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Factors Influencing Nutrition Risk
of Older New Zealanders

A thesis presented in partial fulfilment of the requirements for
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Abstract

As the population ages it is increasingly important to understand the factors influencing dietary habits of older people. Social, biological and psychological factors influence food intake and affect nutrition risk among older people living in the community.

The purpose of this study was to identify food-related behaviours that place older people at nutrition risk and to evaluate older peoples perceptions and experiences of various nutrition support options.

Fifty-one community living people aged between 80 and 85 years were recruited in North Shore City. Food-related behaviours were explored with the use of three quantitative tools. Practitioner Assessment of Network Type (PANT) was used to evaluate social networks. Elderly Assessment System (EASY-Care) was used to evaluate physical and mental wellbeing. Seniors in the Community: Risk Evaluation for Eating and Nutrition Version II (SCREEN II) assessed nutrition risk. Five people participated in a qualitative interview about nutrition support they had received.

A third of the participants (31 percent) were found to be at nutrition risk. Two-thirds (67 percent) showed some evidence of disability and needed assistance with everyday tasks. Nearly half (47 percent) of these older people had supportive social networks including close relationships with local family, friends and neighbours. There was an inverse linear relationship between participants self-rated health and nutrition risk ($p < .001$). Those who perceived their health to be fair or poor were more likely to be at nutrition risk.

The importance of social contact, a sense of gratitude, getting a meal and meeting the need were common themes that emerged from interviews with participants who received nutrition support.

These findings indicate that nutrition risk may be prevalent among community living older people in New Zealand. Strategies and initiatives are needed to encourage independent living and to help older people with the procurement, preparation, cooking and sharing of enjoyable meals.

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Factors Influencing Nutrition Risk of Older New Zealanders

Chapter 1. Background, aims and objectives

1.1. Background

In the thirty-year period from 1976 to 2006 the median age of New Zealand's population increased from 26 years to 36 years. By 2051 the median age is projected to have increased to 46 years. This ageing population trend reflects the combined impacts of increasing life expectancy, sub-replacement fertility, and the ageing of the large numbers of people born after World War II (Statistics New Zealand 2005; 2006). The projected population age pyramid for 2051 is shown in Figure 1 against the 2004 age pyramid.

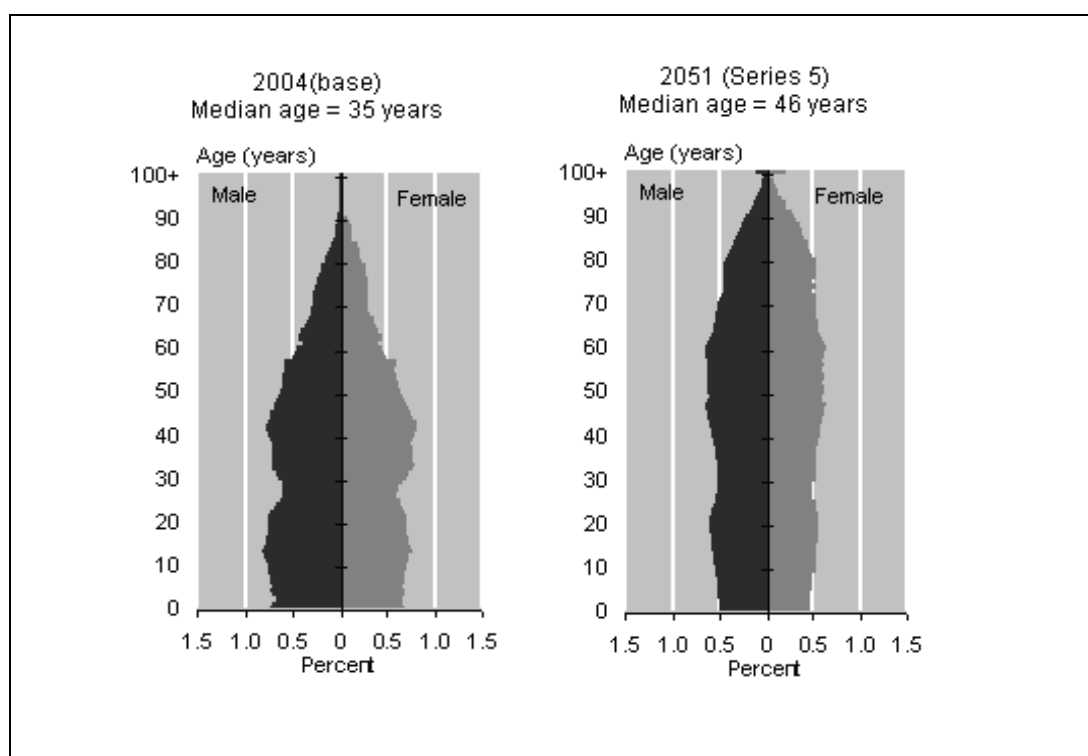


Figure 1 Population age pyramids: 2004 and 2051 projected (Statistics New Zealand 2005)

The older population in New Zealand is growing in both number and proportion. In 2006 the 511,000 people aged 65 years and older comprised 12 percent of the population. By 2051 it is projected this group will be nearly two and a half times larger, numbering 1.3 million people and comprising

one-quarter of the population, as shown in Table 1 (Statistics New Zealand 2005). Within the older population those aged 85 years-plus are the fastest growing age group. They are projected to increase from 11 percent of the 65-plus population in 2004 to 25 percent in 2051 and will then number over 318,000 people (Statistics New Zealand 2005).

Table 1 New Zealand's projected 65-plus population to 2051 (Statistics New Zealand 2005)

| | 2006 | 2021 | 2036 | 2051 |
|--------------------------|---------|---------|-----------|-----------|
| Number | 511,000 | 804,000 | 1,194,000 | 1,325,000 |
| Percentage of population | 12 | 17 | 24 | 26 |

The positive ageing strategy adopted by the New Zealand government aims to improve opportunities for older people to participate in the community in ways that they choose. One of the priority goals of the positive ageing strategy is known as *ageing in place*. This describes an environment where older people can feel safe and secure in their homes and are supported by a wide range of services (Ministry of Social Policy 2001).

The growth in numbers of older people along with the *ageing in place* policy clearly highlight a need to develop our understanding of what factors may influence older people's nutrition status, as this is a major influence on their health and wellbeing. It is also predictable that the need for nutrition support for older people will increase in the coming years. It is therefore important to continue developing our understanding of appropriate ways to deliver this support.

It is known there is an association between social networks and eating behaviours and also that there is an association between functional abilities and food procurement, preparation and eating difficulties. However there is limited data about the association between these three factors: social networks; activities of daily life; and nutrition risk.

There are a number of ways in which older people currently receive nutrition support: home care; meals on wheels; as members of lunch clubs; purchasing frozen meals; and the use of nutrition advice and supplements. In order to

develop nutrition interventions that work for older people there is also a need to evaluate how older people view the different support mechanisms available.

This study investigates the relationships between social networks, activities of daily life and nutrition risk among a group of community living older people in North Shore City. It also asks a small sample of these people to give their views on nutrition support they are currently using in order to add to the knowledge used in developing interventions that have the greatest impact on, and acceptance by, older people.

1.2. Aims and objectives

1.2.1. Aims

The aims of this study are to identify food-related behaviours that place older people (80-85 years) at nutrition risk and to evaluate older peoplesqperceptions and experiences of nutrition support services available in the community.

1.2.2. Objectives

1.2.2.1. Objective one

To investigate the relationship between social networks, the ability to undertake everyday life functions, and nutrition risk by the use of validated questionnaires among 51 community living older people aged 80-85 years.

1.2.2.2. Objective two

To investigate the perceptions and experiences of older people who receive nutrition support by undertaking individual interviews with five community living older people aged 80-85 years who are users of different types of nutrition support.

Chapter 2. Literature Review

This chapter will review the factors affecting healthy eating and ageing. The emphasis is on social factors, physical and mental wellness factors and nutrition factors, and their effects on older people's nutrition risk. Also reviewed is the assessment of nutrition risk and nutrition support for older people living in the community.

2.1. Social factors affecting healthy eating and ageing

2.1.1. Social networks and ageing

Social networks can be viewed as the core integrating feature of a functioning society. Functioning social networks within a community provide real support to their members which becomes particularly important in times of crisis. At a psychological level social networks may also offer a sense of security, identity and predictable order in a member's life (Erikson et al 1999).

The type of social networks an older person belongs to can be used as a measure of social participation and also the level of informal support available to that older person (Wenger 1997a). Thus the risks older people face can be predicted by their social network type. In addition to close friends and neighbours, those with a locally integrated social network have family who will provide the highest level of support and the need for any formal intervention occurs only when the level of dependency becomes very high (Wenger 1997a).

There is a hierarchy of expectations of support that older people have of different people within their social networks. Spouses are expected to provide support, both physically and mentally, to the limit of their capabilities.

Expectations of adult children generally include the provision of emotional support and instrumental help, but this will vary with their own responsibilities. Next are siblings who, if distance allows, can be expected to provide short-term emergency assistance. Their main role however is expressive support and companionship. There are generally no particular expectations of other relatives unless a closer relationship has developed. Friends are generally expected to provide a level of support similar to siblings. There is an expectation that neighbours will take a general interest in the wellbeing of their older neighbours

and possibly to provide some regular form of instrumental assistance, like small shopping errands, if required (Wenger 1997a). Some studies have shown that women are more likely than men to be well supported by relatives because they are the ones more likely to have maintained those relationships (Horwath 1989).

There is clear evidence that a lack of social relationships is a predictor of mortality and probably morbidity from a wide range of diseases (Avlund et al 1998; House et al 1988). House (1988) states that this relationship is arguably a causal one. Results of prospective studies in the United States (US) and Sweden show a strong linear association, with the effects of social isolation being greater for men than women (Avlund et al 1998; House et al 1988). Being married is beneficial to health and losing a partner has been shown to be more detrimental to men's health than women's (House et al 1988). Experimental research with animals and humans has also shown that the presence of a familiar other can buffer the physiological impact of various experimental stimuli (House et al 1988).

Erikson et al (1999) analysed the role of social networks on longevity using data from longitudinal studies in Gothenburg, Sweden and Missouri in the US. The importance of social network type differed between the two countries. For the Americans, marital status and participation in formal organisations were the key predictors of longevity, whereas for the Swedes, contact with children was the most important predictor. However in both countries they found social networks were clearly linked to longevity, women lived longer and were more involved in social networks, and being married predicted longevity for both Swedes and Americans, with the effect more marked for men. Whether the latter was attributable to social network factors or socioeconomic factors was not apparent.

Litwin and Shiovitz-Ezra (2006) found there was a significant relationship between network type and mortality risk among older Israelis in the 70-79 and 80-plus age groups, but not in the 60-69 age group. Those endowed with diverse networks, friend focused networks and community/clan networks demonstrated lower risk of all-cause mortality compared to those with restricted or neighbour focused networks.

While the link between social networks and longevity has been clearly established in many cultures the mechanism of causality has not (Avlund et al 1998; Erikson et al 1999; House et al 1988). It is also possible that social networks may influence longevity in men and women in quite different ways (Avlund et al 1998).

Multi-factorial links can be expected as social networks clearly impact both mental and physical wellbeing. Avlund (1998) summarises four ways social participation has a positive influence on health and wellbeing as: belonging and support; enhancing feelings of wellbeing which may facilitate recovery or rehabilitation; providing a reason to live; and encouraging preventive and therapeutic health behaviours. Avlund (1998) also states that a more general will to live could be both cause and effect on these relationships and behaviours.

2.1.2. Living situation and food consumption

In the US it has been found that the main dietary effect of older people living alone is an overall reduction in energy intake, rather than a decrease in the types of foods chosen, emphasising the importance of a nutrient dense diet (Rolls 1994). While older people who are socially isolated and lonely are more likely to consume an unbalanced diet, surveys in the US and Europe found nutrient intakes were not adversely affected by living alone (de Groot 2000).

Food security describes access to nutritionally adequate and safe food, and the ability to acquire foods in socially acceptable ways. Overall it is estimated that somewhere between 5.5 and 16 percent of older Americans suffer food insecurity, although the most recent data from the 2001 census provides the lower figure (Food Security Institute 2003). Data from the New Zealand National Nutrition Survey (NNS97) indicates that 97 percent of women and 98 percent of men aged 75-plus believe they can always afford to eat properly (Ministry of Health 1999).

Data from the US indicates that food insecurity rates are higher among those who live alone (Food Security Institute 2003). In New Zealand, women are less likely to be living with a partner as they age. In 2001, 80 percent of men and 59 percent of women aged between 64 and 74 years were living with partners and over 70 percent of men were living with partners into their early 80s. However,

only one-third of women in the 75-84 year age group were living with partners. By their late 80s just over 10 percent of women and around half of men were living with partners (Statistics New Zealand 2004).

Loneliness and social isolation have been related to chronic illness, self-rated health, and quality of life in older adults (Alpass & Neville 2003, Gollub & Weddle 2004). Examples of why loneliness led to decreased food intake, cited in Wylie et al (1999), include forgetting to eat proper meals, decreased motivation to prepare meals, not wanting a meal once prepared or wanting to eat with others rather than by themselves.

A study of 369 older people in the United Kingdom (UK) found living status was only of significance to men's food consumption. Single men consumed less fruit and vegetables than those living in a household with a woman (Donkin et al 1998). This concurs with a study of over 2000 older Australians (Horwath 1989) which found that single men had very different dietary habits from the married men. Their fruit and vegetable intake was less, and less varied, and their diet included more convenience items high in fat or salt. Their food habits were more likely to include eating the fat on meat, using cooking or table margarine that was not polyunsaturated, and eating fried meats and pastries. While the single men's diets were of poorer quality than married men, single women had nutrient intakes equal to or greater than their married counterparts.

Hughes et al (2004) found few differences in eating patterns between unmarried men living alone in the north west of England and those who were divorced or widowed. Although the single men consumed more food overall, there were no differences in fruit and vegetable intakes. However routines are an important influence on dietary quality. Widowed, divorced or separated people in the Horwath study (1989) were more likely to miss meals or to have a cooked meal less than once a day and this was presumed to be due to the interruption of lifestyle patterns and routines.

Unless they have suffered a health scare related to nutrition, which increases their awareness and interest in the subject, many older men are quite happy to hand over responsibility for nutrition and health to their spouses (Drummond & Smith 2005, Horwath 1989). After interviewing 50 Australian male veterans of World War II and the Vietnam war, Drummond and Smith (2005) concluded that

many ageing men do not have the necessary skills to ensure good nutrition. The gender roles they took on when they married meant most of these older men left food procurement and preparation entirely to their spouses. When these men became widowers they lacked sufficient nutrition knowledge and cooking skills to adequately look after themselves (Drummond & Smith 2005).

Alongside cooking skills, and possibly related to them, convenience and preparation time are important influences on the food choices of older men living alone (Donkin et al 1998, Horwath 1989). Single men are more likely than single women or married men to seek out foods with the right portion size that are simple to open, prepare and cook (Donkin et al 1998).

It is possible that with their superior cooking skills, the women may be more able to entertain and maintain social contacts (Horwath 1989), also important to overall health and wellbeing.

A further problem for men in Western culture is that ~~masculine~~ foods, those often preferred by men and being part of their cultural masculinity, are heavy on the nutrients we are encouraged to consume less of rather than more, namely fats, sugars and sodium (Drummond & Smith 2005).

In the Horwath study (1989) of older people's eating behaviours, married women were found to consume more sausages (both grilled and fried) and roast meat, and less grilled chops than their single counterparts. Living with a man and preparing foods that both will consume does not appear to enhance nutrition quality for women.

It is important to remember that while in general older men have poorer cooking skills (Hughes et al 2004), not all men living alone are hopeless when it comes to cooking. Some will have good cooking skills, and some will take on the task of developing their cooking skills as required. In their study using in-depth interviews with 16 older people, Falk et al (1996) found the men and women who lived alone often had opposite views about food preparation. The widowed men they interviewed took on food preparation as a new responsibility, a new challenge, and something to enjoy. On the other hand, the women, who were more skilled through years of practice, were often fed up with having to cook day in and day out. Once they were living alone they preferred to give up this burdensome task.

Managing the quantity of food to be prepared influences the food choices that people living alone will make (Falk et al 1996). People brought up during the Depression of the 1930s are likely to be loathe to waste food. Some foods that may be childhood favourites, for example a roast, are not foods that people are likely to prepare just for themselves (Falk et al 1996). Desiring these foods could however influence people's participation in social occasions.

2.1.3. Eating alone and with others

Food consumption generally increases in a social setting. Studies have found that women eat more in the presence of men, and both men and women eat more when eating with family (Thomas & Morley 2002). Thomas & Morley (2002) found that meals eaten in groups tend to be larger by up to 44 percent while other researchers found that young men and women consumed up to 50 percent more when eating with friends (Rolls 1994). These results reinforce earlier findings by de Castro (2002) that meals eaten in groups were up to 46 percent larger than meals eaten alone, and that the more people at the meal, the greater the intake.

De Castro (2002) has also demonstrated that the social facilitation of eating is just as valid for people over 65 years of age as it is for younger people. Using seven day dietary data from 762 healthy adults, de Castro found that in all of the age groups there were significant positive correlations and regression slopes between the number of people at the meal and the amount consumed (de Castro 2002). However the impact of social facilitation on the amount eaten by the 65-plus age group was less overall, because with age there was a reduction in the number of people meals were eaten with (de Castro 2002). McAlpine et al (2003) also tested the impact of the social facilitation of eating on older people, using 20 healthy people aged 60-79 years. They found, in a laboratory setting, that eating with familiar others increased energy intake by 60 percent.

An Australian nutrition screening study of nearly 13,000 women aged 70-75 years found eating alone did not appear to be related to physical or mental health. The researchers concluded that whilst men were less likely to eat when alone, for women this was not a relevant factor (Patterson et al 2002).

Social and behavioural differences are likely to account for the increased consumption, by all age groups, found on weekend days versus weekdays (de Castro 2002). On weekend days people tend to eat later and with more people present, both factors which promote increased intake (de Castro 2002). It has been shown however, that the differences between weekend and weekday intake were less for the over-65 group, apparently due to differences in time of day and number of people at the meal (de Castro 2002).

Eating in restaurants, whether full-service or fast food, is associated with increased consumption and this trend was consistent in the over-65 group studied by de Castro (2002). However, older people are less frequent restaurant goers than younger people (de Castro 2002).

2.2. Physical and mental wellness factors affecting healthy eating and ageing

2.2.1. Self-rated health

Self-rated health can be seen as an overview or summary rating of a person's physical and mental wellbeing (Alpass & Neville 2003, Benyamini et al 2003, Idler & Angel 1990). Self-rated health has been shown to predict a number of future health outcomes, including morbidity, mortality and declines in functional ability (Benyamini et al 2003, Idler & Angel 1990).

Benyamini et al (2003) investigated the determinants of self-rated health among retirement community residents in the US with a mean age of 78 years. Their study concurred with other studies on self-rated health in finding a discontinuity between poor/fair health ratings and higher levels of health rating. Those giving poor/fair health ratings tended to be people who suffered serious diseases and symptoms, and were judging their level of illness. Those rating their health higher, while they may have had health issues, did not tend to have a serious illness and were judging their level of health.

Regardless of their health rating, participants in the study by Benyamini et al (2003) generally had a common understanding of health which included being physically active, being able to do the things they wanted to do, and feeling healthy and energetic. Participants in the study ranked 41 health-related factors

when judging their health. Those with higher health ratings gave a higher ranking to risk factors and indications of good physical and psychological health. For those with poorer health ratings, risk factors were not as relevant and they had a narrower view of their health. Those rating their health as poor/fair ranked dietary habits at number 13, whereas those rating their health as good/very good/excellent ranked their dietary habits at number four (Benyamini et al 2003).

In a Taiwanese sample of adults 54 years and older, Goldman et al (2003) found that a healthy diet and frequent exercise were both associated with better self-rated health. Whichelow and Prevost (1996) analysed foods consumed by over 9000 British adults and identified four main dietary patterns which they then examined for associations with a range of measures including self-rated health. While they found associations between the healthier dietary patterns and higher self-rated health, associations between self-rated health and demographic and lifestyle factors were stronger.

Activities that involve mobility, like shopping, are strongly associated with self-rated health (Gama et al 2000). Associations have also been shown between higher levels of self-rated health and consumption of a healthier diet (Benyamini et al 2003, Goldman et al 2003, Osler et al 2004, Whichelow & Prevost 1996). While a healthy diet promotes wellbeing, so too suboptimal health can adversely influence diet (Osler et al 2004).

2.2.2. Physical disability

In the longitudinal Survey in Europe on Nutrition and the Elderly: a Concerted Action (SENECA), dietary and lifestyle factors of approximately 2,600 people aged 70-76 years old (at baseline) across nine European cities in eight countries were investigated. The percentage of participants who could manage all activities of daily life ranged from two to 64 percent as shown in Table 2.

Table 2 Percentage of SENECA participants who could manage all activities of daily life (de Groot et al 2004)

| Location | Percentage |
|-------------------------------|------------|
| Vila Franca de Xira, Portugal | 2 |
| Hamme, Belgium | 26 |
| Betanzos, Spain | 30 |
| Culemborg, the Netherlands | 39 |
| Padua, Italy | 44 |
| Roskilde, Denmark | 45 |
| Haguenau, France | 46 |
| Romans, France | 64 |
| Yverdon, Switzerland | 64 |

While food security is generally associated with the resources a household has to purchase appropriate foods, for older people food insecurity is also associated with functional limitations which can prevent the acquisition and use of appropriate foods (Gollub & Weddle 2004). Older people with restricted mobility face problems that can affect their food choice. They may face difficulty getting to the shops or be reliant on others for travel to shops. Once in the shop, bending down or reaching up for specific items may be difficult or impractical, and pushing a trolley or carrying shopping may restrict their food choices (Wylie et al 1999).

Declining physical strength has been shown to lead to difficulties with shopping for older people in a number of different countries (Sidenvall et al 2001). For those still managing independent shopping, strategies found included: carefully planning the amount purchased, so that it was able to be transported; using local stores more often; smaller, more frequent shops; using a shopping trolley; and making several trips to carry shopping upstairs (McKie 1999, Sidenvall et al 2001).

Older people may experience disabilities that restrict their ability to prepare certain foods. Arthritis can lead to difficulties with walking, lifting or grasping. Opening cans or bottles may be problematic. For some it may be necessary, or just easier, to sit when preparing food due to shaking, fatigue, breathlessness, poor mobility or safety concerns about dropping things. Blindness can prevent people from preparing and cooking foods as they would not be safe in the

kitchen. Back problems and poor mobility can restrict the lifting of items or bending down to ovens, as well as to items at lower levels in food stores (Gollub & Weddle 2004, Wylie et al 1999).

Disability causing limitations on activities of everyday life is thought to be a key cause of weight loss (Donini et al 2003). A study of older people receiving publicly funded home care services in Canada found a high level of nutritional deficiency among this high risk, functionally dependent group. Despite most participants reporting regular consumption of three meals a day, and 62 percent adding snacks, many reported poor appetite. Mean energy and protein intakes were very low resulting in a high prevalence of low body weight and involuntary weight loss. The low energy and protein intakes put these people at high risk of deficiency of key nutrients (Payette et al 1995). A Swedish study comparing the meals and snacks of self-managing versus disabled women living at home aged 64-88 years, found the disabled women had a significantly lower energy intake than the self-managing women (Andersson et al 2003).

Poor nutrition may be related to physical disability as both a cause and an effect. In their study of 345 homebound older people, Sharkey et al (2002) found physical limitations in meal preparation and consumption were significantly associated with lower calcium intakes. Houston et al (2005) reviewed the diets, functional limitations and disability of over 9000 whites and African Americans. In general, they found dairy, fruit and vegetable intakes were inversely associated with functional limitations and disability at the nine year follow up for both racial groups.

2.2.3. Depression and cognition

Depression is the most important treatable cause of weight loss in older people (Donini et al 2003, Morley 1997). Around 90 percent of older people with depression will lose weight, compared to only 60 percent in younger people, and by successfully treating depression weight loss can be reversed (Morley 1997).

Older people with dementia are at risk of deterioration in nutrition status resulting from poor memory and confusion. Those living independently may forget to shop and prepare meals, or they may choose foods of lower nutritional value (Gray 1989). Deterioration of mental status can mean loss of memory of

the last meal, loss of the ability to perform coordinated movements required for eating, difficulties in interpreting sensory data (vision, taste, smell, or touch) or even distraction from eating a meal. Changes in the circadian rhythm can lead to much greater energy consumption at breakfast than other meals (Donini et al 2003). If caused by stroke, dementia will often involve difficulty swallowing (Gray 1989).

Weight loss in older people with dementia is generally believed to be due to a failure to eat, although another cause may be an increased metabolic rate (de Groot 2000, Morley 1997). Although there is a strong relationship between dementia and failure to thrive it is unclear which comes first and it may be either can initiate the other. While a decline in mental status can lead to decreased consumption of food, malnutrition itself can alter neurotransmission and cause deterioration of mental capacity (Donini et al 2003).

Changes in weight are common among people with Alzheimer's disease and others with dementia. While weight loss appears more common, it has been shown that some gain weight, indicating a general disregulation of energy balance, is associated with dementia (Reynish et al 2001).

Up to one-third of dementia sufferers will consume more food than previously and more than half of people with dementia are reported to display changes in their food choice (Keene & Hope 1997). Keene & Hope (1997) compared the food choice behaviours of people with dementia and non-demented controls aged 18-50 years, and 50-plus. They found that the non-demented older people selected a lower proportion of high-protein food and a higher proportion of carbohydrate compared to the younger control group. The difference in fat intake was not significant. The people with dementia chose a lower proportion of protein foods than their age-matched counterparts and a higher proportion of sweet foods, which may be an exaggeration of the normal changes with ageing (Keene & Hope 1997).

Food consumption is believed to have a two-way relationship with cognition and depression. It is likely that cognitive ability is enhanced through a healthy diet. In a Spanish study of healthy older people (Ortega et al 1997), those with better food habits, that is greater intakes of total food, fruits and vegetables, had better cognition scores. Overall it was found that a diet higher in carbohydrate, fibre,

vitamins and minerals and lower in fat, saturated fat and cholesterol was likely to be related to improved cognitive ability (Ortega et al 1997). Vitamin B deficiency and increased homocysteine levels, obesity and central adiposity in midlife are risk factors for the development of dementia. Conversely a high dietary intake of antioxidants and omega-3 fatty acids is believed to lower the risk of Alzheimer's disease (Donini 2007, Walquist 2000). Consumption of carbohydrate foods are associated with enhancing mood, through their influence on serotonin levels (Walquist 2000).

A Ministry of Health report (Lewis 2002) states that the only published study on the prevalence of dementia in New Zealand shows rates similar to other countries. For those aged 60-64 years the prevalence is estimated at around one percent but this rises at a rate of about one to two percent per year of age, reaching around 30 percent for those aged 85 years and older. For people 65 years and older the prevalence is around eight percent, which means there were around 38,000 people aged 65-plus with dementia in New Zealand in 2002.

Depression, cognitive decline or physical disability do not in themselves preclude an older person from living independently in the community, but they may influence the level of support required to do so (Richardson 2001).

2.3. Food, nutrition and healthy ageing

During the twentieth century life expectancy in western countries almost doubled. This increase has been attributed to a combination of better nutrition, better hygiene and advances in medicine (Horwath 2002).

Nutrition is a key factor in successful ageing (American Dietetic Association 2005) which has been defined as maintaining: a low risk of disease and disease-related disability; high mental and physical function; and active engagement with life (Rowe & Kahn 1998).

Functional capacities, such as ventilatory capacity, muscular strength and cardiovascular output, peak in early adulthood and will eventually decline. However the rate of decline is determined to a great degree by lifestyle factors. Figure 2 illustrates the life course approach to the development and maintenance of functional capacity and the fitness gap associated with a

healthy lifestyle that widens in older age (WHO 2001). The fitness gap illustrates the impact that factors related to lifestyle (like smoking, physical activity, diet and alcohol consumption) along with social support and external environmental factors, can have on functional capacity.

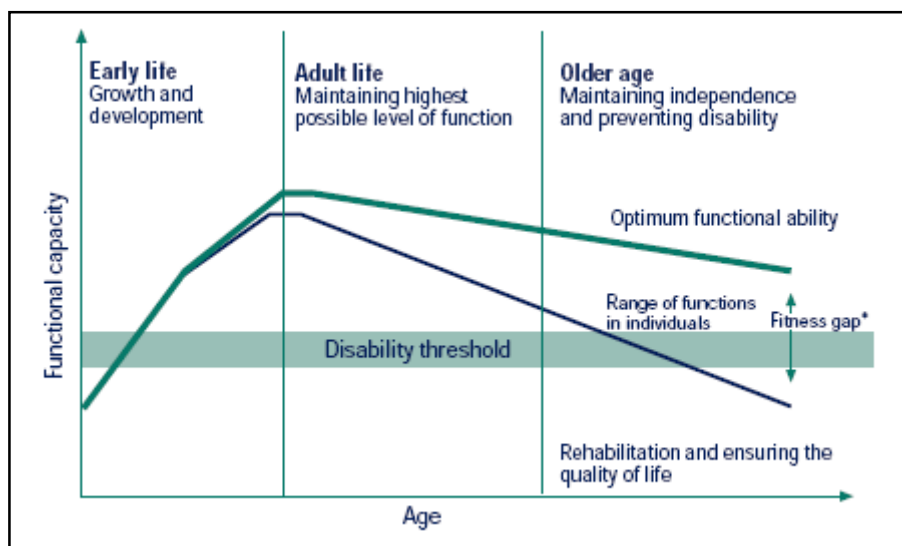


Figure 2 Functional capacity over the life course (WHO 2001)

Research has shown that a healthy lifestyle - that is a healthy diet, physical activity, not using tobacco, and practicing other healthy behaviours - helps to avoid the deteriorating health associated with ageing even more than genetic factors (Centres for Disease Control and Prevention 2005). People who practise healthy lifestyles have reduced risk for chronic disease and half the rate of disability compared to those who do not (Centres for Disease Control and Prevention 2005). Research on a number of biochemical markers of centenarians highlights that nutrition status influences longevity (American Dietetic Association 2005).

Inadequate food intake can be the starting point of a continuum leading to changing body composition and biochemical markers and, over time, malnutrition (Vellas et al 1999). Malnutrition increases the effects of disease and disability and lowers resistance to infection (Food Security Institute 2003). Underweight older adults, defined as those with a body mass index (BMI) less than 19, have an increased risk of early death (Food Security Institute 2003).

2.4. Food choice of older people: A conceptual model

In order to better understand the food choice processes of older people, Falk et al (1996) undertook a qualitative study of sixteen free-living, relatively healthy Caucasians aged 65 years and older in upstate New York. Using the conceptual model of food choice developed by Furst et al (1996) they refined the model to describe the food choice processes of this older age group (Figure 3).

Social, cultural and physical environments and experiences are all components of the life course in the model from Falk et al (1996, Furst et al 1996). This encompasses the importance of childhood food experiences and preferences, which can often come to the fore again in later years, and also refers to the development of different food choices throughout a person's life as their role changes e.g. as a wife or mother, living with a significant other or living alone.

The life course produces a set of influences also shaping the food choice process, namely ideals, social factors, resources, social framework and food context. In the older age group the most prominent influence was ideals, described by Falk et al (1996) as 'strongly held beliefs and attitudes about what should be'. Ideals about the definition of the meal and its cultural significance were common as were ideals about weight management and nutritional balance (Falk et al 1996, Furst et al 1996).

Alongside ideals, social frameworks were found to be the strongest influence on the food choice process of older people such that socialising and companionship could override concerns about food desirability (Falk et al 1996, Furst et al 1996). Personal factors include physiological or physical conditions that have a strong influence on food choice. Falk et al (1996) found problems with the digestion of certain foods, physical disabilities like arthritis, and limitations caused by poor dentition, all had a strong influence on food choice by narrowing the range of foods these older people were preparing and eating. Important resources for the older group included available income and food preservation skills. Food context is related to social framework but encompasses the broader context of food supply factors including seasonality and market influences (Falk et al 1996, Furst et al 1996).

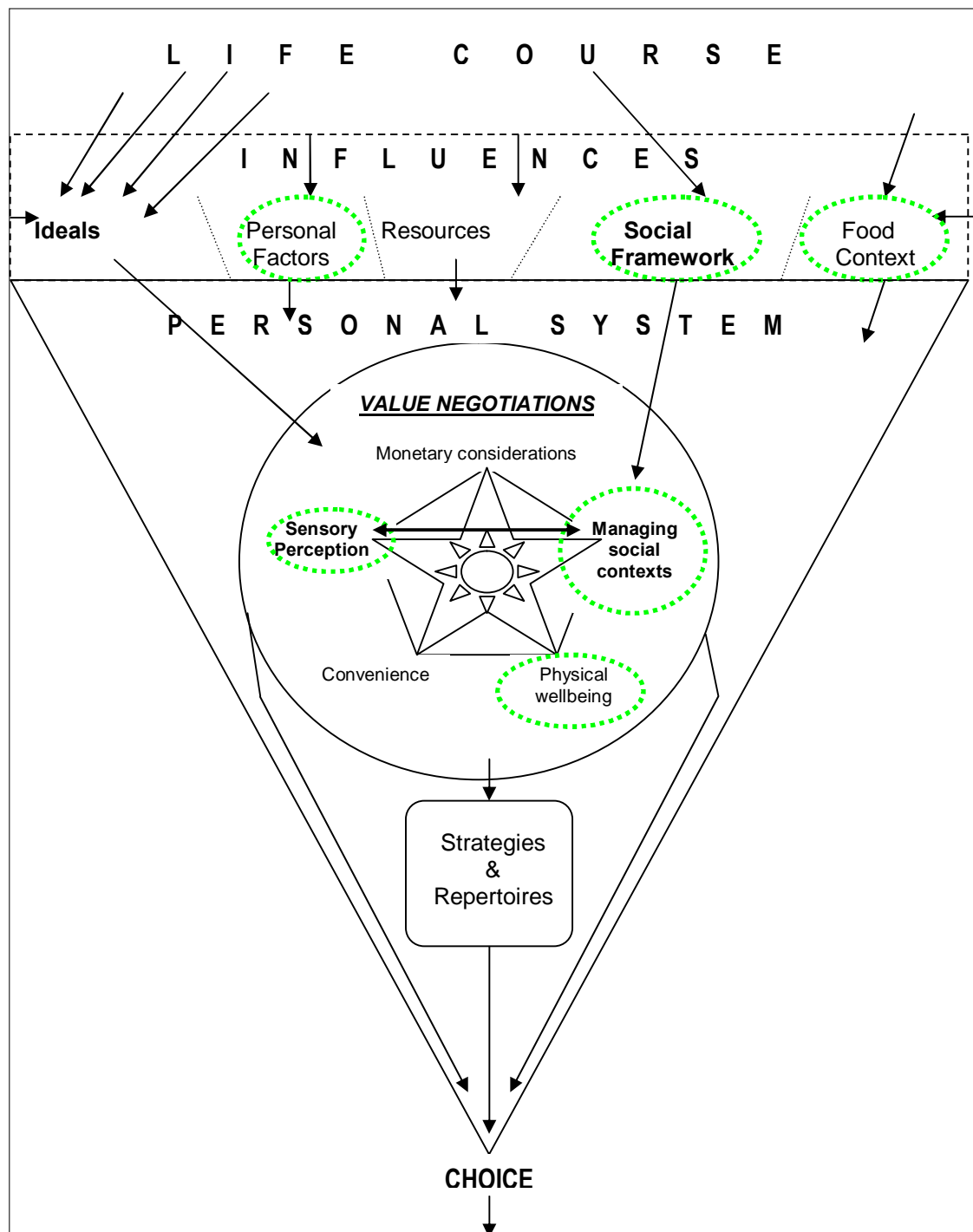


Figure 3 Conceptual model of the food choice processes of older adults, from Falk et al (1996)

Personal systems for food choice are developed over time. The two components of these systems are value negotiations and strategies (Furst et al 1996). *Value negotiations* describes the weighing of different factors when making food choices. Within these, taste was the sensory perception most frequently described as affecting food choice. Price and perceived worth were important factors, and naturally became more important where money was

limited. The management of social context includes factors such as considering one's own needs and the needs of others, and for those living alone the practicalities of preparing meals for one and eating meals alone. This latter factor was the most able to overrule considerations of sensory perception. Physical wellbeing encompasses concerns about health and nutrition as well as physical comfort e.g. does the food cause abdominal discomfort? Other considerations, for example cost and difficulty of procurement or preparation, were more important than health and nutrition issues when making food choices.

Overall the values of managing social contexts and sensory perception were found to be the most important in the value negotiations determining food choice and the dominant conflict between the two is highlighted in the model (Falk et al 1996). Different food activities are often sought out as a means for companionship rather than the other way around.

Convenience is an important value for older people in their food choice (Falk et al 1996). For younger people this value would represent time, but for older people Falk et al (1996) found ease of preparation is the key issue. When older people find meal preparation difficult, but are still trying to manage the task themselves, they are likely to find simple, quick and easy meal solutions (Falk et al 1996).

From the value negotiations, strategies are developed, that is choice patterns that are based on the value negotiations and tend to become habitual over time. While there is flexibility within the strategies, the patterns and rules for making food choices tend to be relatively stable. Strategies used frequently included elimination, limitation or substitution of certain foods and drinks, and the establishment of routines (Falk et al 1996, Furst et al 1996). Falk et al (1996) found that the more health problems people had the more likely they were to have multiple strategies to use in different food choice situations.

The model by Falk et al (1996) encompasses a range of influences and factors affecting food choice by older adults and not all of these factors are considered in this study. The three areas of focus for this study are all encompassed within the influences and value negotiations listed in this model: nutrition (food context, sensory perception, physical wellbeing), social networks (social framework and

managing social contexts) and the ability to undertake everyday life functions (personal factors and convenience). These are circled by a dotted line in Figure 3.

2.5. Nutritional factors associated with healthy ageing and nutrition risk

2.5.1. Nutrient requirements and ageing

Most older people need the same levels, if not higher levels, of micronutrients as younger people but reduced food intake, along with decreased nutrient digestion, absorption and utilisation, can occur for many different reasons in older people (Horwath 2002). It is estimated that people over 70 years old consume approximately one-third less energy than younger people (Thomas & Morley 2002) which means the nutrient density of the food consumed becomes more important as people age (Ministry of Health 1996). While lower energy needs are generally due to lower levels of activity and a lower basal metabolic rate, these decreases may not be an inevitable part of ageing (Ministry of Health 1996).

Disease states and medications can negatively affect the digestion and absorption of nutrients but the most significant gastrointestinal change due to age itself is atrophy of stomach mucosa which may affect around one-third of older people. The effect of this is decreased absorption of vitamin B₁₂ and folate, and the bioavailability of calcium and iron may also be reduced (Ministry of Health 1996).

The Nutrient Reference Values for Australia and New Zealand (Ministry of Health & Department of Health and Aging) published in 2006 took into account the most recent research about nutrient needs for older people. For adults over 70 years the recommended daily intake (RDI) for protein was increased by 25 percent over younger adults. Although the research is limited, it appears older people need higher protein intakes to help maintain muscle mass. The RDI is equivalent to the 40-50th percentile of current intakes of New Zealanders in this age group. This increased protein requirement is set against a background of estimated energy requirements that are up to seven percent less than for 51-70 year olds (Ministry of Health & Department of Health and Aging 2006). While

the revised ~~N~~utrient Reference Values have been published for nutrition professionals these have not yet been communicated to the general public.

The current RDI for protein for people aged over 70 years is 57 grams (g) for women and 81g for men (Ministry of Health & Department of Health and Aging 2006). Mean protein intakes for over 65 year olds in the 1997 National Nutrition Survey (NNS97) (Ministry of Health 1999) were 64g for women and 85g for men, although intakes from a community based sample of people aged over 70 years in Mosgiel were lower at 59g for women and 68g for men (Horwath et al 1992). Although the first figures appear adequate, these represent only 13.5 and 13.3 percent energy from protein respectively, which is lower than the recommended minimum at 15 percent. The 15 percent minimum is set at a level believed to provide appropriate intakes of other nutrients contained in protein foods (Ministry of Health & Department of Health and Aging 2006).

Mean fibre intakes for over 65 year olds in the NNS97 were 19g for women and 22g for men (Ministry of Health 1999) whereas the Mosgiel study (Horwath et al 1992) reported higher intakes for the 70-plus group at 22g for women and 23g for men. This compares to an adequate intake of 25g for women and 30g for men (Ministry of Health & Department of Health and Aging 2006).

Micronutrients for which the RDI is higher in older adults than younger adults include riboflavin, vitamin B₆ and calcium. Additionally the adequate intake for vitamin D (for which there is no RDI) is higher for adults over 70 years. There are no nutrients for which the RDI for older adults is less than for younger adults (Ministry of Health & Department of Health and Aging 2006).

The Mosgiel study (Horwath et al 1992), comparing nutrient intakes to the RDIs in use at the time, found micronutrient intakes were largely adequate with the exceptions being low levels of calcium, magnesium and for men only, zinc. Copper was also reported to be low but the RDI for this has since been lowered and mean intakes for women met the new RDI, although the mean intakes for men still fell short. Using the revised RDIs we can now add vitamin B₆, folate, vitamin D and selenium to the list of nutrients for which mean intakes were low for both men and women in this study, and potassium for men only (Ministry of Health & Department of Health and Aging 2006). Data from the NNS97 (Ministry of Health 1999) for people 65 years and older concurs with these results and

shows mean intakes for manganese (not measured in the Mosgiel study) are also low for both men and women.

While it is possible for most nutrients required by older people to be supplied by a varied diet, vitamin D is the exception. Fatty fish, such as salmon, and eggs are two of the main sources of dietary vitamin D available in New Zealand. The main source of vitamin D is from de novo synthesis by the action of sunlight on the skin and the efficiency of this process declines with age (Ministry of Health & Department of Health and Aging 2006).

Vegetables and fruits are a key source of a wide range vitamins and minerals, including vitamin B₆, folate, potassium and manganese, as well as fibre in the New Zealand diet (Ministry of Health 1999; Ministry of Health & Department of Health and Aging 2006). Seventy-seven percent of women and 71 percent of men aged 75 years and older met the guideline for eating three or more serves of vegetables every day. Seventy-one percent of women and 53 percent of men aged 75 years and older met the guideline for eating two or more serves of fruit each day (Ministry of Health 1999).

Animal products, including red and white meat, fish, seafood and milk, along with bread supply around half of the protein in the New Zealand diet. Animal products supply around one-third of the iron in the diet (Ministry of Health 1999). Meat is also a source of vitamin B₆, magnesium, copper, potassium, selenium and zinc, and animal protein enhances zinc absorption from other sources (Garrow et al 2000; Ministry of Health & Department of Health and Aging 2006). Seafood is a good source of selenium and copper. (Arthar et al 2006; Ministry of Health & Department of Health and Aging 2006).

The NNS97 found 94 percent of women and 96 percent of men aged 75 years and over consumed a regular diet which included animal products (Ministry of Health 1999). For diets excluding some or all animal products, eggs, nuts, seeds, and legumes can play an important role in the supply of protein and other nutrients. As well as supplying vitamin D, eggs are also a source of other vitamins and minerals including selenium and zinc. Along with other vitamins and minerals, nuts and seeds supply vitamin B₆, calcium, magnesium, potassium and zinc. Legumes are also a source of zinc.

Milk and cheese supply almost half the calcium in the New Zealand diet (Ministry of Health 1999). Dairy products also supply a range of other vitamins and minerals, including magnesium, potassium and zinc (Arthar et al 2006). As with younger adults, older people are advised to consume two or more serves of dairy products each day (Ministry of Health 1996) but the proportion of people meeting this was not specifically reported in the NNS97.

Breads and cereals are important contributors to total energy, carbohydrate, fibre, protein, iron and folate in the New Zealand diet, also contributing other vitamins and minerals including vitamin B₆, magnesium, manganese, potassium, selenium, copper and zinc (Arthar et al 2006; Ministry of Health 1999; Ministry of Health & Department of Health and Aging 2006). The NNS97 highlighted that older New Zealanders were the least likely to meet the guideline of consuming six or more cereal serves each day. Only 15 percent of men and eight percent of women aged 75 years and older met this guideline (Ministry of Health 1999).

2.5.2. Weight change

A loss of skeletal muscle and a gradual loss in bone density appear to be inevitable biological processes associated with ageing (Roubenoff et al 2000). Sarcopenia describes an involuntary loss of muscle mass, strength and function which may be caused by neural, hormonal and cytokine activity alterations with age (Hickson 2006). Although resistance training can slow the effects of sarcopenia it cannot fully prevent it, and inactivity will accelerate it (Roubenoff 2000).

In addition to sarcopenia, an inadequate dietary intake, whether due to disease states, psychological or social factors, often leads to unintentional weight loss in older people (Hickson 2006). For older people in the acceptable BMI range it is important to maintain a stable weight and it is not generally advised that people with a higher BMI make any effort to reduce their weight, due to a lack of trials in this area (Seidell & Visscher 2000). A 10 percent loss of muscle mass is associated with reduced immune function and increased risk of infection even in previously healthy older people. Any weight change (weight increase, decrease or fluctuation) in older people is believed to be a predictor of mortality (Hickson 2006; Seidell & Visscher 2000). Weight loss, and the associated protein-energy

malnutrition, is a significant cause of functional decline in older people (Morley 1997). In the SENECA study the absence of weight loss in the first five years of the study was found to be predictive of survival (de Groot et al 2004).

A third type of weight loss that may occur in older people, cachexia, is caused by an acute immune response leading to increased resting energy expenditure and catabolism of muscle tissue. Such changes happen with cancer. Changes in body composition mean weight loss may not occur immediately, but the loss of muscle mass will be associated with a loss of strength and is likely to result in weight loss over time (Hickson 2006).

The ability to regulate energy intake also declines in older age. Studies have shown that older people will overeat at a meal following a preload of food, whereas younger people reduce their intake at the meal to allow for the preload (Donini et al 2003). Of more serious concern is the inability of older people to increase energy intake following fasting or weight loss. Whereas younger people can rapidly regain lost weight by increasing energy intake, older people take longer to gain weight and may not regain as much as was originally lost (Donini et al 2003; Hickson 2006). Older people are susceptible to weight loss due to illness. Inflammation, infection or malignancy will increase metabolic rate and put the body into a catabolic state (Reynish et al 2001).

The risks of excessive weight loss and malnutrition in older people include sarcopenia and reduced muscle function, loss of bone mass, decreased immunity, anaemia, decline in cognitive function, altered drug metabolism and delayed recovery from surgery or rehabilitation (Donini et al 2003).

While malnutrition is not an inevitable result of old age there are many changes associated with ageing that increase the risk of poor nutrition and weight loss (Hickson 2006). In developed countries it has been found that up to 15 percent of community living and homebound older people are malnourished (Chapman 2004).

2.5.3. Chemosensory influence on food choice

The senses of taste and smell may decline with age due to decreased efficiency of receptors and possibly a decline in the number of receptors. The degree to which chemosensory decline occurs varies widely and some suggest the

incidence of decline is very small (Mattes 2002). While individuals will experience physiological changes as they age to different degrees, there is evidence that altered taste and smell, from different causes, is common (Donini et al 2003; Elsner 2002; Schiffman & Graham 2000).

Inappropriate taste due to environmental changes including medications, rather than loss of function, may have a greater impact on the palatability of foods for older people. Institutionalised older people, likely to have poorer health than their community living peers, generally display greater sensory changes (Donini et al 2003; Mattes 2002; Schiffman & Graham 2000). A wide range of medical conditions and medications can have a significant impact on taste and smell (Mattes 2002; Schiffman & Graham 2000).

A number of studies have shown that flavour enhancement of foods increases palatability and acceptance by older people, which in turn enhances their food intake as well as both their immune and functional status (Schiffman & Graham 2000).

Taste and smell play a significant role in food choice. Not only do these senses prepare the body to digest food, they help to discriminate amongst different foods at times of differing nutritional requirements. Through learned association of taste or smell, and the following effects of a food, these sensations help to indicate a food's nutritional value and assist with the regulation of food consumption. In addition, transient physiological needs actually modify the effects of taste neurons (Schiffman & Graham 2000). Sensory perception was the value most often mentioned in the Falk et al (1996) study describing older people's food choice, and taste was the sensory perception talked about the most. Appearance, odour, texture, temperature and colour all affect food choice (Falk et al 1996).

In their study of 345 homebound older people, Sharkey et al (2002) found a diminished sense of taste was significantly associated with lower intakes of energy, protein, phosphorus, thiamine and riboflavin. While the links between chemosensory decline and nutrient adequacy in older people are still uncertain, it may be one of the many factors involved in nutritional decline of older people (Donini et al 2003; Mattes 2002; Schiffman & Graham 2000).

2.5.4. Appetite

Poor appetite has been cited as the likely major cause of malnutrition amongst older people (Hickson 2006). Loss of appetite can be caused by both physiological and psychological factors (Donini et al 2003; Morley 2004).

Older people have elevated levels of the hormone cholecystokinin (CCK) which slows gastric emptying. In addition, CCK plays a separate role in the feeling of satiety. Both of these effects will decrease appetite (Hickson 2006; Morley 2003). The opioid feeding drive stimulates the initiation and termination of eating. The loss of opioid receptors and reduced brain concentrations of endogenous opioids associated with ageing is likely to also influence decreased appetite (Donini et al 2003; Hickson 2006). In addition to these mechanisms, the roles of the hormones ghrelin, leptin, insulin and testosterone on appetite control and the age-related changes that may occur continue to be investigated (Donini et al 2003; Morley 2004).

Taste and smell play a significant role in the amount of food eaten as their signals initiate, sustain and terminate ingestion. A loss of palatability and desire for different foods, due to a decline in taste and smell, can modify behaviour in response to physiological hunger signals, decreasing energy and/or nutrient intake (Donini et al 2003; Elsner 2002; Schiffman & Graham 2000).

Psychological factors which can result in decreased appetite include not having others to prepare food for or share meals with, depression, anxiety, stress and even mood at the time of the meal (Donini et al 2003; Hickson 2006; Morley 2003; Paquet et al 2003).

2.5.5. Fluid intake

Older people are more susceptible to dehydration as they have less total body water, their kidneys are less able to conserve free water, they often have reduced thirst sensation and they may limit fluid intake because of problems with bladder control (Bennett 2000; Chidester & Spangler 1997).

Total body water is around 72 percent of total body mass in younger adults but this declines with age. Studies reporting total body water of older adults estimate it at around 60 percent and down to less than 50 percent of total body mass for people 65 years or more (Bennett 2000; Chidester & Spangler 1997).

While the actual level may be variable this does highlight the importance of hydration for older people.

As we age the kidneys lose their ability to concentrate urine. This means urine is more dilute so water losses are greater (Bennett 2000; Chidester & Spangler 1997).

Getting up in the night can be difficult for older people, in which case fluids may be limited after a certain time in the evening. Older people may also limit their fluid intake when they experience some loss of bladder control (Bennett 2000; Walquist et al 2003).

Many older people have reduced thirst sensation. While the mechanism is not fully understood, many studies show that ageing leads to impaired drinking and thirst in response to water deprivation (Bennett 2000; MacKinley et al 2004).

When older people become dehydrated they are more susceptible to urinary tract infections, pressure ulcers, pneumonia, bowel obstructions, cardiovascular symptoms and confusion (Bennett 2000; Walquist et al 2003).

2.5.6. Biting, chewing and swallowing

There is a clear association between ageing and decreasing masticatory ability (Nakanishi et al 1999). Difficulties with eating a range of foods can impact both food choice and volume (Hickson 2006). Declining masticatory efficiency in older people has been associated with reduced intakes of fruits, vegetables and dietary fibre (Walls & Steele 2004). Chewing difficulties are also associated with poorer general health and quality of life (Hickson 2006). In addition, poor dentition can lead to embarrassment in the company of others and a reluctance to share meals (Nakanishi et al 1999).

Data from the Oral Health Survey of people aged 65 years and older in Britain found better oral status was associated with a better diet and nutrition status. Oral status declined with age: 35 percent of people over 75 years were dentate (had natural teeth) compared to 59 percent of people 65-74 years old. The number of teeth and their distribution was associated with the ease of consumption foods requiring chewing, including fruit and vegetables. Edentate people had lower energy intakes, lower BMI and lower mean plasma levels of vitamins A, C and E. There was also a positive relationship between

haemoglobin levels and numbers of occluding pairs of teeth (Fiske 1999; Hickson 2006).

Age-associated changes in innervation, along with co-morbidity and medications, contribute to an increased incidence of swallowing difficulties (dysphagia) in older people (Saffrey 2004). In the US it has been estimated that one in five people over the age of 50 years experience dysphagia (Elta 2004). This can lead to decreased food intake resulting in poorer nutrition status and even malnutrition (Hickson 2006).

2.5.7. Use of meal replacements

Research on the use of complete liquid supplements in aged-care facilities suggests they are useful in improving energy and nutrient intake as well as the functional status of older people (Tripp 1997; Turic et al 1998). There is little information about their use by community based older people although it is believed that in the US their use is increasing (Tripp 1997).

Dutch researchers undertook a six-month intervention study using 34 free-living people aged 65 years and older at risk of malnutrition. They found dietary supplement drinks had a positive effect on weight compared to the control group, with the supplement not affecting energy intake from meals (Wouters-Wesseling et al 2003). These results concurred with a similar study in Canada by Payette et al (2002) who noted that in their sample of frail, undernourished free-living elderly, weight loss could be stopped and in some cases reversed by using a liquid supplement. In both studies functional measures did not improve, although in the Dutch study sleep was enhanced (Payette et al 2002; Wouters-Wesseling et al 2003). Krondl et al (1999) undertook a similar intervention with a group of subjectively healthy older people who consumed less than four servings of fruit and vegetables daily. They found the supplement enhanced the nutrient status of participants without increasing BMI or energy intake.

2.5.8. Dietary patterns and food avoidance

Overweight people or those diagnosed with hypertension, cardiovascular disease or type 2 diabetes are often advised to make changes to their dietary habits. Using data from the European Prospective Investigation into Cancer and Nutrition (EPIC) it was found that for Italians over 60 years old around 15

percent of the men and 19 percent of the women had dieted in the previous 12 months. If they dieted, both overweight and hyperlipidaemic men and women tended to have a dietary pattern characterised by high consumption of raw vegetables, olive oil as added fat, soup and chicken (Pala et al 2006).

Amongst New Zealand 65-74 year olds, 27 percent of men and 34 percent of women chose trim milk most often, a higher percentage than all other age groups (Ministry of Health 1999). Whether this is driven by health concerns is uncertain. In the 75-plus age group this fell back to 20 percent of men and only 19 percent of women (Ministry of Health 1999). The 65-74 year age group also had the highest percentage people consuming three or more vegetable serves each day and the lowest usage of butter (Ministry of Health 1999).

Although fewer than in other age groups, eight percent of New Zealand men and six percent of women aged 75-plus were trying to change the amount or type of foods eaten. The most common changes being attempted (not age group related) were a reduction in high fat foods and increased consumption of vegetables, fruits, breads and cereals (Ministry of Health 1999).

Some people choose to avoid animal products for health, sensory or ethical reasons (Santos & Booth 2002). The NNS97 indicates that of the 75 years and older group: 96 percent of men and 94 percent of women consume an omnivorous diet; one percent of men and two percent of women avoid meats except chicken; one percent of women are lacto-ovo vegetarian; and two percent of men and three percent of women fall into the diet category of other with non-specified food restrictions (Ministry of Health 1999).

One explanation for decreased energy intake in older people is the consumption of smaller meals eaten more slowly (Thomas & Morley 2002). Skipping meals and low frequency of snacking are also associated with inadequate nutrient status in older people (Shahar et al 2003). Data from SENECA was used to review snacking patterns of older people. It was found the large group of light snackers had low energy and micronutrient intakes, whereas people who consumed alcohol, who also snacked from a range of foods, as well as high dairy snackers, also had high intakes of energy and several vitamins and minerals (Haveman-Nies et al 1998). Zizza et al (2007) evaluated the influence of snacking on the energy intakes of 2002 people aged 65 years and over and

concluded snacking was an important dietary behaviour contributing to the energy intakes of older people. Those who snacked had significantly higher energy, protein, carbohydrate and fat intakes and their snacks contributed nearly a quarter of their daily energy intake.

The few studies available documenting food aversion in older rather than younger adults suggest food aversion declines with age. One study found 56 percent of people over 60 years old reported an aversion to at least one food, compared to 77 percent of younger adults (Bernstein 1999).

In a study of 345 homebound older people (Sharkey et al 2002) 18 percent of the sample skipped breakfast almost every day. These people were found to have significantly lower intakes of energy, protein, and 12 of the 16 vitamins and minerals measured.

2.5.9. Skills and attitudes towards meal preparation

While living alone can decrease motivation to prepare a meal, for older men the lack of cooking skills can be a primary obstacle to healthy eating (Wylie et al 1999). Ease of cooking and preparation can be a strong influencer on food choice for men living alone (Donkin et al 1998; Wylie et al 1999).

In a Scottish study investigating the food beliefs and habits of people 75 years and over it was found the main priority of participants was to remain in their own homes (McKie 1999). Three key strategies to achieve this were identified. Firstly, nutritional independence was seen as important in keeping bodies going and reducing the potential for dependence on others. Secondly, participants were motivated to take care of themselves through a good diet, with some overcoming significant health problems to enable them to continue cooking for themselves. Lastly routines, including food routines and targets like cooking a proper meal each day, were used to give purpose and meaning to daily activities.

2.5.10. Food procurement

As New Zealanders age their mode of travel changes and their shopping habits are likely to be affected. For New Zealanders aged 80-plus, on average 43 percent of trips are taken as the vehicle driver, down from 58 percent in the 65-69 age group. At the same time the proportion of trips as a passenger increases

from 17 percent to 26 percent and walking trips increase from 21 percent to 27 percent (Davey & Gee 2002).

A study of New Zealanders aged 75 years and over who no longer had access to private transport found food shopping was one of the key activities likely to generate transport needs. All of the 99 participants participated in food shopping and over half experienced difficulty meeting their transport needs. Thirty-eight percent could not meet their transport needs through their own efforts and were dependent on assistance from others (Davey 2004).

In a Swedish study of older women (Sidenvall et al 2001), the oldest single-living women wanted assistance with shopping from their children or others in their family. Those with children living in the neighbourhood were most often supported in shopping and cooking by daughters. Family members were more familiar with how things were done, and so were able to shop accordingly. They allowed older people to make their own selections in the store and to cook in their own way. Other helpers may have difficulty providing the same kind of support (Sidenvall et al 2001).

Payette et al (1995) investigated the nutrition status of older people receiving publicly funded home care services. They found more women than men had difficulties with food shopping, whereas more men than women had difficulties with food preparation. Assistance for these tasks was mostly provided by relatives and neighbours.

The importance of food procurement was highlighted in a Scottish study (McKie 1999) where older people were found to spend increasing amounts of time accessing food in a way they could manage. They made adaptations to their routines, placing less importance on their time and other activities, in order to retain control over their food and diet.

2.5.11. Other influences on food intake

After consuming a particular food in a meal it is usual that there is a decline in desire and consumption of that food with a shift to consumption of a different food. This sensory-specific satiety helps to promote variety and nutritional balance within the diet. Rolls and McDermott (1991) studied sensory-specific satiety of age groups ranging from 12-15 year olds to 65-82 year olds. They

found that sensory-specific satiety decreased with age and was lowest in the oldest age group. This reduction in sensory-specific satiety for older people, which is consistent with findings by de Castro (2002), may mean there is less desire for as wide a variety of foods, especially when older people are preparing their own meals.

As the day progresses meal size increases and the time between meals decreases (de Castro 1987) and this does not appear to differ with older people (de Castro 2002). What does differ is that older people appear to eat their meals earlier than younger people. If food is more satiating earlier in the day, as de Castro hypothesises (2002), then this may influence the decreased intake of older people.

2.6. Assessment of nutrition risk

The American Dietetic Association defines nutrition risk screening as ~~the~~ the process of identifying characteristics known to be associated with nutrition problems (Council on Practice Management Committee 1994). The purpose of nutrition screening can be to identify people who are malnourished or to identify currently well people who display behaviours or characteristics that put them at risk of malnutrition over time (Keller 2005a).

From a review of the literature, Green & Watson (2006) found a total of 21 tools which aim to screen or assess the nutrition status of older adults. Many of the tools had not been subject to evaluation so that sensitivity and/or specificity had not been demonstrated. Some tools were designed and used only with older people in residential or nursing care, or those attending out-patient facilities.

Green & Watson (2006) found one of the most extensively used tools was the Mini Nutritional Assessment (MNA). Another tool, Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN), was the only tool specifically designed for community living older people. These tools both demonstrated validity, reliability, sensitivity and specificity.

2.6.1. Mini Nutritional Assessment (MNA)

The MNA tool was developed in order to provide a single, rapid assessment of the nutrition status of older people in clinics, hospitals and nursing homes. Its

aim is to evaluate risk of malnutrition, specifically amongst the frail elderly, in order to facilitate early intervention (Vellas B et al 1999).

The MNA can be completed in 10-15 minutes, and comprises four parts (Charlton et al 2007; Vellas B et al 1999):

1. Anthropometric measurements
2. Global assessment (six questions related to lifestyle, medication and mobility)
3. Dietary questionnaire (eight questions, related to number of meals, food and fluid intake, and autonomy of feeding)
4. Subjective assessment (self-perception of health and nutrition)

The sum of the MNA score places participants into three categories: at risk for malnutrition; protein-calorie undernutrition; and adequate nutrition status. Sensitivity, specificity and predictive value are all high at 96 percent, 98 percent and 97 percent respectively (Vellas B et al 1999).

For the purposes of this study, one short-coming is that the MNA was designed for the frail elderly. The developers of the tool define the frail elderly as: %those with some functional impairments, such as mobility, hearing or cognitive disorders, those who live alone, in nursing homes, or who are more than 85 years old, but living in the community+(Vellas B et al 1999).

Charlton et al (2007) compared the validity of the DETERMINE screening checklist, the MNA and the MNA short form (MNA-SF) for use with older black South Africans. They concluded that the MNA, but not DETERMINE, was appropriate to identify those who were malnourished or at risk of malnutrition. The MNA-SF was found to be highly sensitive for malnourished people, but not able to identify those at risk. Beck et al (2001) trialled use of the MNA with relatively healthy people 65 years and over who attended a general practitioner's clinic for a minor illness, and followed up with another trial six months later. They concluded the MNA seemed more able to identify people who were already malnourished, rather than identifying those at risk of becoming malnourished.

Anthropometric data required for the MNA are BMI (from height and weight), mid-arm circumference, calf circumference and weight loss (Vellas B et al

1999). While these are quite simple non-invasive measurements the measurement of mid-arm and mid-calf circumference can require the adjustment of clothing. Accurate measurements for BMI require appropriate tools, stadia to measure height and accurate scales for weight (Beck et al 2001). These requirements are more appropriate for a clinical setting, rather than in-home interviewing.

2.6.2. Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN)

There is no gold standard for the assessment of undernutrition or malnutrition in older people (Thomas 2002; Vellas B et al 1999). The latest version of SCREEN (SCREEN II) was chosen as a simple, easy to use tool that is highly acceptable for use in people's homes and has been validated for the study of community living older people.

The aim of SCREEN is to identify currently well people who are at nutritional risk. That is, people with identified factors or characteristics related to nutrition status that, if not managed or changed, could result in malnutrition over time (Keller 2005a).

SCREEN was developed in Canada for a prospective cohort study which had the goal of assessing the association of nutritional risk with health outcomes in community living older people (Keller et al 2000). The tool was developed to be specific to people 55 years and older living in the community and not receiving all of their meals through a mandatory meal programme. The average age of the 128 participants during the development of SCREEN was 74 years (Keller et al 2001).

SCREEN was developed to be either self-administered or completed in an interview, without the need for anthropometric or biochemical measurements (Keller et al 2000). It was also developed with the goal of having wide applicability in research, education, screening for community programs, and therapeutic interventions where more complex tools would not be appropriate (Keller et al 2000; Keller et al 2001).

Attributes measured in SCREEN were selected as those having been shown to describe nutrition risk in community living seniors (Keller et al 2000). The three

key elements of nutrition risk are weight change, food intake and risk factors for impaired food intake (Keller et al 2000). Nutrition risk appears to operate on a continuum which includes impaired dietary intake and the observable clinical symptoms of impaired dietary intake (Keller et al 2000).

Following several years of research and use, a second version of SCREEN was developed to improve the tool. SCREEN II retained measurement of the three key elements of nutrition risk but refined the measurements (Keller et al 2005b). SCREEN II has higher sensitivity, specificity and reliability than SCREEN I. Additionally inter/intra-rater reliability has been established for SCREEN II but was not established for SCREEN I (Keller et al 2005a).

Nutrition risk, as measured by SCREEN I, has been shown to predict a decline in quality of life (Keller et al 2004). Using a sample of 357 frail older adults, Keller et al (2004) measured their quality of life every three months over an 18-month period, using both a global whole-life satisfaction question and reported good physical health days, and compared this to their nutrition risk score at baseline. The researchers concluded their findings supported previous findings by others, that there is a direct link between nutrition and the physical, health-related aspects of quality of life, but the relationship between nutrition and more broadly defined quality of life may be direct or indirect. The argument for improved nutritional wellbeing as a useful tool for enhancing quality of life holds in either case.

2.7. Nutrition support for community living older people

Nutrition support services aim to address the barriers associated with the procurement, preparation and consumption of a healthful diet and thus enhance an older person's health related quality of life.

While the prevalence of informal care for older people is not known, the kinds of tasks these people take on are known to include both cooking and shopping. They may also take on the role of ensuring the older person is eating a proper diet (American Dietetic Association 2005; Goodhead & McDonald 2007).

Nutrition support services for grocery shopping and meal preparation, both formal and informal, are believed to assist older people to achieve adequate nutrition (Keller 2006). Informal services are most often provided by spouses or

daughters (Keller 2006) whereas formal services may be provided by non-profit organisations, government-funded agencies or profit-making companies.

There are 21 District Health Boards within New Zealand responsible for ensuring the provision of publicly funded health and disability support services for the population of a specific geographic area (Ministry of Health 2008). These services include the provision of nutrition support for older people, but the specifics of services may vary between the health boards. North Shore City Hospital, as part of the Waitemata District Health Board, provides community services for people aged 65-plus. Following assessment, a needs assessment service can provide support services ranging from a minimal package of basic household tasks through to a more complex package of care including fulltime carers (Waitemata District Health Board 2008b). Support can include provision of Meals on Wheels, in-home assistance, including meal preparation and shopping, for eligible older people with disability. Dietetic support may also be available to people with specific health issues, for example someone newly diagnosed with type 2 diabetes.

Meals on Wheels provides a hot meal in the middle of the day for up to five days a week. Recipients are referred to the service following an assessment and a surcharge is payable for the meals. The programme relies on volunteers to deliver the meals. The Ministry of Health Meals on Wheels specification requires the meals to provide one-third of the older person's daily energy and protein requirements.

A US study found 83 percent Meals on Wheels applicants were at high risk for poor nutrition status (Coulston et al 1996; Krassie et al 2000). The nutritive value of prepared meals, including Meals on Wheels, may often be overestimated as the meals are not always finished (Krassie et al 2000). A Canadian study found that between 67 percent and 83 percent of participants consumed each of the different components of the delivered meal, with the mean utilisation in terms of energy at 81 percent (Folger-Levitt et al 1995).

Meals on Wheels has a limit of five meals per week Monday to Friday and this is believed to be insufficient for older people who are already malnourished (Dennison 2007). The entry criteria for receipt of Meals on Wheels may mean the person is already at nutrition risk, as is the case in the Counties Manukau

District Health Board area (Dennison 2007). The Waitemata District Health Board entry criteria for Meals on Wheels (which are currently under review) require a person to be unable to prepare a hot meal without assistance and that provision of delivered meals will maintain the client's nutrition status and independence and/or prevent unnecessary admission to hospital. People who are able to reheat a frozen meal, or prepare a simple meal from convenience foods and people with family or carer assistance readily available are specifically excluded from the service (Waitemata District Health Board 2008a).

A US study compared the traditional Meals on Wheels delivery of five hot meals each week (meeting 33 percent of the Daily Reference Intake for macro- and micronutrients) to a new restorative Meals on Wheels programme including three meals and two snacks per day, seven days a week, meeting 100 percent of the Daily Reference Intake for macro- and micronutrients. A total of 203 older people identified as either malnourished or at risk took part in the study which found that people receiving the restorative programme gained significantly more weight and their nutrition assessment improved faster than those receiving the traditional programme (Kretser et al 2003).

There are a range of other services available to older people living in North Shore City which support better nutrition. Age Concern North Shore provides a free course called *Eat Well - Live Well* which includes practical cooking demonstrations and nutrition advice. During 2008, funding constraints have meant a reduction in the frequency of these courses (Bryce-Chapman 2008). The success of nutrition education programmes for older people was demonstrated in a Canadian study (Rousset et al 2006) where knowledge and attitudes were measured before and after the programme, and against a control group. The programme used had a goal to increase older people's protein intake and the study found nutrition knowledge and protein intake increased significantly among the programme group participants. Wrieden et al (2007) also demonstrated that a cooking skills programme, in this case for adults living in areas of social deprivation in Scotland, had a small but positive effect on food choice and confidence in food preparation.

A number of frozen meal services are available in North Shore City. While supermarkets carry a range of frozen foods, including meals, other frozen meal

services cater and market themselves more specifically to older people. Two examples available in North Shore City are *Ezee Meals* and *Dinner on Ice*. *Ezee Meals* are produced and distributed by a wholly-owned subsidiary of the Wellington City Mission, operating as Mission Foods Ltd. Offering both a pick up (from Glenfield) or a home delivery service, they aim to meet the needs of people looking for the convenience of ready-prepared home-style meals, or who may have difficulty with shopping or preparing their own meals. These are currently priced at \$6.00 for a main meal, \$4.00 for a light meal and \$2.50 for a dessert (Wellington City Mission 2008). *Dinner on Ice* is a home delivery service based in Otahuhu in Auckland. They offer a range of: Classic meals at \$6.75 each; Home-style meals at \$6.25 each; Bargain meals at \$5.50 each; Snacks at \$4.50 each; and Desserts at \$3.00 each (Nutrifare Ltd 2008). For both companies delivery incurs an additional \$5.00 charge with each order (Nutrifare Ltd 2008; Wellington City Mission 2008). Both of these services offer traditional meals (including protein and carbohydrate portions plus other vegetables) for a price that is generally less than a similar product in a supermarket. For example a 320g McCain frozen lamb roast meal from Foodtown costs \$7.19 (Progressive Enterprises 2008) and is comparable to a 350g *Dinner on Ice* meal at \$6.75.

In a survey of 188 people in the UK (Creed 2001) it was found that participants aged 65 years and older were more likely than younger people to view any method other than traditional meal preparation as less acceptable. Non-traditional methods included cook-freeze, cook-chill, sous vide (which involves vacuum packing, low temperature cooking and rapid cooling) and using dehydrated foods. The older age group were more likely to reject the newer methods of food preparation due to food neophobic tendencies as well as their experiences of limited diets and poor quality processed foods from the 1930s and 1940s (Creed 2001).

In a Scottish study (McKie et al 2000) older people defined healthy eating as proper meals, proper foods and a variety of foods eaten in moderation. These definitions were based on the consumption of fresh foods which would be considered healthy. The participants expressed a general dislike of convenience foods, but despite this a number of participants, especially those with mobility problems, bought ready-made meals to avoid the problem of

carrying bulky or heavy items and reduce the effort of preparation. Older people will differ in their preference for provision of meals and are able to modify their behaviour to adjust to their circumstances. In San Francisco, Meals on Wheels delivered frozen meals to clients who preferred their flexibility over hot meals. While the need for freezer space limits who can use frozen meals, in San Francisco about 15 percent of the clients received the frozen meals in bulk and another 78 percent received a frozen meal daily (Yen 1997).

Age Concern North Shore publishes a calendar of activities run by a wide range of clubs catering to the needs of older people in North Shore City which includes several companionship and lunch clubs (Age Concern North Shore 2008). Day centres and lunch clubs for older people are well established in the United Kingdom. These are run by local councils and community groups and often staffed by volunteers. Some community groups in New Zealand also provide lunch clubs for older people. For example the Prescott Club in North Shore City is a lunch club specifically for older people who have little other social interaction. Attendees are taxied to and from the club, provided with a light refreshment as well as lunch, and entertainment.

A longitudinal analysis was undertaken on 367 community living older people in Canada who required support for activities of daily life. Twenty-eight percent received Meals on Wheels and 42 percent participated in meals provided in a social setting. Ten percent required help with meal preparation or grocery shopping. At the 18-month follow up 47 percent were at high nutrition risk, determined by SCREEN. Those receiving formal support or daily informal support for meals were less likely to be at high nutrition risk at follow up. Where the level of support had decreased at follow up nutrition risk appeared to be increased (Keller 2006).

In the US the Administration on Aging's Elderly Nutrition Program provides grants to support nutrition services for older people. They aim to provide community based services for older people who may be at risk of losing their independence by improving the dietary intake of participants as well as providing opportunities to form new friendships and create informal support networks. Service provision includes the supply of home-delivered meals as

well as congregate meals in a variety of delivery settings. The services are targeted to those most in need (Administration on Aging 2003).

A review of the services in the US found that those receiving congregate meals had dietary intakes equal to or better than those of the general population aged 60-plus. In the home-delivered nutrition programme, which is targeted at the most frail and vulnerable, 63 percent reported that the meals provided half or more of their daily food intake. Dietary intake for the homebound participants was also found to be equal to or better than those of the general population aged 60-plus (American Dietetic Association 2005).

2.8. Summary

There are a wide variety of factors that may affect the nutrition risk of older people living in the community. The importance of supportive social networks, living and eating alone, self-rated health and physical and mental wellbeing cannot be overestimated. The food choice processes of older adults are affected by factors such as access to personal transport, cooking skills, ease of preparation and personal resources. Strategies to support older people with food procurement, preparation, cooking and sharing of meals may help to enhance nutrition status and quality of life.

Chapter 3. Methods

3.1. Ethics

Participation in this research was undertaken on a voluntary basis after potential participants were fully informed of the requirements of the research. Initial contact was either in person or by telephone and all participants were given or sent an information sheet (Appendix 1). The information sheet detailed:

- who was being recruited
- what they would be asked
- where and when the interview would happen
- how long the interview might take
- the rights of participants
- confidentiality
- how participants could get more information about the research
- how participants could contact the researcher

Prior to the interview the researcher checked their understanding of the information sheet and participants signed a consent form (Appendix 2). Each participant was advised that should they feel uncomfortable with any question or questions they could choose not to answer. They were reassured this would not be a hindrance, nor would it affect the progress of the research.

Participants were assured their individual details and responses would remain confidential to the researcher and the research supervisor. The signed consent forms are kept in a locked filing cabinet and electronic files are password protected.

Keller (2005b) is an advocate for ethical screening, highlighting that there must be some follow up where nutrition risk is identified. Where participants in this research were identified as being at nutrition risk the researcher, a degree-qualified nutritionist, went through their SCREEN II questionnaire responses and identified where improvements could be made in their diet. These were then discussed with the participant. In most cases participants were very interested and open to this discussion with only one participant expressing a firm desire to make no changes.

Participants identified as at nutrition risk were also advised that a referral could be made to the Field Worker at Age Concern North Shore who could offer further assistance. None of the participants wanted referral in this way. Some had already made arrangements to overcome the specific shortcomings they had, whereas others felt that following the discussion with the researcher they could make positive changes themselves. Keller advises that even where referrals are refused, the screening process can be helpful to increase awareness and lead to behavioural changes (Keller 2005b).

During the development of the research project, feedback and support was sought from Age Concern North Shore. The Ethics Application was reviewed by their Executive Officer prior to submission and their support of the project was confirmed in writing.

Within two to three days of their interview each respondent was sent a thank you card from the researcher to thank them for their time and openness in the interview.

Following completion of the research report, a brief summary of findings from the research was prepared and sent to each participant (Appendix 3).

3.2. Recruitment of subjects

Participants were recruited with the assistance of Age Concern North Shore. Three methods were used: advertising and publicity; recruitment through community groups; and recruitment at the Prescott Club.

3.2.1. Advertising and publicity

Advertisements were placed in the March 2006 issue of the Age Concern North Shore newsletter which is distributed monthly to 1600 individuals and community groups in North Shore City. The advertisements (Appendix 4) were aimed at potential participants plus community groups with members in the 80-85 age group. They outlined the nature and purpose of the research and asked for interested parties to contact the researcher directly by phone or email.

Age Concern North Shore also issued a press release about the research (Appendix 5) to the North Shore Times and the North Harbour News in April 2006. Although only two participants (four percent) cited this publicity as the

source of their information, several participants commented that they had heard about the research from more than one source.

3.2.2. Recruitment through community groups

The Research Co-ordinator at Age Concern North Shore was very active in publicising the research to a number of community groups in the area and her efforts accounted for the recruitment of sixteen participants (31 percent).

During May 2006 information flyers about the research were sent directly to eight community groups in North Shore City.

3.2.3. Recruitment at the Prescott Club

In April 2006 the researcher attended a meeting of the Prescott Club, in North Shore City, to recruit potential participants. The club is an entertainment and lunch club for older people who may otherwise be isolated in the community.

3.3. Screening of subjects

Once people contacted the researcher willing to participate in the research they were screened to ensure eligibility. They were asked their age to ensure they were between 80-85 years old and they were asked whether they lived alone or with others. People were defined as living independently if they lived in their own home, excluding within a retirement village, either by themselves, with a partner or spouse, or with others of a similar age. People living with younger family members or others who could be described as their carer were excluded from the research. At this time the researcher also evaluated potential participants' ability to hear spoken questions and to respond in a way that could be understood by the researcher.

Two people who contacted the researcher were not suitable for the research. Age was the reason for ineligibility in both cases.

3.3.1. Recruitment for personal interviews

Further screening was undertaken to recruit five participants who received a specified type of nutritional support. These included:

1. Regularly received Meals on Wheels
2. Attended a lunch club at least once a month

3. Had purchased frozen meals several times in the last two months
4. Had received advice from a public health dietitian or other medical professional which led to having a special diet/using supplements
5. Received homecare assistance with shopping or meal preparation

The screening questionnaire is in Appendix 6.

3.4. Sample

The sample recruited were 51 independent, community living people, aged between 80 and 85 years, living in North Shore City. As the 85-plus age group is projected to be the fastest growing segment in the older population (Statistics New Zealand 2005) it was relevant to select this group. However to facilitate recruitment of independent living older people the sample age group in this study needed to include those aged 80-85 years. As the sample was a self-selected convenience sample recruited with the assistance of Age Concern North Shore it was not representative of older people and was limited in sample size.

At the 2006 census there were 6,309 people aged 80 years or older living in North Shore City, comprising 4.2 percent of the residents. This compares to 4.3 percent of the total population of New Zealand in this age group. Within this age group in North Shore City the percentage of Maori and Pacific Peoples is less than nationally at 0.8 percent and 0.4 percent respectively, versus 2.1 percent and 1.1 percent, and the percentage of Asian people is higher at 2.7 percent compared to 1.6 percent nationally (Statistics New Zealand 2007). The ethnic breakdown of New Zealanders and North Shore City residents 80 years and older is shown in Table 3.

Table 3 Ethnicity of people 80 years and older in New Zealand and North Shore City (Statistics New Zealand 2007)

| | NZ total | percentage | North Shore City | percentage |
|---------------------------------------|----------|------------|------------------|------------|
| European | 112,473 | 89.1 | 5,682 | 90.1 |
| Maori | 2,652 | 2.1 | 51 | 0.8 |
| Pacific Peoples | 1,359 | 1.1 | 27 | 0.4 |
| Asian | 2,037 | 1.6 | 168 | 2.7 |
| Middle Eastern/Latin American/African | 162 | 0.1 | 27 | 0.4 |
| Other Ethnicity | 7,521 | 6.0 | 354 | 5.6 |
| Total 80 + | 126,204 | 100.0 | 6,309 | 100.0 |

People aged 80-plus living in North Shore City have higher education levels than the total New Zealand population in this age group, with 26 percent and 32 percent respectively having no qualification. In North Shore City 3.9 percent have a university qualification compared to 3.0 percent for total New Zealand as shown in Table 4 (Statistics New Zealand 2007).

Table 4 Education of 80 years plus population: North Shore City compared to Total NZ (Statistics New Zealand 2007)

| | Total NZ | North Shore City |
|--------------------------------|----------|------------------|
| No Qualification | 31.7 | 25.7 |
| Secondary School Qualification | 18.1 | 20.5 |
| Vocational Qualification | 6.3 | 7.7 |
| University Qualification | 3.0 | 3.9 |
| Other Qualification | 35.9 | 32.8 |

Households in North Shore City have higher median incomes, greater access to telephones, the internet and motor vehicles and higher household expenditure than total New Zealand households. Table 5 shows the average personal incomes of residents 65 years and older in North Shore City compared to total New Zealand. Older residents of North Shore City have higher incomes than the national average, with 21 percent of those 65 years and older having an income of \$30,000 or more compared to only 15 percent for all people in New Zealand in that age group (Statistics New Zealand 2007).

Table 5 Personal Income of people 65 years and older in New Zealand and North Shore City (Statistics New Zealand 2007).

| | \$20,000 or less | \$20-30,000 | \$30,000 or more | not stated | total |
|------------------|------------------|-------------|------------------|------------|-------|
| Total NZ | 59.6 | 13.2 | 15.2 | 12.0 | 100.0 |
| North Shore City | 54.1 | 14.7 | 21.4 | 9.8 | 100.0 |

3.5. Methodology

This study used both quantitative tools and qualitative personal interviews to identify food-related factors that place older people at nutritional risk and to describe older peoples perceptions and experiences of nutritional care practices currently used in the community.

In the first part of the study quantitative tools were used to evaluate the social networks, physical and mental wellbeing, and nutrition risk of a sample of older people. Three short, validated questionnaires were used.

1. Practitioner Assessment of Network Type (PANT).

While there is no gold standard in social research for assessing social support (Goodger et al 1999) the network types using PANT have been shown to relate to many areas of behaviour (Wenger 1994a). PANT was specifically developed using an older cohort, making it suitable for this study. Additionally, it has been shown that people in Europe, North America and Australia share similar forms of social and support networks (Wenger 1997b). In the context of this research the aim was to understand whether these network types would relate to behaviours that predict nutrition risk.

2. Elderly Assessment System (EASY-Care).

The Elderly Assessment System (EASY-Care) was developed for the European regional office of the World Health Organisation to provide a more comprehensive, multi-practitioner assessment tool which could gather core information to assess the health and social functioning of older community living people (Philp 2001; Richardson 2001). Its usefulness is as an initial screening tool, especially in primary health and community care (Philp 2000; Richardson 2001). In a clinical setting it can indicate where further, more detailed assessment is required. The

simplicity of this tool made it ideal for use in a non-clinical setting. The aim was to understand whether the ratings for disability, cognition and depression would relate to behaviours that predict nutrition risk.

3. Seniors in the Community: Risk Evaluation for Eating and Nutrition Version II (SCREEN II).

A wide range of nutrition screening tools for older people exist but most are not suitable for community living subjects and many have not been validated. SCREEN II was specifically designed for use with community living older people and its use has been validated in this group. Requiring no anthropometric or biochemical data, it is ideal for use in a community setting. This tool provides a score indicating the presence or absence of nutrition risk.

In the second part of this study, qualitative personal interviews were used to investigate the perceptions and experiences of older people who received different types of nutritional support. The aim was to provide preliminary descriptive information only.

3.6. Part A: Questionnaire

Fifty-one people responded to the first part of the research which utilised a questionnaire. This was an observational study of a self-selected group of participants.

The objective was to provide insights into nutrition risk within this self-selected group and to identify possible relationships between social networks, physical and mental wellness, and nutrition risk.

The questionnaire (Appendix 7) comprised 63 questions in four parts:

1. Practitioner Assessment of Network Type (PANT).

This eight question validated questionnaire is used to evaluate the social networks of older people. The questionnaire places people into one of five network types. These networks of social support are categorised according to the proximity and accessibility of family, the frequency of interaction with people who provide practical support and advice, and the person's level of community involvement.

2. Elderly Assessment System (EASY-Care).

This 35 question validated questionnaire is used to assess physical, mental and social wellbeing of older people. The questionnaire provides a summary score for disability, cognition and depression.

3. Seniors in the Community: Risk Evaluation for Eating and Nutrition Version II (SCREEN II).

This 14 question validated questionnaire evaluates the nutrition risk of older people and provides a summary score of nutrition risk.

4. Demographic characteristics.

Six questions were used to establish the demographic characteristics of the sample.

The questionnaire was pre-tested with a 79 year old woman with good cognitive skills and took 26 minutes to complete. Allowing for an additional five to ten minutes prior to and following the interview for social engagement, it was estimated that interviews would take between 35 and 45 minutes.

3.6.1. Practitioner Assessment of Network Type (PANT)

This questionnaire was used to identify the support networks that are perceived by the older person to be available for companionship and to provide help, support and advice on a regular basis. The types of support networks older people have can predict their ability to maintain independence and usage of formal social services (Wenger 1994a; 1995). Those with the support of family who live close by tend to rely on their family for assistance that may otherwise be required to be provided by formal support services. For example this could include help with food shopping and preparation. For people whose support is mainly neighbours or friends, the level of support is generally less and the intervention of formal support services is required earlier. This would also contrast with people who are very private who may resist any form of outside assistance (formal or informal) until a crisis point is reached (Wenger 1994a; 1995).

Five different types of social support networks for older people were identified from the Bangor Longitudinal Study of Ageing (BLSA) undertaken by the University of Wales from 1979-1999. The support network typologies were

developed based on research data from people aged 65 years and older living in the community (Wenger 1994a). The main differences between the network types include: how close other family members live and the frequency of contact; frequency of contact with neighbours and local friends; and involvement in community groups (Wenger & Tucker 2002).

The PANT questionnaire comprises eight questions, as shown in Table 6. Allocation of network type is based on a summation of nearness of relatives, frequency of contact with relatives, friends and neighbours, and regularity of attendance at religious or community groups.

Table 6 Questions in the PANT questionnaire

| | |
|----|---|
| 1. | How far away, in distance, does your nearest child or other relative live? Do not include spouse. |
| 2. | If you have any children, where does your nearest child live? |
| 3. | How often do you see any of your children or other relatives to speak to? |
| 4. | If you have any living sisters or brothers, where does your nearest sister or brother live? |
| 5. | If you have friends in this community/neighbourhood, how often do you have a chat or do something with one of your friends? |
| 6. | How often do you see any of your neighbours to have a chat or do something with? |
| 7. | Do you attend any religious meetings? |
| 8. | Do you attend meetings of any community/neighbourhood or social groups, such as older people's clubs, lectures or anything like that? |

The five support network types from the BLSA have been used in this study (Wenger 1994a; Wenger & Tucker 2002). They are described as follows:

1. Locally integrated support network

Includes close relationships with local family, friends and neighbours and often based on long-term residence and active involvement with the community. This is a supportive network which reinforces independent living.

The locally integrated network type is the most robust network type. It is associated with the fewest risks for older people as well as the fewest demands on formal social services. These people tend to be well supported with high morale and low levels of isolation, loneliness or depression (Wenger 1997a, Wenger & Tucker 2002).

2. Local family dependent support network

Focused on close family ties, few neighbours and peripheral friends. Family are relied upon to take care of them if necessary.

Family dependent networks support the most highly dependent people who remain in the community. These people can feel like a burden when in poor health, and low morale and loneliness are not uncommon in these circumstances (Wenger 1997a, Wenger & Tucker 2002).

3. Wider community focused support network

Typified by an absence of nearby relatives but active relationships with distant relatives, usually children, and a high prominence of friends and community involvement.

Older people with this network type are more likely to have problems related to poor health and to need carer support. The primary reliance for support is on friends and those who are able will buy in help as needed (Wenger 1997a, Wenger & Tucker 2002).

4. Local self-contained support network

Typified by arms-length relationships or infrequent contact with at least one relative. The lifestyle is household focused and community involvement is limited. More likely than other network types to have problems related to poor health. The primary reliance for support is on neighbours (Wenger 1997a, Wenger & Tucker 2002).

5. Private restricted support network

Typically household focused with an absence of local family, few nearby friends and limited community involvement. These people value their independence. There is usually no informal help available to them and any support would come from formal sources.

Wider community focused and private restricted network types, both associated with a lack of local family and low levels of informal support, are associated with an earlier need for formal intervention by social services (Wenger 1997a, Wenger & Tucker 2002).

These network types have, since the BLSA, been shown to be correlated with demographic variables, variables associated with depression, self-perception of

health, and the use and response to formal services and interventions. (Wenger & Tucker 2002).

3.6.2. Elderly Assessment System (EASY-Care)

This questionnaire was used to assess physical and mental wellbeing. The questionnaire gathers information about an older person's cognitive ability, their mental state as well as physical abilities to undertake tasks of daily life. These capacities affect older people's ability to maintain independence. This may affect food procurement and preparation as well as food choice and consumption.

The EASY-Care questionnaire (UK Version 1999-2002) comprises four parts, as shown in Table 7. Part one establishes basic functional ability and self-ratings on health, loneliness and accommodation.

Part two investigates a person's ability to carry out activities of daily living (ADL), those activities required for personal care, as well as instrumental activities of daily living (IADL), those activities related to independent living. These questions are rated depending on a need for assistance and if so, the type of assistance required. The scoring of part two results in a disability score (Richardson 2001).

Part three is used to identify the possibility of depression and part four to identify the possibility of cognitive impairment. These tests are relatively basic and suitable for screening purposes only (Richardson 2001).

EASY-Care incorporates questions from a range of well-validated tools as well as being validated as a tool in its own right. Evaluation of EASY-Care has been undertaken in eight European countries using 3,500 participants (Philp 2000). Studies have demonstrated reliability, validity and stability (Philp et al 2002). An Australian review of comprehensive assessment tools for older people listed EASY-Care among the four tools with the strongest evidence for reliability and validity (Lincoln Centre for Ageing & Community Care Research 2004).

Table 7 Questions in the EASY-Care questionnaire

| Section | Item |
|------------|---|
| Part 1 | 1. Can you see? (with glasses if worn) |
| General | 2. Can you hear? (with hearing aid if worn) |
| | 3. Do you have difficulty chewing food? (with dentures if used) |
| | 4. Do you have difficulty in making yourself understood because of problems with your speech? |
| | 5. How would you rate your health? |
| | 6. Do you ever feel lonely? |
| | 7. In general, how would you rate your accommodation? |
| Part 2 | 8. Can you do your housework? |
| Disability | 9. Can you prepare your own meals? |
| | 10. Can you go shopping? |
| | 11. Can you handle your own money? (e.g. pay bills, count money, etc) |
| | 12. Can you use the telephone? |
| | 13. Can you take your own medicine? |
| | 14. Can you walk outside? |
| | 15. Can you get around indoors? |
| | 16. Can you manage stairs? |
| | 17. Can you move yourself from bed to chair, if next to each other? |
| | 18. Can you use the toilet (or commode)? |
| | 19. Can you use the bath or shower? |
| | 20. Can you keep up your personal appearance? (e.g. brush hair, shave, put on make-up etc.) |
| | 21. Can you dress yourself? |
| | 22. Can you feed yourself? |
| | 23. Do you have accidents with your bladder? (incontinence of urine) |
| | 24. Do you have accidents with your bowels? (incontinence of faeces) |
| Part 3 | 25. Are you basically satisfied with your life? |
| Depression | 26. Do you feel your life is empty? |
| | 27. Are you afraid something bad is going to happen to you? |
| | 28. Do you feel happy most of the time? |
| Part 4 | 29. What year is it now? |
| Cognition | 30. Repeat this phrase after me: "Mr John Brown, 42 West Street, Wellington" |
| | 31. What time is it? (within one hour) |
| | 32. Count backwards from 20 to 1 |
| | 33. Say the months in reverse order |
| | 34. Repeat the memory phrase |

3.6.3. Seniors in the Community: Risk Evaluation for Eating and Nutrition, Version II (SCREEN II)

This screening questionnaire was used to identify community living older people who, whilst unlikely to be suffering malnutrition at the time, may display behaviours or characteristics that put them at nutrition risk. That is, over time those behaviours or characteristics could potentially lead to malnutrition.

The SCREEN II questionnaire comprises fourteen questions, as shown in Table 8. All questions are multi-choice with scores for each choice allocated. The highest possible score is 64.

Table 8 Questions in the SCREEN II questionnaire

| Item |
|---|
| 1. Weight change: |
| 1. Has your weight changed in the past 6 months? If so by how much? |
| 2. Have you been <u>trying</u> to change your weight in the past 6 months? |
| 3. Self-rating of weight |
| 2. Do you skip meals? |
| 3. Do you limit or avoid certain foods? |
| 4. How would you describe your appetite? |
| 5. How many pieces or servings of fruit and vegetables do you eat in a day? <i>(Can be canned, fresh, frozen or juice)</i> |
| 6. How often do you eat meat, eggs, fish, poultry OR meat alternatives? <i>(Meat alternatives are dried peas, beans, lentils, nuts, peanut butter or tofu)</i> |
| 7. How often do you have milk products? |
| 8. How much fluid do you drink in a day? |
| 9. Do you cough, choke or have pain when swallowing food OR fluids? |
| 10. Is biting or chewing food difficult for you? |
| 11. Do you use commercial meal replacements or supplements? <i>(Shakes, puddings, energy bars)</i> |
| 12. Do you eat one or more meals a day with someone? |
| 13. Meal preparation: |
| 1. Who usually prepares your meals? |
| 2. Which statement best describes meal preparation for you? |
| 14. Do you have any problems getting your groceries? <i>(Can be poor health or disability, limited income, lack of transportation, weather conditions, or finding someone to shop)</i> |

SCREEN II has been specifically tested for sensitivity, specificity and reliability. Sensitivity describes its ability to correctly identify those at nutrition risk; specificity describes its ability to correctly identify those who are not at nutrition risk; and reliability identifies whether the questionnaire will provide the same answers on repeated administration (Keller 2005b).

SCREEN II was validated for its ability to measure nutrition risk in older people by assessing the tool against dietitians' assessments of nutritional risk and by using medical, weight and diet histories as well as anthropometric measurements. SCREEN II was shown to have higher sensitivity than SCREEN I. Using the rating of less than 50 as a cut-point identifying nutrition risk, sensitivity was 86 percent and specificity 66 percent (Keller et al 2005b).

The test re-test reliability of SCREEN II was significantly and highly correlated with intra-class correlation equal to 0.83 (95 percent confidence interval) in a test with 145 people aged 55 years and over (Keller et al 2005b). In addition, inter-rater and intra-rater reliability have been established (Keller et al 2005b).

Keller (2005b) advises that for the purposes of health promotion and nutrition education, the less than 54 cut-point is recommended for use, whereas the less than 50 cut-point is recommended for screening which would result in referrals to dietitians or physicians for further assessment and treatment (Keller et al 2005b). For this research a cut-point of 50 was used to describe those at nutrition risk.

3.6.4. Demographics and personal characteristics

The six demographic questions asked about: age; gender; living situation; ethnicity; whether or not participants had access to a vehicle; and whether or not participants held a community services card.

3.6.5. Data collection: Computer assisted personal interviewing (CAPI)

The questionnaire was administered in participants' homes using computer assisted personal interviewing (CAPI). A computer programme was written so that questions from the questionnaire could be read on the screen of a laptop computer and responses could be directly input by the researcher and captured

in a database. The programme automatically skips to the next relevant question, saving interviewer time (Wenger 2003).

CAPI avoids the need for printed questionnaires and separate data entry of responses. Reducing the steps involved reduces the margin of error (Wenger 2003).

Some may question whether the use of a laptop computer might present a barrier between an older person and the researcher, but the experience of Wenger (2003) is the opposite of this. For many older people her research was their first close contact with a computer and the general reaction was interest in the technology. The laptop computer was not of special interest or concern by any of the participants during the course of this research in 2006.

The programme enabling the use of CAPI with this questionnaire was written so that participants could view the questions as they came up if they wanted to. The typeface could be easily enlarged and spacing was used to enable easy reading of both the questions and the possible responses. Any material not designed to be read directly by the respondent did not appear on the screen and the interviewer carried separate notes about these as required. For example the memory phrase in question 54 was not shown on the screen.

Scoring was calculated by the computer programme. Care was taken to ensure no distress was caused to the respondent. In the paper version of Easy-Care the interviewer is asked to indicate the number of mistakes in several questions. In the CAPI version we altered this so the number could be input without alerting the respondent.

The computer programme operated as expected and it transpired that the majority of participants were not interested in looking at the screen.

3.7. Part B: Personal interviews

The second part of the study aimed to investigate the experiences of people who received different types of nutrition support. These people had all participated in the questionnaire and the interviews were undertaken immediately following completion of the questionnaire.

Five semi-structured qualitative interviews were conducted with participants who received different types of nutrition support to understand the advantages and disadvantages of these different types of support services. This was undertaken as a pilot study to provide preliminary descriptive information for a further study.

One respondent who had each used one of the following nutrition support services was interviewed:

1. Regularly received Meals on Wheels
2. Attended a lunch club at least once a month
3. Had purchased frozen meals several times in the last two months
4. Had received advice from a public health dietitian or other medical professional which led to having a special diet/using supplements
5. Received in-home assistance with shopping or meal preparation

These were short focused interviews which on average lasted around 15 minutes.

3.7.1. Individual interview format

A discussion guide using open ended questions (Appendix 8) was used to gather information in the respondent's own words about their experiences of the nutrition support they received.

To engage the participant on the subject and to listen to the words and phrases they used, the first question asked for an overview of the nutrition support received and how it worked. . As well as gaining information about the service this enabled the researcher to use the same words as the respondent during the interview.

Participants were asked how they came to start using the service in order to understand what triggered the use of these services and they were probed on where they gained information about the service to understand their sources of information. Participants were also probed for behavioural and attitudinal changes to their eating habits, as well as any changes in their everyday lives in order to understand what impact the service may have had on nutrition risk.

To investigate any negative experiences of the service, participants were first asked about a time when the service was particularly good. They were then asked to talk about a time when the service was particularly bad, or they were disappointed with it. The aim was to elicit all experiences and overcome any tendency to only talk positively about a service.

Final questions sought whether they had recommended the service to anyone else, who the service was most suitable for, and their perceived benefits of the service. It was expected probing from these questions would elicit any uncovered aspects or feelings about the service.

3.7.2. Data collection: Tape recorded personal interviews

A tape recorder was used to capture the personal interviews and the information sheet provided an explanation for this.

The information sheet also explained that participants had the right to ask for the tape recorder to be turned off at any stage and this was verbally repeated prior to the interview. During this research all participants were comfortable with the use of the tape recorder.

It was also explained that the audio tapes would be transcribed and participants had the right to edit the transcript of their interview. One respondent requested a copy of the transcript and chose to edit it to further explain her experiences.

3.8. Quantitative data analysis: Part A. Questionnaire

3.8.1. Social networks

Social network types were tabulated and categorised manually from responses to the PANT questions using the PANT algorithm (Wenger & Tucker 2002). Following the guidelines for use by Wenger (1994a) the 10 borderline or inconclusive cases were assumed to reflect a shift towards a more dependent network type and were placed into these categories. This left only one participant with an inconclusive network type.

3.8.2. Physical and mental wellbeing

Using the algorithms for EASY-Care (UK Version 1999-2002) (Sheffield Institute for Studies on Ageing 2002), the computer programme capturing the data calculated scores for disability, depression and cognition for each participant.

3.8.3. Nutrition risk

Nutrition risk scores for each participant were calculated by the computer programme capturing the data, using the algorithm for SCREEN II (Keller 2004). A score of 50 or less was used to determine nutrition risk.

3.9. Statistical analysis

Frequencies were calculated for the method of recruitment of participants. The mean times, and the ranges, were calculated for the time taken for the questionnaires and for the personal interviews.

Data was then transferred into the statistical analysis programme SPSS Student Version 14.0 for analysis.

3.9.1. Demographic data and personal characteristics

Statistical analyses undertaken on demographic and other variables are shown in Table 9.

Table 9 Statistical analysis of demographic variables

| Variables | Analysis |
|--------------------------------|-------------------------------------|
| Age | Frequency; mean; standard deviation |
| Gender | Frequency |
| Living situation | Frequency |
| Ethnicity | Frequency |
| Use of a vehicle | Frequency |
| Community services card holder | Frequency |

3.9.2. Social networks

Frequencies were calculated for each of the five social network types: locally integrated; local family dependent; wider community focused; local self-contained; and private restricted support network.

3.9.3. Nutrition risk

Frequencies were calculated for responses to each question within the SCREEN II section of the questionnaire, nutrition risk score and nutrition risk category. Mean and standard deviation values were calculated for nutrition risk score, as shown in Table 10.

Table 10 Frequencies calculated from SCREEN II section of questionnaire

| Variables | Analysis |
|--------------------------------|-------------------------------------|
| Each question within SCREEN II | Frequency |
| Nutrition risk score | Frequency; mean; standard deviation |
| Nutrition risk category | Frequency; mean; standard deviation |

3.9.4. Analysis of relationships within the data

Using cross tabulations and Pearson's chi-square test for non-parametric data, possible relationships were investigated between demographic variables and: social network types; nutrition risk; questions within SCREEN II; disability, depression and cognition scores; plus selected questions from EASY-Care, as shown in Table 11.

Table 11 Cross-tabulations with demographic variables

| 1. Demographic variables | 2. Variable each of the six demographic variables cross-tabulated with | Source of variable 2 | Association test |
|--|--|-----------------------|----------------------|
| Age; Gender; Living situation; Ethnicity; Use of a vehicle; and Community services card holder | Social network type | PANT typology | Pearson's chi-square |
| | Nutrition risk score | SCREEN II score | Pearson's chi-square |
| | Nutrition risk category | SCREEN II score | Pearson's chi-square |
| | Each question in SCREEN II | SCREEN II | Pearson's chi-square |
| | Disability score | score from EASY-Care | Pearson's chi-square |
| | Depression score | score from EASY-Care | Pearson's chi-square |
| | Cognition score | score from EASY-Care | Pearson's chi-square |
| | Self-rated health | question in EASY-Care | Pearson's chi-square |
| | Loneliness | question in EASY-Care | Pearson's chi-square |

Cross tabulations and Pearson's chi-square test for non-parametric data were used to investigate possible relationships between social network type and: nutrition risk; selected questions within SCREEN II; selected questions within EASY-Care; disability, depression and cognition scores, as shown in Table 12.

Table 12 Cross-tabulations with network types

| 1. Network type | 2. Variable network type cross-tabulated with | Source of variable 2 | Association test |
|-----------------|---|-----------------------|----------------------|
| | Nutrition risk score | SCREEN II | Pearson's chi-square |
| | Nutrition risk category | SCREEN II | Pearson's chi-square |
| | Consumption of fruit and vegetables | question in SCREEN II | Pearson's chi-square |
| | Consumption of protein foods | question in SCREEN II | Pearson's chi-square |
| | Consumption of dairy | question in SCREEN II | Pearson's chi-square |
| | Consumption of fluids | question in SCREEN II | Pearson's chi-square |
| | Meal sharing | question in SCREEN II | Pearson's chi-square |
| | How feel about meal preparation | question in SCREEN II | Pearson's chi-square |
| | Problems getting groceries | question in SCREEN II | Pearson's chi-square |
| | Disability score | score from EASY-Care | Pearson's chi-square |
| | Depression score | score from EASY-Care | Pearson's chi-square |
| | Cognition score | score from EASY-Care | Pearson's chi-square |
| | Self-rated health | question in EASY-Care | Pearson's chi-square |
| | Loneliness | question in EASY-Care | Pearson's chi-square |

Cross tabulations and Pearson's chi-square test for non-parametric data were used to investigate possible relationships between nutrition risk and selected EASY-Care questions, as well as EASY-Care scores.

Spearman's rho non-parametric correlation test was also used to investigate any relationships between nutrition risk and: self-rated health; feelings of loneliness; disability, cognition and depression scores. Items cross-tabulated and tested for relationships with nutrition risk are shown in Table 13.

Table 13 Cross-tabulations with nutrition risk

| 1. Nutrition risk | 2. Variables nutrition risk score and nutrition risk category cross-tabulated with | Source of variable 2 | Association test |
|---------------------------|--|-----------------------|--|
| Nutrition risk score; and | Attendance of religious meetings | question within PANT | Pearson's chi-square |
| Nutrition risk category | Attendance of community group meetings | question within PANT | Pearson's chi-square |
| | Disability score | score from EASY-Care | Pearson's chi-square Spearman's rho |
| | Depression score | score from EASY-Care | Pearson's chi-square Spearman's rho |
| | Cognition score | score from EASY-Care | Pearson's chi-square Spearman's rho |
| | Self-rated health | question in EASY-Care | Pearson's chi-square Spearman's rho |
| | Loneliness | question in EASY-Care | Pearson's chi-square Spearman's rho |
| | | | |

3.10. NZDep2006 Scores

FISHEYEⁱ (Terralink International 2006) mapping software was used to identify the meshblock for the address of each participant. The NZDep2006 index of socioeconomic deprivation (Salmond et al 2007) was used to identify the index score for each address. Using data from the 2006 census, the NZDep2006 scale of deprivation from 1 to 10 divides New Zealand into tenths of the distribution of the scores. A value of one indicates the meshblock is in the least deprived 10 percent of areas in New Zealand and a value of 10 indicates the meshblock is in the most deprived 10 percent of areas. (Note this 1 to 10 index operates in the opposite direction to the more widely known decile rankings for schools, where decile 10 indicates the highest socioeconomic level and decile 1 the lowest).

Figure 4 shows the relationship between the NZDep2006 scores and the NZDep2006 scale. It is important to note the distribution is skewed, illustrating that NZDep2006 reflects a continuum from 'least deprivation' to 'most deprivation', and the decile cut-points are not equally spaced, so the difference

between deciles two and five is not huge, unlike the difference between deciles seven and 10.

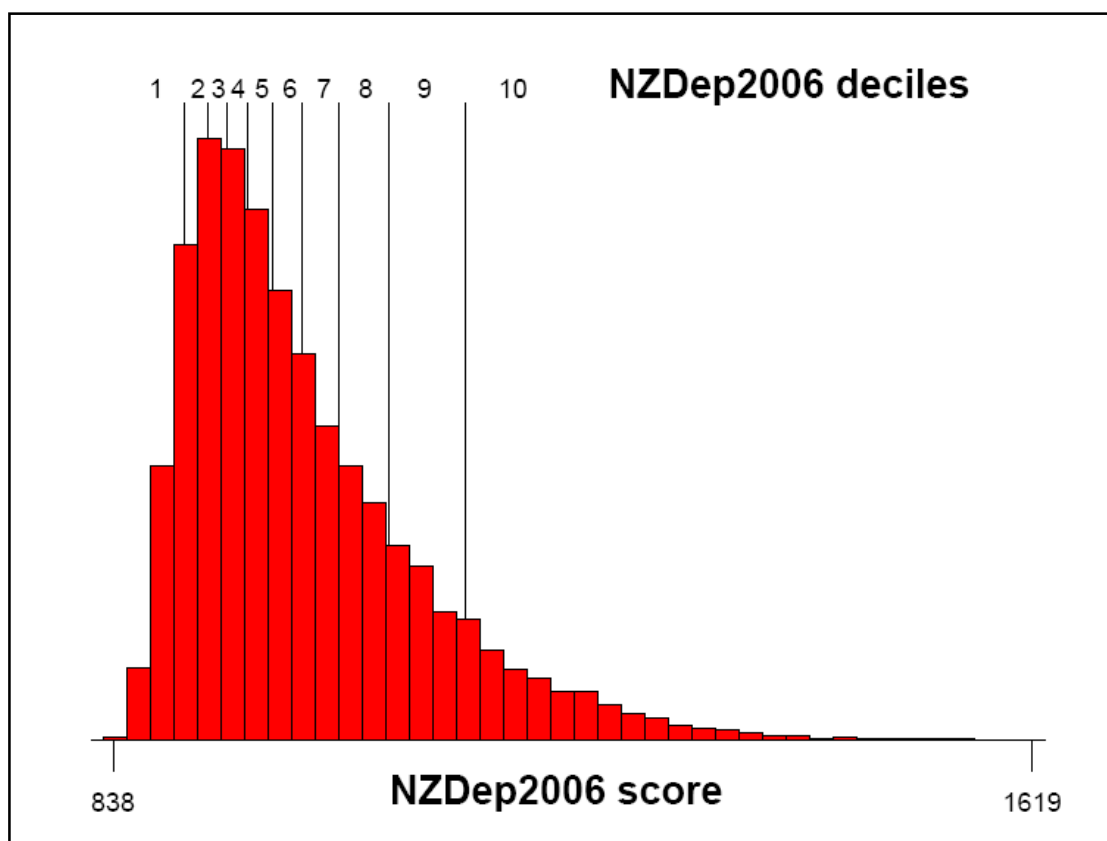


Figure 4 Relationship between the NZDep2006 scores and the NZDep2006 scale from 1 to 10 (Salmond et al 2007)

3.11. Qualitative analysis: Part B. Interviews

Five interviews were undertaken to investigate experiences of different types of nutrition support, namely: Meals on Wheels; attending a lunch club; purchasing frozen meals; receiving advice from a public health dietitian; or home care. Each interview was undertaken with a person who had experience with one of these support types.

3.11.1. Qualitative analysis

A general inductive approach to qualitative analysis was used to analyse the interviews. The interview transcripts were used to develop categories which could be used to cluster important themes that arose. The findings are influenced by the knowledge and experience of the researcher as the researcher evaluates which themes are important (Thomas 2003).

The general inductive coding process was followed. After several readings of the transcripts and identification of the meanings within the text, categories or themes were identified and the text coded. Any one segment of text could be coded to more than one category. Refinement of the categories continued until useful themes emerged (Thomas 2003).

Chapter 4. Results

4.1. The participants

Nearly one-third of participants (16 people) were recruited through Age Concern North Shore. The Research Co-ordinator publicised the research to a number of different community groups. One-quarter of participants (13 people) cited the advertisement in the Age Concern newsletter as their primary source of information about the research. A further 11 people (22 percent) contacted the researcher after receiving an information flyer handed out at a community group they attended and five people (10 percent) made contact after hearing about the research through friends. Four people were recruited by the researcher at the Prescott Club and two made contact after reading an article in the North Shore Times. Table 14 shows where participants heard about the research.

Table 14 Participant recruitment

| | number | percentage | number | percentage |
|--|--------|------------|--------|------------|
| Age Concern: | | | | |
| Research Co-ordinator passes on contacts from community groups | 16 | 31.4 | | |
| Advertising | 13 | 25.5 | | |
| Subtotal | | 56.9 | 29 | 56.9 |
| Information flyers to clubs: | | | | |
| Glenfield Salvation Army Companions Club | 3 | | | |
| 60's Up (unspecified) | 3 | | | |
| Probus, Northcote | 3 | | | |
| Glenfield Senior Citizens | 1 | | | |
| Senior Citizens (unspecified) | 1 | | | |
| subtotal | | | 11 | 21.6 |
| Other: | | | | |
| Friends pass on the information | 5 | 9.8 | | |
| Prescott Club | 4 | 7.8 | | |
| North Shore Times | 2 | 3.9 | | |
| subtotal | | | 11 | 21.6 |
| Total | | 100.0 | 51 | 100.0 |

The target was to recruit fifty participants. Fifty-one were included in the sample.

4.2. Interview length

The mean time taken to administer the questionnaire, including pre-amble and any social interaction, was approximately 50 minutes. The shortest questionnaire interview took around 20 minutes and the longest around 90 minutes.

The personal interviews took on average an additional 15 minutes, and ranged from 10 to 20 minutes.

4.3. Demographic and personal characteristics of the participants

4.3.1. Age

The participants comprised 51 people between 80 and 85 years of age. The mean age was 82 with a standard deviation of 1.7. Table 15 and Figure 5 show the age distribution of the sample. At the 2006 Census 4.2 percent of the population in North Shore City was aged 80 years or over, compared to 4.3 percent for total New Zealand (Statistics New Zealand 2007).

Table 15 Age distribution of participants

| Age (years) | 80 | 81 | 82 | 83 | 84 | 85 | Total |
|-------------|------|-----|------|------|------|-----|-------|
| Number | 11 | 5 | 11 | 8 | 11 | 5 | 51 |
| Percentage | 21.6 | 9.8 | 21.6 | 15.7 | 21.6 | 9.8 | 100.0 |

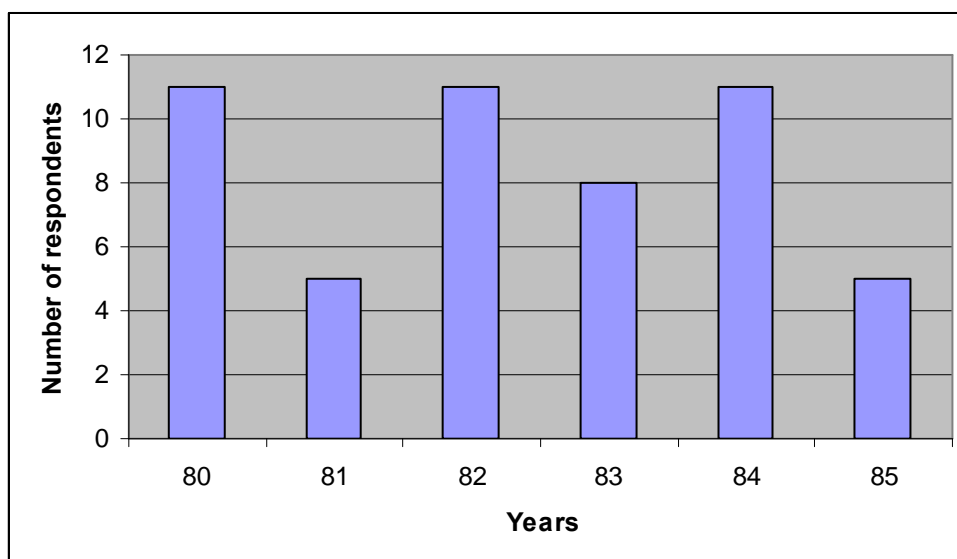


Figure 5 Age distribution of participants

4.3.2. Gender

Seventy percent of the participants were female and 30 percent were male, as shown in Table 16 and Figure 6. At the 2006 Census, 62 percent of 80-84 year olds and 70 percent of 85-89 year olds living in North Shore City were female, compared to 60 percent and 66 percent respectively for total New Zealand (Statistics New Zealand 2007).

Table 16 Gender

| | Female | Male | Total |
|------------|--------|------|-------|
| Number | 36 | 15 | 51 |
| Percentage | 70.6 | 29.4 | 100.0 |

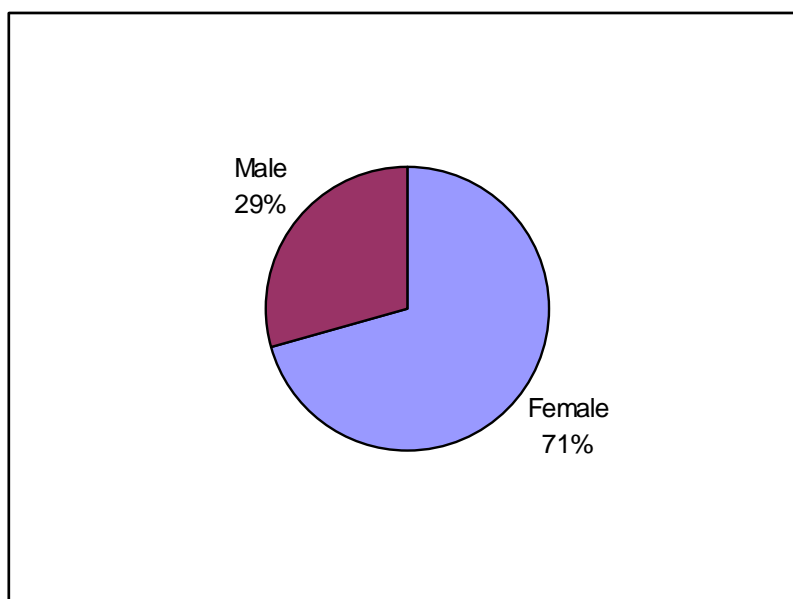


Figure 6 Gender

4.3.3. Living situation

Eighty-two percent of the participants were living alone and 18 percent were living with their spouse (Table 17).

Table 17 Living situation

| | Living alone | Living with spouse | Total |
|------------|--------------|--------------------|-------|
| Number | 42 | 9 | 51 |
| Percentage | 82.4 | 17.6 | 100.0 |

Eighty percent of the participants were in the same living situation as they were five years ago (who they lived with and the home they lived in). Sixteen percent of the participants were living with a spouse in the last five years, and now were not, and four percent were still living alone but had changed their place of residence (Table 18).

Table 18 Changes in living situation in the past five years

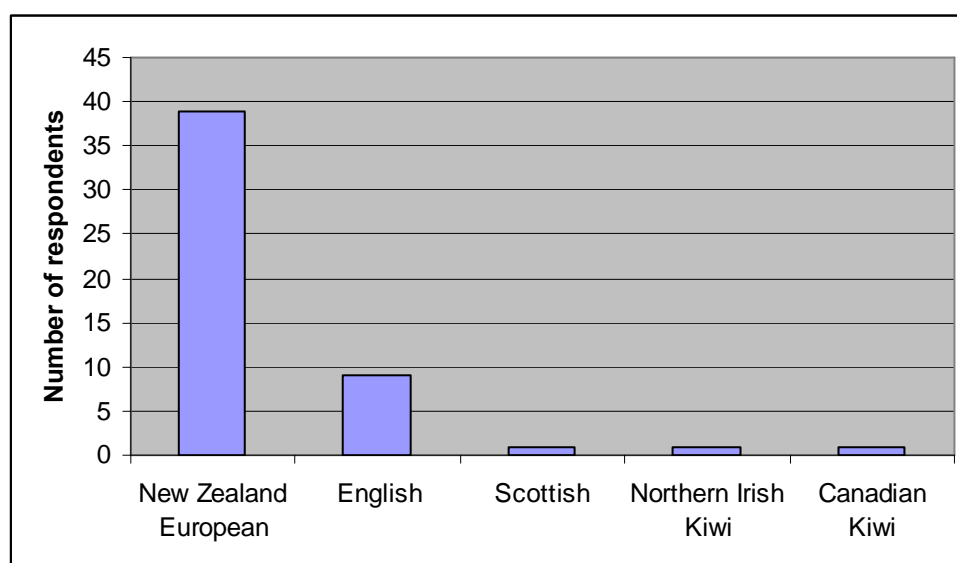
| | No change | Was with spouse/ now alone | Still alone/ moved house | Total |
|------------|-----------|-------------------------------|-----------------------------|-------|
| Number | 41 | 8 | 2 | 51 |
| Percentage | 80.4 | 15.7 | 3.9 | 100.0 |

4.3.4. Ethnicity

Three-quarters of the participants described themselves as New Zealand Europeans. As shown in Table 19 and Figure 7 most of the other participants originated from the UK, with one person from Canada.

Table 19 How participants described their ethnicity

| | New Zealand European | English | Scottish | Northern Irish Kiwi | Canadian Kiwi | Total |
|------------|----------------------|---------|----------|---------------------|---------------|-------|
| Number | 39 | 9 | 1 | 1 | 1 | 51 |
| Percentage | 76.5 | 17.6 | 2.0 | 2.0 | 2.0 | 100.0 |

**Figure 7 How participants described their ethnicity**

Census classifications of ethnicity include: European; Maori; Pacific Peoples; Asian; Middle Eastern/Latin American; and Other Ethnicity. All of the sample in this study would be classified as European in the census data.

Ninety percent of North Shore City residents aged 80 years or older and 89 percent of total New Zealand residents in this age group were classified as European in the 2006 Census (Statistics New Zealand 2007).

4.3.5. Access to a vehicle

Fifty-seven percent of participants owned a vehicle and held a current driving licence as shown in Table 20 and Figure 8.

Table 20 Access to a vehicle

| Own a vehicle and have a current driving licence? | Yes | No | Total |
|---|------|------|-------|
| Number | 29 | 22 | 51 |
| Percentage | 56.9 | 43.1 | 100.0 |

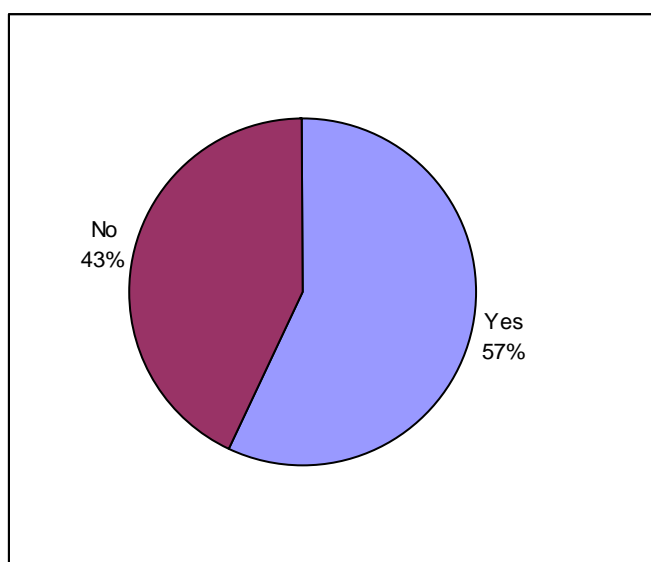


Figure 8 Ownership of a vehicle and current driving licence

4.3.6. Community services card

Eighty-four percent of the participants held a community services card and 16 percent did not (Table 21 and Figure 9).

Table 21 Hold a community services card

| | Yes | No | Total |
|------------|------|------|-------|
| Number | 43 | 8 | 51 |
| Percentage | 84.3 | 15.7 | 100.0 |

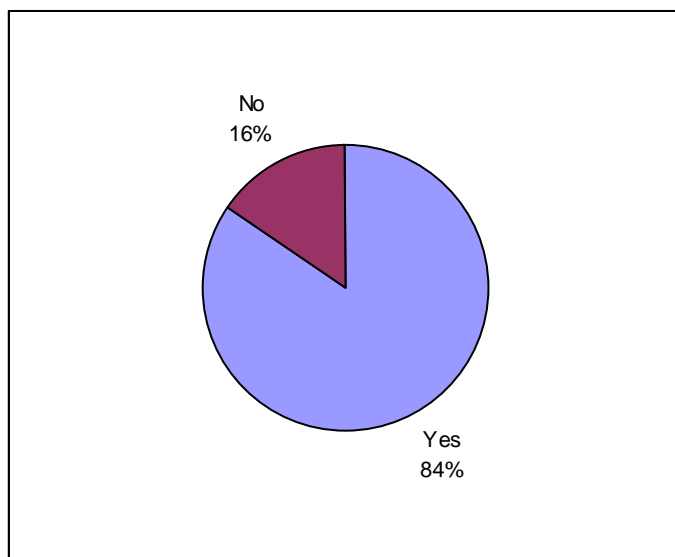


Figure 9 Hold a community services card

4.3.7. NZDep2006 scores

Two addresses were in meshblocks with no NZDep2006 score. One was a rural address and the other within a large complex of housing for older people which included self-contained apartments through to a hospital.

NZDep2006 scores, for the 49 addresses included, ranged from decile one through to decile nine. The mean score was 4.4 with a standard deviation of 2.5. While one-third of the sample was in the higher one and two deciles, half of the sample fell within the five to seven decile range. Frequencies for the scores are shown in Figure 10.

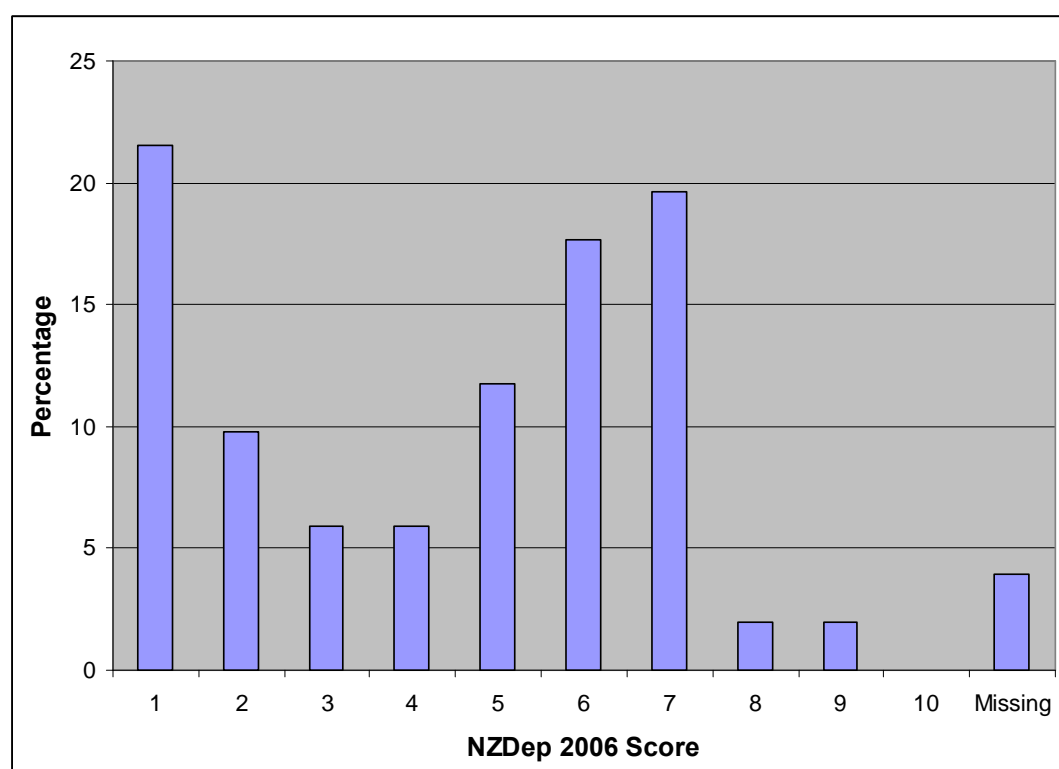


Figure 10 NZDep2006 scores

4.4. Social network types of the participants (PANT)

The most common social network type within the sample was locally integrated. This is indicative of a support network including close relationships with local family, friends and neighbours. Forty-seven percent of the sample fit into this typology.

The second most common social network type in this sample was wider community focused with 20 percent of participants in this category. While people with this type of support network do not tend to have relatives nearby they often have active relationships with more distant relatives, usually children, and significant relationships with friends.

Fourteen percent of participants fit into the family dependent social network type. As the name suggests this support network primarily comprises close family with little interaction with neighbours and friends.

Twelve percent of participants fit into the local self-contained social network typology. This is typified by infrequent contact with at one least relative with the mainstay of their support network being neighbours.

Just three participants (six percent) fit into the private restricted social network type. These people typically have a limited informal support network with no relatives, few nearby friends and little community contact or involvement.

One participant had equal scores in three categories (locally integrated, wider community focused and local self-contained) which did not naturally indicate a specific shift occurring, so the social network type was inconclusive.

Network type distribution is shown in Table 22 and Figure 11.

Table 22 Social network types

| | Locally integrated | Wider community focused | Local family dependent | Local self-contained | Private restricted | Inconclusive | Total |
|------------|--------------------|-------------------------|------------------------|----------------------|--------------------|--------------|-------|
| Number | 24 | 10 | 7 | 6 | 3 | 1 | 51 |
| Percentage | 47.1 | 19.6 | 13.7 | 11.8 | 5.9 | 2.0 | 100.0 |

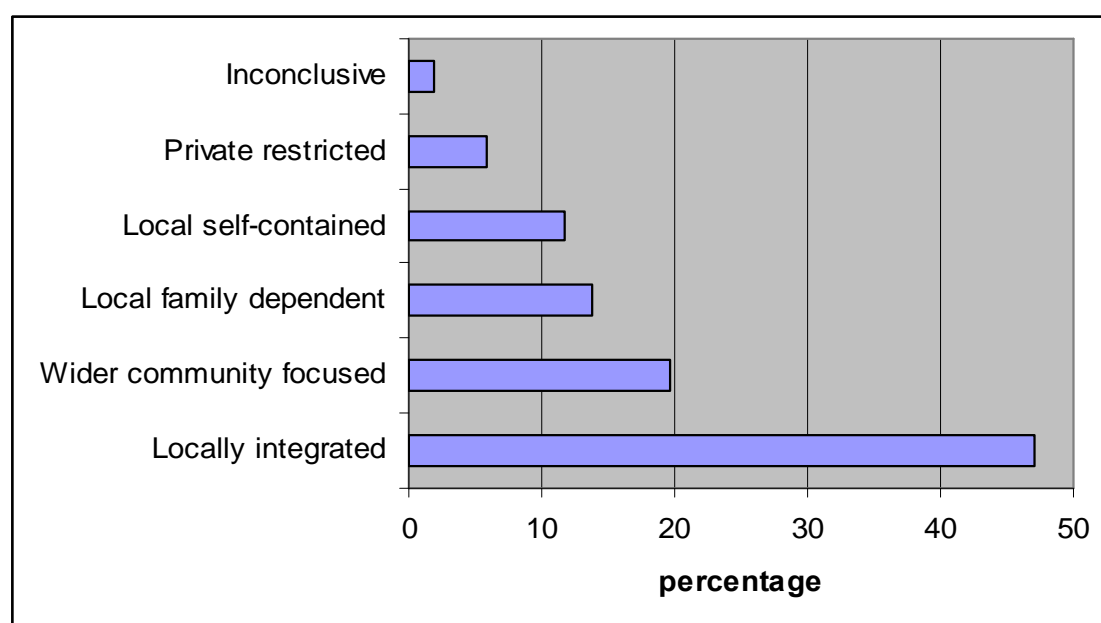


Figure 11 Percentage distribution of social network type

4.5. Personal assessments of the participants (EASY-Care)

4.5.1. Vision and verbal communication

Fifty of the participants (98 percent) could see without difficulty, with glasses if worn, and one respondent had limited vision. This participant had ageing macular degeneration.

All of the participants could hear, with a hearing aid if worn. None of the participants had difficulty making themselves understood due to their speech. People with hearing and verbal communication problems were excluded during recruitment.

4.5.2. Self-rated health

When asked to rate their own health on a scale of five ratings from excellent to poor, 51 percent rated their health as excellent or very good, 28 percent as good, and 22 percent as fair or poor (Table 23 and Figure 12).

Table 23 Self-rated health

| | Excellent or Very Good | Good | Fair | Total |
|------------|---------------------------|------|------|-------|
| Number | 26 | 14 | 11 | 51 |
| Percentage | 51.0 | 27.5 | 21.6 | 100.0 |

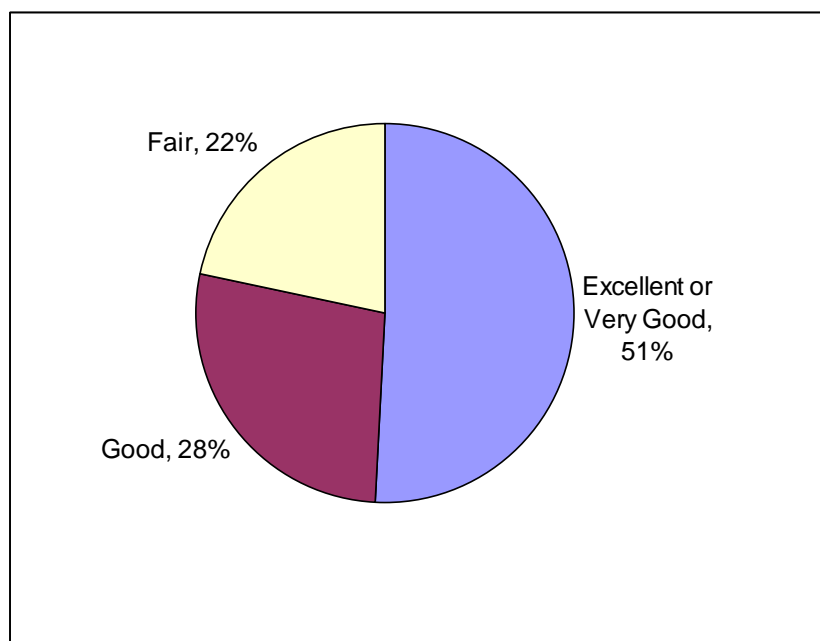


Figure 12 Self-rated health

4.5.3. Loneliness

Thirty-seven percent of participants said they never felt lonely, 49 percent sometimes felt lonely and fourteen percent often felt lonely (Table 24).

Table 24 Loneliness

| Ever feel lonely? | Never | Sometimes | Often | Total |
|-------------------|-------|-----------|-------|-------|
| Number | 19 | 25 | 7 | 51 |
| Percentage | 37.3 | 49.0 | 13.7 | 100.0 |

4.5.4. Accommodation rating

Most participants (sixty-one percent) felt their accommodation was excellent and the remaining 39 percent rated their accommodation as very good (Table 25).

Table 25 Accommodation

| | Excellent | Very Good | Fair | Poor | Total |
|------------|-----------|-----------|------|------|-------|
| Number | 31 | 20 | 0 | 0 | 51 |
| Percentage | 60.8 | 39.2 | 0 | 0 | 100.0 |

4.5.5. Disability score

One-third of participants showed no evidence of disability at all with a zero score and two-thirds showed evidence of some degree of disability (Table 26).

Out of a maximum disability score of 100, the mean score was 4.9 with the standard deviation at 7.0. The highest disability score amongst this group was 28.

Table 26 Disability

| | No disability: Score 0 | Some disability: Score 1 or more | Total |
|------------|---------------------------|-------------------------------------|-------|
| Number | 17 | 34 | 51 |
| Percentage | 33.3 | 66.7 | 100.0 |

The questions used to establish a disability score, and responses given by participants, are summarised in Table 27. The most common need for assistance was with housework: 47 percent of the sample could do their housework without any help, 43 percent required some help and 10 percent could not do their housework at all.

Table 27 Questions resulting in a disability score and the number of participants for each response

| | Without help | With some help | Not able to do at all | Total |
|---|--------------|-----------------------------------|---------------------------------|-------|
| Can you do your housework? | 24 (47.1%) | 22 (43.1%) | 5 (9.8%) | 51 |
| Can you prepare your own meals? | 42 (82.3%) | 6 (11.8%) | 3 (5.9%) | 51 |
| Can you go shopping? | 44 (86.3%) | 3 (5.9%) | 4 (7.8%) | 51 |
| Can you handle your own money? (e.g. pay bills, count money, etc) | 48 (94.1%) | 3 (5.9%) | 0 | 51 |
| Can you use the telephone? | 51 (100%) | 0 | 0 | 51 |
| Can you take your own medicine? | 51 (100%) | 0 | 0 | 51 |
| Can you walk outside? | 51 (100%) | 0 | 0 | 51 |
| Can you get around indoors? | 51 (100%) | 0 | 0 | 51 |
| Can you manage stairs? | 47 (92.2%) | 0 | 4 (7.8%) | 51 |
| Can you move yourself from bed to chair, if next to each other? | 51 (100%) | 0 | 0 | 51 |
| Can you use the toilet (or commode)? | 51 (100%) | 0 | 0 | 51 |
| Can you dress yourself? | 50 (98.0%) | 1 (2.0%) | 0 | 51 |
| Can you feed yourself? | 50 (98.0%) | 1 (2.0%) | 0 | 51 |
| | Without help | Need help | | Total |
| Can you use the bath or shower? | 48 (94.1%) | 3 (5.9%) | | 51 |
| Can you keep up your personal appearance? (e.g. brush hair, shave, put on make-up etc.) | 51 (100%) | 0 | | 51 |
| | No accidents | Occasional accidents (<1 per day) | Frequent accidents (>1 per day) | Total |
| Do you have accidents with your bladder? (incontinence of urine) | 37 (72.4%) | 10 (19.8%) | 4 (7.8%) | 51 |
| Do you have accidents with your bowels? (incontinence of faeces) | 48 (%) | 3 (5.9%) | 0 | 51 |

4.5.6. Depression score

As shown in Table 28, 84 percent of participants showed no evidence of depression, scoring zero on the depression score. In total 14 percent (seven people) showed some evidence of depression. Of these, six participants scored one on the depression score and one participant scored two out of a maximum score of four. The questions used to establish the depression score, and responses given by participants, are summarised in Table 29.

Table 28 Depression scores

| | Score 0: No evidence of depression | Score 1: Some evidence of depression | Score 2: Some evidence of depression | Total |
|------------|--|--|--|-------|
| Number | 43 | 6 | 1 | 51 |
| Percentage | 84.3 | 11.8 | 2.0 | 100.0 |

Table 29 Questions resulting in a depression score and the number of participants for each response

| | Yes | No | Total |
|---|-----|----|-------|
| Are you basically satisfied with your life? | 48 | 3 | 51 |
| Do you feel your life is empty? | 3 | 48 | 51 |
| Are you afraid something bad is going to happen to you? | 2 | 49 | 51 |
| Do you feel happy most of the time? | 50 | 1 | 51 |

4.5.7. Cognitive impairment score

From a maximum score of 28, scores between 0-10 are indicative of normal to mild cognitive impairment and scores from 11-28 are indicative of moderate to severe cognitive impairment in older people. The mean score was 6.5 (standard deviation 4.7).

Eighty percent of the participants showed normal to mild cognitive impairment and 20 percent of the participants showed moderate to severe cognitive impairment (Table 30).

Table 30 Cognitive impairment

| | Normal-mild | Moderate-severe | Total |
|------------|-------------|-----------------|-------|
| Number | 41 | 10 | 51 |
| Percentage | 80.4 | 19.6 | 100.0 |

The questions used to establish the cognition score, and responses given by participants, are summarised in Table 31.

Table 31 Questions used to establish the cognition score and the number of participants for each response

| | Correct | Incorrect | Total |
|------------------------------------|---------|-----------|-------|
| What year is it now? | 47 | 4 | 51 |
| What month is it now? | 50 | 1 | 51 |
| What time is it? (within one hour) | 51 | 0 | 51 |

| | Correct | 1 error | 2+ errors | Total |
|---------------------------------|---------|---------|-----------|-------|
| Count backwards from 20 to 1 | 45 | 5 | 1 | 51 |
| Say the months in reverse order | 39 | 7 | 5 | 51 |

| | Correct | 1 error | 2 errors | 3 errors | 4 errors | 5+ errors | Total |
|--------------------------|---------|---------|----------|----------|----------|-----------|-------|
| Repeat the memory phrase | 9 | 11 | 8 | 4 | 3 | 16 | 51 |

4.6. Nutrition risk of the participants (SCREEN II)

4.6.1. Weight

Eighty percent of participants had not noticed any weight change in the previous six month period. Fourteen percent thought they had lost weight and six percent felt they had gained weight over the previous six months (Table 32).

Table 32 Weight change

| | Lost weight | No change | Gained weight | Total |
|------------|-------------|-----------|---------------|-------|
| Number | 7 | 41 | 3 | 51 |
| Percentage | 13.7 | 80.4 | 5.9 | 100.0 |

As shown in Table 33 only four percent of participants had been trying to change weight during this period. Eighteen percent had not been trying to change their weight but it had changed anyway.

Of the nine people whose weight changed unintentionally, seven lost weight and two gained weight.

Of the two people who had tried to change weight, one had lost more than five kilograms and the other had not experienced weight change. Both now felt their weight was just right.

Table 33 Trying to change weight

| | No | Yes | No. Weight changed anyway | Total |
|------------|------|-----|------------------------------|-------|
| Number | 40 | 2 | 9 | 51 |
| Percentage | 78.4 | 3.9 | 17.6 | 100.0 |

As shown in Table 34, three-quarters of participants (77 percent) felt that their weight was just right. A little over one-fifth of participants (22 percent) felt they were heavier than they should be and only two percent (one person) felt they were lighter than they should be.

Table 34 Self-assessment of weight

| | More than it should be | Just right | Less than it should be | Total |
|------------|---------------------------|------------|---------------------------|-------|
| Number | 11 | 39 | 1 | 51 |
| Percentage | 21.6 | 76.5 | 2.0 | 100.0 |

4.6.2. Meal skipping

Most participants (84 percent) never skipped meals and six percent skipped meals only occasionally. Eight percent often skipped meals, half of these because their overall eating patterns were quite irregular, and four percent (two people) always skipped lunch. For one participant this was a lifelong habit and for the other this was because they could not be bothered once their spouse had passed away (Table 35).

Table 35 Ever skip meals

| | Never or rarely | Sometimes | Often | Almost every day | Total |
|------------|-----------------|-----------|-------|------------------|-------|
| Number | 43 | 2 | 4 | 2 | 51 |
| Percentage | 84.3 | 5.9 | 7.8 | 2.0 | 100.0 |

4.6.3. Food avoidance

Most participants (94 percent) stated they ate most foods. The remaining six percent stated they limited some foods but did not find that difficult to manage. This included a lifelong vegan, a person with a dairy and beef allergy and a person who did not consume foods with seeds due to having diverticulosis (Table 36).

Table 36 Limit or avoid certain foods

| | Eat most foods | Limit some foods but manage fine | Limit some foods; find it difficult | Total |
|------------|----------------|----------------------------------|-------------------------------------|-------|
| Number | 48 | 3 | 0 | 51 |
| Percentage | 94.1 | 5.9 | 0 | 100.0 |

4.6.4. Appetite

Most participants (96 percent) described their appetite as either very good (39 percent) or good (57 percent), with only two people (four percent) describing their appetite as fair (Table 37).

Table 37 Appetite

| | Very good | Good | Fair | Poor | Total |
|------------|-----------|------|------|------|-------|
| Number | 20 | 29 | 2 | 0 | 51 |
| Percentage | 39.2 | 56.9 | 3.9 | 0 | 100.0 |

4.6.5. Fruit and vegetable consumption

As shown in Table 38, three-quarters of participants consumed the recommended five or more servings of fruit and vegetables on an average day and one-quarter did not. Foods included were fresh, canned, frozen or juices.

Table 38 Pieces or servings of fruit and vegetables eaten each day

| | Five or more | Four | Three | Two | Less than two | Total |
|------------|--------------|------|-------|-----|---------------|-------|
| Number | 39 | 5 | 5 | 1 | 1 | 51 |
| Percentage | 76.5 | 9.8 | 9.8 | 2.0 | 2.0 | 100.0 |

4.6.6. Protein consumption

Twelve percent of participants consumed protein foods two or more times each day, 55 percent one to two times each day and 34 percent once a day or less (Table 39). Foods included were meat, eggs, fish, poultry or meat alternatives including dried peas, beans, lentils, nuts, peanut butter or tofu.

Table 39 How many times protein foods are eaten each day

| | Two or more | One to two | Once | Less than once | Total |
|------------|-------------|------------|------|----------------|-------|
| Number | 6 | 28 | 15 | 2 | 51 |
| Percentage | 11.8 | 54.9 | 29.4 | 3.9 | 100.0 |

4.6.7. Dairy consumption

As shown in Table 40, half of the participants consumed milk products two or more times each day, 35 percent one to two times each day and 14 percent once a day or less. Foods included were milk, milk puddings, milk used in cooking, ice cream, yoghurt, cheese or milk alternatives like soy beverages.

Table 40 How many times milk products are consumed each day

| | Three or more | Two to three | One to two | Usually once | Less than once | Total |
|------------|---------------|--------------|------------|--------------|----------------|-------|
| Number | 2 | 24 | 18 | 6 | 1 | 51 |
| Percentage | 3.9 | 47.1 | 35.3 | 11.8 | 2.0 | 100.0 |

4.6.8. Fluid consumption

Half of the participants drank eight or more cups of fluid each day. Forty percent had five to seven cups each day and the remaining 12 percent only drank three to four cups of fluid a day (Table 41). Drinks included were water, tea, coffee, herbal drinks, juice and soft-drinks. Alcoholic drinks were excluded. Sixty percent of those who did not experience accidents with their bladder consumed

the recommended eight or more glasses of fluid each day compared to 21 percent of those who did experience accidents (Table 42).

Table 41 Cups of fluid drunk each day

| | Eight or more | Five to seven | Three to four | Less than three | Total |
|------------|---------------|---------------|---------------|-----------------|-------|
| Number | 25 | 20 | 6 | 0 | 51 |
| Percentage | 49.0 | 39.2 | 11.8 | 0 | 100.0 |

Table 42 Fluid consumption and bladder accidents

| | Drink eight or more cups of fluid each day | Drink less than eight cups of fluid each day | Total |
|--|--|--|-------------|
| Do not experience bladder accidents | 22 (59.5%) | 15 (40.5%) | 37 (100.0%) |
| Occasional or frequent bladder accidents | 3 (21.4%) | 11 (78.6%) | 14 (100.0%) |
| Total | 25 (49.0%) | 26 (51.0%) | 51 (100.0%) |

4.6.9. Coughing, choking and swallowing

Table 43 shows most participants (90 percent) never or rarely experienced any coughing, choking or pain when swallowing food or fluids, however six percent (three people) sometimes did and four percent (two people) often or always did.

Table 43 Cough, choke or have pain on swallowing food or fluids

| | Never | Rarely | Sometimes | Often or always | Total |
|------------|-------|--------|-----------|-----------------|-------|
| Number | 42 | 4 | 3 | 2 | 51 |
| Percentage | 82.4 | 7.8 | 5.9 | 3.9 | 100.0 |

4.6.10. Biting, chewing

Most participants (86 percent) never or rarely had difficulty biting or chewing food but four percent often or always did and 10 percent sometimes did (Table 44).

Table 44 Difficulty biting or chewing food

| | Never | Rarely | Sometimes | Often or always | Total |
|------------|-------|--------|-----------|-----------------|-------|
| Number | 37 | 7 | 5 | 2 | 51 |
| Percentage | 72.5 | 13.7 | 9.8 | 3.9 | 100.0 |

4.6.11. Meal replacements

As shown in Table 45, almost all participants (96 percent) never or rarely used commercial meal replacements or supplements (like shakes, puddings or energy bars) but one participant sometimes did and another participant often or always did. Examples of meal replacements used as prompts were shakes (like Complan), puddings or energy bars.

Table 45 Ever use commercial meal replacements or supplements

| | Never or rarely | Sometimes | Often or always | Total |
|------------|-----------------|-----------|-----------------|-------|
| Number | 49 | 1 | 1 | 51 |
| Percentage | 96.1 | 2.0 | 2.0 | 100.0 |

4.6.12. Meal sharing

As shown in Table 46, only one-third of participants often or almost always had a meal each day with another person, 53 percent sometimes ate with other people and 14 percent never shared a meal with others.

Table 46 Meal sharing

| Eat one or more meals a day with someone? | Never or rarely | Sometimes | Often or almost always | Total |
|---|-----------------|-----------|------------------------|-------|
| Number | 7 | 27 | 17 | 51 |
| Percentage | 13.7 | 52.9 | 33.3 | 100.0 |

4.6.13. Meal preparation

As shown in Table 47, 73 percent of participants prepared their own meals. Four percent shared the cooking while the remaining 24 percent had someone else preparing their meals.

Table 47 Meal preparation

| Who prepares your meals? | I do | Cooking shared | Someone else cooks most of my meals | Total |
|--------------------------|------|----------------|-------------------------------------|-------|
| Number | 37 | 2 | 12 | 51 |
| Percentage | 72.5 | 3.9 | 23.5 | 100.0 |

All of those having meals prepared for them by others expressed satisfaction with the quality of the meals (Table 48).

Table 48 Food prepared by others

| | I'm satisfied with the quality of food prepared by others | I'm NOT satisfied with the quality of food prepared by others | Total |
|------------|---|---|-------|
| Number | 12 | 0 | 12 |
| Percentage | 100.0 | 0 | 100.0 |

Of those involved in meal preparation, 56 percent said they enjoyed cooking meals, 28 percent said they sometimes found cooking a chore and 15 percent said they usually found cooking a chore. Of all participants nearly one-quarter had meals prepared for them and one-third sometimes or usually found cooking a chore (Table 49).

Table 49 Describing meal preparation

| | I enjoy cooking most of my meals | I sometimes find cooking a chore | I usually find cooking a chore | Someone else cooks most of my meals | Total |
|--|----------------------------------|----------------------------------|--------------------------------|-------------------------------------|-------|
| Number | 22 | 11 | 6 | 12 | 51 |
| Percentage of those involved in meal preparation | 56.4 | 28.2 | 15.4 | - | 39 |
| Percentage of all participants | 43.1 | 21.6 | 11.8 | 23.5 | 100.0 |

4.6.14. Getting groceries

Most participants (92 percent) did not have any difficulties getting their groceries, whether or not they did it themselves, but four percent sometimes had difficulty and four percent often or always had difficulty (Table 50).

Table 50 Getting groceries

| Any problems getting groceries? | Never or rarely | Sometimes | Often | Always | Total |
|---------------------------------|-----------------|-----------|-------|--------|-------|
| Number | 47 | 2 | 1 | 1 | 51 |
| Percentage | 92.2 | 3.9 | 2.0 | 2.0 | 100.0 |

4.6.15. Nutrition risk

With a maximum possible score of 64, nutrition risk scores ranged from a low of 38 to a high of 61, as shown in Table 51. The mean score was 52.2 (standard deviation 6.7). Thirty-one percent of participants scored less than 50 putting them into the nutrition risk category. Sixty-nine percent of participants scored 50 or more indicating no nutrition risk (Table 52).

Table 51 Nutrition risk score

| Score | Number | Percentage | Cumulative percentage |
|-------|--------|------------|-----------------------|
| 38 | 1 | 2.0 | 2.0 |
| 39 | 1 | 2.0 | 3.9 |
| 40 | 1 | 2.0 | 5.9 |
| 41 | 1 | 2.0 | 7.8 |
| 42 | 1 | 2.0 | 9.8 |
| 43 | 3 | 5.9 | 15.7 |
| 44 | 1 | 2.0 | 17.6 |
| 45 | 1 | 2.0 | 19.6 |
| 46 | 2 | 3.9 | 23.5 |
| 47 | 2 | 3.9 | 27.5 |
| 48 | 1 | 2.0 | 29.4 |
| 49 | 1 | 2.0 | 31.4 |
| 50 | 5 | 9.8 | 41.2 |
| 51 | 2 | 3.9 | 45.1 |
| 52 | 1 | 2.0 | 47.1 |
| 54 | 2 | 3.9 | 51.0 |
| 55 | 1 | 2.0 | 52.9 |
| 56 | 5 | 9.8 | 62.7 |
| 57 | 5 | 9.8 | 72.5 |
| 58 | 2 | 3.9 | 76.5 |
| 59 | 6 | 11.8 | 88.2 |
| 60 | 5 | 9.8 | 98.0 |
| 61 | 1 | 2.0 | 100.0 |
| Total | 51 | 100.0 | |

Table 52 Nutrition risk category

| | Nutrition risk (Score <50) | No nutrition risk (Score 50-64) | Total |
|------------|-------------------------------|------------------------------------|-------|
| Number | 16 | 35 | 51 |
| Percentage | 31.4 | 68.6 | 100.0 |

4.7. Associations between variables

The six demographic and personal characteristic variables were tested for associations with: social network type; each variable within SCREEN II; nutrition risk score; and nutrition risk category using Pearson's chi-square test. No significant associations were found between these variables.

The five social network types were tested for associations with: variables within SCREEN II; nutrition risk score; nutrition risk category; disability score; depression score; and cognition score using Pearson's chi-square test. Similarly no significant associations were found between social network types and these other variables.

Nutrition risk score and nutrition risk category were also tested for associations with: attendance at religious or community group meetings; self-rated health; loneliness; disability score; depression score; and cognition score using Pearson's chi-square test and Spearman's rho test. Among these variables there was a significant inverse linear relationship between participants' self-rated health and nutrition risk. Those who perceived their health to be fair or poor were more likely to be at nutrition risk (SCREEN II score <50) ($p < .001$).

4.8. Individual interviews: Nutrition support received by interview participants

4.8.1. The participants

A convenience sample of five participants was interviewed to investigate the perceptions and experiences of older people who received different types of nutrition support. The mean disability score in this study was 4.9 and these participants' scores ranged from 1 to 18. Out of a possible score of 64 for nutrition risk, of these five participants, two scored highly at 60; one was more marginal at 51; and two scored below 50 (44 and 47) indicating they were at nutrition risk. Characteristics of the participants are summarised in Table 53.

Table 53 Summary of characteristics of interview participants

| Participant | 1 | 2 | 3 | 4 | 5 |
|--------------------------------|--------------------------|---|---|--|--|
| Nutrition support: | Receives Meals on Wheels | Attends a weekly lunch club (the Prescott Club) | Purchases delivered, frozen meals for daily consumption | Has received dietetic advice and support for type 2 diabetes | Receives in-home assistance for meal preparation |
| Recruitment vehicle: | Prescott Club | Prescott Club | Frozen meals | Saw article in North Shore Times | Saw ad in Age Concern Newsletter |
| Age: | 83 | 85 | 83 | 83 | 80 |
| Gender: | Female | Female | Male | Female | Female |
| Address decile: | 4 | 7 | 4 | 6 | 1 |
| Network type: | Wider community focused | Locally integrated | Wider community focused | Locally integrated | Local self-contained |
| Evidence of depression: | No | No | No | No | No |
| Disability score: | 7 | 1 | 5 | 8 | 18 |
| Level of cognitive impairment: | Normal-mild | Normal-mild | Moderate-severe | No impairment | Normal-mild |
| Self-rated health: | Excellent | Fair | Very good | Very good | Good |
| Nutrition risk score: | 60 | 44 | 60 | 51 | 47 |

4.8.2. Themes from the interviews

The general inductive approach to qualitative analysis typically contains as few as three and no more than eight categories or themes. In this study four themes emerged that were common to many but not necessarily all of the participants.

Firstly, **social contact** was a very important part of the service for most of these people, even when its provision was a very small part of the overall service.

Secondly, the **participants felt grateful** for the service; it was not something they took for granted. They were generally highly complimentary about the services and especially the service providers they were in contact with.

Within this small group there was no consensus about the nutritional benefits of the services or the changes it made to their dietary habits. However there was commonality in the general attitude about the importance of getting a meal, whatever it may be, and whatever specific nutritional benefits that may provide. This attitude is shown as the third theme: **‘I’m getting a meal, what more is there to say?’**

Linked to the theme of being grateful to the service is the fourth theme: **‘meeting the need’**. There is an overall impression that these different services do meet the differing needs of the recipients. Of course, that is not to say extended support would not also to be gratefully received.

4.8.2.1. Theme 1: Importance of social contact

Generally, social interaction came through as the most important aspect of the service, even for those services where the social interaction appears very limited.

Participant 1: The Meals on Wheels recipient was more focused on the company than the food, even though it was quite fleeting. When asked how long the people took to deliver the food, the response was, ‘Oh about two seconds,’ but the brevity of the interaction seemed irrelevant. It may seem from this excerpt that Meals on Wheels was the only social interaction for this participant, but she also talked about having her meal at midday and then often being straight out the door to one activity or another.

‘I just keep them... it’s just that I feel much better to hang onto that if I can because of the loneliness factor. You see I’ve got someone popping in. Some days you wouldn’t say boo to a goose you see, if I didn’t have that +
‘Oh they’re hot, so they can’t stay around at all – they just have long enough to say ‘Oh, how are you today . isn’t it a lovely day . isn’t your garden looking lovely and they’re halfway down the drive on their way out – Someone cheerful around the place.’+

Participant 2 comments about the Prescott Club:

‘I wouldn’t do to be alone all the time – Once I started going I looked forward to going – you were able to talk, and you meet people you know –

it's very friendly – it keeps you talking, which is one of the main things you need to be able to do – I look forward to it – otherwise you're a week on your own.

It's togetherness really (the main benefit). Being able to talk, have a laugh.

Participant 3: For the user of the frozen meal service, although social contact could be quite limited this respondent enjoyed the contact and seemed to make the most of it. Although giving the impression he had very limited contact with them, it transpired that he often rang to find out who would be delivering the meals that week. And it seemed he had got to know them all.

I try to keep Friday free for the arrival of the meals. But I also have a chilly bin that I leave out there, and I put the money in an envelope so that if I'm not here they just leave the meals in the chilly bin – The chap who delivers them, he's a very nice guy. We usually have a little chat before he takes off. He's pretty busy: he has places to go all around Auckland – So it's sort of a companion thing as well.

I can ring them at any time you see. And I'll say 'who's delivering today?' And they'll tell me.

When I ring them up, if I'm changing anything . which I don't do very often . I usually get someone I know on the phone and we have a bit of a chat.

Participant 4: For the person receiving dietetic advice (about type 2 diabetes), the social aspect did not seem an important feature. Because of her condition, education and teaching self-management was the focus of the support.

There is a great deal of help available, you are not on your own, you only have to ask for it.

The hospital has been very helpful to me – Once I was in the database they would call me up just to check on me –

Participant 5: For the participant receiving help with meals in the home, even though the meals were important for her, the top-of-mind main benefit was still the people. This is despite a fairly full schedule for their visit.

They come at five (pm). The ingredients are ready here. They just get to and cook it and while I'm eating my meal they're washing up and it's all

done. They're gone by six, just after, and I can just settle down for the evening. +

%I look forward to them coming. It's very interesting. I hear their stories. +

4.8.2.2. Theme 2: It's great - I'm grateful

It is apparent that participants feel very grateful for the service they receive, irrespective of who instituted the service and who pays for it. Alongside this is a general reluctance to be seen to be at all critical. Perhaps they don't wish to seem ungrateful and risk the service not being available to them?

Participant 1: Receives Meals on Wheels

%It's not cheap, but I think it's worth it. They had to put them up. but I couldn't care less. as long as I can afford them I will have them. +

%I know for a fact that if I had to turn around and cook a meal now I probably wouldn't be bothered. That's how you get into the habit of not eating proper meals. Whereas if it's like this; I think I'm on a really good wicket. It's all served up beautifully and a cheery smile and company, and quite often a little thought with it. As long as they keep going, even if we have to pay more and more I couldn't care less. +

Not only is this participant grateful, she doesn't want to advertise she gets Meals on Wheels in case she no longer meets the criteria for a referral:

%That's why I don't talk about it much out in public. Cause they'll say huh. look at her garden. what's wrong with her? sort of thing. Well I'd just as soon they didn't know, don't you think? +

Participant 2: Attends a weekly lunch club (the Prescott Club)

%They do a very good job. It's hard. it's not easy work. a lot of people need to be helped out to the toilets and into the taxis and things. But they do a good job - it's a good thing that it's going. +

%The girls are so nice, they're all voluntary. they do a jolly good job. +

Participant 3: Purchases delivered, frozen meals for daily consumption

%am happy with what I'm getting. They have everything, everything that I would expect of a meal. everything seems to be going all right. I've found them to be very good.+

%get other meals of course from friends. Like at Christmas time you know. But basically that's the meals I have every day, and I've had no reason to change it because I'm happy with them.+

Participant 4: Has received dietetic advice and support for type 2 diabetes

%The hospital has been very helpful to me, there is always someone to help you.+

%have found that everyone I've approached for information has always been very good and helpful.+

Participant 5: Receives in-home assistance for meal preparation

%he's had so many away at the moment, he worked really hard to get me this lady I had before. How he copes with all of these things that happen. Some have young families and they all have their own lives, and he just accommodates it all and manages it completely. Just wonderful.+

Even when a service is not up to its usual standard, there was little room for criticism. When asked about when things weren't up to scratch, the participants still tried to be positive. The providers are always complimented in one way or another and any small issues readily overlooked.

Participant 1: Receives Meals on Wheels

%They did have a little bad phase, when um. for some reason. it depends on the cooks, you see? ...That was only once. But I think that does happen occasionally in the hospital. they take on somebody who's not very competent. but that would be very rare.+

Participant 2: Attends a weekly lunch club (the Prescott Club)

%sometimes, if you get somebody who doesn't play the things you know. If they came along and played today's music. No, generally they're all pretty good. I've always thought it's worthwhile.+

Participant 3: Purchases delivered, frozen meals for daily consumption

%don't think I could say that I was ever disappointed; I think it's always been satisfactory, and seems to fill the bill, as well as my stomach.+

%Sometimes if he's on holiday they usually gear up the person who's doing it to do the right thing. But a couple of times they came to the wrong door. But I was expecting them, so I was able to see them. If something like that happens I usually make sure that I am home.+

Participant 4: Has received dietetic advice and support for type 2 diabetes

This respondent chose to take advantage of the offer to review and edit the transcript. It was noticeable that any reference that may have appeared in the slightest bit negative or ungrateful about the service was removed in the editing process. Everyone and everything was %very helpful+or %very useful+ (as opposed to not being as helpful, or as useful, as other aspects of the service).

Participant 5: Receives in-home assistance for meal preparation

%They're all lovely people - I don't know where he gets them all from - they really are. There was only one that came in she was quiet and a bit uncommunicative. But she's gone to hospital and is having an operation on her spine; she wasn't well. But by and large they're all lovely, they really are.+

4.8.2.3. Theme 3: I'm getting a meal, what more is there to say?

While there is general recognition that food is important to health, it seemed easier for participants to talk about the ways the service had made a difference to their overall quality of life, rather than to talk about how it had made a difference to their eating habits or nutritional wellbeing.

Although prompted, participants didn't generally talk in terms of variety in their diet, how often or how much they were eating, or their nutritional wellbeing. It seemed that eating was something one did to stay alive and their expectation of a meal was quite basic. The components of a proper meal or main meal may have been readily identified but the questioning did not explore this.

It may be unrealistic to look for a consistent theme around food and nutrition when the support services are meeting different needs.

Participant 1: Receives Meals on Wheels

%I had to turn around and cook a meal now I probably wouldn't be bothered. That's how you get into the habit of not eating proper meals. .whereas if it's like this. I know I'm on a really good wicket. It's good plain tucker. and that's all you want after all.

Participant 2: Attends a weekly lunch club (the Prescott Club)

%Well it's usually mashed potatoes, peas or beans, carrots, sometimes we wonder what it is . sometimes we're not sure if it's chicken or fish. You never get a nice cut of meat like you used to years ago. But they're good. We pay \$8 but it's worth it.

Participant 3: Purchases delivered, frozen meals for daily consumption

%I depend on them for my main meal. (If I cooked myself) it would be the same sort of food. I've tried different meals but these are the ones I enjoy best. they have everything I expect in a meal.

Participant 4: Has received dietetic advice and support for type 2 diabetes

%It's quite difficult to understand. a big turnaround. I thought it would be hard and I would not know what to cook. Now it's alright, as long as I don't eat too much, like a big meal. I go easy on sauces. I know I cannot afford to get hungry, that's my biggest worry. even if you have an extra meal or something like that, small portions are best.

Participant 5: Receives in-home assistance for meal preparation

%Probably I am (eating better now), because if I was tired I wouldn't bother to make a proper meal. I didn't really think I was so bad, but my daughter seemed to think so. Well I did go through a bad patch and she took my meals in hand and I did pick up, so it must have been that.

%I just had vegetables before. I couldn't be bothered. Oh occasionally I'd buy a fish fillet from down the road. But no, I do have a wider variety now.

4.8.2.4. Theme 4: Meeting the need

Each of the five different services appeared to provide the nutrition support needed by the recipients, as shown in these comments.

Participant 1: Meals on Wheels provides a nutritious meal.

%t\$ good plain tuckerõ and that\$ all you want after all+

Participant 2: The Prescott Club is aimed at people with no other social interaction.

%t wouldn\$ do to be alone all the time+

Participant 3: Delivered, frozen meals provide a nutritious meal.

%depend on them for my main meal...they have everything I expect in a meal.+

Participant 4: Dietetic advice provides the knowledge to enable people to self-manage their dietary needs.

%thoughtõ I would not know what to cookõ now it\$ alright.

%She also told me I could ring her with my questions at any time, which gave me confidence.+

Participant 5: In-home assistance for meal preparation provides a nutritious meal.

%provide the food and they just come and cook it. So (the family) know I\$ getting a decent meal at night and that somebody\$ looking after me.+

%And I just know that I\$ going to be overseen...It\$ just a comforting feeling to know that somebody is coming in to check on me.+

Chapter 5. Discussion

5.1. Introduction

The first aim of this study was to investigate food-related behaviours that can place older people at nutrition risk. Three validated questionnaires were used to investigate the relationships between participants' type of social networks, their ability to undertake everyday life functions, and their level of nutrition risk.

The second aim was to evaluate older people's perceptions and experiences of different nutrition support services currently available. Qualitative interviews were undertaken. Five participants provided their experiences and perceptions with one type of nutrition support service which they were currently receiving or, in the case of dietetic advice, had recently received.

5.2. The participants

The sample of 51 people aged 80-85 years in this study were self-selected and therefore not representative of all people in this age group living in North Shore City nor within New Zealand.

Participants in this study may be more actively involved in community groups than others in their age group. Most were recruited through Age Concern North Shore and associated community groups. One-quarter of participants responded to advertising in the Age Concern Newsletter; 53 percent were recruited from community clubs; and 10 percent were encouraged to participate by friends who had volunteered. Another four percent of participants read about the study in the North Shore Times and telephoned to volunteer. This suggests these 92 percent of participants are likely to be relatively outgoing. Conversely the remaining eight percent were recruited by the researcher at the Prescott Club, a lunch club for people with limited social interaction.

In the US participation in formal organisations has been found to be a key predictor of longevity (Erikson et al 1999). Social participation is considered beneficial to physical and mental health and wellbeing for many reasons (Avlund et al 1998). These include the desire to engage in more preventive and therapeutic health behaviours, which can include food-related behaviours.

Therefore participants in this study may be more aware of healthy eating practices and at less nutrition risk than the general population.

All participants in this study lived in North Shore City, a region with a slightly higher socioeconomic level than the New Zealand average (Statistics New Zealand 2007). Older people living in North Shore City have higher personal income levels than the national average for the same age group. Using the NZDep2006 scores from 1 to 10 (10 being the most deprived), the mean for this sample was 4.35 although participants' addresses ranged from score one through to score nine. Only the most deprived NZDep2006 score 10 was not represented in this group. There is clear evidence of a social gradient in overall health which may also apply to good nutrition. The better educated, those with higher status jobs, those with higher incomes and living in higher socioeconomic areas, have better health and a longer life expectancy and this relationship is consistent throughout the gradient. It is believed the key factor in this is not just material, but the degree of control people have over their lives (Howden-Chapman et al 1999).

Many studies have reported an association between higher socioeconomic status, improved health status and better diet quality (Elia & Stratton 2005; Lantz et al 1998; McKay et al 2006; Muennig et al 2007; Shahar et al 2005). One-third of participants in this study were represented in the least deprived addresses with NZDep2006 scores of one and two. These participants may be expected to be at less nutrition risk than those in more deprived areas however the sample size was too small to show this. Half the participants in this study were in addresses with NZDep2006 scores of five to seven. These participants could be expected to be more vulnerable to poor nutrition. When surveyed for the NNS97, 98 percent of men and 97 percent of women aged 75-plus believed they could always afford to eat properly (Ministry of Health 1999). From this data it would not be expected that participants in this study could not afford to eat a healthy diet, although this survey is over 10 years old.

People over 80 years old living in North Shore City have attained higher levels of education than the national average for this age group (Statistics New Zealand 2007). Thus we could expect participants from North Shore City to be more informed and at less nutrition risk than people from other areas, as

education level has been shown to be a predictor of disease risk, health outcomes and diet quality (McKay et al 2006).

Women comprise 60 percent of the 80-84 year old age group nationally and 66 percent of the 85-89 year age group. In this study of 80-85 year olds, 70 percent of participants were women, so men were slightly under-represented. As older women tend to have a better quality diet than older men (Hughes et al 2004; Ministry of Health 1999) and older women tend to have superior cooking skills (Wylie et al 1999), we might expect this sample to be at less nutrition risk than one more representative of the total population in this age group.

Older people who are socially isolated and lonely are more likely to consume an unbalanced diet although some studies have shown nutrient intakes are not adversely affected by living alone (de Groot 2000). Although most of the participants in this study lived alone (83 percent) nearly 40 percent said they never felt lonely. Only 14 percent said they often felt lonely. People who feel lonely or depressed can lose the motivation to prepare meals or even to consume meals that are in front of them. Some lose the desire to eat with others (Elsner 2002; Wylie et al 1999).

In this study 14 percent of participants were men living alone, 69 percent were women living alone and the remainder lived with a spouse. There was no statistical relationship between living situation and nutrition risk score, although a higher proportion of the men living alone were at nutrition risk than the women living alone. This concurs with other studies showing men living alone are more vulnerable to nutrition risk, have less dietary variety and lower intakes of fruits and vegetables. Older women tend to be more aware of healthy eating and more capable of looking after their own and their spouse's dietary needs (Donkin et al 1998; Hughes et al 2004; Wylie et al 1999).

In this study 80 percent of the women living alone reported eating five or more serves of fruit and vegetables each day, compared to only 57 percent of the men living alone. It has been shown that cooking skills and ease of preparation can have a strong influence on men's food choice (Donkin et al 1998; Horwath 1989; Hughes et al 2004) which could explain their lower fruit and vegetable intake.

All participants in this study were of European ethnicity. In North Shore City, as for the New Zealand population, 10 percent of people aged 80 years or older are from non-European ethnicities (Statistics New Zealand 2007). One-quarter of participants described their ethnicity as English, Scottish, Irish or Canadian. Many more were originally immigrants from the UK who now described themselves as New Zealanders. Many people who emigrate to another country are motivated to do so to improve their socioeconomic status (Shaw 1975). Low socioeconomic status is a predictor of poorer diet quality and this is reinforced by studies in the UK (Elia & Stratton 2005). It may be that the diets of participants who were immigrants are influenced by the food habits and traditions of a poorer upbringing.

Forty-three percent of participants did not have access to a private car. In Davey's New Zealand study (2003) 22 percent of households in which the oldest person is between 75 and 84 years old did not have a vehicle. In households where the eldest was 85 years or more, the number without a vehicle increased to 42 percent. Food shopping is one of the key activities for older people where transport is required. Older people without a vehicle are likely to be reliant on others to take them shopping or to assist with shopping (Davey 2004). This could adversely affect their food choice and therefore diet quality.

Eighty-four percent of participants in this study held a community services card. This card is available to lower income New Zealanders and provides subsidies on general practitioner visits and prescription medications (Ministry of Social Development 2008). The card could be seen as a proxy for a low income level however given that one-third of participants live at addresses with NZDep2006 scores of one and two, this is ambiguous. Eighty-one percent of the participants at addresses with NZDep2006 scores of one and two held a community services card. It is possible those with higher incomes in the past have made use of trust funds to avoid added taxation. It may also be that they are asset-rich and cash-poor.

While the level of accommodation within this North Shore City sample varied from small council bed-sits to large two-storied four-bedroom homes, all participants rated their accommodation highly. Good quality housing has been

shown to be an important determinant of health in older people (Howden-Chapman et al 1999).

Relative to their age the majority of participants showed normal cognitive abilities. Twenty percent of participants were outside of the cognition norms and showed signs of moderate to severe cognitive impairment. An association with their eating patterns and nutrition risk was not shown although their poorer cognitive abilities may have influenced their responses.

Fourteen percent of the participants showed some sign of depression however this did not appear to affect their eating patterns and nutrition risk.

5.3. Social networks and participation

A variety of food-related behaviours were explored with the use of three quantitative tools to evaluate social networks, physical and mental wellbeing and nutrition risk.

The context of social networks is important as they can affect older people's ability to procure food and behaviours such as eating with others.

Understanding the type of social support networks older people have can also help to evaluate the level of formal support likely to be required in times of crisis (Falk et al 1996; Wenger 1994a).

Nearly half the sample belonged to a locally integrated support network, the most robust network type which is associated with fewer risks for older people. This network includes family, neighbours and friends, all within close proximity, as well as strong community involvement (Wenger 1997a). This is likely to have a positive effect on many aspects of their lives, including adequate nutrition. This network has the potential to provide much greater support for an older person's capacity to select, procure, prepare, and even consume appropriate food than less supportive network types.

The 14 percent of this sample with family dependent networks are likely to be supported in independent community living, even with disability, for as long as their family are able to cope with their needs. This network can generally support the most dependent of older people living within the community

(Wenger 1997a). Support would include food procurement and preparation as well as physically assisting with eating food.

The wider community focused network, which comprised nearly 20 percent of this sample, can provide informal support for food choice. People in these support networks focus on reciprocal arrangements where they and their friends help each other out. The ability to select, procure, prepare and consume appropriate foods is viewed as a basic necessity so supporters are likely to be willing to facilitate these activities. There may also be more willingness to ask for this type of assistance (Davey 2004). However if serious disability strikes those with a wider community focused network can be at risk because they lack family support (Wenger 1997a). These people may purchase services rather than receive informal assistance they cannot reciprocate (Wenger 1997a). This can potentially limit their food choice to a much greater degree than for those with family support (Wenger 1994b).

The more independent network types (local self contained and private restricted) lacking in family support, together accounted for 18 percent of participants. These people are unlikely to have support in food procurement and preparation from their social network. If their physical or mental abilities declined to restrict these activities they would also be more likely to suffer inadequate nutrition unless supported by formal services. These more self-reliant older people may have more difficulty accepting assistance from others. This can delay their use of formal services (Wenger 1997a). As physical capacities decline the risk for these people is narrowing food choice which can precipitate a downward spiral in their physical and mental health (Wenger 1997, Vellas et al 1999). These people need formal support at an earlier stage to maintain independent living (Wenger 1994b). Those in private restricted networks have little support available to them. They are the most at risk in times of need and can be the most difficult to assist (Wenger 1997a).

Network type comparisons with the sample in this study and samples of people in urban Liverpool and rural Wales (Wenger 1994b) are shown in Figure 13. In each of these samples the majority belong to the most supportive network types, the locally integrated and family dependent networks (64 percent in Liverpool, 57 percent in rural Wales and 61 percent in North Shore City). The

North Shore City sample has a higher proportion of older people in locally integrated networks and fewer in local family dependent networks. This reflects high proportion of immigrants without local family ties.

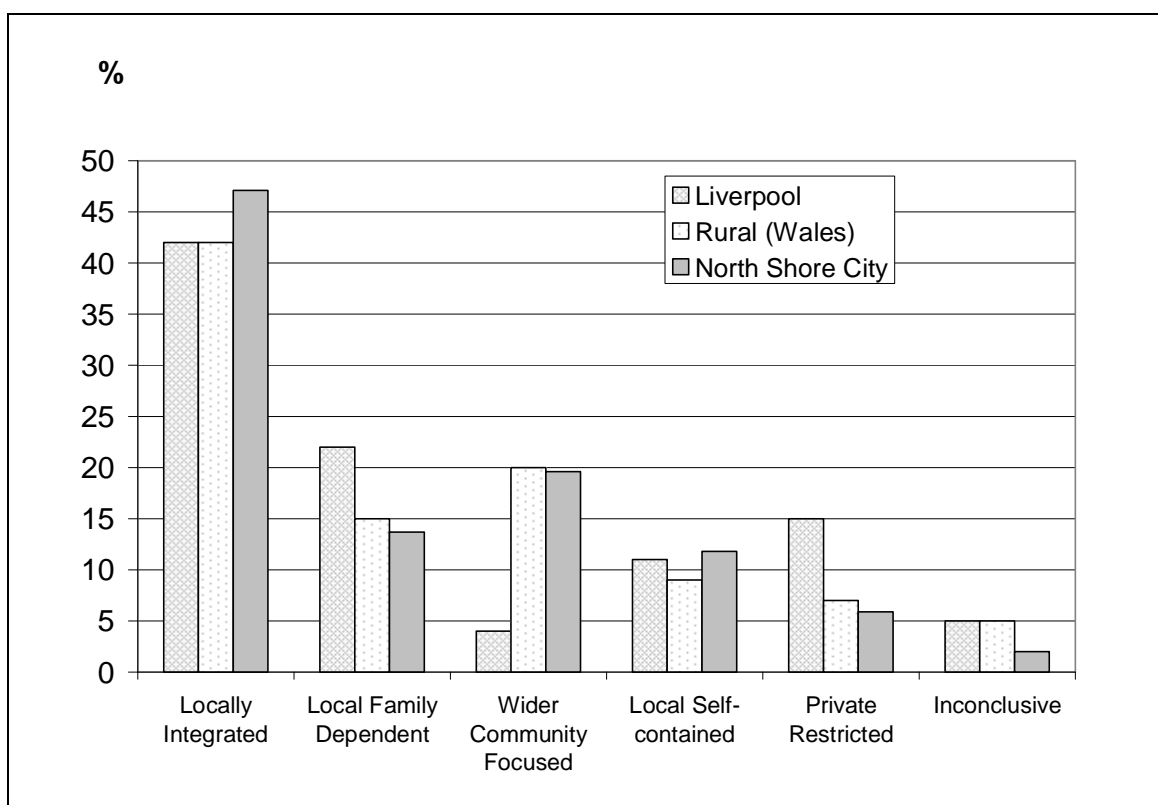


Figure 13 Percentage distribution of social network type compared to Liverpool and rural Wales samples

The number of immigrants in the North Shore City sample is also reflected in the higher proportion of older people belonging to wider community focused networks compared to the Liverpool sample. Wenger (1997a) highlights that this network type is often associated with migration during adulthood. There are also fewer belonging to private restricted networks in the North Shore City and rural Wales samples compared to those in the urban Liverpool sample. This could reflect less willingness by those with private restricted networks to volunteer to participate in this type of research.

Network types can shift. The most likely network shifts are from a stronger to a more vulnerable network type, often associated with declining physical or mental health. Geographical shifts are the exception as they disrupt the original network (Wenger 1994a). For the North Shore City participants who are immigrants, many without local family, the shift to the highly supportive family dependent support network may not be possible.

One-third of participants in this study regularly shared meals with other people, which may enhance the nutrition status of older people through increased energy intake (Amarantos et al 2001). Around half of these participants were living with a spouse. For the remainder of this group, regularly sharing a meal with others could mean as seldom as once a week or less.

Most of the participants shared meals with others only on an irregular basis while 14 percent of the sample never or rarely shared a meal with others. In this study there was no relationship between the frequency of sharing meals and the network type, possibly due to the small sample size.

As 70 percent of participants were women, this may explain why meal sharing or eating alone did not appear to influence nutrition risk. This concurs with studies by Howarth (1989) and Patterson et al (2002) where the nutrition status of men living alone was poorer than married men, but this did not apply to the women.

One participant, who had a supportive social network, discussed no longer enjoying sharing meals with others. This contrasts with a general view that sharing meals is a positive experience (Amarantos et al 2001; de Castro 2002; Thomas & Morley 2002). This alternative view may be explained by the conflict between the two most important values in the negotiations determining food choice by older people, namely managing social contexts and sensory perception (Falk et al 1996) (Figure 3, page19). Preparing meals for others may be too difficult or tiring; there may be physical difficulties with eating; and digestive issues may cause embarrassment.

5.4. Ability to shop and prepare food

Many older people in poor health, with disabilities, or restricted mobility have trouble getting to shops, doing their grocery shopping, and preparing food. For older people with restricted mobility, difficulties encountered when shopping for food include bending to reach items, reaching items high on shelves, pushing trolleys and carrying shopping (Wylie et al 1999). Without support, food choice can be restricted and this may lead to food insecurity (Sidenvall et al 2001).

Most participants in this study were capable of going shopping for their groceries without help but three required assistance and four were completely

unable to go shopping for groceries themselves. Those requiring assistance are likely to be dependent on the goodwill of family, or possibly friends, to help them on a regular basis. Sidenvall (2001) found close relatives were preferred to assist with shopping as they were more able to know and understand how food was used and prepared in the household. Other helpers were not able to assist to the same standard.

The 44 participants who were able to shop for their groceries without help had higher intakes of fruit and vegetables, protein and fluids, than the seven who required help or could not shop themselves, although these differences were not statistically significant. This may indicate more restricted food choice for those who could not shop independently, or their health status may have restricted their food and fluid intakes. The four participants who said they experienced problems getting their groceries did not have less nutritious diets than the other participants.

People who receive assistance are likely to modify their food choice. For example, older people do not always feel they are given enough time to make their choices when they are taken food shopping by relatives or carers, and they may not be able to take advantage of sales or seasonal fruits and vegetables in the same way as they may have in the past (Davey 2004).

The conceptual model of the food choice processes of older adults (Falk et al 1996) (Figure 3, page 19) shows the development of strategies and repertoires as a result of life course factors and events, food choice influences and repeated value negotiations. When older people get to the point of needing assistance with shopping, they will also need to develop new and simplified strategies and repertoires. Frequently used strategies include food avoidance, limitation, substitution and developing routines. Routines promote comfort by making the potentially complicated process of food choice so much simpler (Falk et al 1996). Where older people have limitations with shopping, developing routines may be a widely used strategy.

Most of the participants were capable of preparing their own meals, but six required some assistance and three were not able to prepare their own meals at all. The degree to which their nutrition status is affected by their disabilities will be influenced by the nutrition support they receive. Nutrition support

programmes have been shown to improve nutrition intake and quality of life (Gollub & Weddle 2004; Keller 2006), however the support only occurs once the need is identified. It is likely nutrition status has been compromised before nutrition support is put in place (Gollub & Weddle 2004; U.S. Department of Health and Human Services Administration on Aging 2008). This was highlighted in the individual interview with a participant who received help with meals in the home. Prior to receiving this support she did not prepare proper meals when she was tired, which often occurred due to a health condition. She had not realised she was compromising her health further through poor eating habits, but her daughter saw the problem and instituted the support. Since receiving this support her health had improved.

5.5. Factors which may influence nutrition risk

A range of psychological and physiological factors can lead to older people experiencing a loss of appetite. In this study only two participants described their appetite as poor. With age, the hormonal control of feeding alters so that satiety is reached sooner and felt for longer, and our drive to eat may also decline (Donini et al 2003; Hickson 2006). Anxiety, stress, depression, preparing food for one, eating alone and mood at the time of the meal are cited as factors which can reduce an older person's appetite (Donini et al 2003; Hickson 2006; Morley 2003; Paquet et al 2003).

Ten percent of participants in this study often or sometimes experienced swallowing difficulties, coughing or choking when eating. This can be caused by disease states, medications or simply declining function and has been linked to decreased food intakes (Saffrey 2004).

Fourteen percent of participants often or sometimes experienced problems with biting or chewing food. The Oral Health Survey in Britain showed dental status declined with age and this was associated with increased difficulty in consumption of foods requiring chewing, including fruit and vegetables (Fiske 1999; Hickson 2006). Poor dentition can lead to embarrassment in the company of others and reluctance to share meals. Chewing difficulties have been associated with decreased general health and quality of life (Hickson 2006; Nakanishi et al 1999).

While three people in this study limited certain foods for specific reasons, namely veganism, diverticulitis and food allergy, they each reported no difficulties with their diet associated with this.

Nearly one-quarter of participants in this study had someone else preparing their meals. In some cases this was a spouse or family member and in others this was paid for. The latter included: a reliance on frozen meals as the main meal; Meals on Wheels; and the use of carers who prepared meals in the participants' home. All participants whose meals were prepared for them expressed satisfaction with the food. This links with the second theme found in the individual interviews, where the participants expressed gratitude for the nutrition support service; it was not something they took for granted. They were complimentary about the support and the people providing the service.

Of the three-quarters of participants who either prepared all meals themselves or assisted with meal preparation, one-third sometimes or always found it a chore. This has the potential to negatively impact on the nutritional quality of meals as ease of preparation becomes a more important value in defining the strategies and repertoires of food choice. The motivation to prepare a meal can be less for people living alone (Wylie et al 1999). For older men living alone in particular, a lack of cooking skills can be an obstacle to preparing healthy meals (Donkin et al 1998; Wylie et al 1999).

Despite many participants in this study not having access to private transport, and some with disability, almost all participants had no difficulties getting their groceries. In most cases strategies had been put in place to overcome any potential difficulties with food procurement. In a New Zealand study Davey (2004) found 38 percent of the participants aged 75 years and over received assistance from other people to meet their transport needs for grocery shopping. In a Scottish study, older people adapted their routines, spent more time shopping for food and prioritised this activity over others, in order to retain control over their food and diet (McKie 1999).

Over ninety percent of participants consumed regular meals every day and rarely skipped meals. Only two people used meal replacements, like shakes, puddings or energy bars. Of those who often skipped meals this was generally due to habitual meal skipping or habitually irregular meal times. Skipping meals

and a low frequency of snacking are concerning as these have been associated with inadequate dietary intakes in older people (Shahar et al 2005).

Three-quarters of the sample claimed to consume the recommended level of five or more servings of fruit and vegetables each day which is similar to the findings for this age group in the NNS97 (Ministry of Health 1999). In New Zealand vegetables and fruit are a key source of fibre and a wide range of vitamins and minerals, including vitamin B₆, folate, potassium and manganese. Therefore a quarter of older people in this study would have difficulty achieving recommended intakes of fibre and these vitamins and minerals. This concurs with data from the NNS97 (Ministry of Health 1999) and the Mosgiel study (Horwath et al 1992) where, using current RDIs, low mean intakes of vitamin B₆ and folate were found in older men and women, and for the men intakes of potassium and manganese (not measured in the Mosgiel study) were also low. While their results differed, both studies found that fibre intakes for older people were below recommended levels (Horwath et al 1992; Ministry of Health 1999).

Around one-third of participants in this study consumed protein foods only once or less each day which is likely to provide less protein than is recommended. At least two serves of protein foods each day are needed to achieve the 2006 recommendations from the Ministry of Health (Ministry of Health & Department of Health and Aging 2006).

Only one participant did not regularly consume milk or dairy products, which are the major source of calcium in the New Zealand diet, and only half of the participants regularly consumed two or more serves. Therefore half of the participants were unlikely to get the recommended amount of calcium from their diets. While calcium recommendations are higher for people 70 years and older there may be little awareness of this as the recommendation was increased by the Ministry of Health in 2006 (Ministry of Health & Department of Health and Aging 2006) but consumer communications from the ministry have not been updated.

Older people are advised to consume at least eight cups of fluids each day to replace losses, with more in hot weather (Ministry of Health 1996). Around half of the participants consumed eight or more cups of fluid each day. Thirty-nine percent consumed between five to seven cups and the remaining 12 percent

only three to four cups. A high fluid intake is needed to prevent dehydration especially in older people (Bennett 2000; Chidester & Spangler 1997). Dehydration increases the risk of confusion which may interfere with activities of daily living (Bennett 2000; Walquist et al 2003).

Although not statistically significant, it appears the likelihood of accidents with their bladder may have influenced the fluid intake of older people in this study. Of those who did not experience accidents with their bladder 60 percent consumed the recommended eight or more glasses of fluid each day, whereas for those who did experience accidents just 21 percent consumed the recommended amount of fluid.

One participant in this study felt they were lighter than they should be, three-quarters evaluated their weight as about right, and the remainder believed they were heavier than they should be. Eighty percent of participants had not experienced any weight change over the previous six months (including the participants who felt they were underweight).

For most of the participants whose weight had changed in the previous six months, this change was unintentional. This included six percent who had gained weight and 14 percent who had lost weight. Gradually losing bone density and skeletal muscle mass may be an inevitable part of ageing, but further unintentional weight loss from an inadequate dietary intake can be caused by neural, hormonal and cytokine activity alterations of age, disease states which can put the body into a catabolic state, or psychological or social factors (Hickson 2006; Reynish et al 2001; Roubenoff 2000). While any weight change in older people is thought to predict mortality, weight loss, which is associated with protein-energy malnutrition, is more common and is a significant cause of functional decline (Hickson 2006; Morley 1997; Seidell & Visscher 2000).

The nutrition risk score is reduced if the participant has experienced weight change and the greater the weight change the more the score will be reduced. Of the seven participants who had lost weight, six were classified as being at nutrition risk with scores less than 50 whereas only one of the three people who had gained weight was at nutrition risk. Therefore the nutrition risk score

provides a useful means of screening older people for factors that may impact on overall health and quality of life.

5.6. Nutrition risk of the participants

Nearly one-third (31 percent) of the participants in this study were found to be at nutrition risk, that is, they had dietary habits or food-related behaviours that over time have been shown to be associated with poor nutrition status. Over two-thirds of the participants were not at nutrition risk. Although the results of this study in North Shore City may not be generalisable to all community living older people, it does confirm that nutrition risk among community living older people is prevalent in New Zealand. This concurs with findings in other countries (Burge & Gazibarich 1999; Keller & Hedley 2002).

In Canada, Keller & Hedley (2002) used SCREEN I to identify nutrition risk found 50 percent of respondents to be at nutrition risk with one-quarter at high risk. Earlier research in Canada using the DETERMINE checklist found 47 percent of community living seniors to be at either moderate (27 percent) or high nutrition risk (20 percent) (Keller & Hedley 2002). Using the Australian Nutrition Screening Initiative (ANSI) checklist, Burge & Gazibarich (1999) found 27 percent of respondents at high risk and 30 percent at moderate risk of having a compromised health and nutritional status.

For older community living Canadians nutrition risk, as measured by SCREEN I, is an independent predictor of self-reported health-related quality of life (Keller et al (2004). Similarly, using the ANSI checklist, Patterson et al (2006) found that women identified as high risk were more likely to have poorer physical and mental health and to be higher users of the health services. The predictive relationship between nutrition risk of older people and their physical and mental health, quality of life and use of health services, is also likely to stand in the New Zealand context. This highlights the need for earlier interventions to modify behaviours that over time put older people at nutrition risk.

Poor nutrition in older people may hasten or amplify poor health and conversely poor health may lead to poor nutrition. Whether it is cause or effect, it remains clear there is a strong relationship. By improving nutritional intake, overall health and wellbeing may be enhanced (Keller et al 2004).

5.7. Self-rated health and nutrition risk

The majority of participants in this study rated their health as good, very good or excellent. There was an inverse linear relationship between participants' self-rated health and whether or not they were at nutrition risk ($p < .001$). Those who perceived their health to be fair or poor were more likely to be at nutrition risk.

Although a significant correlation could not be shown in this small sample, this linear relationship is consistent with other studies. Burge & Gazibarich (1999) found a significant positive relationship between perceived health status and nutrition risk using the ANSI checklist. Keller et al (2005a) found those who perceived their health to be excellent had significantly higher SCREEN II scores than those rating their health as poor.

Healthier diets have been associated with higher ratings of self-rated health (Goldman et al 2003; Whichelow & Prevost 1996). In this study the relationship between self-rated health and diet is reinforced, as those who reported their health to be fair or poor were found to be more likely to be at nutrition risk. Those rating their health as fair or poor may be less likely to consider their dietary habits an important part of their health, as they may already suffer symptoms of a serious disease and take a narrower view of health than those without serious disease, as found by Benyamini et al (2003). This lack of concern for nutritional intake may explain why their dietary habits were more likely to put them at nutrition risk.

Activities involving mobility, including grocery shopping, have also been shown to be strongly associated with self-rated health (Gama et al 2000). Although not shown in this study, changes in food choice associated with new strategies for food procurement may affect nutrition risk.

The finding that self-rated health is associated with nutrition risk also concurs with a study of rural New Zealanders aged 70 years and older (Campbell et al 1995) which found that different perceptions of control over health were associated with significantly different health practices. Those who had greater feelings of control over their future health had better nutrition practices and were more physically active. These people also expressed more willingness to make changes to their food consumption if it was likely to improve their future health.

While self-rated health has been shown to predict morbidity, mortality and declines in functional ability (Benyamini et al 2003; Idler & Angel 1990) its relationship with nutrition risk highlights that relatively simple interventions around improving nutrition may be able to break this predictive link.

5.8. Perceptions towards nutrition support

From personal interviews with five of the participants four common themes emerged about different nutrition support services. These were:

- the importance of social contact
- the gratitude felt by recipients
- the importance of getting a meal
- their needs were being met

The themes that emerged from the interviews were consistent with research undertaken with users of day centres for older people in Surrey, as part of the European Food in Later Life project. Hunter & Lumbers (2005) found that while the meal was important for a variety of reasons, the social aspect was also extremely important. While the food and the environment were not always adequate, people were very grateful for the service and dared not complain lest it be taken away from them (Hunter & Lumbers (2005)). Falk et al (1996) also highlight that when eating with others, accommodation and flexibility are the values most likely to influence food choice. That is, while the food is important, the social interaction can be seen as more important.

In a review of the provision of Meals on Wheels from an Australian perspective, Krassie et al (2000) note that it is difficult to gauge meal quality as recipients may either fear the service will be taken away from them if they are critical, or see the service as akin to a charity, so do not have such high expectations. These are both different ways of expressing that the recipients are grateful for the service. It may also demonstrate that the importance of getting a meal outweighs the sensory enjoyment of it. A report from the Counties Manukau District Health Board notes 86 percent satisfaction with the Meals on Wheels service by current recipients. This is despite concerns expressed in an audit of

the service about its nutritional adequacy and poor uptake of the service (Dennison 2007).

In a study of caregivers to older people with dementia in Canada, Morgan et al (2002) found that feelings of guilt at not being able to fulfil the roles expected of them, particularly among older women, held them back from using formal support services (Morgan et al 2002). The flip side of guilt may be expressed as gratitude. Findings of this study, where gratitude was expressed for services received, seems to concur with Morgan et al (2002).

The importance of the meal or the proper meal concurs with findings from Scotland by McKie et al (2000). These people aged 75 years and older had been brought up to value the importance of having a proper meal. Almost all participants still had this goal as the main part of their nutritional regime. They regularly referred to the role of their parents, in particular their mother, in establishing their dietary beliefs and practices which were retained into older age.

The five people interviewed about the nutrition support they received were in essence describing a strategy they had chosen from the value negotiations undertaken. Sensory perception did not strongly influence strategy selection or satisfaction. In this study the basic nature of the food received was highlighted by several participants. This is consistent with other findings that socialising and companionship override concerns about food desirability for older people (Falk et al 1996).

Monetary considerations would necessarily be an over-riding factor in the selection of a food choice strategy. In this study affordability of the strategy appeared to be key, rather than any apparent value for money comparisons. In their study of older Scottish people, McKie et al (2000) found restricted access to food, the high cost of some foods, and in some areas poorer quality of foods, meant the desire to achieve a varied diet using fresh foods could be more difficult, if not impossible for some.

Convenience, which this age group describes as ease of preparation, has high salience with participants in this study. This related to the declining ability to undertake the daily task of meal preparation, combined with the belief in the need for a proper meal every day to maintain wellbeing. Participants were able

to discuss the impact of nutrition support on their overall quality of life, but not their nutritional intake. This was consistent with the findings of Falk et al (1996) who reported that difficulty of procurement or preparation was more important than health and nutrition issues when making food choices.

As circumstances change so do the strategies and repertoires older people use to develop food choice. The consumption of a proper meal each day appears ingrained in older people. When they are unable to prepare these for themselves they are very grateful to receive meals whether or not they reach the standards set in the past. Food is about more than just nutrients and the social context of it appears to be more important.

5.9. Summary

This study found one-third of these community living participants (31percent) were at nutrition risk. Two-thirds (67percent) showed some evidence of disability and needed assistance with everyday tasks. Nearly half (47percent) of these older people had supportive social networks including close relationships with local family, friends and neighbours. There was an inverse linear relationship between participants' self-rated health and nutrition risk ($p < .001$). Those who perceived their health to be fair or poor were more likely to be at nutrition risk.

The importance of social contact, a sense of gratitude, getting a meal and meeting the need were common themes that emerged among interviews with participants who received nutrition support.

These findings indicate that nutrition risk may be prevalent among community living older people in New Zealand. Strategies and initiatives are needed to encourage independent living and to help older people with the procurement, preparation, cooking and sharing of enjoyable meals. Access to nutrition support needs to be available to older people before their nutrition status has been compromised.

5.10. Limitations

Participants in this study were recruited through Age Concern North Shore and associated community groups. As a result it is not possible to make generalisations about the total 80 to 85 year old population from this sample as they are from a higher socioeconomic area and are likely to be more educated than the population average. Women were slightly over-represented in this sample and although many were not New Zealand-born, all were European with other ethnicities not represented. Most of the participants had lived alone for the previous five years. Therefore these participants had successfully aged living independently in the community. They were not typical of older adults of this age. About 20 percent of the participants showed signs of moderate to severe cognitive impairment. This may have influenced the responses to the questionnaire however there were no obvious indications of misunderstanding.

The tools used in this study are from overseas and have not been validated in New Zealand. The PANT questionnaire, used to assess social support networks, was developed in the UK. The EASY-Care questionnaire, used to assess physical and mental abilities, was developed in the UK although it has also been used in Australia (Lincoln Centre for Ageing & Community Care Research 2004). The SCREEN II questionnaire, used to assess nutrition risk in this study, was developed and validated in Canada for people 55 years and older living in the community. The average age of participants during the development of the SCREEN I questionnaire was 74 years (Keller et al 2001), younger than the group in this study. SCREEN I and II have not been validated in New Zealand.

The small sample size of 51 and the skew towards locally integrated and other supportive network types meant that significant associations between the data were not found. To more fully understand the relationship between social network type and nutrition risk it may be necessary to first screen participants by network type in order to stratify an adequate number of participants within each network type.

It is likely that people over 80 years old living independently in the community are over-represented in the more supportive network types (as these networks

support their continued independence). However, as this was a self-selected sample, the nature of the people volunteering may also skew towards people who are more social and more likely to belong to the more supportive network types.

In this study only five participants were interviewed about their experiences of nutrition support services, and each participant had experience of a different service. This provides limited information about each individual nutrition support service so generalisations are not able to be made.

5.11. Conclusions and recommendations

5.11.1. Screening for nutrition risk

This study has explored the food-related behaviours that place older people at nutrition risk. Findings related to 51 community living people between 80 and 85 years of age living in North Shore City. The majority of participants (Falk et al 1996) lived by themselves and most were women (70 percent).

Nutrition risk of participants was assessed using a 14 item questionnaire (SCREEN II) which has been validated for use with older people living in the community. Despite living in a higher than average socioeconomic area, a third of the participants (31 percent) were found to be at nutrition risk. From previous research the implications of this finding suggest that these older people are at higher risk of morbidity and mortality.

SCREEN II is a useful tool to use in the community to assess nutrition risk especially in vulnerable older adults. Living alone, the recent loss of a spouse, having recently relinquished a driver's licence, being on a restricted budget, having physical or mental disability, or not having a supportive social network of family, friends and neighbours can all result in an older person becoming vulnerable to malnutrition.

While there are many life course influences on food choice (i.e. social, cultural, physical environment and life experiences) these are steered by personal factors, the social context in which people live and value negotiations that people undertake. Therefore there are a wide range of influences on the food choice strategies that older people adopt. Similarly, there are many possible ways to positively influence the food choice of older adults in order to enhance their nutritional intake, reduce their nutrition risk and ultimately improve their quality of life.

The Ministry of Health food and nutrition guidelines provide six key recommendations for healthy older people (Ministry of Health 1996). Whilst these are in need of updating the principle issues of the recommendations still apply and provide a useful framework to discuss findings from this study.

Recommendation 1: Eat a variety of foods

Consumption of protein foods, dairy foods and fruit and vegetables were investigated in this study using SCREEN II which formed part two of the questionnaire (Appendix 7). It was found that one-third of these older people consumed less protein foods than recommended. Protein is important to maintain muscle mass and prevent sarcopenia. Strategies need to be put in place to provide older people with simple dietary solutions and to overcome perceived cost barriers often associated with protein foods. Older people can be encouraged to prepare meals with slowly-cooked cheaper cuts of meat and to use canned fish, legumes, eggs and milk-based meals (such as macaroni cheese) to ensure protein needs are met.

While three-quarters of the participants in this study appeared to eat sufficient fruit and vegetables, messages to encourage greater usage may be helpful, including suggestions to use frozen and canned alternatives when staple items are out of season. Many people do not recognise that these alternatives to fresh produce are just as nutritious, and in some cases more so compared to fresh produce that has deteriorated in storage. As well as being nutrient-rich, fruit and vegetables are also an important source of antioxidants, various phytochemicals and dietary fibre which is so important for healthy bowel function.

Only half of the participants regularly consumed at least two serves of milk and dairy products each day. While dairy foods are an important source of protein and other nutrients, their high calcium content is of particular importance for older people. Milk and milk products provide a convenient, bioavailable source of calcium that is difficult to obtain from other foods. To maintain bone mineral status it is important that barriers to consuming an adequate intake of dairy products are overcome. For example, to avoid milk wastage UHT or powdered milk may be a better alternative to fresh milk. With widespread media coverage about the increased price of dairy products during 2008, those older people concerned about their food budgets may now view cheese as a luxury item. However, the addition of a relatively small amount of grated cheese on vegetable dishes, for example, can be a useful way to increase both calcium and energy intakes.

Recommendation 2: Keep active and maintain a healthy weight

In this study the majority of the participants (three-quarters) were satisfied with their current weight although some were concerned they were overweight. Fourteen percent of participants had lost weight and six percent had gained weight in the previous six months. In later years attempting to lose weight is not advised. In this small group of older people weight change was not found to predict nutrition risk. However malnutrition - that is both overweight and underweight - can amplify poor health in older adults. Therefore knowledge about healthy eating and healthy activity to maintain a healthy weight is advised.

Recommendation 3: Choose foods low in fat, sugar and salt

Food behaviours relating to the intake of fat, sugar and salt were not investigated in this study, however information should be freely available to support older people to shop for and prepare foods that are low in these ingredients. Offering snack ideas and meal solutions which meet healthy recommendations will allow older people to choose and consume healthy food.

Recommendation 4: Have plenty to drink

About half of the participants in this study consumed the recommended eight cups of fluids each day. Adequate fluid is important to prevent dehydration and reduce the risk of associated side-effects, such as confusion and constipation. Although not statistically significant in this small sample, participants who reported bladder-control problems appeared to consume less fluid. These people are likely to be unaware of the possible consequences of dehydration. Older people living alone without social support may be at greater risk of dehydration. Educational strategies are needed to overcome resistance to increased fluid intakes and to encourage older people to consume more fluids in social settings.

Recommendation 5: Go easy on alcohol

Alcohol consumption was not investigated in this study and was not a topic that came up in the individual interviews. The alcohol intake in this subject group is unknown but it appears that there were no subjects with alcohol-related health problems.

Recommendation 6: Make meal time a social time

While a third of participants in this study regularly shared their meals, for those living alone this could mean just once a week. Most of the participants in this study took part in shared meals only on an irregular basis. For many older people living alone there may be few opportunities to enjoy eating meals in a social setting.

Eating with others often results in a longer mealtime and more food being consumed. For older people, eating more at mealtimes is often helpful to consumption of a wider variety of foods and maintaining a healthy body weight. As well as physically enhancing wellbeing, socialising at meals can also be mentally stimulating and emotionally satisfying. Encouragement to participate in shared meals will help improve older people's nutrition status. Wider availability of shared meals is needed for older people living in the community as well as availability of transport to facilitate their access to shared meals.

5.11.2. The importance of strong social networks

A high proportion of participants in this study had strong support networks amongst family, friends, neighbours or the wider community. These social networks help maintain good nutrition because support in the procurement and preparation of food is likely to be available when required, making it easier to eat a healthy diet.

For those older people who do not have these social connections and support, recommendations are made to assist food procurement and the preparation and consumption of healthy food.

Food shopping

Easing the burden of food shopping for older people is a priority. In this study over 40 percent of participants did not have access to private transport. These people were reliant on walking, mobility scooters, public transport or other people for their transport needs. Those people who have their own cars need to be encouraged to offer assistance to the many older people without transport in ways which will enhance their nutrition, namely for grocery shopping and attending shared meals.

Supermarkets and other food outlets need to understand the difficulties older adults experience when shopping for food. Their needs could be much better catered for. An example of a supermarket which does this is *Activ Markt 50+* in Europe. In this store, where all employees are over 50, design modifications include reduced-glare lighting, slip-proof flooring, reduced-height shelving, wider aisles, larger than usual signage and easier to navigate parking spaces. These and many more design modifications combine to make food shopping for the over 50s an easier and more pleasant experience (Everitt 2004; Ralli 2003; Rizzo 2005).

An individual supermarket can stock between 10,000 and 20,000 items. Supermarket tours designed to highlight foods that will help make quick, easy and nutritious meals could be provided for older people. These could be linked to cooking classes or operate on a stand alone basis. These tours would ideally be undertaken in small groups and at the store where people normally shop. This would enable them to more readily find the items they want at a later date. Being introduced to new foods and products has two potentially significant benefits for older people. Firstly it may help increase the variety of foods in their diet, thus enhancing the overall nutritional quality of the diet. Secondly it may help them find new simpler, quicker meal solutions which means *proper* balanced meals may be prepared and consumed more often.

Cooking classes

In this study over 40 percent of people involved in meal preparation admitted that they sometimes or usually found it a chore. Some older people have been preparing meals virtually every day of their adult life . possibly for more than 60 years . so it's understandable that new inspiration and encouragement might be required. For others cooking may be a chore because they lack the requisite skills to prepare a range of appetising meals.

It may be helpful to provide cooking classes for older people in the community. This could be an enjoyable social outing where the goal is not only to *learn* to cook, prepare and enjoy meals but also to acquire tips and ideas about new foods and quick and easy meal ideas. It would also be an opportunity to share ideas and learn from older people who already have cooking skills. The classes

could incorporate information and discussions about nutrition requirements and about healthy food choices that would meet those needs.

For older people living alone, cooking for one may be especially problematic as there may not be the same motivation to cook a balanced meal. It is common for people to want to spend less time preparing a meal for one than they would for two or more people. Older men, who often have poorer cooking skills and nutrition knowledge, can be particularly vulnerable to poor nutrition when living alone. Ideas, tips and tricks on quick and healthy meal solutions need to be shared.

Experimenting with new foods can be risky for people living alone or those on a restricted budget. There is the risk of wastage if they are unsure how to prepare the food and they may have to buy a large amount without knowing whether or not they will like it. Being introduced to new foods or products in a class or club environment takes away these risks.

As well as enhancing cooking skills and providing nutrition education these classes need to be enjoyable and provide social engagement. Attendees could be encouraged to get together for shared meals in the future. This would provide motivation to put cooking skills into practice at the same time as contributing the physical, mental and emotional benefits of sharing meals.

Age Concern North Shore provides cooking classes for older people, however the number of classes was reduced in 2008 due to a lack of funding. Given the importance of meeting the recommendations for food and nutrition it may be prudent for government resources to be allocated to community organisations as a preventative measure.

Sharing of meals

Shared meals generally enhance nutrition but older people often have fewer opportunities to share meals. Families, friends, neighbours, clubs and community groups all need to recognise this increasing need and find ways to offer more shared meals to older people, especially those living alone.

Community groups and settings in particular provide an ideal opportunity for meal sharing initiatives to be instigated. While many clubs and community groups do provide opportunities for shared meals, finding ways to increase

these, and to increase access to these by people not currently accessing them, is very important. People currently involved in groups offering shared meals should be encouraged to bring along older friends, family or neighbours who would otherwise be eating alone. Community groups who do not currently offer shared meals are encouraged to evaluate ways this could be initiated.

5.11.3. The value of nutrition support

For older people who need nutrition support, social contact of even the briefest duration appeared to be greatly valued. This was highlighted in the one on one interviews with people who received either Meals on Wheels five days a week, attended a weekly a lunch club, used of a frozen meal delivery service, received dietetic advice or had daily home help with meal preparation. No matter how brief the social interaction these services provided, the recipients discussions emphasised how important this contact was. Further research is needed to explore the nutritional benefits as well as the social benefits of these services.

Social contact, especially for those older people living alone, needs to be encouraged and facilitated within our communities. One example of an initiative which does this is the St John Caring Caller programme. This is a free long-term friendship service offered to people who are housebound or live on their own. Each day they are contacted by phone by a person who cares about them.

Another theme that emerged from all of the interviews in this study was about gratitude: these older people were very grateful for the nutrition support they received. The gratitude that older people feel and express may mask any shortcomings of the service. Alternative methods of evaluation are needed to determine the effectiveness of nutrition support. Another consequence of this gratitude expressed by older people is the positive feedback and reward for people involved in the delivery of nutrition support. This could be highlighted when recruiting for nutrition support service providers for older people.

The older people interviewed in this study did not talk about nutrition support services in terms of enhancing their nutritional status or overall wellbeing. That participants did not readily expand on these subjects may relate to the gratefulness they feel for whatever support they receive. The themes which emerged from the interviews were about getting a meal and meeting the need. For this reason evaluating nutritional outcomes would be best achieved

through quantitative rather than qualitative research. SCREEN II is recommended as an easy to use, validated tool to measure nutrition risk which is easily administered in a community setting. To evaluate changes in nutrition status this could be used prior to the use of a nutrition support service and again after a period of time.

Two-thirds of participants in this study (67 percent) showed some evidence of disability and needed assistance with everyday tasks. Nearly half (47 percent) of the participants had supportive social networks including family, friends and neighbours but the other half did not. This highlights a need for more community involvement and assistance for older people to support healthy eating for older people.

Community awareness needs to be raised about the nutrition support needs of older people. Many people in our communities will be unaware that older people often need assistance with everyday tasks, which can include the procurement and preparation of meals. Family, friends, acquaintances or neighbours may be willing and able to help in some way, once they know this need exists.

5.11.4. The implications of personal wellbeing

In this study half the participants (51 percent) rated their health as excellent or very good, nearly one-third (28 percent) rated their health as good, and one-fifth (22 percent) rated their health as fair. This study also found an inverse linear relationship between participants' self-rated health and nutrition risk ($p < .001$). Participants who perceived their health to be fair or poor were more likely to be at nutrition risk, a finding which is consistent with other studies. Nearly one-third (31 percent) of participants in this study were at nutrition risk, a figure not inconsistent with overseas studies. This study points towards a high prevalence of nutrition risk among community living older people in New Zealand which should not be ignored.

It is recommended that self-rated health - measured on a simple scale of five ratings - could be used as a quick, one-question screening tool by general practitioners and other medical professionals to evaluate older people's sense of personal wellbeing. Nutrition risk screening could then be initiated for those who rate their health as only fair or poor. This screening could identify nutrition

risk among older people living in the community who otherwise present as reasonably healthy and capable of looking after themselves. Those at risk could then be referred to a community dietitian for further assessment, advice and support. There are very simple and effective ways to improve nutrition status by instigating small lifestyle changes and support mechanisms. This can be a very cost effective preventative measure. It also provides the opportunity for older people to continue living independently in good health.

Self-rated health and nutrition risk are not end-points in themselves; rather they are of utmost importance because they are linked to the overall quality of life of older people. Where self-rated health is poor there may be poor nutrition status. For older people at nutrition risk there may be ways to positively influence their nutrition status and in turn enhance their overall quality of life.

5.11.5. Summary

This study has identified a range of factors that may place this small sample of older people living in the community at nutrition risk. These factors may compromise health and wellbeing and therefore the opportunity for successful ageing. New Zealand's positive ageing strategy seeks to provide help and support for ageing in place. Identification of the needs of older people to ensure that food and nutritional needs are not compromised requires further investigation to ensure appropriate services are provided.

The conceptual model of the food choice processes of older adults (Falk et al 1996) provides a range of influences which shape the food choice process for older people. The strongest influences are ideals or strongly held beliefs and attitudes about what should be and the social framework in which older people live. Socialising and companionship are key factors in improving food intake. As the population ages the need for nutrition support in the community is likely to increase. Therefore it is important to develop an understanding of effective ways that this support can be delivered. Further research is needed to investigate the feasibility and success of various options.

This study has shown that further community based strategies and initiatives are needed to encourage independent living and to help older people with the procurement, preparation, cooking and sharing of enjoyable meals. These may be simple measures which can allow older people to age in place with better

health and happiness. While some physical deterioration is inevitable with ageing, healthful practices which facilitate eating a nutritious, balanced diet can help to maintain health and quality of life. Good nutrition plays a key role in reducing the risk of disease and disability and in helping to maintain mental function throughout life.

Overall health is associated with more than the absence of disease. Physical, social and mental wellbeing all contribute to our health and quality of life. The social meaning of food is of paramount importance to older people and has a strong influence on their health and wellbeing. Caring, sharing and enjoyment of meals are central to healthy eating now and in the future.

Appendix 1a. Information Sheet (Questionnaire only)

[Print on Massey University departmental letterhead]

[Logo, name and address of Department/School/Institute/Section]

Factors Influencing Nutritional Intake of Older New Zealanders

INFORMATION SHEET

Hello I am Rose Carr, a mature student at Massey University, working towards my Masters of Science in Human Nutrition.

I'd like to invite you to participate in a study to look at factors that may influence the health and nutrition of older people.

Who I'd like to talk to:

I would like to interview 50 people who:

- Are aged between 80 and 85 years old
- Live independently in the community. This means that you live in your own home either:
 - alone
 - with a spouse, partner or sibling/s; or friend(s) of a similar age
- Speak English
- Are not hearing impaired (you can hear clearly spoken questions)
- Are not speech impaired (you can easily answer questions).

What is involved?

Interviews will take place between April 2006 and July 2006. If you agree to take part I will visit you at home. Only one visit will be required.

I will read the questions aloud and then type your responses into a laptop computer. No reading or writing will be required by you.

This will take about thirty minutes.

I will be asking you about:

- Your social networks e.g. how often you see your children or nearest relative;
- Your ability to carry out everyday activities of daily life e.g. handling bill payments; and
- Factors affecting nutrition e.g. appetite

Your Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question
- withdraw from the study at any time
- ask any questions about the study at any time

After the study has finished all participants will be mailed a ~~S~~Summary of Findings~~q~~of the study, unless they state on the consent form that they do not wish to receive one.

All participants will be mailed a ~~S~~Summary of Findings~~q~~of the study, unless you do not wish to receive this.

Should there be any indication that you may be at risk of inadequate nutrition I will:

- Advise how your nutrition could be improved
- Offer to contact a Field Worker at Age Concern North Shore on your behalf; **OR** provide you with contact details

No contact to a third party will be made without your permission.

Confidentiality

All information collected will be kept strictly confidential to the researcher.

For More Information

If you have any questions about this study do not hesitate to contact me (Rose) or my supervisor (Carol) during normal working hours.

If we are not available when you call please leave a message with your name and phone number and state that it is about Rose Carr's research study.

| | |
|---|---|
| Researcher: Rose Carr | Supervisor: Dr Carol Wham |
| Phone: 376 1353 | Phone: 414 0800 extension 9642 |
| Email: r.carr@massey.ac.nz | Email: c.a.wham@massey.ac.nz |

Committee Approval Statement

This project has been reviewed and approved by the Massey University Human Ethics Committee, ALB Application 06/03. If you have any concerns about the conduct of this research, please contact Professor Kerry Chamberlain, Chair, Massey University Campus Human Ethics Committee: Albany, telephone 09 414 0800 x41226, email humanethicsalb@massey.ac.nz.

Appendix 1b.

Information Sheet (Questionnaire & Interview)

[Print on Massey University departmental letterhead]

[Logo, name and address of Department/School/Institute/Section]

Factors Influencing Nutritional Intake of Older New Zealanders

Information Sheet

Hello I am Rose Carr, a mature student at Massey University, working towards my Masters of Science in Human Nutrition.

I would like to invite you to participate in a study to look at factors that may influence the health and nutrition of older people.

Who I'd like to talk to

I would like to interview 50 people who:

- Are aged between 80 and 85 years old
- Live independently in the community. This means that you live in your own home either:
 - alone
 - with a spouse, partner or sibling/s; or friend(s) of a similar age
- Speak English
- Are not hearing impaired (you can hear clearly spoken questions)
- Are not speech impaired (you can easily answer questions).

What is involved?

Interviews will take place between April 2006 and July 2006. If you agree to take part I will visit you at home. Only one visit will be required.

There are two parts to the interview.

In the first part I will read the questions aloud and then type your responses into a laptop computer. No reading or writing will be required by you.

This will take about thirty minutes.

I will be asking you about:

- Your social networks e.g. how often you see your children or nearest relative;
- Your ability to carry out everyday activities of daily life e.g. handling bill payments; and
- Factors affecting nutrition e.g. appetite

The second part is a discussion style interview to find out about your experiences with one of the following: home care; meals on wheels; attending lunch clubs; purchasing frozen meals; or taking nutrition products.

I will record this interview on an audio tape, as it would be too difficult to record all of the information any other way.

This discussion will take about twenty minutes, so the total time commitment will be about fifty minutes.

Your Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- decline to answer any particular question
- withdraw from the study at any time
- ask any questions about the study at any time
- ask for the audio tape to be turned off at any time during the interview

After the study has finished all participants will be mailed a ~~S~~Summary of Findings~~q~~of the study, unless they state on the consent form that they do not wish to receive one.

All participants will be mailed a ~~S~~Summary of Findings~~q~~of the study, unless you do not wish to receive this.

Should there be any indication that you may be at risk of inadequate nutrition I will:

- Advise how your nutrition could be improved
- Offer to contact a Field Worker at Age Concern North Shore on your behalf; **OR** provide you with contact details

No contact to a third party will be made without your permission.

Confidentiality

All information collected will be kept strictly confidential to the researcher.

For More Information

If you have any questions about this study do not hesitate to contact me (Rose) or my supervisor (Carol) during normal working hours.

If we are not available when you call please leave a message with your name and phone number and state that it is about Rose Carr's research study.

| | |
|---|---|
| Researcher: Rose Carr | Supervisor: Dr Carol Wham |
| Phone: 376 1353 | Phone: 414 0800 extension 9642 |
| Email: r.carr@massey.ac.nz | Email: c.a.wham@massey.ac.nz |

Committee Approval Statement

This project has been reviewed and approved by the Massey University Human Ethics Committee, ALB Application 06/03. If you have any concerns about the conduct of this research, please contact Professor Kerry Chamberlain, Chair, Massey University Campus Human Ethics Committee: Albany, telephone 09 414 0800 x41226, email humanethicsalb@massey.ac.nz.

Appendix 2. Consent Form

[Print on Massey University departmental letterhead]

[Logo, name and address of Department/School/Institute/Section]

Factors Influencing Nutritional Intake of Older New Zealanders

PARTICIPANT CONSENT FORM

Thank you for considering taking part in this study.

If you would like to take part in this study please complete the attached consent form and retain it.

The researcher, Rose Carr, will collect your consent form when she comes to conduct the interview.

[Print on Massey University departmental letterhead]

[Logo, name and address of Department/School/Institute/Section]

***Factors Influencing Nutritional Intake
of Older New Zealanders***

PARTICIPANT CONSENT FORM

This consent form will be held for a period of five (5) years

I have read the Information Sheet and have had the details of the study explained to me.

My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

If I participate in Part B of the study I agree/do not agree to the interview being audio taped.

Signature:

Date:

**Full Name -
printed**

Phone Number

Would you like to receive a Summary of Findings of the study after the study is completed?

- No, do not send me a Summary of Findings
- Yes, I would like to receive a Summary of Findings.
Please send it to the following address:

Appendix 3. Summary of Findings

Factors Influencing Nutritional Risk of Older New Zealanders

Rose Carr

The interviews

During 2006, 51 people aged between 80 and 85 years living in the community in North Shore City answered a questionnaire which asked about three aspects of their life, namely:

- Social networks;
- Abilities to carry out activities of daily life; and
- Food and eating behaviours.

Less structured interviews were conducted with five people who had experienced different types of nutrition support, namely:

- Meals on Wheels
- Lunch club
- Frozen meals
- Advice from a Public Health dietitian
- Home care assistance with meal preparation

Findings

Social networks

A high proportion of participants had strong support networks amongst family, friends or the wider community. This can have a positive influence on people's nutrition. Older people without such networks generally need to initiate the use of formal support services at an earlier stage in order to maintain their independence.

Nutrition risk

Overall, just over two-thirds of participants had adequate nutrition, however nearly one-third of participants were found to be at nutrition risk (for malnutrition). These people had dietary habits or food-related behaviours that, over time, have been shown to be associated with poor nutrition status. These factors were discussed with participants individually immediately following the interview.

The level of nutrition risk in this group of community living older people is comparable to levels found in overseas studies.

Personal wellbeing

Self-rated health can be seen as an overview of a person's wellbeing. Half the participants rated their health as excellent or very good; nearly one-third rated their health as good; and one-fifth rated their health as fair. A key finding of this study was that those who perceived their health to be fair or poor were more likely to be at high nutrition risk.

Nutrition support

The interviews about different types of nutrition support highlighted the importance of social contact. It seemed that people's nutrition needs were being met by the different services in a number of different ways.

Nutrition for older people – key tips

Older people need less energy (calories or kilojoules) than when they were younger, but they still need the same, if not more, of the vitamins and minerals food provides. This means the quality of our diet becomes more important as we grow older. Foods that provide lots of nutrients with relatively little energy . like vegetables and fruits . are even more important. Unfortunately things like chocolate cake, for example, that fill us up but provide little in the way of vitamins and minerals, need to be eaten in much smaller quantities.

- **Tip:** Aim for bigger portions of fruits and vegetables and smaller portions of high energy (high calorie/kilojoule) foods.

Many people in this study did not eat enough protein foods.

Research now suggests that higher protein intakes can help older people maintain muscle. For this reason the Ministry of Health recently increased the recommendations for protein intakes for people over 70 years old.

Foods containing protein include: lean meat, chicken, seafood, eggs, cooked dried beans, peas and lentils. These foods are also good sources of iron, zinc and other nutrients. Milk and dairy products also add protein to our diet.

- **Tip:** Aim to include protein foods in at least two meals each day.

Easy examples - beans on toast; poached, scrambled or boiled eggs; canned salmon, tuna or sardines on toast or in a salad; add quick-cooking red lentils to soups; bean salad (using canned 5-bean mix); hot chocolate made with milk.

Many New Zealanders, including older people, don't get the recommended amounts of fibre in their diets. Breads and cereals, especially whole grains, are a good source of fibre as well as being an important source of carbohydrate, B vitamins and minerals.

- **Tip:** Aim for 6 serves of breads and cereals each day and make at least half whole grains. Whole grains include oats, bran, brown rice, barley, wholemeal pasta, whole grain breads or crackers, sweet corn and popcorn.
1 serve = 1 slice grainy bread; ½ cup porridge; 1 cup cooked pasta

Many people in this study did not eat enough dairy foods. These add protein to the diet, are an important source of calcium for bone health, and provide other nutrients. As dairy contains saturated fats which are not good for heart health, always choose reduced fat-milk, yoghurt or cheese.

- **Tip:** Aim for 2 or more serves of dairy each day.
Examples: a glass of milk; a pottle of yoghurt; 2 slices of cheese; 2 scoops of ice cream.

Adequate fluids are important for many reasons, not least of all to avoid constipation and maintain blood pressure. It's recommended we aim for 6 to 8 glasses of fluids each day . but this can be as tea, coffee, milk, juice or water. Any beverage except alcohol counts. We need to drink more when it's hot or when we've been active.

- **Tip:** As we age our thirst mechanism does not work as well, so it's a good idea to develop a habit of drinking at regular times during the day.

Appendix 4.

Advertising in Age Concern Newsletter



Massey University

**Are you aged between 80 and 85 years?
Do you live in your own home, either alone, with a
spouse,
or with people of a similar age?
A Masters student at Massey University wants to talk to
you!**

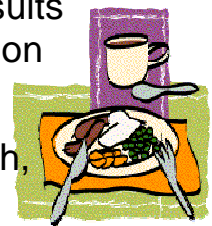
You are invited to participate in a Massey University study being undertaken on the North Shore. The study is to investigate factors that may influence the maintenance of adequate nutrition in people aged 80 to 85 years old.

I need 50 people to interview in their homes.

The purpose of this study is to investigate food-related behaviours that may make it more difficult to maintain adequate nutrition and, where relevant, to evaluate experiences of some nutritional care practices.

As the older population in New Zealand is growing, and more people are staying in their own homes, it is important to gain a greater understanding of factors influencing food intake. The results of this study will help to identify factors influencing nutrition and evaluate different types of nutrition support.

If you think you may be able to participate in my research, please contact me for more information.



Rose Carr Phone 376 1353 email: r.carr@massey.ac.nz



Massey University

Attention Clubs and Community Groups

Do you have members aged between 80 and 85 years?

I'd like to talk to them!

I'd like to come and talk to your members to invite those between 80 and 85 years old to participate in a Massey University study being undertaken on the North Shore. The study is to investigate factors that may influence the maintenance of adequate nutrition in people aged 80 to 85 years old. I need 50 people to interview in their homes.

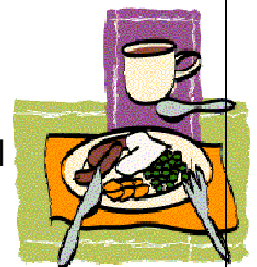
The purpose of this study is to investigate food-related behaviours that may make it more difficult to maintain adequate nutrition and, where applicable, to evaluate experiences of some nutritional care practices.

As the older population in New Zealand is growing, and more people are staying in their own homes, it is important to gain a greater understanding of factors influencing food intake. The results of this study will

help to identify factors influencing nutrition and evaluate different types of nutrition support.

If I may be able to come and talk to your members to tell them about the study and invite them to participate, please contact me:

Rose Carr Phone 376 1353 email: r.carr@massey.ac.nz



Appendix 5. Press Release by Age Concern

Factors Influencing Nutritional Intake of Older New Zealanders

Press Release from Age Concern North Shore (by email)

(For release to: North Shore Times; North Harbour News)

Seeking independent 80-85 year olds for Massey University study.

Age Concern North Shore is working with a Masters student at Massey University who is looking for people on the North Shore, aged between 80 and 85 years, to participate in a research study. The researcher, Rose Carr, wants to talk to people who live in their own homes either by themselves, with a spouse or partner, or even with flatmates of a similar age.

The purpose of the study is to investigate factors that may make it more difficult for older people to maintain adequate nutrition and, where relevant, to evaluate their experiences of nutritional care practices. Age Concern North Shore are helping Rose to recruit participants by publicising the study to their members.

Executive Officer Janferie Bryce-Chapman says:

As the older population in New Zealand is growing, and more people are staying in their own homes, it is important to gain a greater understanding of factors influencing food intake of older people in the community. We are supporting this study as the results will help to identify factors influencing the maintenance of adequate nutrition and evaluate different types of nutrition support.+

Rose will be asking about behaviours that may make it more difficult for older people to maintain adequate nutrition and also about their experiences of different nutritional care practices. She is hoping to gather the views of a wide range of people in the 80-85 age group. Confidentiality for individual participants will be maintained and the information will only be used in an aggregated form.

If you think you may be able to participate in this study please contact Rose directly for more information. A written information sheet with details about the study will be provided before anyone is asked to consent to taking part.

Rose is also able to come and talk to any community groups or clubs who have members in this age group, to tell them about the research and invite them to participate.

Contact information: Rose Carr, phone 376 1353 or email: r.carr@massey.ac.nz

339 words

For more information contact:

Rose Carr, Researcher ph. 376 1353 mob: 027 2077 828

email: r.carr@massey.ac.nz

Janferie Bryce-Chapman, Executive Officer, Age Concern North Shore,
ph 489 4975

Appendix 6. Screening Questionnaire

Participant Screening Questionnaire including Health Checklist

| | | |
|--|-----|----|
| Are you aged between 80 and 85 years old? | Yes | No |
| What is your living situation? That is: | | |
| ○ Do you live alone? | Yes | No |
| ○ Do you live with a spouse, partner or sibling/s? | Yes | No |
| ○ Do you live with other people of a similar age? | Yes | No |
| Other living situation . specify | | |

Evaluate from previous questions:

| | | |
|---|-----|----|
| ▪ Is hearing impaired to the degree that it would be difficult to hear clearly spoken questions? | Yes | No |
| ▪ Is speech impaired to the degree that you could not answer questions in a way that could readily be understood by someone you do not know | Yes | No |
| ▪ Fluent in English? | Yes | No |

| | | |
|-----------------------------|-----|----|
| Suitable for Part A? | Yes | No |
|-----------------------------|-----|----|

Use this section if still recruiting for part B of the study. Check which still required.

| | | |
|--|-----|----|
| ▪ Do you receive meals on wheels on a regular basis? | Yes | No |
| ▪ Do you attend a lunch club at least once each month? | Yes | No |
| ▪ Have you purchased frozen meals several times in the last two months? | Yes | No |
| ▪ Have you received advice from a Public Health Dietitian or other medical professional which has led to you having a special diet or using supplements? (If yes – request description. Looking for people using dietary products) | Yes | No |
| ▪ Do you receive home care to assist with shopping or meal preparation? (If yes – who from; how did it come about? Looking for people receiving home help via Waitemata DHB Community Services) | Yes | No |

- Explain whether or not applicant is suitable for the study – or whether already have enough suitable participants
- Explain process
- Provide Information Sheet and Consent Form if applicable. Check able to read information sheet.
- Take name, address and phone number
- Explain likely timing of interview

Appendix 7. Questionnaire

Factors Influencing Nutritional Intake of Older New Zealanders

QUESTIONNAIRE (PART A)

Note: The questionnaire will not be printed. Computer Assisted Personal Interviewing (CAPI) will be used where the interviewer reads the questions and types responses directly into a database.

Code Number:

| | | |
|--|--|--|
| | | |
|--|--|--|

Time started:

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Date:

| | | | | | |
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| | | | | | |
|--|--|--|--|--|--|

Day Month Year

Part 1: (PANT Tool)

The first set of questions I am going to ask you, is about contact you might have with a range of different people

There are no right or wrong answers to any of these questions

1. How far away, in distance, does your nearest child or other relative live? Do

No relatives

- ☐ Same house / within 1½ km
- ☐ 1½ - 8 km
- ☐ 9 -24 km
- ☐ 25 . 80km
- ☐ 80 km +

2. If you have any children, where does your nearest child live?

- ☐ No children
- ☐ Same house / within 1½ km
- ☐ 1½ - 8 km
- ☐ 9 -24 km
- ☐ 25 . 80km
- ☐ 80 km +

3. If you have any living sisters or brothers, where does your nearest sister or brother live?

- ☐ No sisters or brothers
- ☐ Same house / within 1½ km
- ☐ 1½ - 8 km
- ☐ 9 -24 km
- ☐ 25 . 80km
- ☐ 80 km +

4. How often do you see any of your children or other relatives to speak to?

- ☐ Never / No relatives
- ☐ Daily
- ☐ 2-3 times a week
- ☐ At least weekly
- ☐ At least monthly
- ☐ Less often

5. If you have friends in this community / neighbourhood, how often do you have a chat or do something with one of your friends?

- ☐ Never / no friends
- ☐ Daily
- ☐ 2-3 times a week
- ☐ At least weekly
- ☐ At least monthly
- ☐ Less often

6. How often do you see any of your neighbours to have a chat or do something with?

- ☐ No contact with neighbours
- ☐ Daily
- ☐ 2-3 times a week
- ☐ At least weekly
- ☐ At least monthly
- ☐ Less often

7. Do you attend any religious meetings?

- ☐ Yes, regularly
- ☐ Yes, occasionally
- ☐ No

8. Do you attend meetings of any community / neighbourhood or social groups, such as older people's clubs, lectures or anything like that?

- ☐ Yes, regularly
- ☐ Yes, occasionally
- ☐ No

Part 2: (SCREEN II)

- *I'm now going to ask you some questions about your eating habits*
- *I want to find out about your normal habits – so we'll talk about a **typical** day*
- *There are no right or wrong answers to any of these questions*

9a. Has your weight changed in the past 6 months?

- ☐ No, my weight has stayed within a few kilos
- ☐ I don't know how much I weigh or if my weight has changed

Yes, I gained...

- ☐ More than 5kg
- ☐ 2½ - 5kg
- ☐ About 2-2½ kg

Yes, I lost...

- ☐ More than 5kg
- ☐ 2½ - 5kg
- ☐ About 2-2½ kg

9b. Have you been trying to change your weight in the past 6 months?

- ☐ Yes
- ☐ No
- ☐ No, but it changed anyway

9c. Do you think your weight is...

- ☐ More than it should be
- ☐ Just right
- ☐ Less than it should be

10. Do you skip meals?

- ☐ Never or rarely
- ☐ Sometimes
- ☐ Often
- ☐ Almost every day

11. Do you limit or avoid certain foods?

- ☐ I eat most foods
- ☐ I limit some foods and I am managing fine
- ☐ I limit some foods and I am finding it difficult to manage

12. How would you describe your appetite?

- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

13. How many pieces or servings of fruit and vegetables do you eat in a day?

Can be canned, fresh, frozen or juice.

- ☐ Five or more
- ☐ Four
- ☐ Three
- ☐ Two
- ☐ Less than two

14. How often do you eat meat, eggs, fish, poultry OR meat alternatives?

Meat alternatives are dried peas, beans, lentils, nuts, peanut butter or tofu.

- ☐ Two or more times a day
- ☐ One to two times a day
- ☐ Once a day
- ☐ Less than once a day

15. How often do you have milk products?

Includes fluid milk, cooking with milk, milk puddings, ice cream, cheese, yoghurt and milk alternatives like soy beverages.

- ☐ Three or more times a day
- ☐ Two to three times a day
- ☐ One to two times a day
- ☐ Usually once a day
- ☐ Less than once a day

16. How much fluid do you drink in a day?

Includes: water tea, coffee, herbal drinks, juice, and soft-drinks but not alcohol

- ☐ Eight or more cups
- ☐ Five to seven cups
- ☐ Three to four cups
- ☐ About two cups
- ☐ Less than two cups

17. Do you cough, choke or have pain when swallowing food OR fluids?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often or always

18. Is biting or chewing food difficult for you?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Often or always

**19. Do you use commercial meal replacements or supplements?
(Shakes, puddings, energy bars)**

- ☐ Never or rarely
- ☐ Sometimes
- ☐ Often or always

20. Do you eat one or more meals a day with someone?

- ☐ Never or rarely
- ☐ Sometimes
- ☐ Often
- ☐ Almost always

21a. Who usually prepares your meals?

- ☐ I do
- ☐ I share my cooking with someone else
- ☐ Someone else cooks most of my meals

21b. Which statement best describes meal preparation for you?

- ☐ I enjoy cooking most of my meals
- ☐ I *sometimes* find cooking a chore
- ☐ I *usually* find cooking a chore
- ☐ I *am satisfied* with the quality of food prepared by others
- ☐ I *am not satisfied* with the quality of food prepared by others

22. Do you have any problems getting your groceries?

Can be poor health or disability, limited income, lack of transportation, weather conditions, or finding someone to shop

- ☐ Never or rarely
- ☐ Sometimes
- ☐ Often
- ☐ Always

Part 3: (EASYcare Tool)

- *I'm now going to ask some questions about a range of activities of everyday life*
- *I want to find out about any difficulties you might have*
- *There are no right or wrong answers to any of these questions*

23. Can you see? (with glasses if worn)

- ☐ Yes
- ☐ With difficulty
- ☐ Cannot see at all

24. Can you hear? (with hearing aid if worn)

- ☐ Yes
- ☐ With difficulty
- ☐ Cannot hear at all

DO NOT ASK – Repeat of Q18 – record from there

(25. Do you have difficulty chewing food? (With dentures if used)

- ☐ No difficulty
- ☐ Some difficulty
- ☐ Unable to chew)

26. Do you have difficulty in making yourself understood because of problems with your speech?

- ☐ No difficulty
- ☐ Difficulty with some people
- ☐ Considerable difficulty with everybody

27. In general, would you say your health is...

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

28. Do you ever feel lonely?

- ☐ Never
- ☐ Sometimes
- ☐ Often

29. In general, would you say your accommodation is

- ☐ Excellent
- ☐ Very good
- ☐ Fair
- ☐ Poor

30. Can you do your housework?

- ☐ Without help (clean floors etc.)
- ☐ With some help (can do light housework but need help with heavy work)
- ☐ Or are you completely unable to do any housework?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help

- ☐ Public help
- ☐ Other
- ☐ No available help

31. Can you prepare your own meals?

- ☐ Without help (plan and cook full meals yourself)
- ☐ With some help (can prepare some things but unable to cook full meals yourself)
- ☐ Or are you completely unable to prepare meals?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

32. Can you go shopping?

- ☐ Without help (taking care of all shopping needs yourself)
- ☐ With some help (need someone to go with you on all shopping trips)
- ☐ Or are you completely unable to do any shopping?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

33. Can you handle your own money? (eg: pay bills, count money, etc)

- ☐ Without help (write cheques, pay bills etc.)
- ☐ With some help
- ☐ Or are you completely unable to handle your own money?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

34. Can you use the telephone?

- ☐ Without help, including looking up numbers and dialing
- ☐ With some help
- ☐ Or are you completely unable to use the telephone

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

35. Can you take your own medicine?

- ☐ Without help (in the right doses at the right time)
- ☐ With some help (able to take medicine if someone prepares it for you and/or reminds you to take it)
- ☐ Or are you completely unable to take your medicine?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

36. Can you walk outside?

- ☐ Without help
- ☐ With some help
- ☐ Or are you completely unable to walk outside your home?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

37. Can you get around indoors?

- ☐ Without help
- ☐ In a wheelchair without help
- ☐ With some help
- ☐ Or are you confined to bed?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

38. Can you manage stairs?

- ☐ Without help (including carrying any walking aid)
- ☐ With some help
- ☐ Or are you unable to manage stairs?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

39. Can you move yourself from bed to chair, if next to each other?

- ☐ Without help
- ☐ With some help
- ☐ Or are you completely unable to move from bed to chair?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

40. Can you use the toilet (or commode)?

- ☐ Without help (can you reach toilet/commode, undress sufficiently, clean self and leave)
- ☐ With some help (can do some things, including wiping self)
- ☐ Or are you completely unable to use the toilet / commode?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

41. Can you use the bath or shower?

- ☐ Without help
- ☐ Or do you need help with using the bath or shower?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

42. Can you keep up your personal appearance? (eg: brush hair, shave, put on make-up etc.)

- ☐ Without help
- ☐ Or do you need help with keeping up your personal appearance?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

43. Can you dress yourself?

- ☐ Without help (including buttons, zips, laces etc.)
- ☐ With some help (can do half unaided)
- ☐ Or are you completely unable to dress yourself?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

44. Can you feed yourself?

- ☐ Without help
- ☐ With some help (cutting food up, spreading butter etc.)
- ☐ Or are you completely unable to feed yourself?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

45. Do you have accidents with your bladder? (incontinence of urine)

- ☐ No accidents
- ☐ Yes, occasional accident (less than once a day)
- ☐ Or do you have frequent accidents (once a day or more) or need help with urinary catheter?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

46. Do you have accidents with your bowels? (incontinence of faeces)

- ☐ No accidents
- ☐ Yes, occasional accident (less than once a week)
- ☐ Or do you have frequent accidents or need to be given an enema?

If you have difficulty, who helps you?

- ☐ Spouse or partner
- ☐ Family member
- ☐ Friend or neighbour
- ☐ Private help
- ☐ Public help
- ☐ Other
- ☐ No available help

The next four questions are to find out how you generally feel about life:

47. Are you basically satisfied with your life?

- ☐ Yes
- ☐ No

48. Do you feel your life is empty?

- ☐ Yes
- ☐ No

49. Are you afraid something bad is going to happen to you?

- ☐ Yes
- ☐ No

50. Do you feel happy most of the time?

- ☐ Yes
- ☐ No

- *We're nearly at the end of the questionnaire*
- *I just want to ask you a few questions that might test your memory a bit:*

51. What year is it now? _____

52. What month is it now? _____

53. Memory Phrase

Repeat this phrase after me:

Mr John Brown, 42 West Street, Wellington.

(Original phrase: Mr John Brown, 42 West Street, Sheffield. Changed to New Zealand context).

54. What time is it? (Within one hour) _____

55. Count backwards from 20 to 1 _____

56. Say the months in reverse order _____

57. Repeat the memory phrase

Part 4. Demographics

We're nearly finished. I just need to ask few general descriptive questions for the statistics

58. What age are you as at today?

- ☐ 80
- ☐ 81
- ☐ 82
- ☐ 83
- ☐ 84
- ☐ 85

59. a. How would you describe your living situation?

- ☐ Living alone
- ☐ Living with spouse (or partner)
- ☐ Living with sibling/s or other/s of a similar age
- ☐ Other, specify _____

b. Has your living situation changed in the past five years?

- ☐ Yes
- ☐ No

If yes: How would you describe your living situation five years ago?

- ☐ Living alone
- ☐ Living with spouse (or partner)
- ☐ Living with sibling/s or other/s of a similar age
- ☐ Other, specify _____

60. Which of these best describes your ethnicity?

- ☐ New Zealand European
- ☐ New Zealand Maori
- ☐ Pacific People
- ☐ Other, specify _____

61. Do you own a car or other motor vehicle?

Exclude motor scooters.

- ☐ Yes
- ☐ No

If yes: Is it kept at your home and available for you (or another person in your household) to use at any time?

- ☐ Yes
- ☐ No

If yes: And do you (or another person in your household) have a current driving licence?

- ☐ Yes
- ☐ No

62. Do you hold a community services card?

Some people know it as: Health Card; Exemption Card; Discount Card for GP and prescriptions (do not confuse with 'High Use health Card' for anyone with an ongoing health condition).

- ☐ Yes
- ☐ No

63. Gender: Female ☐ Male ☐

Time finished:

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Appendix 8. Discussion Guide

Factors Influencing Nutritional Intake of Older New Zealanders

Discussion Guideline: Personal Interview about Nutrition Support (Part B)

Code Number:

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Day Month Year

Objective: To investigate the experiences of older people who receive nutrition care by undertaking individual interviews with five current nutrition support users – one for each of the five delivery methods listed below.

Introduction: We've talked about the fact that you
õ (pick one)

- regularly receive Meals on Wheels
- attend a lunch club at least once a month
- have purchased frozen meals several times in the last two months
- have received advice from a public health dietitian or other medical professional which has lead to you having a special diet/using supplements
- receive home care assistance with shopping or meal preparation

õ now I'd like to spend some time talking specifically about that. I'm particularly interested in your experiences with (this type of nutrition support).

1. Firstly, can you tell me about (the nutrition support that you receive/use) in general. i.e. How does it work?
Warm up; General/overview; note *words* used by participant (and start using them)
2. And how long have you been (using this nutrition support?)
What made you start using (this service)?
How did it come about?
How did you know about it?
Did you know other people using it?
3. In what ways has (this service) made a difference to your eating patterns?
 - i. The amount you eat?
 - ii. The variety of foods that you eat?
 - iii. Other ways?

4. How do you think your eating habits are different because of this service?

In what ways do you think differently about your eating habits now?

5. How has (this service) made a difference to your everyday life?

How has (this service) made a difference:

i. in terms of social networks/ socialising/ seeing others?
(check language used)

ii. in terms of keeping healthy?

iii. in terms of being able to look after yourself and maintain your independence?

iv. in other ways?

(Ensure clear about what they are comparing. Eg. 3 months ago year or 10 years ago? How different now to before *X event*?)

6. Can you think of a time when (the service) was particularly *good*? Or you felt especially grateful for it?

What happened? Does this happen often?

What could make it even better?

7. Can you think of a time when the (service) was particularly *bad* or you were disappointed with it?

Or maybe there was a time you considered not carrying on with it?

What happened? Does this happen often?

What do you think could be done better?

Are there other things that could be done better?

8. Have you ever recommended (this service) to someone else?

(If not): Would you recommend (this service) to someone else?

In your opinion, who is it most suitable for?

In your opinion, who is it not suitable for?

9. What do you think are the *main* benefits to you of (this service)?

10. Is there anything else that you'd like to tell me about (this service)?

Time finished:

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Note 1: Demographic information provided from the questionnaire (Part A)

Note 2: Critical incident technique to be used to find out about negative experiences.

Experience from the *Food in Later Life* project in the UK indicated that older people using day centres didn't want to complain as they were very grateful for the service and didn't wish to risk it being taken away. Use of the critical incident technique managed to uncover negative issues that otherwise may not have been mentioned.

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