care. It also indicates mediating effects apparent in the data. These become evident by comparing whether a predictor becomes less significant on subsequent steps of the analysis. Apart from prescription items, mediating effects were present for all services; as a function of both need and enabling variables. The profile of non-users, described below examines their relationship with disability days, bed days, GPs, health professionals, hospitals and prescription items.

Disability days

Findings from the present study suggest that use of bed days is driven equally by predisposing and need characteristics as both explained approximately equal amounts of variance (9%). Women who did not take a disability day were likely to be a) Maori, b) have less qualifications, c) be unable to obtain a GP appointment, c) have less physical symptoms and d) were not restricted in their daily activities. As indicated in Table 59 contact with disability days has not traditionally been researched, making comparisons with previous literature impossible. This draws attention to the unique contribution the present research makes to the literature, where the Andersen model has been applied to a general population of women of all ages.

Bed days

Women who avoided taking bed days were a) socially isolated, b) not in paid employment, c) not worried, d) older and e) not particularly worried about the state of their health. Similarly, Wolinsky and Johnson (1991) also found the last three variables

Table 61 Profile of women *not* contacting health care services: Summary of significant variables for each model of the logistic hierarchical multiple regressions

	Model 1	Model 2	Model 3
		DISABILITY DAYS	
Predisposing	Maori	Maori	Maori
	Presence of phone	Presence of phone	-
	No health control	-	-
	-	-	Low educational attainment
	No health worries	No health worries	-
Enabling		Inconvenient appointment	Inconvenient appointment
		Long waiting room time	-
Need			Low no. physical symptoms
			Low no. ADLs
		BED DAYS	
Predisposing	Older	Older	Older
	No paid employment	No paid employment	No paid employment
	No health worries	Not worried	Not worried
	-	No social contacts	No social contacts
	Have no control	-	-
	Less life events	Less life events	-
Enabling			
Need			Good self-rated health
		GPs	
Predisposing	Younger	Younger	-
	Low educational attainment	Low educational attainment	Low educational attainment
	No health worries	No health worries	No health worries
Enabling		Shorter time seeing doctor	Shorter time seeing doctor
		Long waiting room time	Long waiting room time
Need			
		HEALTH PROFESSIONALS	
Predisposing	Older	Older	Older
	Less educational attainment	Less educational attainment	Less educational attainment
	Maori	Maori	Maori
	No health worries	No health worries	-
Enabling		No health insurance	No health insurance
		No private vehicle	No private vehicle
Need			
		HOSPITALSs	
Predisposing	Have paid employment	-	-
	No health worries	No health worries	-
	No health control	No health control	-
	Less life events	Less life events	Less life events
Enabling		Shorter time seeing doctor	Shorter time seeing doctor
		Appointment inconvenient	Appointment inconvenient
		-	No private vehicle
Need			Good self-rated health
			Less no. bodily problems
		PRESCRIPTION ITEMS	
Predisposing	Low educational attainment	Low educational attainment	Low educational attainment
	No health worries	No health worries	No health worries
Enabling			
Need			Low no. chronic symptoms

(c, d and e) indicative of elderly men and women who did not take bed days. Further, both studies found Andersen's model explained approximately 14% of the variance when applied to contact with bed days. The physical symptoms confirms that the relationships in the Andersen model identified by Wolinsky and Johnson are consistent for a completely different general population. Thus the present study corroborates the reliability of the findings by Wolinsky and Johnson and indicates the present research has extended the current literature by examining contact with bed days on a unique sample of women.

GPs

Women who avoided contact with GPs were a) less well educated, b) not worried, c) had been consulting the same doctor for a shorter length of time and d) previously had waited for a long time in the waiting room. No significant individual predictor was identified for need. As indicated in Table 59, GP contact has previously been examined in the context of Andersen's model by four studies: Bazargan et al. (1998), Nelson (1993), Stoller (1982) Wolinsky and Johnson (1991). In addition to the present study, these researchers have used the Andersen model to explain between 3% (Nelson, 1993) and 55% (Bazargan et al., 1998) of the variance. The variance explained by the present study is comparable to the prior research, with the exception of Bazargan et al., who examined an elderly ethnic minority using extensive chronic indicators of need. Again, this reinforces the conclusion that if future research encompassing need characteristics took gender specific needs into account it may well increase the explained variance. Such measures were suggested in the last paragraph of section 15.2.1.

As in the present study, Bazargan et al. (1998) and Wolinsky and Johnson (1991) both found less well educated people used less GPs. Nelson (1993) found no relationship, while Stoller (9182) excluded education from her study. The findings in the present study confirms that people with lower educational levels use GPs less often. It is unlikely that education itself is a function of utilization, but rather a closely associated third variable such as awareness of health and illness behaviours. Nevertheless, this relationship appears consistent when examined in the light of different populations,

including ethnic minorities (Bazargan et al., 1998), elderly men and women (Wolinsky & Johnson, 1991) and women of all ages.

In comparison with the prior research, the present study is the only one to have examined prior length of time a person has been consulting with the doctor. As noted earlier, women with a history of consulting the same physician are two and a half times more likely to have contacted a GP. Moreover, the present study was the only one not to have identified individual need predictors associated with the GP contact. Need only contributed 2% to the variance, while predisposing characteristics contributed 3%. This may signal a difference in American and New Zealand health care delivery systems.

Overseas, need appears to drive whether or not contact is made with a GP. In New Zealand, predisposing characteristics appear to determine GP contact. Interpreted cautiously, it suggests the system is not equitable for GP contact, considering that Andersen (1995) Andersen and Newman (1973) and Wolinsky and Johnson (1991) all advocate that a system dominated by need may be characterised as equitable. This is a finding unique to the health care utilization literature that draws attention to possible inequities in the New Zealand health care system.

Health professionals

A further unique aspect of this research is the examination of health professional contact within Andersen's model. To date, the literature dealing with this aspect of health care has not yet examined contact with health professionals within the context of Andersen's model. The present study shows that by using an aggregate measure representing health professionals the model is able to explain 13% of the variance and identify four variables related to contacting health professionals. Women who *did not* contact health professionals were a) older, b) less well educated, c) Maori, d) uninsured and e) did not have a private vehicle. Thus, consistent with Olaman (1997) contact with health professionals is made by New Zealand women in the upper socio-economic bracket, who appear to be well educated, can afford insurance and have their own private car. As with GP contact, the absence of need dominating contact with health professionals signals the possibility of an inequitable health system. This is because contact with

these health providers is related to insurance, level of education and transport (i.e., enabling characteristics) as opposed to need.

Hospitals

The present study has established that in a general population of women, those who do not make hospital contact are women who a) have experienced less life events, b) have a short history of seeing the doctor, c) had inconvenient appointment times, d) did not have a private vehicle, e) felt in good health and f) had few bodily problems. In comparison with prior research examining hospital contact (Bazargan et al., 1998; Nelson, 1993; Wolinsky & Johnson, 1991), the present study is unique in that for the first time the relationship between hospital contact and life events, access to a vehicle and convenient appointments has been examined. The latter two variables were recommended for inclusion by Andersen (1995) and drawn from the Penchansky and Thomas (1981) framework of enabling characteristics. In comparison to variables previously examined, the present study, Nelson (1993) and Wolinsky and Johnson (1991) consistently found people in poor self-rated health contacted a hospital, findings contrasting with Bazargan et al. (1998). It is possible that perception of self-rated health was not identified as significant in this latter study perhaps because of cultural differences in symptom recognition. Again, aside from Bazargan et al. (1998) due to the same reasons stated earlier (see the final paragraph in section 15.2.1), the present study found the model explained 14% of the variance for health control, more than that found by either Nelson (1993) or Wolinsky and Johnson (1991). This confirms the present research has extended earlier findings both in application to the general female population and by the addition of unique indicators into the model.

Prescription items

A further unique aspect of this research is the examination of contact that occurs with prescription items. Again, this has not been previously examined by the health care literature. Women who did not use prescription items were those who were a) less well educated, b) not worried and c) had few chronic symptoms. Earlier within this section, the findings from the present study indicated that for GP contact the New Zealand may be inequitable. This is supported by the results relating to prescription items, which

identified that predisposing characteristics explained more use of prescription items than did need characteristics. This is consistent with the arguments of Rodin and Ickovics (1990) and Waldron (1976) who noted that use of prescription items is higher for women than for men, because women use GPs more often. If this is true and prescription items are a function of GP utilization as demonstrated by the data here, it appears the inequity in the system regarding contact with GPs has been carried forward and affected contact with prescription items.

Summary

The first issue to emerge is the absence of need driving the system for contact with health services. Non-users felt positive about their health status, their bodies functioned well and they reported less physical, chronic or limiting symptoms. Although this foreshadows the conclusion that women contacted services primarily on the basis of need, two issues require consideration. As mentioned previously, the first is the evidence of dominating predisposing and enabling characteristics, which indicated the significance of characteristics influencing contact unrelated to need. The second is that many of these characteristics were evidenced after need had been accounted for, suggesting they made a substantive contribution to service use in their own right. Table 61 presented several predictors of a socio-economic nature and characteristics relative to life style position which may be interpreted as barriers to access. These included lack of private insurance, lack of private transport (especially for non-essential services such as health professionals), lack of paid employment and lack of educational attainment. These findings are strongly supported by New Zealand Health Information Service data (NZHIS, 1995), which released statistics indicating that people did not contact health services primarily due to cost, especially if they were Maori, low income earners or unemployed.

15.2.6 Profile of frequent users

Table 62 profiles significant predictors of women who frequently used services. Unlike the contact profile, frequency of use was dominated by women who consistently

Table 62 Profile of women who *frequently* used health services: Summary of significant variables for each step of the OLS hierarchical multiple regressions

	Step1	Step 2	Step 3
		DISABILITY DAYS	
Predisposing	Older	-	-
	Paid employment	Paid employment	-
	Health worries	Health worries	-
Enabling		Satisfied with standard of living	
Need			Poor self-rated health
			High no. physical symptoms
			High ADL scores
		BED DAYS	
Predisposing	Health worries	Health worries	-
	Health control	Health control	-
Enabling		Short waiting room time	Short waiting room time
Need			Poor self-rated health
		GPs	
Predisposing	-	-	Younger
	No paid employment	-	-
	Health worries	Health worries	-
	More life events	More life events	More life events
Enabling			Health insurance
		Has community services card	Has community services card
Need			Poor self-rated health
			High no. chronic symptoms
		HEALTH PROFESSIONALS	
Predisposing	Presence of phone	Presence of phone	Presence of phone
	Health worries	Health worries	-
	Health control	Health control	-
Enabling		No community services card	No community services card
		Adequacy of income	-
		Longer time seeing doctor	-
Need			Distressed
			High ADL scores
		HOSPITALSs	
Predisposing	Less educational attainment	-	-
	Health worries	-	-
	More life events	-	-
Enabling			Doctor is a female
Need			High no. chronic symptoms
		PRESCRIPTION ITEMS	
Predisposing	Older	Older	Older
	No paid employment	No paid employment	-
	Health worries	Health worries	-
	Health control	Health control	-
		Presence of phone	-
Enabling		Unsatisfied with std. of living	-
		-	Fees don't limit access
Need			Poor self-rated health
			High no. chronic symptoms
			Distressed
			High ADL scores

demonstrated high needs. For four of the six services need was the most important factor and it mediated the effects of predisposing and enabling variables. This was especially the case for ongoing use of disability days. All predisposing and enabling characteristics identified as significant on steps one and two became non-significant after need entered the equation. Similarly, predisposing variables became non-significant after accounting for need. This suggests that for both these forms of self treatment, need drives the system.

Women who often consulted their GP were those likely to have a) poor self-rated health, b) be younger and c) have a high number of chronic symptoms. These exact findings replicate the New Zealand Household Health Survey (Statistics New Zealand, 1993) which reported younger women often use GPs as these are the main reproductive years when women seek advice regarding contraception, pregnancy and childbirth. They also report greater use of GPs by women who rated their health as 'poor' and those who had long term disabilities. As in the present study, the New Zealand Household Health Survey did not find ethnicity to be a factor influencing use of GPs. That is, Maori women were just as likely as non-Maori women to have visited a GP[9]. The present study is able to expand this profile and add that frequent users of GP services included women who had a) experienced more life events and b) had some type of financial assistance in the form of either health insurance or a community services card. This implies costs were taken into consideration when consulting a physician over a lengthy period of time, findings similar to Wolinsky and Johnson (1991). Financial concerns of a different nature were applied to frequent use of health professionals. Women consulting (non-essential) health professionals were less likely to receive financial assistance in the form of a government subsidised community service card. These women classified their income as adequate, where they always had a little money left over, or they always had extra money. They also had a history of prior consultations with their GP occurring over a longer period of time. It is therefore possible that after a period of seeing their GP he or she recommended ongoing treatment in the form of a specialist. Unfortunately the data did not permit further investigation to clarify the exact

nature of the relationship in terms of preventative or restorative treatment, but it is possible that other health professionals were being utilized as a result of GP referral.

Women who were frequent users of hospitals reported they had experienced a high number of chronic symptoms and that they had consulted a female doctor. Preference for a female doctor has been identified by Kerssens et al. (1997) who conducted a random survey of 961 Dutch men and women. They found a gender preference stronger amongst female patients, where 45% of female patients preferred a same sex provider in the field of nursing and obstetrics. Gender preference for instrumental care (such as anesthetists, surgeons and neurologists) was not evidenced, however, female providers were preferred in conditions requiring disrobing, extensive body probing or examination of the genitalia. Considering New Zealand women aged between 15 to 44 years are hospitalised for childbirth, labour and pregnancy complications, while women 45 to 59 years are hospitalised for disorders of the female genital tract (Statistics New Zealand and Ministry of Health, 1993) the evidence presented here, that hospitalised females prefer a female physician, is not unexpected.

Data concerning hospitalisation also indicated that life events, low educational attainment and health worries were mediated by enabling characteristics. Although failing to reach statistical significance, general trends were similar to data reported by the New Zealand Health Information Service (NZHIS, 1995) which indicated that women using hospitals tended to be younger. This is also consistent with prior research indicating elevated use of health services by younger women due to pregnancy and childbirth requirements (Waldron, 1983). Women using hospitals also tended to live alone, had few social contacts, were in paid employment but had some form of financial assistance (either a government subsidised community services card or health insurance), were not satisfied with their standard of living and felt GP fees limited their access. Since significance was not attained for these variables extreme caution should be implied when considering this general trend. However, it does offer a tentative interpretation that women using hospitals were of a lower socio-economic background

[9] Ethnicity is a complex social and political issue and the detailed unravelling of the effects of ethnicity are beyond the scope of this thesis. However, ongoing local research in the area (e.g., Hirini (1998)) is

exposed to economic constraints, where cost impacted on use of GPs. This suggests that in some cases hospitals may have been substituted for GP visits. This interpretation is again made with extreme caution since data provided by Statistics New Zealand and Ministry of Health (1993) indicates pregnancy and childbirth accounted for 13% of hospitalisations where use of a GP would have been inappropriate. Lack of precision in the aggregate measure of hospital use made it difficult to determine whether these women were admitted to the hospital, were using the accident and emergency or outpatient services. However, a clear picture contrasts them from women frequenting health professionals, who tended to live with others, had at least three social contacts, reported higher educational attainment and failed to qualify for a community services card.

A final profile is provided for women who often used prescription items. Within the context of Andersen's model, use of prescription items is the one service that has been seldom documented in the literature. Women who frequently used prescription items tended to be a) older, b) not limited by GP fees, c) have 'poor' self-rated health d) chronic conditions, e) were distressed and f) had restricted daily activities. Need dominated the use of prescription items more than any other health service, both in terms of the number of significant variables (four) and level of explained variance (14%). Again, the mediating effects of need on predisposing and enabling characteristics were evident. Prior to taking need into account, significant predisposing variables were health worries, health control, presence of a phone and lack of satisfaction with one's standard of living and not having paid employment. Once need was considered these variables became non-significant. The New Zealand Household Health Survey (Statistics New Zealand, 1993) reported pharmacists to be the second most commonly used service (after use of GPs) and similar findings are reflected here, with prescription items being the second most commonly used health service after GPs. Within the sample, 85% of women visited their GP and 78% of women received prescription items. Thus, a high rate of women consulting their GPs received prescription items.

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aimed at extensively examining the effects of ethnicity within the context of Andersen's model.

Several explanations for this may be drawn from psycho-social factors presented in the literature. First, women receive more prescribed medication due to frequent contact with their GP (Rodin & Ickovics, 1990; Waldron, 1983). Secondly, women are more likely to be advised by their GP to make a follow-up visit to have follow-up contact with their GPs, again exposing them to possible use of prescription items (Verbrugge & Steiner, 1981). They also suggest women receive more services from their GP per visit because they express more anxiety about their symptoms and request treatment. Fourth, women use their GPs for preventative care (Verbrugge, 1989; Waldron, 1976; Waldron, 1983) so their treatment is often more likely to be a form of prescriptive medication, rather than surgery. Finally, women are more likely [than men] to be treated with prescription items, not due to gender bias, but due to presentation of symptoms as women tend to present with less severe symptoms than men (Verbrugge & Steiner, 1981). These variables are represented in the significant variables identified in conjunction with use of prescription items in Table 62. Prescription items are more likely to be used by older people who suffer from chronic symptoms which require continuous care (and therefore GP contact); they rate their health as poor and are worried about it. They also feel they have little control over their health and therefore require the assistance of medical interventions. These variables are likely to be associated with frequent GP use and follow up care resulting in frequent use of prescription items.

15.2.7 Summary: the model replicated

Profile

Predisposing and enabling characteristics were more influential in predicting the likelihood of initial contact with medical services (evidenced by the greater number of statistically significant effects) than they were with volume of use. Characteristics present prior to the onset of illness (especially the extent to which a woman was worried) and availability of resources facilitating access (primarily money and transport) were important in the determination of initial contact. This signals importance for the concept of discretion, where either the patient herself decided whether or not to use a

health service, or their circumstances decided this for them (i.e., lack of money or transport). After predisposing and enabling characteristics had played their discretionary role and contact had been established, their importance diminished and need became the dominating influence that determined the level of consumption. A likely explanation is that at this point, the patient's discretion was reduced and ongoing consumption was largely determined by the professional. This is especially likely for women, because as found by Verbrugge and Steiner (1981), women are more likely [than men] to be advised to make a follow up visit. Predisposing and enabling characteristics then became overshadowed by need, especially for use of essential services. Need had more mediating effects on predisposing and enabling variables and was more influential in maintaining ongoing use than establishing contact. Need was less dominant in the contact analyses, which did suggest infrequent users had proportionately lower needs. However, non-medical aspects of the model facilitated the explanation of health care utilization above and beyond a simple need.

Hypotheses supported

To summarise the support for the hypotheses, the first hypothesis was supported for use of health professionals. This indicated that both predisposing and enabling characteristics made a unique contribution to the variance above and beyond need. Predisposing characteristics, however, made a unique and significant contribution to all health services. The second hypothesis was supported for ongoing use of bed days, disability days, GPs and health professionals. This indicated that for these services, need explained more variance than either predisposing or enabling characteristics. The finding that predisposing and enabling characteristics are more influential than need in establishing contact, but need is more influential in determining ongoing use has implications regarding equitable delivery of services by the New Zealand health care system.

Equity and contact

A review of significant indicators predicting probability of contact with health care services compels the conclusion that the health care system in New Zealand is not equitable. These data present evidence for all six services which have demonstrated that

predisposing and enabling variables (and not simply need) were important influences in determining contact with health services. Equality is defined according to which predictors are identified as dominant, for example, if need characteristics are the principal determinants of health service utilization then the system may be characterized as equitable. Inequality occurs when social structure, health beliefs, demographics and enabling variables primarily determines who attains health care. (Aday & Andersen, 1974; Aday Andersen, & Fleming, 1980; Andersen, 1968; Andersen & Newman, 1973; Anderson, 1995; Wolinsky & Arnold, 1988; Wolinsky & Johnson, 1991). It is the variables of this nature (e.g., ethnicity, education, health worries) that have been determined by the present study as predominant factors influencing contact with health services and thus indicates an inequitable health system. In systems where predisposing and enabling characteristics have only minimal effects there is no requirement for targeted, programmatic interventions (Wolinsky & Johnson, 1991). However, for these data, this appears not to be the case. They suggest health beliefs (e.g., health worries and health control), socio demographic variables (e.g., education levels which potentially influence perceived need and transport) and socio-economic variables (e.g., government assistance, health insurance and paid employment) all determine who does and who does not, have contact with health services. These variables are potentially suitable as targets for long term intervention programmes and health policies aimed at changing women's health and illness behaviours and improving women's health care services.

Equity and volume

Need dominated the volume of use profiles and consistently mediated the effects of predisposing and enabling characteristics for both medical and non-medical services. Table 62 shows a reduced number of significant predisposing and enabling variables on the third step. For example, health worries, significant on the first step for all health services, became non-significant after need entered the equation. Predisposing characteristics were statistically significant and as an individual entity explained more variance than need for hospitals and prescription items. However, for the remaining four services need was the most important factor and it mediated the effects of everything else. Need explained the most variance for ongoing use of disability days,

bed days, GPs and health professionals. This demonstrates that need drives the system and therefore suggests that the health system is capably delivering equitable health care (Andersen & Newman, 1973). Despite this, much variance describing the use of health services remains unexplained, results similar to Wolinsky and Johnson's (1991), but unlike those by Bazargan et al. (1998) whose examination of a sub-population of elderly African-Americans explained 55% of the variance. This argues that the model works better for the elderly than it does for people of all ages, consequently future research into Andersen's model should focus on specific sub-populations (e.g., the elderly) and use measures specifically tailored to capture the requirements of that population.

Conclusion

Although the variance explained in the present study is consistent with prior research (Millar, 1996; Wolinsky & Johnson, 1991) it has not greatly increased the robustness of the model. However, non-medical aspects are worthy of inclusion as future predictors as they have clarified the relationships between behavioural variables and the use of the various health services. These variables appear more important in the establishment of contact, rather than ongoing use, as these data demonstrate the volume analyses were driven by need. This supports Wolinsky and Johnson (1991) who argued that the model is limited to this current level of predictive utility and including additional measures for predisposing and enabling variables would not result in substantial improvements in the explained variance. However, in theoretical advancement of the model, the unique inclusion of traumatic events to further explain women's patterns of health care utilization is considered next.

15.3 The model expanded: trauma

15.3.1 Traumatic events and PTSD

Hypothesis three theorised that the inclusion of trauma as an aggregate measure would predict use of medical services above and beyond the significant predictors identified earlier by Andersen's model. The theoretical base underlying this hypothesis advocated that exposure to potentially traumatic events appears to result in cumulative adversity

which in turn increases the use of health services. This hypothesis was supported for two services, use of bed days and hospitals and a third (use of health professionals) almost attained statistical significance. This evidence therefore suggests that cumulative trauma is a significant predictor in the use of health services for New Zealand women, above and beyond previous predispositions and illness requirements that would normally account for their utilization patterns.

Evidence of this nature is unique in the literature, not in the least because of the method that has been used to represent effects of traumatic events. Most researchers to date have conducted either cross-sectional or longitudinal research focusing on the effects of just one traumatic event (Golding et al., 1988; Kimerling & Calhoun, 1994; Koss et al., 1990). The effects of cumulative trauma on *mental health* has been examined (Turner & Lloyd, 1995) but its effect on health service utilization is less well documented. The adverse relationship between a single traumatic event, elevated levels of psychological distress and poor physical health has been documented by Koss et al. (1990); Turner and Lloyd (1995). Turner and Lloyd reported that cumulative childhood traumas represented a significant dimension of risk in the onset of adult psychiatric disorders. They demonstrated a clear association between experience of trauma and onset of both psychological distress and psychiatric disorder. The present study expands on this by extending the link between exposure to cumulative traumatic events and use of health services. Thus, as reported by Golding et al. (1988) the sequelae commences with exposure to trauma, its [latent] impact on mental or physical health, finally resulting in elevated use of health services.

In terms of the type of services used Kimerling and Calhoun (1994) and Koss et al. (1990), provided evidence that traumatic events (i.e., sexual assault) resulted in increased use of medical rather than psychological services. This would imply that it is the nature of the traumatic event that determines the type of service used. Evidence from the present study affirms a somewhat more widespread application - that exposure to cumulative traumatic events affects more than just one type of health service; and that both medical (hospitals) and non-medical (bed days) services are utilized. To clarify the relationship between exposure to cumulative traumatic events, health outcomes and

impact on use of health services, future research should examine type of treatment (e.g., medical and non-medical) in terms of type of trauma. For example, traumatic events resulting in use of hospitalisation are likely to result from physical injuries (such as physical assault) whereas use of mental health professionals are likely to result from psychologically damaging events such as death or injury to a loved one. Treating the measures of traumatic events and their outcomes more specifically and adopting a less broad approach would have the advantage of clarifying these relationships for women of all ages and in populations of differing risk. In summary, results from the present study confirms that exposure to cumulative traumatic events is a significant predictor in the use of health services (see Table 56), although its inclusion as an aggregate measure failed to significantly enhance the robustness of the behavioural model.

The last three hypotheses made a unique contribution to the health literature by shifting from replicating Andersen's model to expanding the model. Hypothesis four examined the effects of different traumatic events on use of health services. It hypothesised that different traumatic events would significantly predict use of health services after the significant predisposing, enabling and need variables identified earlier in Andersen's model had been accounted for. The different types of events were sexual abuse, assault, accidents, natural disasters and injury or death to a loved one. This hypothesis was supported for a non-medical service only (bed days) where assault was the only category that realised significance.

The prevalence of significance for an non-medical service is an interesting one, as to date prior research has examined trauma in terms of traditional medical services such as physicians, hospitals and mental health professionals. Norris et al. (1990) suggested that professionals may be consulted as the victim's last resort when all other avenues of help (such as social support networks) are exhausted – this is one possible explanation why traumatic events are a significant predictor in the use of non-medical services. This should not be interpreted as an indication that women suffering from assault take bed days as a substitute for other services. However, it is feasible that after medical treatment has occurred women optimized their recovery by frequently taking bed days. One interesting avenue of future research would be to investigate these findings in

relation to women's living arrangements. Earlier (see hypothesis 2), evidence emerged suggesting that women who lived alone were more likely to take a bed day rather than a cut back day, possibly because they are free of household responsibilities towards household members. It is probable that these are the women who are taking bed days. This assumption would fit in well with findings by Martin et al. (1998) who reported that most New Zealand women who reported an assault over the past 12-months lived alone.

With regards to medical services in the present study, specific types of trauma did not make unique and significant contributions to the model, nor did they greatly increased the explained variance. Although not an exact replication of the study conducted by Golding et al. (1988), findings between the two studies are not dissimilar. These authors found that in predicting health care utilization 'sexual assault' became non-significant after need had been stepped into the logistic regression equation. They also reported that victims of assault used medical services more frequently than non-victims, results similar to Kimerling and Calhoun (1994) who found that utilization of medical services increased for victims, but mental health services did not. Unlike these two studies, the present study identified cumulative traumatic events (rather than a single incident) as a significant predictor of non-medical services.

This suggests that over a period of time assault victims substitute use of medical services with non-medical services. It is possible these women stayed at home rather than consult a medical or mental health professional and attempted to deal with the psychological aspects themselves (possibly with the aid of a social support network), but continued to seek medical treatment primarily from their GP only when stress manifested in the form of a somatic symptom. Why use of GPs did not attain significance is both unexpected and unclear, as Kimerling and Calhoun (1994) reported they are considered the primary source of care following assault. However, considering the importance of money it is possible the women in this sample who were assaulted did not have financial access to health professionals if they lived alone, as reported by Martin et al. (1998). If this is the case then use of bed days does seem a feasible alternative, especially if use of a mental health professional is perceived as a stigmatism.

Finally, hypothesis five predicted PTSD would be a significant predictor in the use of health services above and beyond significant predictors identified by Andersen's model and total number of traumatic events. In stage five, the six regression equations entered significant predisposing, enabling and need variables identified in stage two (volume) on the first step and total number of traumatic events[10] on the second step (as in stage four). PTSD was entered on the third and final step. An association emerged between PTSD and use of bed days, GPs and hospitals. As the reaction to traumatic events manifested as PTSD became more prevalent, use of both medical and non-medical services increased. These findings are consistent with Long et al. (1992) who reported that Vietnam veterans with elevated rates of PTSD used more health services. The use of bed days, GPs and hospitals increase with the onset of PTSD for a number of reasons. Firstly, GPs are the most commonly used medical service and point of contact for victims of trauma (Flett et al. 1997; Kimerling & Calhoun, 1994). When consulting with their GP, the victim may be advised to rest up in bed and return for a check up at a later point in time. This would account somewhat for the increased utilization for these two services. Use of hospitals may be elevated as it can be an initial point of contact for women of lower socio-economic standing – (the volume analyses in chapter 10 showed that women who used hospitals found that GP fees limited their access). These women may well have used the accident and emergency or outpatient services at their primary point of contact in the treatment of PTSD.

There are two reasons why PTSD was not associated with use of cutback days (measured over a three month period). The first issue to consider here is the relevant time frame – a confirmed diagnosis of PTSD can only be made if the symptoms are evidence for a minimum period of three months – thus, traumatic events experienced by women within the three months prior to data collection would not be evident, (although it may be unlikely that enough women fell into this category to make a significant impact on the data). Secondly, as suggested earlier, it is probable that women's living arrangements impact on these data. Since hypothesis two (volume) indicated that

women who lived alone were more likely to take bed days and the 86% of women in this sample lived with others, it is probable that women experiencing PTSD who live with others are less likely to take cutback days. PTSD was not related to use of health professionals. This finding may be attributed to the aggregate nature of the outcome variable. Health professionals included professionals such as dentists and optometrists – professionals unlikely to be consulted due to the onset of PTSD. Further, data from the volume analyses indicated that health professionals were used less by women who had limited financial resources; with the onset of PTSD these women were likely to have used hospitals. Clarification of the relationships between traumatic events, PTSD, social support, financial standing and use of health care services are certainly worthy of further examination.

As stated earlier, much prior research focused on one type of traumatic event (e.g., assault or sexual abuse) but investigation of PTSD within the context of the present study considered a wide array of potentially traumatic events. The key phrase here is *potentially* traumatic event; a phrase open to interpretation of event effects. This suggestion is endorsed by Friedman and Schnurr (1995b) who argued that exposure to traumatic events was only one aspect; equally important is the victim's individual reaction to that event. Thus, different women experiencing the same event could perceive varying levels of distress or trauma. As evidenced by the varying levels of PTSD in the present study not all women exposed to a traumatic event went onto develop PTSD. Some women agreed they had experienced an event listed on the Traumatic Event Scale but if they failed to find them traumatic there was little effect on their use of health services.

Friedman and Schnurr (1995b) further advocated that reaction to trauma in the form of PTSD was an important variable mediating the relationship between traumatic events and *health status*. A unique feature of the present study was a logical extension of this argument that proposed PTSD could be an important factor mediating the relationship between traumatic events and health care *utilization*. Additional analyses within the

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[10] Total traumatic events (as in hypothesis four) were used in hypothesis five to test PTSD rather than specific types of trauma (as in hypothesis three) as significance was more prevalent for this aggregate

present study provided evidence to support this argument. Evidence emerged that PTSD mediated the relationship between traumatic events and health care utilization was established for use of bed days and hospitals (illustrated in Tables 51 and 54 respectively).

The approach to testing mediation and moderation effects used in the present study was a relatively 'broad brush' approach to determine if PTSD exerted a mediating effect. It assumed a linear effect and an additive set of relationships. However, when examining the issue of health and mental health the possibility of reciprocal feedback loops is always present. James and Brett (1984) note a variable can be both a mediator and a moderator within a single set of functional relations. This appears to be the case represented here (see Table 56). Since more statistically sophisticated tests of mediation and moderation were considered beyond the scope of the present study future research could focus on a longitudinal design with a well specified causal model which apply more elaborate analysis techniques such as the LISREL approach (Joreskog & Sorbom, 1979). This would be able to clearly specify causal relationships, feedback loop effects and unspecified indirect effects. These suggestions are discussed in detail in section 15.5.3.

Although evidence of PTSD as a mediator between traumatic events and health care utilization is supported by both Friedman and Schnurr (1995b) as well as the present study, not all research has established this effect. Flett et al. (1997) used Andersen's theoretical framework to examine effects of trauma and PTSD for both men and women. A main effect for traumatic events was not identified, nor was evidence of a PTSD mediation effect. The lack of significant evidence was arguably due to the aggregate nature of the dependent variable; Flett and his colleagues were forced to adopt a parsimonious strategy and aggregate several services to ensure an adequate response rate. Scores for visits to GPs, Accident and Emergency clinic attendance, hospital admissions, outpatient clinic attendance, use of prescription items and use of health professionals were aggregated into one variable indicating service use. The trade off between combining services to ensure adequate response rates possibly resulted in a loss

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measure than it was for the five specific trauma categories.

of precision which masked significant effects. A similar methodology was followed in the present study where three services were combined into an aggregate measure for hospital use. Such aggregate outcome health care use measures may lack the sensitivity to detect mediation effects for PTSD.

As well as showing a mediating effect of PTSD, Table 56 also provides evidence of a significant statistical interaction of traumatic events and PTSD, suggesting in essence that the effect of PTSD on bed days changes as a result of different number of traumatic events. After exposure to traumas, the development or absence of PTSD affected the number of bed days taken, especially for elevated levels of PTSD. The development or absence of PTSD after exposure to trauma as a key determinant in the use of health care services is complex question for the consideration of future research. It is probable the onset of PTSD is related to the characteristics associated with the traumatic event itself. Such characteristics include the duration of the event, the level to which the victim felt out of control, the degree of unexpectedness, as well as characteristics associated with the aftermath of the event, e.g., the overall effect on the victim's life (Flett et al., 1997). Additional event characteristics include the extent to which the victim confided their feelings and how often they had talked about the event (Stephens, 1996). Stephens established a significant relationship between disclosure and PTSD for members of the New Zealand police force where increased communication regarding traumatic events resulted in lower levels of PTSD. Additional characteristics are represented by exposure to more than one type of trauma, the recency of the event and number of times a traumatic event, e.g., sexual abuse, has occurred (Turner & Lloyd, 1995) (a variable somewhat similar to the sum of traumatic events used in stages three and five of the present study).

15.3.2 Conclusion – traumatic events and PTSD

In effect, the last three hypothesis of the present study have made a theoretical advancement of Andersen's model. This has been achieved by investigating the impact of traumatic events and PTSD on health care utilization after controlling for significant

predisposing, enabling and need characteristics. Hypothesis three to five incorporated significant predisposing, enabling and need characteristics identified in hypothesis two (volume analyses); predictors that still accounted for most of the variance explaining the use of health services. Exposure to traumatic events and PTSD affected the utilization of both medical and non-medical services. While overall aggregate trauma was related to use of both medical and non-medical services (bed days and hospitals), specific traumatic events was only related to non-medical services. Women involved in accidents tended to take more disability days and women subjected to assault tended to take more bed days. It remains possible that these relationships are a function of some third variable affecting exposure to assault and use of non-medical services. Not surprisingly, women using non-medical services after exposure to these different categories of trauma had one thing in common – they rated their own health as poor. Exposure to specific trauma did not predict use of medical services, possibly because non-medical services (especially bed days) were substituted for the use of medical services. However, the time that had lapsed since the occurrence of the event and the effects of re-experiencing the same trauma over and over again was not controlled and the size of the effects were small.

The presence or absence of PTSD is related to utilization of bed days, GPs and hospitals. The trend for these three services consistently indicated that after exposure to trauma, with the onset of PTSD use of these services increased. For use of bed days and hospitals, exposure to traumatic events became less important after the onset of PTSD had been considered. This suggests the critical component is the development (or absence) of PTSD rather than actual exposure to the trauma itself. This unique extension of the Andersen model corroborates arguments by Breslau et al. (1991) and Green (1990) that an individual's reaction is critical in determining what does and what does not constitute a traumatic circumstance.

As women reported higher PTSD scores, consumption of these services increased. For women who developed PTSD the number of bed days which they eventually took depended on how many traumatic events they had been exposed to. PTSD was not associated with use of disability days, health professionals or prescription items. It is

possible no trend emerged for disability days due to lack of time - disability days spanned three months and the latent effects of PTSD may not have developed. An effect may have been absent for health professionals as this aggregate measure included professionals not required in the treatment of PTSD such as dentists and optometrists.

In summary, exposure to traumatic events resulting in cumulative adversity and the onset of PTSD is related to a utilization of an array of health services. Within the context of Andersen's model their presence merits inclusion in future models researching health care utilization behaviours.

15.4 General limitations and suggestions for future research

Specific limitations associated with particular findings and research suggestions to overcome these limitations have been addressed throughout the discussion. This section discusses general limitations and restrictions related to representation of health services, measures, indicators and issues relating to research design and statistical analysis. Embedded through out this section are potential avenues for future research.

15.4.1 ***Issues of internal validity***

The data in the present study was collected by cross sectional design and analysed by a correlational based statistic. For these reasons, causal attributions cannot be made by these results alone. Considering the present study was designed to advance a theoretical model the cross sectional nature of the research design was appropriate. However, the results suggest that future research would benefit through the application of a longitudinal research design examining the *process* of health care utilization. Health care utilization appears to be a dynamic process which could be generally progressive in nature. For this reason application of a longitudinal design to investigate causal relationships is warranted.

In addition, since these data were collected retrospectively they are reliant on self-report measures possibly subject to respondent's inaccurate recall. There is, therefore, concern regarding the extent to which they reflect objective health status. For example, satisfaction levels reported at the time of the interview were used to predict past behaviour. This problem was first pointed out by Ware et al. (1978) and may have affected the extent to which satisfaction was considered non-significant in the context of this data. Further longitudinal comparisons and research designs that follow women over a period of time (discussed below) will constitute the next phase of this research.

15.4.2 Issues of external validity

The boundaries of this research are defined by its methodology, design and statistical analysis. There are limitations as to how a 'household' sample of household women can be generalised to the population of New Zealand women. The sample design resulted in the oversampling of Maori and rural respondents. This allowed the experiences of these groups to be documented with a greater degree of statistical reliability than would other wise be the case had the sample simply been a numerical reflection of the New Zealand female population. In this respect unweighted data have been reported, thus confining discussions to the sample at hand and avoiding population projections. Reweighting strategies and the importance of reweighting oversampled strata prior to projecting results onto the underlying population are reported by Helzer, Robins and McEvoy (1987), Shore, Vollmer and Tatum (1989) and Winfield, George, Swartz and Blazer (1990).

15.4.3 Issues of measurement

A number of measurement issues existed that may have contributed to the under or over estimation of relationships among the variables in the present study.

Independent variables

Examination of the independent variables raises several issues. Social contacts, for example, measured whether or not contact had been made with a friend, speaking over the phone, or going to church. This variable would be better suited aimed to encompass the *quality* of the contact that occurred, rather than the frequency with which it occurred. In this sense, the importance of social networks may be masked. Women also have larger social support networks (Nelson, 1993) than men so representation of social *support* rather than social *contact* appears feasible.

Predisposing characteristics also included a measure examining major life events, such as getting divorced, adopting children or changing employment status. Perhaps some of these events, for example, adopting a baby or having legal problems with the police, are not ones that respondents readily admit to. Moreover, Delongis et al. (1988) suggest that minor daily hassles have a cumulative effect in the long term. The adverse effects of daily hassles may be more sensitive in accounting for women's use of health services as opposed to major events that occur less often. Gortmaker et al. (1982) found daily hassles strongly predicted physician utilization. A measure of this nature may be well suited to further research examining women's utilization patterns, given that they experience stress as a result of role overload (Facione, 1994). One variable precluded from the present study which appears to affect women's behavioural patterns was their schedule. Women in who have dual responsibilities at work and at home may have less flexible schedules (Rodin & Ickovics, 1990) that may impact on the patterns of health care utilization.

Need indicators were drawn from studies which principally focused on measurement of utilization patterns for the elderly. Indicators derived from those studies (e.g., chronic symptoms, bodily function and activities of daily living) are perhaps tailored for the elderly. As a result, these data were skewed as the measures drawn from researchers captured homogenous samples of the elderly. The etiology of morbidity is a complex pattern that extends beyond the narrower conceptual definition of measures tailored to the elderly and ideally should be represented by indicators that equally affect younger and middle aged women. Research dealing with heterogeneous samples of women

should incorporate a broader array of measures. This may, for example, include specific indicators dealing with reproductive needs and a range of measures dealing less with chronic needs and more with acute needs. Examples of these indicators such as conception and contraceptive issues were discussed in the last paragraph in section 15.2.1.

Dependent variables

The first issue regarding measurement of health services concerns combining several services into a single outcome service. This technique applies to health professionals and hospital use. The volume analyses of health professionals measured how *many* services were used, not how *often* a particular service was used. In order to meet the women's true health care needs health care services should be investigated in terms of number of visits to specific professionals such as psychiatrists, dentists and optometrists. This would further determine whether the model is a more powerful predictor for use of either discretionary or non-discretionary services. For discretionary services this would have the further advantage of signaling significant mutable variables as potential targets for intervention programmes. The dependent variable of hospital utilization was also an aggregate measure derived from three different hospital services. This composite variable was created when low response rates did not allow analyses of the individual services as the available responses violated the 5:1 cases to independent ratio suggested by Tabachnick and Fidel (1989). As a result precision was sacrificed in the development of the hospital use variable. Future research should ideally incorporate a higher N for each service, allowing individual analysis of specific services.

It was the original intention of the present research to incorporate two additional dependent variables, dealing with non-medical use of health services, these being visiting nurses and meal delivery to the home. However, a low number of respondents resulted in these two services being dropped from the analysis. Again, it is possible that the low number of responses were due to the heterogeneous nature of the sample – these services are generally used by the elderly and not required by younger women. Consequently, the low response rate forced their exclusion from the analysis.

A further limitation regarding the measurement of health services concerned disability days as the catchment period only covered a three month period. This gave an indication of short term occurrences only, somewhat constraining comparisons with the findings from the other services which covered a 12-month period. To overcome this limitation future research should simply measure consistent time frames. Finally, an aspect that may have limited the extent to which certain effects were detected was the interview procedure. For some people the interview may have been too long. Consequently, there may have been some associated unreliability of measurement.

15.4.4 Issues associated with statistical analysis

Investigation of health care utilization as a phenomena in its own right is inherently problematic where studies consider utilization as the overall outcome variable. People with identical symptoms might behave differently depending on their circumstances at any given time. This suggests moving away from simply examining health care utilization where the overall outcome variable is a defined catchment period of time. This approach could be too broad and perhaps blends the different reasons why contact and especially continuous use occurs. Reasons why service utilization occurs could be clarified if incidents of illness episodes were examined rather than just overall use. Examination of episode measures would not use a period of time as the catchment period, but rather the emergence and sequelae of an illness event. If, as suggested by Mechanic (1979) health care utilization varies as a function of circumstance, examination of illness episodes clarify if different women with the same symptoms have the same liklihood of contacting a particular service. Instead of examining episode specific measures in terms of simply contact and volume illness, episodes could be examined as a dynamic process. Comparisons between women using health services could clarify if everyone received the same treatment or number of visits. Given that women may not indicate the same symptoms over a catchment period with a short time span, some creativity would be required in the development of appropriate data collection strategies.

It would also be possible to expand on the current arena of health care utilization by further refining type of service consultations. For example, the present research design failed to distinguish between different types of consultations such as restorative utilization (curative consultations after onset of symptoms) and preventative utilization (consultation prior to onset of symptoms). It is entirely possible that predisposing and enabling characteristics are more predictive of preventative consultations and need more predictive of restorative utilization. Distinction between these types of consultation is important because it is possible that one type of consultation may cancel out the other. That is, one preventive contact with a professional could cancel several restorative visits to either the same GP or other health professionals and perhaps in severe cases negate hospitalisation. It could also be reflected in the subsequent use of non-medical services. Alternatively a woman who falls ill after failing to engage in a preventative consultation could have to continually visit a GP, yet may fail to improve her health. It is even probable that women who have no physician contact may be very ill. Thus the nature and type of consultation under consideration should be clarified from the outset. Again this concept could be refined by investigating episodes of illness, rather than just overall utilization. Investigating the overall course of a morbidity episode as opposed to overall utilization occurring over a 12-month catchment period would clarify the different predictors of use for women identified as high risk group and determine the extent to which preventative or restorative consultations impact on their health.

While some of the findings from the present study are consistent with other multivariate analyses from large scale surveys it does suggest a further need to modify the techniques required to interpret these complex relationships along with their interactive and recursive links. This raises three issues, use of linear regression, the cross sectional nature of this study and how to overcome these limitations and extend both the model and the field of future health care utilization research.

The most appropriate strategy for analysing the relative importance of predisposing, enabling and need characteristics is an issue which requires further clarification. In the present study the analysis strategy was identical to that found in Wolinsky and Johnson (1991) where the order of entry of variables was 'predisposing', 'enabling' and 'need'

respectively. In line with the findings of Wolinsky and colleagues, the overall picture that emerged from the analysis reported herein was one in which there was a dominance of need variables in the model and overall there were relatively modest amounts of variance accounted for in health care utilization variables. An alternative analysis strategy can be found in Strain (1991) where the order of entry of variables is 'need', 'enabling' and 'predisposing' respectively. In justifying this approach Strain (1991) notes that "...it reflects a decision making sequence. Individuals must first perceive a need for a service. Once a decision is made to use a service, they must be able to use it as well as be predisposed toward such use" (p. 147).

In line with the present research findings Strain also found that need was the most important determinant of health care use. A reanalysis of this thesis data using the Strain approach resulted in an increased dominance of need variables and a diminishing of the importance of predisposing and enabling characteristics although the total variance accounted for did not change substantially.

In summary, it is not clear on the basis of the available data how research might best proceed in further clarifying this issue. Clearly, there are some 'order' effects associated with entry of predisposing, enabling and need characteristics into the analysis of variability in health care use. Despite the different conclusions that one might draw about the relative importance of these characteristics (as a function of these order effects) the overall picture remains one in which the current level of predictive utility of this model can best be described as 'modest'. The primary assumption of the regression relationship is one that assumes linearity between the predictor and criterion variable. However, it is possible that the relationship between traumatic events and use of health services is non-linear; it may be curvilinear. To examine this further methodological refinements are required where analysis incorporates a more sophisticated analysis.

It is acknowledged that other possible models exist and more complex reciprocal feedback loops and recursive connections could be studied in the future. Figure 2 provides suggestions for further theoretical advancement of the model. The suggested relationships could examined by sophisticated statistics such as LISREL analysis. The

essential elements of predisposing, enabling and need characteristics and their effects on health care utilization are integral to the model, however, it encompasses a number of feedback loops as well as personal and situational characteristics.

The first issue of concern is the woman's health status, defined by the World Health Organisation a state of physical, mental and social well-being, not simply an absence of physical disease (WHO, 1948). According to Waldron (1976, 1983) a woman's health status is affected by her personal health practices (such as her diet, exercise, occupation and even include birth control practices). Health status has also been seen to be affected by exposure to traumatic events (Burnam et al., 1988; Kimerling & Calhoun, 1994).

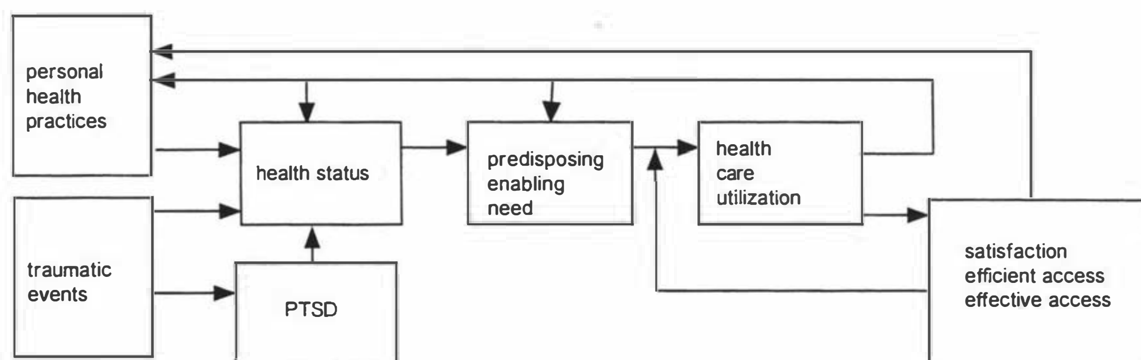

Figure 2 The model extended: future research using LISREL analysis

Additional issues for consideration could include number of incidences, severity and personal control (Flett et al., 1997). Exposure to trauma may or may not result in the onset of PTSD (Friedman & Schnurr, 1995b) which can affect health status. A woman's health status affects her predisposing, enabling and need characteristics, for example, how she perceives her health (Wolinsky & Johnson, 1991), whether or not she is worried (Millar, 1996; Wolinsky & Johnson, 1991) and whether or not she perceives a need to use health services (Andersen, 1995). Need could include measures tailored for the specific subgroups, such as chronic needs for the elderly (Bazargan et al., 1998) and gynaecological and reproductive measures for younger women (as suggested by the present study). At this point, it is probable that she calls upon her prior experience of service use (Eve, 1988) and remembers her level of satisfaction from prior contact with

health services (Roghmann et al., 1979) which affects her judgement of whether or not she will engage in the use of health services (Zastowny et al., 1983). Andersen (1995) linked satisfaction to access and considered that 'effective access' was established when prior use improved consumer satisfaction. He also considered that 'efficient access' had been established when the level of satisfaction increased relative to the amount of health care received. This indicates satisfaction to be a more complex variable than that examined within the present study, indicating further examination of this complex variable is warranted.

The model then progresses to actual use of health services. As well as encompassing non-medical and medical services, services could be examined in terms of episodic events (as mentioned above), preventative use and restorative and curative use. These refined analyses would provide a clearer picture of who is using health services, for what purposes and why. The identification of influential determinants of health care utilization for women of different age groups would provide a basis for designing interventions to modify utilization behaviours within those groups. In turn, health care utilization affects a number of variables, including ones' health status, their levels of satisfaction, their personal health practices and even their predisposing, enabling and need characteristics. These dynamic and changing relationships would benefit from analysis taken from several measures made over a period of time, in order to examine trends and possible latent effects. Many variables under consideration are progressive in nature and therefore comprehensive investigation would require prospective longitudinal research design. Methodological refinements to undertake research of this nature would require a more sophisticated statistical method of analysis such as LISREL. This suggested model defines use of health services as a function of variables relates to the individual, however, it could be applied in a wider context building in environmental characteristics such as affects of health care policy and economic climate (Muller, 1986b).

15.5 Conclusion

This study has theoretically advanced Andersen's Behavioural Model of Health Care Utilization. In doing so, it has achieved its objectives and in the process has provided a useful information for those involved with the development of policy and the delivery of health services.

The present study has provided a comprehensive descriptive account of the nature and extent of recent health care utilization by a community sample of New Zealand women. This provides a valuable baseline measure against which future comparisons can be made to judge their changing health status and patterns of utilization. In addition, it can provide a platform to document the changing incidence of traumatic events on women's use of health services.

There is value in knowing who needs health services and who uses health services. The present study has provided comprehensive profiles of women who avoid use of health services and those who use them frequently. It effectively portrays the equity (and inequity) regarding the delivery of health care services to New Zealand women. Embedded throughout are suggestions that policy makers can target to alter the health and illness behaviours of women and improve the health care which they receive.

If New Zealand is to achieve a society that comforms to the World Health Organisation's definition of health a commitment should be made to facilitate ongoing research that fully captures the dynamic nature of health care utilization. Because of women's role as caregivers, the health of women is essential to the health of society. Special issues relate to women and so the delivery of their health services should conform to a coordinated framework as opposed to being implemented on an ad hoc basis.

In the final analysis, this study has achieved provided a comprehensive overview of women's health care utilization in New Zealand. From a practical perspective, it has applied one of the most widely used models explaining health care utilization to provide

a description of which women use health services and why. It has detailed the effects that a range of circumstances have on use of health services. Moreover, it has set precedent by theoretically advancing Andersen's Behavioural Model of Health Care Utilization. This has been achieved by examining the effects that general and specific traumatic events and PTSD have on women's use of medical and non-medical services. To conclude, the one of the most important outcomes of the present study has been the identification of correlates associated *specifically* with women's health care utilization. The groundwork for future research initiatives have been laid to assist in the delivery of services ensuring the health and well-being of New Zealand women.

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PREDISPOSING MEASURES

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APPENDIX A
PREDISPOSING MEASURES

Items labelled * excluded from final analysis.

1. Age

In what year were you born?
(Year recorded)

2. Marital status

Are you currently married or living in a defacto relationship?

No	1
Yes	2

3. Living alone

Which group best describes who you usually live with? Do not include people who are visiting or temporarily residing with you such as family or friends on holiday?

Live alone	1
Live with spouse / partner	2
Live with children (single parent households)	3
Live with spouse / partner and children	4
Live with mother and / or father(child living at home	5
Live with spouse / partner, children & other relatives (extended family)	6
Live with other adults (ie flatting)	7
Other (please specify)	8

4. Social contacts

1.Have you spoken on the phone with relatives and friends over the past two weeks?

No	1
Yes	2
Don't know / cant remember	3

2.Have you got together with friends and relatives over the past two weeks?

No	1
Yes	2
Don't know / cant remember	3

3.Have you attended church in the past two weeks?

No	1
Yes	2
Don't know / cant remember	3

5. Paid employment

Are you engaged in any paid employment?

No	1
Yes	2

6. Telephone

Do you have a working telephone in your home?

No	1
Yes	2

7. Qualifications

Which group shows your highest education or job qualification?

No school qualification	1
School certificate passes in one or more subjects	2
6th form certificate or university entrance pass in one or more subject	3
University bursary or scholarship	4
Trade or professional certificate or diploma	5
University undergraduate degree or diploma	6
University postgraduate qualification	7
Other (eg, overseas: please specify)	8

8. Ethnicity

Which of these groups best describes what ethnic group you belong to?

New Zealand European	1
New Zealand Maori	2
Samoan	3
Cook Island Maori	4
Tongan	5
Niuean	6
Chinese	7
Indian	8
Other (please specify)	9

9. GP Satisfaction

The following items are concerned with how you view the overall medical care you receive from your family doctor or GP. Tell me how much you agree or disagree with each statement *(all responses coded as follows):*

Strongly agree	1
Agree	2
Unsure	3
Disagree	4
Strongly disagree	5
Don't know	6

1.My doctor could give better care
2.My doctor is not as thorough as he or she should be
3.There are things about the medical care I receive from my doctor that could be better
4.My doctor doesn't explain way to avoid illness or injury
5.I'm very satisfied with the medical care I receive from my doctor
6.My doctor encourages me to get a regular examination
7.The care I receive from my doctor is just about perfect
8.My doctor is very careful to check everything when examining me.

10. Health worries

Over the past twelve months, which statement best describes the degree of worry your overall health status has caused you?

A great deal of worry	1
Some worry	2
Hardly any worry	3
No worry at all	4
Don't know	5
No response	6

11. Health control

Which statement best describes how much control you think you have over your future health?

A great deal of control	1
Some control	2
Very little control	3
No control	4
Don't know	5
No response	6

12. Life events

Source: Life Event Scale (Brook et al., 1979; Koss, Woodruff, & Koss, 1990)

Have you experienced any of the follow events during the past twelve months?
(All responses coded as follows):

No	1
Yes	2
Don't know / cant remember	3

1. Did you have an operation, injury or major illness
2. Did a close family member have an operation, injury or major illness?
3. Did you get married?
4. Did you get separated or divorced/
5. Did you get reconciled after a period of separation?
6. Did your partner or spouse die?
7. Did a close family member, other than your spouse die/
8. Did you, or your partner, become pregnant?
9. Did you, or your partner, have a baby or adopt a child?
10. Did a new person, other than a new baby, come to live in your household?
11. Did a child or other close relative leave home (other than separation)?
12. Did you retire?
13. Did you start a new job or change jobs?
14. Did you lose your job or business?
15. Were you unemployed and seeking work of one month or more?
16. Did you move house?
17. Have you had major financial difficulties?
18. Did your finances improve considerably?
19. Did you have serious legal problems with the police or authorities?
20. Did a close family member have serious legal problems with the police or authorities?

13. Relationship status*

Which group best describes your marital or relationship status?*

Never married	1
Separated / divorced	2
Widowed	3

14. Living siblings / children*

Do you have any living brothers / sisters or children?*

No	1
Yes	2

15. Living arrangement*

Which statement best describes your living conditions?

I own my own home (with / out mortgage)	1
I live in a house owned by a family member	2
I live in rented accommodation	3
Other (please specify)	4

16. Employment*

1.What is your main paid job?*

Administration	1
Professional	2
Technician / clerks	3
Sales and service	4
Agriculture / fisheries	5
Tradesperson	6
Operators / assembly line	7

2.Which of these groups is most appropriate for you?*

Employed in full time employment	1
Employed in part time employment	2
Unemployed	3
Retired	4
Student	5
Beneficiary (ACC / sickness benefit, etc)	6
Other (please specify)	7

3.How many hours do you work each week on average?*
(Actual number of hours recorded).

17. Ethnicity*

1.Were you born in New Zealand?*

No	1
Yes	2

2.(If no to above item) In which country were you born?*

Australia	1
Tonga	2
Samoa	3
Cook Islands	4
Niue	5
United Kingdom	6
Refused	7

APPENDIX B

ENABLING MEASURES

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APPENDIX B
ENABLING MEASURES

Items labelled * precluded from analyses.

1. Health insurance

Do you belong to any health insurance scheme which refunds any of your money when you pay fees or charges for health care?

No	1
Yes	2
Don't know	3

2. CS card

Do you have a community services card?

No	1
Yes	2
Don't know	3

3. Satisfied in standard of living

Which statement best describes how satisfied you are with your overall standard of living?

Very dissatisfied	1
Dissatisfied	2
Satisfied	3
Very satisfied	4
Don't know / refused to answer	5

4. Adequacy of income

Which statement best describes how you feel about your ability to get along on your income?

Cant make ends meet	1
Have just enough money	2
Have enough with a little left over	3
Always have money left over	4
Don't know / refused to answer	5

5. Fees limit access

Do you feel the doctor's fee ever stops you from going to the doctor when you think you should really see the doctor?

Not at all	1
Occasionally	2
Some of the time	3
Often	4
Don't know	

6. Length of time seeing doctor

How long have you been seeing [the same] doctor?

0-3 months	1
4-12 months	2
1-2 years	3
3-5 years	4
Over 5 years	5
Don't know	6

7. Doctor gender

Is your doctor male or female?

Male	1
Female	2

8. Transportation

Which statement best describes how you normally get to the doctor's office?

Private vehicle	1
Walk	2
Bus	3
Taxi	4
Bike	5
Courtesy vehicle	6
Work / company vehicle	7
Motorbike / scooter	8
Other (please specify)	9

9. Access to vehicle

Do you have access to a motor vehicle?

No	1
Yes	2
Don't know / can't remember	5

10. Appointment delay (convenient / inconvenient)

Do you usually get an appointment to see the doctor the same day, the next day or at some other time?

Convenient	
The same day	1
To suit	2
Well in advance	3
Inconvenient	
Next day	4
2-3 days	5
1 week	6

11. Waiting room time

How long do you usually have to wait in the doctor's waiting room before being seen by the doctor?

(Actual number of minutes recorded).

12. Regular doctor*

Do you have a regular doctor? By that I mean do you usually see the same GP or family doctor?

No	1
Yes	2
Don't know	3

13. Income*

What is your personal yearly income before tax? Include income from all sources.*

(Actual dollars recorded).

14. Residency*

1.In years or months, how long have you been in New Zealand/
(Actual years / months recorded).

2.In years or months, how long have you lived in the town, city or rural area in which you currently live?
(Actual years / months recorded).

15. Health card*

Do you have a high use health card or a 'chronically ill certificate'?*

No	1
Yes	2
Have applied for one	3
Don't know	4
Cant remember	5

APPENDIX C
NEED MEASURES

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6. Activities of daily living ____ 289
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APPENDIX C
NEED MEASURES

Items labelled * precluded from final analyses.

1. Self rated health

Overall, would you say your health is

Excellent	1
Good	2
Not so good	3
Poor	4

2. Physical symptoms

Source: Pennebaker Inventory of Limbic Languidness (PILL) (Pennebaker, 1982)

Please indicate, by choosing a number along this scale, how much each of the following problems have bothered or disturbed you during the last month. If you haven't been bothered by the problem, indicate 1. If the problem has been an extreme bother, then indicate 5, and so on. *(All responses coded as follows):*

Not at al	1
A little	2
Moderately	3
Quite a bit	4
Extremely	5
Don't know	6
Refused	7

1.Eye problems?
2.Ear problems?
3.Nose problems?
4.Asthma or wheezing?
5.Breathing difficulties?
6.Chest pains?
7.Racing heart?
8.Cold hands or feet, even in hot weather?
9.Leg cramps?
10.Insomnia or sleep problems
11.Toothaches?
12.Stomach upset or pain?
13.Problems passing urine or motions?
14.Muscles or joint pain?
15.Sensitive, itching or tender skin?
16.Acne or pimples?
17.Boils?
18.Sweat, even in cold weather?
19.Headaches?
20.Hot flushes, face flushes?
21.Dixxiness, feel faint?
22.Chills?
23.Numbness or tingling in any part of the body?
24.Twitching of eyelid?
25.Twitching other than eyelid?
26.Hands tremble or shake?
27.Sore throat?
28.Nausea or vomiting?

3. Chronic symptoms

Source: (Belloc, Breslow, & Hochstim, 1971); New Zealand Household Health Survey (StatisticsNZandMinistryofHealth, 1993)

1.We would like you to think about long term health problems you may have. Long term health problems are more severe health problems that you have had for six months or more, or something that is likely to last for at least six months. Please answer 'yes' or 'no' to indicate if a doctor, nurse of other health care worker has told you that you have any of the following long term health problems.
(All responses coded as follows):

No	1
Yes	2
Don't know	3
Refused	4

1.Cancer?
2.Diabetes?
3.Epilepsy?
4.High blood pressure or hypertension?
5.Heart trouble (eg asthma, angina, myocardial infarction)?
6.Asthma?
7.Other respiratory conditions (eg bronchitis)?
8.Stomach ulcer or duodenal ulcer?
9.Chronic liver trouble (eg cirrhosis)?
10.Bowel disorder, (eg colitis or polyps)?
11.Hernia or rupture?
12.Chronic kidney or urinary tract conditions?
13.Chronic skin conditions (eg dermatitis or psoriasis)?
14Arthritis or rheumatism?
15.Hepatitis?
16.Hearing impairment or loss?
17.Sight impairment or loss?

2.Do you have any other medical conditions, ailments or impairments you have had for three months or longer, which have not been mentioned so far?

No	1
Yes	2
Don't know	3

3.If yes (to item above) could you please name them or describe them?
(Actual condition recorded).

4. Well-being

Source: Mental Health Inventory (Veit & Ware, 1983)

For each question, please indicate which number along the scale best describes the way you have been feeling.
(All responses coded on the following scale):

1 2 3 4 5 6 7

(Well-being continued)

During the past month, how much of the time
Have you felt lonely?
Have you felt the future looks hopeful and promising?
Did you feel relaxed and free of tension?
Have you generally enjoyed the things you do?
Have you felt loved and wanted?
Did you wake up feeling fresh and rested?
How happy, satisfied or pleased have you been with your personal life during the past month?
Have you been a very nervous person?
Have you felt emotionally stable?
Were you able to relax without difficulty?
Have you been moody or brooded about things?
Did your hands shake when you tried to do something?
Did you feel that others would be better off if you were dead?
Have you been in firm control of your behavior, thoughts, emotions, feelings?

5. Distress

Mental Health Inventory (Veit & Ware, 1983)

For each question, please indicate which number along the scale best describes the way you have been feeling.
(All responses coded on the following scale):
1 2 3 4 5 6 7

Have you felt tense or highly strung?
Have you felt down hearted and blue?
Has living been a wonderful adventure for you?
Have you thought about taking your own life?
Have you felt restless, fidgety and impatient?
Have you been in low or very low spirits?
You become nervous or jumpy when faced with excitement or unexpected situations?
You feel that you had nothing to look forward to?
You feel like crying?
You feel that nothing turned out for you the way you wanted it to?
You feel so down in the dumps that nothing could cheer you up?
You get rattled, upset or flustered?
You find yourself having difficulty trying to calm down?
Did you feel depressed?
How much have you been bothered by nervousness or your nerves?
Have you been anxious or worried
Have you felt you have been under or were under any strain, stress or pressure?
Have you had any reason to wonder if you were losing your mind, losing control over the way you act, talk, think, feel or of your memory?
Has your daily life been full of things that were interesting to you?
You expect to have an interesting day when you get up on the morning?
Have you felt calm and peaceful
Did you feel that your love relationship, loving and being loved were full and complete?
Have you felt cheerful, light hearted?
Were you a happy person?

6. Activities of daily living

Activities of Daily Living Scale (ADL Scale): (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963)

Here are a list of activites of daily living that people sometimes have trouble with. Do you have trouble doing any of these things because of your health?
(All responses coded as follows):

No	1
Yes	2

Basic
1.Bathing?
2.Dressing?
3.Getting out of bed?
4.Walking?
5.Toileting?

Household
6.Meal preparation?
7.Shopping?
8.Light housework?
9.Heavy housework?

Advanced
10.Managing money?
11.Using the telephone?
12.Eating?

7. Bodily functioning

Disability scale: (Nagi, 1976)

Here are some bodily activities that people sometimes have difficulty with. Do you have difficulties doing any of these things?
(All responses coded as follows):

No	1
Yes	2

Lower body functions
1.Walking half a kilometre?
2.Walking up to 10 steps without a rest?
3.Standing or being on your feet for two hours?
4.Stooping, crouching or kneeling?

Upper body functions
5.Sitting for two hours?
6.Lifting or carrying 10 kilos (22 pounds)?
7.Reaching up over your head?
8.Reaching out as if to shake hands?
9.Using fingers to grasp objects?

APPENDIX D

TRAUMA MEASURES

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1. **Total (Aggregate) score of traumatic events** ______ **291**
2. **Specific traumatic events** ______ **291**
3. **Post Traumatic Stress Disorder (PTSD)** ______ **292**

APPENDIX D
TRAUMA MEASURES

1. Total (Aggregate) score of traumatic events

Source: Traumatic Events Scale (Flett, Millar, Long, & MacDonald, 1997)

Responses for the following questions were coded as follows:

No	1
Yes	2

1.Have you ever been engaged in military combat
2.During your childhood, did anyone ever make you have sex by using force or threatening to harm you? (This involves all unwanted sexual activity)
3.Has anyone ever made you, as an adult, have sex by using force or threatening to harm you? (This involves all unwanted sexual activity, but not as a child)
4.Have you ever been seriously beaten or attacked by a member of your family? (such as your spouse, partner, parent, child)
5.Have you ever been seriously beaten or attacked by someone who was not a member of your family?
6.Has anyone ever taken or tried to take something from you by force or threat of force, such as in a robbery, mugging or hold up?
7.Have you ever been in a serious motor vehicle accident in which one or more people were seriously injured or killed?
8.Have you ever been seriously injured in an accident other than a vehicle accident, such as at work?
9.Have you ever suffered serious injury and or property damage because of a natural or manmade disaster such as a fire, flood or earthquake?
10.Have you ever been forced to leave your home or take other precautions because of an approaching disaster such as flood, earthquake or cyclone?
11.Have you ever experienced the violent or very unexpected death of a loved one, such as through an accident, homicide or suicide?
12.Has anyone very close to you (a loved one) ever experienced violent assault, serious accident or serious injury?

2. Specific traumatic events

Derived from the TES scale indexed above:

1.Sexual abuse
Categories 2 and 3 combined

2.Assault
Categories 4, 5, 6 combined

3.Accidents
Categories 7 and 8 combined

4.Disaster
Categories 9 and 10 combined

5.Harm to loved one
Categories 11 and 12 combined

3. Post Traumatic Stress Disorder (PTSD)

Source: Short Form Mississippi Civilian Scale (Keane, Cadell, & Taylor, 1988b)

We are interested in how you have been thinking and feeling about things over the last month or so. For each of these statements, please indicate which number best describes your experiences at present.
(All responses coded as follows):

Never	1
Rarely	2
Sometimes	3
Frequently	4
Very frequently	5
Don't know	6
Refused	7

1. Being in certain situation makes me feel as though I am back in my past
2. I am able to get emotionally close to others
3. Unexpected noises make me jump
4. I am an even tempered person
5. I have nightmares of experiences in my past that really happened
6. I have trouble going to sleep and staying asleep
7. I lose my cool and explode over minor everyday things
8. I try to stay away from anything that will remind me of the things that happened in my past
9. In the past I had more close friends than I have now
10. It seems that I am emotionally numb, that I have no feelings
11. I feel guilt over things that I did in the past.

APPENDIX E

HEALTH CARE UTILIZATION MEASURES

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1. Disability days ______ 294
2. Bed days ______ 294
3. GPs ______ 294
4. Health professionals ______ 294
5. Hospitals ______ 295
6. Prescription items ______ 295

APPENDIX E
HEALTH CARE UTILIZATION MEASURES

1. Disability days

How many days over the last three months has ill health interfered with your ability to perform normal daily activities (eg going to work, playing sport, doing housework, and so on)?
(Actual number of days recorded).

2. Bed days

1.During the past 12 months, did you spend any days at home, in bed, due to your health?

No	1
Yes	2

2.How many days did you spend at home, in bed, due to your health?
(Actual number of days recorded).

3. GPs

1.In the past 12 months, have you seen a doctor or been visited by a doctor? By doctor I mean GP or family doctor, but not a specialist. This may have been a doctor from a "Shortland Street" type clinic.

No	1
Yes	2
Don't know	3

2.(If yes to the above item) How many times have you seen a doctor or been visited by a doctor in the past 12 months?
(Actual number of visits recorded).

4. Health professionals

Have you sought advice or help in the previous 12 months from the following professional groups?
(All responses coded as follows):

No	1
Yes	2

1.Medical specialist other than GP or family doctor?
2.Dentist or dental nurse?
3.Optometrist or optician?
4.Physiotherapist?
5.Chiropracter?
6.Psychologist?
7.Psychiatrist?
8.Occupational therapist?
9.Counsellor?
10.Social worker?
11.Naturopath or homeopath?

5. Hospitals

1.In the past 12 months, have you been admitted as an inpatient to hospital, that is, stayed as a patient overnight?

No	1
Yes	2
Don't know	3

2.(If yes to the above item) How many nights did you stay in hospital altogether in the last 12 months?
(Actual number of visits recorded).

3.In the past 12 months, how many times have you personally used the casualty, that is, accident and emergency department of a public hospital?
(Actual number of visits recorded).

4.How many times in the past 12 months have you personally used an outpatients department or a ward or a clinic where you went as an outpatient> (ie not an emergency clinic).
(Actual number of visits recorded).

6. Prescription items

How many prescription items have you had for yourself from the chemist in the past 12 months?

No prescription items	1
1-4 items	2
5-9 items	3
10-14 items	4
15 or more items	5
Don't know / can't remember	6

APPENDIX F

INTERACTION EFFECT OF PTSD X TRAUMA ON USE OF BED DAYS

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1. Interaction effect of PTSD x trauma on use of bed days ____ 297

APPENDIX F
HEALTH CARE UTILIZATION MEASURES

1. Interaction effect of PTSD x trauma on use of bed days

As well as showing a mediating effect of PTSD Table 56 provides evidence of a significant statistical interaction of traumatic events x PTSD. This evidence suggests that in essence the effect of PTSD on bed days varies as a result of different levels of traumatic events. To examine this interactive effect further, a median split for both traumatic events and PTSD was taken to examine mean differences between high and low scorers in each of these groups. Women with low PTSD scores took approximately 9 bed days. A t test was conducted on these women with low PTSD scores to see if there was a significant between their exposure to high and low traumatic events. The difference was not statistically significant ($t(509) = -1.84, p>.05$). Women with high PTSD scores took approximately 17 bed days. A t test was conducted on these women who had reported high PTSD scores and their exposure to traumatic events. The test was statistically significant ($t(429) = -8.40, p<.05$). Taken together these considerations suggested that any difference between high and low PTSD depends on the number of traumatic events, although this finding was stronger for those with high levels of PTSD. In summary, after exposure to traumatic events, the development or absence of PTSD affected the number of bed days taken, especially for elevated levels of PTSD. This is represented graphically below in Figure 3.

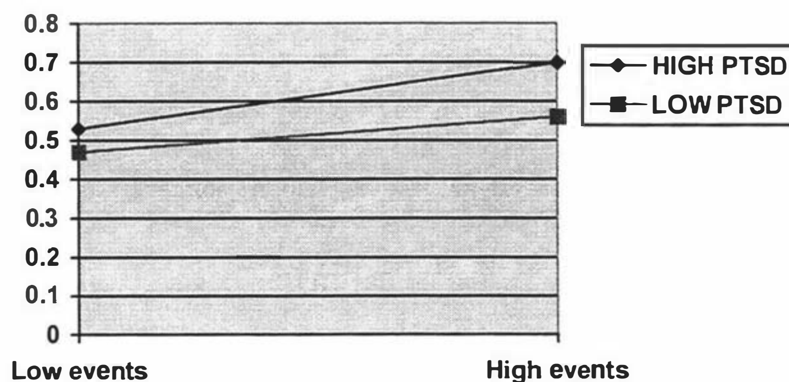

Figure 3. Interaction of PTSD and traumatic events for use of bed days.

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