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**Sleep, Mental Distress, and Support in Mothers in Aotearoa New
Zealand: A Mixed Methods Thesis**

A thesis presented in partial fulfilment of the requirements for the degree
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ABSTRACT

Sleep health, mental distress, and support are closely linked in mothers' lives, yet these relationships are not well understood within the social and structural context of Aotearoa New Zealand. Existing research has often examined sleep, mental distress, or support in isolation, with limited attention to how they interact and are shaped by inequities in social determinants of health. To address these gaps, secondary data from the *Wāhi Kōrero* online story-sharing platform and the *Moe Kura: Mother and Child, Sleep and Wellbeing in Aotearoa/New Zealand* study were analysed using a convergent parallel mixed methods design to examine relationships between maternal sleep health, mental distress, and support.

The qualitative component drew on 181 *Wāhi Kōrero* sleep-related stories to explore mothers' experiences of sleep and professional support within the Well Child Tamariki Ora service. Reflexive thematic analysis identified three themes: maternal instinct as a guide in navigating child sleep practices; shifting from deficit-focused messaging to strength-based approaches; and moving beyond rigid, monocultural service models.

The quantitative component used cross-sectional *Moe Kura* data from 294 Māori and 618 non-Māori mothers of 3 to 4-year-old children. Highlighting social and health inequities, Māori mothers were disproportionately affected by socioeconomic deprivation, social jetlag, and mental distress. Multivariable logistic regression models examined associations between unmet social support needs across emotional, advice, concrete, and financial domains, cumulative support adequacy, maternal sleep health, and mental distress. Findings indicate domain-specific associations between unmet social support and sleep outcomes, alongside a dose-response relationship whereby cumulative unmet support needs were associated with progressively poorer sleep health and higher mental distress.

Integrated mixed methods findings showed that maternal sleep health, mental distress, and support occur within constrained socioecological contexts and are shaped by cumulative unmet needs, relational safety, and service fit. Support was not a unitary construct, and its meaning depended on both how it was measured and whether mothers felt safe to disclose need. Overall, this thesis demonstrates that improving maternal sleep and mental wellbeing requires coordinated, relational, culturally safe, whānau-centred and needs-responsive support systems that address both immediate support needs and the broader structural conditions shaping inequities in Aotearoa New Zealand.

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TERMS AND ABBREVIATIONS

Aotearoa	Māori name of New Zealand
ESS	Epworth Sleepiness Scale
GSDS	General Sleep Disturbance Scale
Hapū	Pregnant
Hauora	Health
ISI	Insomnia Severity Index
K10	Kessler 10 Psychological Distress Scale
Kāhui Rangahau	Expert advisory group
Kaitiaki	Guardian
Kaupapa Māori	Māori ideology – a philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society
Kōrero	To tell, say, speak, read, talk, address
Māmā	Mother
Māori	Indigenous people of Aotearoa New Zealand
MCTQ	Munich Chronotype Questionnaire
Moe Kura	Moe Kura: Mother and Child Sleep and Wellbeing in Aotearoa/New Zealand (Moe Kura) study
NZ	New Zealand
NZiDep	New Zealand Individual Deprivation Index. A non-occupational, composite measure of individual-level socioeconomic deprivation based on experiences of 8 deprivation characteristics in the past 12

	months
Pākehā	New Zealander of European descent
Pēpi	Baby
Rangatira	Chief
SUDI	Sudden Unexpected Death in Infancy
Tamariki	Children
Te ao Māori	The holistic worldview of the indigenous Māori people of Aotearoa New Zealand
Te Tiriti o Waitangi	Treaty of Waitangi
Wāhine	Female, women
WCTO	Well Child Tamariki Ora
Whanaungatanga	Relationship, kinship, sense of family connection - a relationship through shared experiences and working together which provides people with a sense of belonging
Whānau	Family or closely connected kin group
Wharenui	Meeting house, large house - main building of a marae where guests are accommodated

CHAPTER 1 INTRODUCTION

Sleep is a cornerstone of health across the lifespan. Yet its role in shaping maternal mental distress and wellbeing remains insufficiently understood within the structural context of Aotearoa New Zealand (NZ). Poor sleep health is associated with adverse physical health outcomes such as heart disease, diabetes, obesity, and hypertension (Buysse, 2014), and there is robust evidence of a bidirectional relationship between sleep health and mental distress (Lawson et al., 2015). For mothers, poor sleep health during pregnancy and the postpartum period has both immediate and long-term implications, influencing infant and maternal physical health, maternal emotional wellbeing, and family functioning (Christian et al., 2019; Khan-Afridi et al., 2025).

Social support has been widely researched in the context of maternal mental distress (Wang et al., 2021a). Research has demonstrated that a lack of social support is associated with an increased likelihood of postpartum depression, whereas good social support is associated with better mental health outcomes (Heh, 2003; Leahy-Warren et al., 2012; Spry et al., 2021). Additionally, access to effective healthcare and professional support is essential for promoting positive health outcomes for mothers (World Health Organization, 2022). Conversely, poor engagement in maternal care has a strong relationship with adverse maternal outcomes, even when a range of demographic variables such as age, ethnicity, and socioeconomic deprivation are controlled for (Dawson et al., 2022). When healthcare needs are left unmet, this can create health inequities that exacerbate existing disparities (Gauld et al., 2014; Matheson & Ellison-Loschmann, 2017).

Despite strong evidence linking sleep, mental distress, and support in the maternal population, these relationships are frequently examined in relatively homogenous samples and without explicit attention to social and structural determinants of health. This limits

understanding of how sleep and mental distress are shaped by social context and obscures the experiences of mothers facing systematic inequities.

In NZ, this limitation is particularly consequential given persistent inequities for Māori mothers, who experience disproportionately high rates of adverse perinatal outcomes and mental distress (Te Hiringa Mahara—Mental Health and Wellbeing Commission, 2024). Given that suicide is the leading single cause of maternal death in NZ, maternal mental distress warrants greater prioritisation in both prevention and intervention efforts (Perinatal and Maternal Mortality Review Committee, 2024). These statistics underscore that maternal mental distress is not a marginal issue, but a pressing public health concern requiring nuanced and contextually grounded investigation.

Existing research has predominantly been conducted in international contexts, often limited to the first year postpartum, and rarely centred on Indigenous women. Furthermore, few studies have combined quantitative and qualitative methods to capture both population-level patterns and lived experiences of maternal sleep, mental distress and support. Addressing these gaps is essential to developing a deeper and more nuanced understanding of maternal sleep health and its relationship to mental distress and support within the context of broader structural forces. In turn, this knowledge can inform more equitable and responsive approaches to improving outcomes for mothers and their families.

1.1 Thesis Context

This thesis investigates the relationships between sleep health, mental distress and support in the maternal population in NZ. It uses secondary data collected from two separate research projects, the *Wāhi Kōrero* platform and the *Moe Kura: Mother and Child Sleep and Wellbeing in Aotearoa/New Zealand (Moe Kura)* study.

To provide context for this thesis, the following sections outline the societal background, the research context, the researcher's identity and position, and the scope and overview of the thesis.

1.1.1 Aotearoa New Zealand Context

As of 2025, NZ had a residential population of 5.32 million (Stats NZ, 2025a). Approximately 17.8% of the population identifies as Māori (either exclusively or in combination with other ethnic groups), 67.8% as NZ European/Pākehā, 17.3% as Asian, 8.9% as Pacific peoples, 1.9% as Middle Eastern, Latin American or African and 1.1% as other ethnicities (Stats NZ, 2024). Within NZ's health and disability sector, self-identified ethnicity is the standard measure over race or ancestry (Paine et al., 2013). Stats NZ (2025b) defines ethnicity as “A common proper name; One or more elements of common culture which need not be specified, but may include religion, customs, or language; Unique community of interests, feelings, and actions; A shared sense of common origins or ancestry; and a common geographic origin.” Individuals may identify with one or more ethnic groups, and identification is self-perceived and may change over time and in different contexts, reflecting that ethnicity is a social rather than a biological construct.

Māori are the tangata whenua (Indigenous people) of NZ. British colonisation, including the signing of Te Tiriti o Waitangi/the Treaty of Waitangi in 1840, established enduring political and structural conditions that have shaped land ownership, availability of resources, and the structure of institutions, with ongoing impacts on Māori wellbeing. Colonisation is underpinned by racist ideology (Paradies, 2016). Racism operates as a system that asserts the superiority of some racial or ethnic groups over others and is expressed through the beliefs and practices that reinforce this (Williams & Mohammed, 2013).

Health inequities refer to systematic differences in health outcomes between population groups, with substantial social and economic consequences for both individuals and society. They are not solely due to poor health-related decisions by the individual (World Health Organization, 2018). A substantial body of scholarship links persistent Māori health inequities to the ongoing impacts of colonisation and structural, interpersonal and internalised racism, underscoring the need for research and services to explicitly attend to these social and structural determinants of health (Brown & Bryder, 2023; Sheridan et al., 2024).

Te Tiriti o Waitangi is regarded as one of the founding documents of NZ. In 1840, more than 500 rangatira (chiefs) signed the Māori text Te Tiriti o Waitangi, while British members of the Crown signed the English text, the Treaty of Waitangi, thereby formalising the partnership between Māori and the Crown. However, important discrepancies existed between the two versions. The provisions of Te Tiriti o Waitangi affirmed the right of the Crown to govern (Article One), but for Māori to have control over their resources (Article Two) and royal protection and citizenship rights (Article Three). However, Article One of the English version articulated Crown *sovereignty*. Since then, this article has been the source of debate. The Waitangi Tribunal (2014) concluded that the rangatira who signed the Māori version did not cede sovereignty to the Crown, but rather agreed to a relationship based on power sharing and authority.

In the years following the signing of Te Tiriti o Waitangi, the Crown confiscated Māori land and suppressed Māori knowledge and practices through the Tohunga Suppression Act (New Zealand Government, 1907). This Act limited political representation through the allowance of only four Māori parliamentary seats in 1867, and suppressed Te Reo Māori (Māori language) among other actions (New Zealand Parliament, 2009; Stephens, 2001). The Tohunga Suppression Act was later repealed in 1962.

The legacy of British colonisation remains visible today. Māori are disproportionately represented in areas of highest socioeconomic deprivation and are overrepresented in lower-income and more disadvantaged occupational groups, which collectively underpin persistent health inequities (Howden-Chapman et al., 2000; Loring et al., 2022; Ministry of Health, 2024a). Inequities are also seen in socioeconomic indicators such as employment, home ownership, and educational attainment (Ministry of Health, 2024a). These inequities are also observed in health outcomes. For example, life expectancy is approximately 7 years shorter for Māori (Stats NZ, 2025c) and Māori experience a higher chronic disease burden (type 2 diabetes, asthma, cardiovascular disease, etc.; Gurney et al., 2020; Hogarth & Rapata-Hanning, 2023). Health inequities exist at crucial stages across the lifespan, with Māori experiencing poorer mental health and perinatal outcomes than non-Māori. A greater proportion of Māori over the age of 15 experience mental distress compared to non-Māori (Te Hiringa Mahara—Mental Health and Wellbeing Commission, 2024), and Māori mothers experience disproportionately higher rates of serious adverse perinatal outcomes and mortality (Perinatal and Maternal Mortality Review Committee, 2024). Persistent inequities between Māori and non-Māori are widely understood as reflecting the Crown’s failure to uphold its obligations under both Te Tiriti o Waitangi and the United Nations Declaration on the Rights of Indigenous Peoples (Reid & Robson, 2007; UNDRIP, 2007).

1.1.2 Language Use

Language matters in perinatal research because terms such as “mother” and “woman” carry both relational meaning and gendered assumptions. In this thesis, mother is primarily used as a relational term to refer to the primary caregiver who is pregnant, has recently given birth, and/or is parenting an infant or young child. This usage aligns with the kaupapa of the studies from which data were analysed for this thesis, which centre on the experiences, health, and wellbeing of those undertaking primary caregiving in the perinatal period. At

the same time, the thesis recognises that pregnancy, birth, and parenting are experienced by people with diverse gender identities and family structures, and that not all caregivers identify with the terms “mother” or “woman”.

1.1.3 Researcher’s Identity and Position

I am a NZ European/Pākehā (non-Māori) woman. My family is from a small town in Ireland called Arklow. Alongside being a NZ citizen, I also hold Irish citizenship, though I have never lived in Ireland. As a Pākehā researcher, I do not claim to understand the lived experience of Māori, and I acknowledge my privilege in this space and the limitations this brings. I am committed to honouring the Kaupapa Māori research principles of both *Wāhi Kōrero* and *Moe Kura* and the participants who trusted the respective research teams with their data. I also acknowledge that, as someone who does not have children, I lack the direct lived experience of motherhood. This limits my perspective but also underscores the importance of centring the voices of mothers in this research.

1.2 Scope of the Thesis

The scope of this thesis is restricted to secondary analysis of existing data collected through *Wāhi Kōrero* and *Moe Kura*. *Wāhi Kōrero* was open to the general public in NZ and did not have exclusion criteria based on stage of motherhood. For the *Moe Kura* study, data were analysed from the last data collection wave, which was approximately 3 years postpartum.

1.3 Thesis Overview

This thesis has been written in the format of a doctorate with publications. At the time that this thesis was submitted for examination, one article (Chapter 4) was accepted and published by *Kōtuitui: New Zealand Journal of Social Sciences Online* and the second article

(Chapter 5) was in a final draft stage, ready for submission to *Sleep Health: Journal of the National Sleep Foundation*.

Following this chapter, Chapter 2 reviews the current literature on maternal sleep health, mental distress and support. It closes by emphasising the key knowledge gaps that underpinned this research.

Chapter 3 describes the datasets and methodological frameworks that inform the thesis. This includes details on the *Wāhi Kōrero* platform and *Moe Kura* study and the statistical and qualitative analytic approaches used.

Chapters 4 and 5 present the research results in manuscript format. As the thesis follows a publication format, some repetition—particularly within the methods sections—is unavoidable. The manuscripts have been reformatted to align with the overall style of the thesis, with all references consolidated into the main reference list after the last chapter.

Chapter 6 provides an overarching discussion using a mixed methods approach. It integrates findings from the qualitative and quantitative studies to provide a comprehensive understanding of the relationships between maternal sleep health, mental distress and support. It incorporates a discussion of the contribution and implications of this research, followed by consideration of strengths, limitations, possible areas of future research and the overall conclusion of this research.

Taken together, this thesis responds to critical gaps in maternal sleep research by situating sleep health, mental distress and support within the structural context of NZ. By integrating qualitative narratives with quantitative data and grounding the work in Kaupapa Māori principles, it offers a more nuanced and equity-focused account of maternal sleep health and its implications for research, policy, and practice.

CHAPTER 2 BACKGROUND

This chapter synthesises evidence on three topics: 1) maternal sleep health, 2) maternal mental distress, and 3) maternal support, while situating these within the socioecological conditions that shape mothers' lives in NZ. The chapter first briefly describes sleep physiology, then establishes the sleep health framework and its relevance to maternal populations, and then reviews maternal mental distress and the bidirectional relationship with sleep. It next outlines a critical account of support theory, definitions, and measurement, before turning to professional support in NZ, with specific attention to Well Child Tamariki Ora (WCTO). The chapter then synthesises integrative studies linking maternal sleep health, mental distress, and support and identifies key knowledge gaps that the thesis addresses.

2.1 Sleep

Sleep is a complex neurobiological state that plays a vital role in maintaining physical, cognitive, and emotional health (Buysse, 2014). It has been defined as a repeated and reversible neurobehavioural state marked by reduced awareness of and responsiveness to the surrounding environment (Carskadon & Dement, 2005). It differs from other states of unconsciousness, such as a coma or an individual under general anaesthesia, in which sleep is self-regulating and easily reversible (Fuller et al., 2006). That is, individuals can typically be awakened by appropriate sensory stimulation, and sleep is governed by intrinsic homeostatic and circadian processes that regulate its timing, depth, and duration.

2.1.1 Sleep Physiology

2.1.1.1 Sleep Architecture

The term sleep architecture refers to the structure and organisation of sleep. Two distinct states of sleep can be identified by polysomnography (the multiparameter measurement of sleep): non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep (Carskadon & Dement, 2005). NREM can be broken down further into three stages (N1-N3). Stage 1 (N1) is the transition between wakefulness and light sleep and is characterised by increased theta activity (4-8 Hz) in the electroencephalogram (EEG, which measures electrical activity of the brain) and slow rolling eye movements. Stage 2 (N2) is defined as light sleep, during which a sleeper fully loses consciousness, and sleep spindles and K-complexes appear in the EEG. Stage 3 (N3) is also known as slow wave or deep sleep. During this stage of sleep, respiration and heart rate slow, an individual is more difficult to wake, and delta waves (1-4 Hz) appear on the EEG. Although the precise functions of each stage remain an active area of research, NREM has several possible roles, such as supporting memory consolidation, learning, and metabolic waste clearance via the glymphatic system (Le Bon, 2020; Sigl-Glockner & Seibt, 2019; Wilckens et al., 2018).

In contrast to NREM sleep, REM sleep is characterised by increased EEG activity similar to that seen during N1 and wakefulness, yet paradoxically, the skeletal muscles are paralysed. During REM, sleepers regularly dart their eyes from side to side, hence the name of this sleep state, which is also commonly associated with vivid dreaming (Carskadon & Dement, 2005).

A healthy individual sleeping during their biological night typically enters sleep through NREM, progressing through the three stages before entering REM. This is one complete sleep cycle, with humans typically experiencing 4-6 cycles per night, each lasting on average

90 minutes (Carskadon & Dement, 2005). Normal sleep is also characterised by brief arousals (several seconds of faster brain activity) and awakenings. Across a normal period of nighttime sleep, N3 sleep predominates in the first third of the night, whereas in the last third of the sleep period, higher proportions of REM are observed (Feinberg & Floyd, 1979).

2.1.1.2 Sleep/Wake Regulation

Sleep/wake cycles are physiologically regulated by two distinct processes: the circadian time-keeping system (Process C) and the homeostatic sleep drive (Process S). Together, these processes constitute the two-process model of sleep regulation, which influences sleep timing, quality and duration (Borbely, 1982). Process C is coordinated by the suprachiasmatic nucleus, located in the anterior part of the hypothalamus in the brain. This process enables humans to remain aligned with the light-dark cycle. We are a diurnal species, meaning we typically sleep at night and are awake during the day. Process C remains in step with the day-night cycle through the receipt of information from external time cues (zeitgebers), primarily daylight.

Process S denotes sleep pressure, which builds during wakefulness and dissipates during sleep. Although these processes are conceptually independent, they interact to shape predictable windows for wake and sleep. During the day, the circadian wake-promoting signal typically counteracts the rising homeostatic drive, supporting sustained alertness despite accumulating sleep pressure. In the evening and biological night, circadian wake promotion wanes and sleep propensity is high, effectively “opening” a sleep window in which a given level of Process S is more likely to trigger sleep onset. Conversely, toward morning, circadian wake promotion rises again, when Process S has sufficiently declined during the night. This circadian drive facilitates awakening and helps maintain daytime wakefulness. Together, the dynamic balance between the homeostatic build-up and

dissipation of Process S and the circadian modulation of sleep-wake propensity (Process C) supports consolidated nocturnal sleep and stable daytime wakefulness in most adults.

Chronotype refers to an individual's preferred timing of sleep and wake, in other words, whether they naturally feel alert and sleepy earlier or later across the 24-hour day (Natale & Cicogna, 2002; Roenneberg et al., 2003). It reflects the phase of a person's internal circadian rhythm, which can align well with, or differ from, externally imposed schedules such as work and school. For example, people with an earlier chronotype ("larks") tend to fall asleep and wake earlier, whereas those with a later chronotype ("owls") tend to fall asleep and wake later. Difficulties can arise when social demands and schedules require timing that conflicts with these preferences.

2.1.2 Unique Characteristics of Maternal Sleep

During the transition to motherhood, insufficient and poor quality sleep is a near-universal concern, with frequent nighttime awakenings (Mindell & Jacobson, 2000). Sleep during pregnancy is complex and varies across trimesters in response to hormonal, physical, and physiological changes. For example, in the first trimester, hormonal changes and symptoms such as nausea and vomiting may disrupt sleep. In the second trimester, ongoing bodily changes, including increased urinary frequency, may continue to affect sleep. By the third trimester, sleep is often more substantially disrupted by physical discomfort, bladder pressure, and the effects of the growing foetus (Mindell et al., 2015; Mindell & Jacobson, 2000).

During the postpartum period, mothers often report that sleep is disrupted by infant waking and feedings (Hunter et al., 2009). However, empirical research has demonstrated that sleep disruption during this period is a complex phenomenon influenced by a range of variables, including hormonal changes, mental distress, napping, and alterations in sleep

architecture (Goyal et al., 2007). Additionally, returning to typical pre-pregnancy sleep patterns can vary widely among mothers, with some resuming their usual sleep within three months and others taking several years (Hedman et al., 2002; Richter et al., 2019; Sweet et al., 2020).

2.1.3 Sleep Health

Sleep is a complex phenomenon that has historically been examined from a medical perspective, with much of the early empirical research focusing on sleep disorders. However, more recently, there has been a shift away from this medicalised view of sleep towards a more holistic understanding of its importance for overall health and wellbeing. Buysse's (2014) model of 'sleep health' is multi-faceted, incorporating sleep duration, timing, continuity, efficiency, daytime alertness, and satisfaction or perception of the quality of one's sleep. More recently, regularity has been included in the model (St-Onge et al., 2025). Sleep duration is simply measured as the amount of time one sleeps within a 24-hour period. Timing refers to the positioning of sleep within the 24-hour period, and continuity and efficiency relate to the ease of falling and returning to sleep. Outside of the sleep period, alertness and sleepiness refer to the ability to maintain wakefulness. Regularity refers to the consistency of sleep time from one night to the next, and lastly, satisfaction or quality relates to an individual's perception of their sleep, for example, if their sleep was 'good' or 'inadequate'. All these measures can be self-reported, have excellent face validity, and are easily understood by the public.

Furthermore, these sleep dimensions have been linked to several significant health outcomes, including mortality, obesity, and depression (Baglioni et al., 2011; Buxton & Marcelli, 2010; Elder et al., 2008). The sleep health model recognises that different dimensions of sleep are interconnected but can be examined separately for their unique implications for health and wellbeing. For instance, sleep duration is often used as a simple

indicator of sleep health. However, short sleep may also reflect poor regularity or low sleep efficiency, each calling for different types of intervention or screening. Taking a multidimensional approach provides a more accurate and meaningful picture of sleep health and the links to health outcomes (Ravyts et al., 2021).

2.1.3.1 Sleep Duration

Sleep duration refers to the total amount of time spent sleeping within a 24-hour period, including naps. In NZ, the Ministry of Health (2024c) recommendations are for adults to obtain 7-9 hours of sleep. However, the applicability of these guidelines to maternal sleep health is unclear, as they do not reflect the substantial changes in sleep duration that occur across the perinatal period. For example, the greatest reduction in sleep duration relative to pre-pregnancy is often observed at around three months postpartum (Hunter et al., 2009). Longitudinal research observed a maximum decrease of 62 minutes in sleep duration in mothers at 3 months postpartum, and after 6 years, sleep duration did not return to pre-pregnancy levels (Richter et al., 2019; Sivertsen et al., 2015). When napping is possible, mothers can increase their sleep duration within the 24-hour sleep window (Witkowska-Zimny et al., 2024).

2.1.3.2 Sleep Efficiency and Continuity

Sleep efficiency describes the amount of time asleep as a proportion of time spent trying to sleep. Sleep continuity refers to the degree to which sleep is interrupted and is sometimes combined with efficiency as a single construct (Buysse, 2014). High sleep efficiency means that an individual falls asleep quickly and has minimal periods of wakefulness throughout the sleep period. Efficiency and continuity can be quantified objectively via actigraphy (a wearable sensor that measures sleep through activity) or polysomnography. It can also be measured subjectively via sleep diaries, and insomnia focused questionnaires such as the Insomnia Severity Index (Morin, 1993) are often used when the emphasis is on perceived

difficulty initiating or maintaining sleep. Again, the early postpartum period is the most challenging time for mothers, as they are often awake due to childcare responsibilities (Parsons et al., 2023). Sleep efficiency is the poorest during the first week postpartum (Signal et al., 2007), and longitudinal research has shown that sleep continuity improves around 4 months postpartum, due to a decrease in prolonged awakenings (Filtner et al., 2014).

2.1.3.3 Sleep Timing

Sleep timing refers to the placement of sleep throughout the 24-hour day (Buysse, 2014). It includes when one falls asleep and wakes up. This dimension of sleep health typically reflects an individual's chronotype and personal schedule (Chaput et al., 2020). As previously mentioned, mothers may not be able to sleep in one consolidated sleep period due to infants' awakenings and feedings. Therefore, mothers may split their sleep into multiple blocks throughout the 24-hour period, particularly in the early months postpartum (Hunter et al., 2009).

2.1.3.4 Sleep Regularity

Sleep regularity refers to the consistency of sleep patterns from day to day. Reasonable regularity would mean that a person typically goes to sleep and wakes up at similar times throughout the week. Although not initially proposed as a facet of sleep health in Buysse's (2014) seminal paper, more recent research has begun to include regularity as a key measure of sleep health (Ravyts et al., 2021; St-Onge et al., 2025; Windred et al., 2024). Social jet lag is a concept in sleep regularity that describes the misalignment between a person's biological clock and their social clock (Wittmann et al., 2006). Regularity can be operationalised using social jetlag derived from measures such as the Munich Chronotype Questionnaire (MCTQ), by calculating the difference between weekday and weekend midsleep times (the temporal midpoint between sleep onset and wake up), often

dichotomised using a clinically meaningful threshold such as >1 hour versus ≤ 1 hour (Roenneberg et al., 2003). Social jetlag is common in pregnancy. In one cohort study, 54.5% of pregnant women had social jetlag greater than 1 hour in the first trimester, and 77.0% exceeded 1 hour in at least one trimester across gestation (Balieiro et al., 2021). Social jetlag appears to be poorly understood and documented in the postpartum period.

2.1.3.5 Daytime Sleepiness

Daytime sleepiness or alertness refers to the tendency to feel drowsy or experience increased alertness during periods when one is not typically asleep (Buysse, 2014). It reflects an individual's ability to maintain alertness in situations where they are expected to be awake, such as while working, studying and engaging in daily activities. Daytime sleepiness is commonly measured using the Epworth Sleepiness Scale (ESS), an 8-item self-report of the likelihood of dozing in everyday situations, with a typical cut point of >10 indicating excessive daytime sleepiness (Johns, 1991). Excessive daytime sleepiness extends beyond normal tiredness, indicating insufficient restorative sleep. Excessive daytime sleepiness is a significant issue for mothers, as they face increased demands during the postpartum period (Fahey & Shenassa, 2013). Research indicates that daytime sleepiness generally decreases over the first 18 weeks postpartum. However, it remains a significant issue for more than half of mothers during that period (Filtiness et al., 2014).

2.1.3.6 Sleep Satisfaction/Quality

Satisfaction or quality is the subjective evaluation of one's own sleep (Buysse, 2014). Unlike other facets of sleep health, which can be measured using physiological or behavioural data, sleep satisfaction/quality is personal. That is, two individuals may share the same sleep on all other dimensions, but one person may evaluate their sleep as "good" while the other person may evaluate their sleep as "poor". The General Sleep Disturbance Scale (GSDS) quality subscale is a frequently used measure in women (Lee, 1992) which indexes

perceptions such as sleeping poorly, feeling rested on waking, and satisfaction with sleep quality over the past week. Another commonly used measure of sleep satisfaction/quality is the Pittsburgh Sleep Quality Index (PSQI), a 19-item self-report questionnaire that assesses subjective sleep quality and sleep disturbance over the previous month (Buysse et al., 1989). The PSQI captures multiple components of sleep, including subjective sleep quality, sleep latency, duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction, producing a global score in which higher scores reflect poorer sleep quality. Because it provides a broad subjective measure of sleep across several facets, it has been widely used in perinatal and maternal sleep research. Meta-analytic research has demonstrated that poor sleep quality is common in the perinatal period (Yang et al., 2020). In the immediate postpartum period, sleep satisfaction/quality is observed to decrease (Song et al., 2014). Richter et al. (2019) found that in a sample of 2514 mothers, sleep satisfaction plummeted in the first 3 months postpartum by an average of 1.8 points on a 0-10 scale compared with pre-pregnancy levels, and that it did not return to pre-pregnancy levels after 6 years.

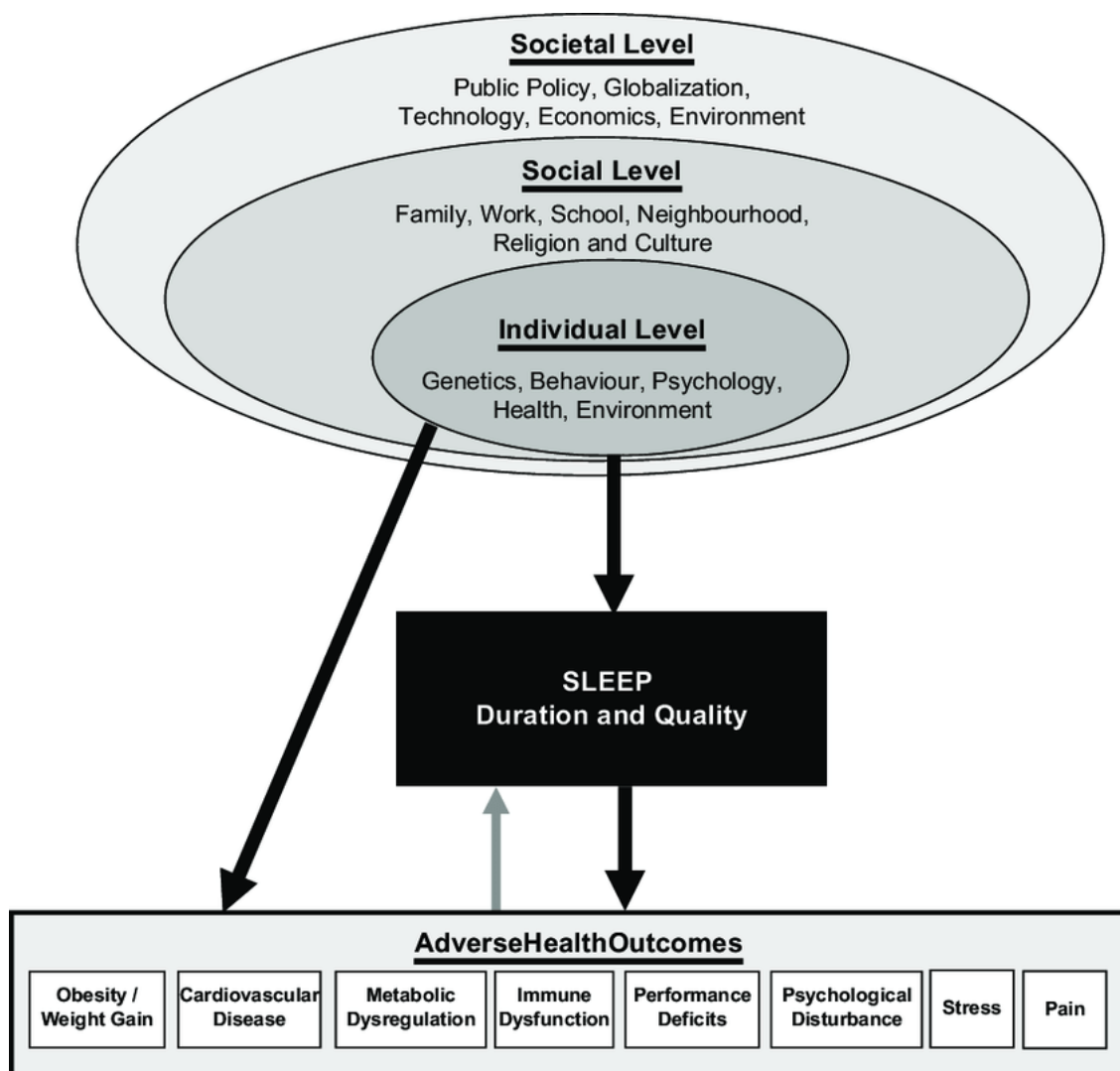
Although some studies have examined specific dimensions of sleep health in mothers, what constitutes “healthy sleep” across perinatal stages and beyond remains unclear, and the field remains markedly under-researched. Notably, there are currently no comprehensive review papers synthesising evidence on maternal sleep health across its multiple facets across the entire perinatal period. Additionally, very few studies investigate periods beyond 1 year postpartum. During this time, greater clinical attention is often focused on child sleep (Redeker, 2020). Although infant sleep typically becomes more consolidated during this time, qualitative studies highlight that many mothers continue to experience sleep difficulties, often due to cognitive hyperarousal at bedtime and during nighttime awakenings beyond the first 3 months postpartum (Fischer, 2022; Zambrano et al., 2016).

Further qualitative research on first-time mothers highlighted that the changes in maternal sleep and related exhaustion can be a surprise (Kennedy et al., 2007).

2.1.4 Sleep Health Inequities and Structural Context in Aotearoa

Sleep does not occur in isolation. It is shaped by a multitude of influences, ranging from the individual level to the societal level. Socioecological models of sleep health provide a framework for understanding these factors (Fischer et al., 2021; Grandner, 2014; Grandner, 2022) and are informed by Bronfenbrenner's (1977) social-ecological model of child development (see Figure 1). This model posits that 1) individual-level factors (genetics, health status, beliefs and choices about sleep); 2) social-level factors (religion, culture, work, home, family); and 3) societal-level factors (racism, discrimination, economics, globalisation) all impact sleep health. Importantly, socioecological models of sleep health suggest that these levels do not act independently but interact dynamically with one another. A mother's short sleep duration, for example, may be simultaneously shaped by her beliefs about sleep (individual), her infant's night awakenings or cramped living conditions (social), and limited access to paid parental leave (societal). This perspective underscores the importance of multi-level interactions and interventions. While education on healthy sleep can target individual behaviours, long-term improvements often require addressing systemic factors such as poverty, housing, and workplace policy. Thus, socioecological models offer a comprehensive lens for understanding and improving sleep health across diverse populations.

Figure 1 Socioecological model of sleep health



Note. Reprinted from Addressing sleep disturbances: An opportunity to prevent cardiometabolic disease?

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Within this socioecological framing, social determinants of health can be positioned as the upstream, patterned conditions and systems that distribute sleep-relevant risks and resources across populations. Social determinants of health refer to the non-medical factors and conditions of daily life that influence health (World Health Organization, 2025b). These factors are specific to an individual, such as socioeconomic position, housing, education, access to food and water, as well as wider forces and systems within an individual's context, including political systems, social policies, and norms. These determinants map most

directly onto the social and societal/structural layers of socioecological sleep models, while also shaping individual-level beliefs and behaviours via opportunity structures (e.g., time scarcity, stress exposure, access to healthcare, and culturally safe services). The unequal distribution of social determinants drive sleep inequities (Jean-Louis et al., 2022).

Bringing socioecological models of sleep health together with social determinants of health makes explicit how inequities in sleep health arise; not simply through individual choices, but through socially patterned exposures (e.g., discrimination, precarious work, neighbourhood disadvantage) that affect sleep health. These findings underscore the importance of understanding sleep health within a broader context and at a population level, rather than viewing poor sleep health through a victim-blaming, individualistic lens (Hale & Hale, 2010). By situating sleep health within socioecological models of sleep health and social determinants of health, researchers and policymakers can design more effective and equitable interventions that address the root causes of inequities rather than their downstream consequences.

Evidence from NZ illustrates that these socioecological factors and social determinants of health translate into sleep health inequities across the lifespan (Paine & Muller, 2023). For example, Muller et al. (2019) observed ethnic and socioeconomic inequities in sleep duration among preschoolers. Māori children aged 3 to 4 years old were disproportionately impacted by socioeconomic deprivation and short sleep durations compared to non-Māori. A dose-response relationship was identified whereby greater area-level deprivation was independently associated with increasingly higher odds of short sleep, highlighting the partial attribution of inequitable socioeconomic position to Indigenous sleep health inequities and impacts of structural racism evident in the social inequities observed. Similarly, in the adolescent population, Muller et al. (2024) reported that Māori adolescents and youth from other minoritised ethnic groups, including Pacific, Asian and 'other'

ethnicities, were impacted by inequities in social determinants of health. When compared to European adolescents, these included disproportionate prevalences of high area-level socioeconomic deprivation, school-level deprivation, housing deprivation, sleeping elsewhere due to inadequate housing, exposure to unsafe environments and experiences of racism. Ethnic inequities were identified in short sleep, late bedtimes (after midnight) and early waketimes (5am to 6am or earlier) on school days, which were partially explained by the social determinants measures included in the study, suggesting additional structural drivers beyond measured material and contextual factors. Further, in the adult population, Paine and Gander (2016) noted inequities in insufficient sleep (≥ 2 hours difference between free and scheduled day average sleep duration), and both short and long sleep durations for Māori adults in NZ compared to non-Māori. Inequities in insufficient sleep were largely accounted for by higher neighbourhood socioeconomic deprivation, unemployment and greater exposure to night work, and poorer health among Māori; however, these did not fully explain inequities in short and long sleep durations.

These findings underscore the role of structural power and policy in producing unfair and unjust sleep health inequities in NZ. Collectively, these frameworks and findings from research conducted in the NZ context highlight why sleep health must be treated as both a clinical and equity issue. They show that sleep patterns are not simply a function of individual knowledge or motivation, but are systematically shaped by lived conditions (e.g., housing stability, time autonomy, safety) and structural forces (e.g., racism, labour conditions, policy), which can impact opportunities for good sleep health. This has direct implications for research and intervention: analyses that ignore social determinants risk misattributing sleep inequities to individual-level deficits, whereas socioecological approaches support multi-level solutions that combine individual supports with upstream changes to the contexts that produce sleep health inequities.

2.2 Maternal Mental Distress

The perinatal period is an important time in a mother's life. Many physiological, psychological and life adjustments occur during this time. Just like sleep health, much of the empirical research has focused on mothers up to 1 year postpartum, meaning that less is understood about the changes in mental distress beyond that initial year. More specifically, postpartum depression has been associated with poorer maternal-infant attachment and interactions that may impact infants' emotional, cognitive, and social development (Sangsawang et al., 2019; Stein et al., 2014). Effects of maternal mental distress can extend beyond infancy, with the children of mothers who experience postpartum depression being five times more likely to experience depression during adolescence and middle age compared to children of mothers who did not (Murray et al., 2011). With suicide being the leading single cause of maternal death in NZ, maternal mental distress requires prioritised attention and intervention (Perinatal and Maternal Mortality Review Committee, 2024).

2.2.1 Conceptualising Maternal Mental Distress

Similar to the movement in sleep research toward a multidimensional understanding of sleep health, recent literature has expanded the conceptualisation of postpartum depression and anxiety to encompass a broader, multidimensional construct of maternal mental distress (Copeland & Harbaugh, 2019; Liou et al., 2016; Wu et al., 2022). This shift recognises that maternal mental distress rarely occurs in isolation or fits neatly within categorical diagnoses. Instead, mothers often experience a spectrum of overlapping symptoms, including low mood, anxiety, irritability, and a sense of being overwhelmed. Adopting a broad definition of mental distress is particularly important for this thesis, as it enables examination of how multiple facets of sleep health and the presence or absence of social and professional support relate to maternal mental distress with or without a formal diagnosis. This broader conceptualisation allows for the inclusion of clinical and subclinical

levels of mental distress, acknowledging that moderate or contextually driven distress may be associated with poorer sleep health and therefore impact mothers.

Within this broader construct, postpartum depression refers to a sustained pattern of depressed or persistently low mood and/or marked loss of interest or pleasure, accompanied by cognitive, emotional, and physical changes that impair daily functioning (Leahy-Warren & McCarthy, 2007). Depressive experiences can include feelings of hopelessness, guilt or worthlessness, reduced concentration and decision-making capacity, and changes in appetite, energy, and psychomotor activity (American Psychiatric Association, 2022). Depression also frequently involves disruptions to sleep (e.g., insomnia, early morning waking, or hypersomnia) and can shape how mothers interpret their own parenting competence and their infant's cues (Arteche et al., 2011). This can have negative impacts including inducing feelings of shame, which may lead to reduced help-seeking (Dunford & Granger, 2017), and exacerbate feelings of loneliness and hopelessness (Leahy-Warren & McCarthy, 2007).

Anxiety refers to excessive fear, worry, or apprehension that is difficult to control and disproportionate to the situation, alongside physiological and behavioural symptoms linked to heightened arousal (American Psychiatric Association, 2022). Common features include persistent rumination (e.g., "what if" thinking), restlessness, muscle tension, irritability, difficulty concentrating, and somatic symptoms such as heart palpitations or gastrointestinal discomfort. In the postpartum period, anxiety may be expressed as intrusive worries about the infant's health or safety, heightened vigilance, reassurance seeking, avoidance of situations perceived as risky, or difficulty relaxing even when the infant is settled (Dennis et al., 2017).

Postpartum psychosis typically presents with marked mood disturbance (elated, dysphoric, or rapidly fluctuating mood), agitation, severe insomnia, and bizarre, disorganised

behaviour or thinking (American Psychiatric Association, 2022). Psychotic features may include hallucinations, mood-incongruent delusions, or experiences of external control, with themes frequently centred on the infant or the mother herself (e.g., fears or beliefs about harm coming to the infant or self; Monzon et al., 2014).

Prevalence rates of maternal mental distress vary greatly, in part due to differing measures, sampling methods and cultural understandings. The World Health Organization (2025a) states that 13% of postpartum women experience a “mental disorder” and that depression is the most common presentation. Some cross-cultural research estimates that somewhere between 10-50% of mothers experience symptoms of postpartum depression (Arifin et al., 2018). Whereas a systematic review of longitudinal studies examining maternal mental distress in NZ and Australia reports that approximately 10-20% of mothers experienced moderate to severe depressive symptoms for several months during the first year postpartum (Schmied et al., 2013). Interestingly, these prevalence rates stayed relatively stable over the 25 years preceding the review. This review also noted that fewer studies measured anxiety, but that prevalence is reported to be approximately 8-10% of mothers during pregnancy and at 6 months postpartum. Estimates for postpartum psychosis are much lower, affecting an estimated 0.09% to 0.26% of births and usually occurs in a very short window postpartum (VanderKruik et al., 2017).

2.2.2 Pathways to Maternal Mental Distress

Maternal mental distress can arise from an interaction between biological, psychological, and environmental factors (O'Hara & Wisner, 2014). While many causal mechanisms are shared with mental distress outside the postpartum period, postpartum mental distress is also shaped by the profound hormonal, neurological, and social changes unique to pregnancy, childbirth, and the transition to parenthood.

The literature is most robust for postpartum depression, therefore, much of the aetiological research is based on this specific disorder (Meltzer-Brody & Rubinow, 2021). The strongest and most consistent risk factors for postpartum depression include a history of depression, antenatal depression or anxiety, neuroticism, low self-esteem, stressful life events, poor marital relationships, and low social support (Biaggi et al., 2016; O'Hara & McCabe, 2013). Childbirth experiences have also been cited as a risk factor for postpartum anxiety (Field, 2018). These findings suggest that risk factors group into three categories: prior psychiatric illness, exposure to life stress, and poor social relationships (O'Hara, 2024; O'Hara & McCabe, 2013). Low socioeconomic position, single parenthood, unwanted pregnancy, and obstetric complications have been less frequently observed as risk factors (Biaggi et al., 2016; Gastaldon et al., 2022; Lancaster et al., 2010)

Many hormonal changes occur throughout pregnancy and the postpartum period. Dysregulation of the hypothalamic pituitary adrenal (HPA) axis has been linked to both postpartum depression and major depressive disorder (Glynn et al., 2013; Magiakou et al., 1996; Maguire, 2019). Rapid shifts in reproductive hormones during pregnancy and postpartum are thought to contribute to psychological changes, though findings are inconsistent. Oestrogen levels rise over 1000-fold before birth, then fall sharply, and evidence on progesterone's role remains mixed (Payne & Maguire, 2019). Women vulnerable to mood changes during other hormonal transitions (e.g., premenstrual phase, hormonal contraception, menopause) are also at higher risk (Batt et al., 2020), and an umbrella review identified premenstrual syndrome as one of the strongest predictors of postpartum depression (Gastaldon et al., 2022).

Postpartum depression and major depressive disorder appear to share genetic vulnerabilities, with polymorphisms in catechol-O-methyltransferase serotonin transporter (5HTT), and monoamine oxidase genes implicated in both disorders (Castro et

al., 2015). Although no postpartum depression specific genes have yet been identified, some evidence suggests postpartum depression may have greater heritability than major depressive disorder (Viktorin et al., 2016). Association studies have also examined candidate genes in women with postpartum psychosis and bipolar disorder, focusing particularly on gene expression influenced by steroid hormones (Jones & Craddock, 2007).

While our understanding of the biological mechanisms contributing to postpartum mental distress is rapidly advancing, it is essential to recognise that no single explanatory model applies universally (Meltzer-Brody & Rubinow, 2021). Pregnancy and the postpartum period represent profound biopsychosocial transitions that significantly shape and disrupt many aspects of a woman's life, often challenging previously effective coping strategies. Consequently, there are multiple potential pathways through which mental distress may develop.

2.2.3 Measurement of Mental Distress

A range of psychometric instruments have been used to assess maternal mental distress in perinatal research and clinical practice. The following section provides a brief, non-exhaustive overview of several commonly used measures relevant to this thesis, with attention to their construct focus, strengths, and key limitations in perinatal and postpartum contexts.

Perhaps the most widely used psychometric for maternal mental distress is the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987). It is a brief 10-item self-report screening tool developed to identify women who may be experiencing clinically significant depressive symptoms in the postpartum period (up to 12 months postpartum). It assesses mood and cognitive-affective symptoms over the preceding 7 days and was designed to minimise confounding from somatic symptoms common in the perinatal period (e.g., fatigue), thereby

supporting its practicality in routine maternity and primary care settings. A key measurement issue is that optimal cut-offs vary by purpose and context (Levis et al., 2020). Importantly, cut-offs may also differ across cultural/linguistic groups; for example, a NZ validation study of Samoan and Tongan postpartum women supported higher screening thresholds, highlighting the need for local validation rather than assuming a universal cut-point (Ekeroma et al., 2012). Its construct coverage is also debated with factor-analytical work commonly finding a multidimensional structure (e.g., depression/anhedonia/anxiety components), and evidence suggests the EPDS (and the EPDS anxiety subscale) may correlate only moderately with formal anxiety criteria, so EPDS scores should not be treated as a comprehensive anxiety screen without additional assessment (Lautarescu et al., 2022).

The Generalized Anxiety Disorder Scale-7 (GAD-7) is a brief 7-item self-report measure used to screen for probable generalised anxiety disorder (GAD) and index anxiety symptom severity over the past two weeks (Spitzer et al., 2006). In perinatal research, the GAD-7 has been evaluated specifically among pregnant and postpartum women and has demonstrated clinically useful properties for identifying probable GAD, with evidence supporting its use in perinatal samples (Simpson et al., 2014). Although widely used as a general “anxiety” screener, the GAD-7 primarily captures worry and tension consistent with GAD and may not fully reflect perinatal anxiety presentations characterised by panic symptoms, trauma-related symptoms, or postpartum-specific intrusive thoughts, meaning it may be best positioned as part of a broader assessment battery rather than a standalone measure of perinatal anxiety (Ayers et al., 2024).

The Patient Health Questionnaire-9 (PHQ-9) is a 9-item self-report measure aligned with diagnostic criteria for depressive symptoms over the past two weeks (Kroenke et al., 2001). In perinatal populations (including postpartum), systematic review and meta-analytic evidence indicates that the PHQ-9 has good criterion validity against diagnostic interviews;

at the standard threshold of ≥ 10 , pooled sensitivity and specificity are both typically above 0.80, and head-to-head comparisons suggest its overall screening performance can be broadly comparable to the EPDS (Wang et al., 2021b). A key caveat in postpartum and sleep focused work is potential construct contamination, because the PHQ-9 includes somatic items (sleep, fatigue, appetite) that can reflect normative postpartum recovery and infant care demands, complicating interpretation of total scores (Wang et al., 2021b).

The Kessler Psychological Distress Scale (K10) is a 10-item self-report measure designed to index non-specific psychological distress, capturing a mix of depressive and anxiety-related symptoms, over the past four weeks (Kessler et al., 2002). For postpartum research, the K10's main advantage is that it provides a brief, scalable measure of general distress that is widely used in population health surveillance and has an established relationship with risk of common mental disorders in general samples (Stolk et al., 2014). However, it is not perinatal-specific and does not clearly delineate depression from anxiety, which can limit interpretability when the research question requires disorder-specific inference. Additionally, because postpartum experiences often include normative sleep disruption and fatigue, some symptom content assessed within the K10 can overlap with postpartum physiology and caregiving demands. Evidence for postpartum screening utility exists in some settings. For example, in an urban Ethiopian postpartum sample the EPDS, K6, and K10 showed acceptable clinical utility for detecting common mental disorders. However, performance and optimal cut points may vary by context and population, so thresholds should be justified transparently and results interpreted cautiously (Tesfaye et al., 2010).

2.3 Sleep and Mental Distress

The connection between sleep and mental distress has long been documented with early formal observations dating back to Kraepelin (1909), the founder of modern psychiatry.

Difficulties with sleep are listed as a diagnostic criterion for depressive disorders and bipolar disorders (American Psychiatric Association, 2022). Sleep problems are also observed in up to 80% of individuals who experience a psychotic illness (Wulff et al., 2012). A recent review study has highlighted the bidirectional relationship between sleep and mental distress. That is, the development of mental distress contributes to sleep problems and vice versa (Fang et al., 2019). In his seminal paper, Buysse (2014) associated satisfaction/quality and efficiency with depression.

A bidirectional relationship between sleep and maternal mental distress has also been well established in the empirical literature (Lawson et al., 2015). For example, mothers experiencing depression report greater sleep disruption, and mothers with poorer sleep are more likely to experience depressive symptoms (Bhati & Richards, 2015; Dorheim et al., 2009; Goyal et al., 2007). Sleep disturbances during pregnancy are also associated with an increased risk of subsequent postpartum depression (Maghami et al., 2021). Importantly, poor sleep shows an association with many types of postpartum mental distress such as depression, anxiety and psychosis (Lawson et al., 2015). Although sleep is often described as a modifiable risk factor, postpartum sleep is also strongly constrained by external factors such as infant care, caregiving load, and available support, which have important implications for how interventions are designed and evaluated.

Across the perinatal period, published literature has consistently demonstrated links between multiple facets of sleep health and maternal mental health outcomes. Ladyman et al. (2021) found that poorer sleep quality, poorer continuity, longer sleep latency, and greater daytime sleepiness, but not shorter sleep duration, were consistently associated with a chronic high depressive symptom trajectory from late pregnancy to 3 years postpartum among Māori and non-Māori women in NZ. Similarly, Gueron-Sela et al. (2021) observed that poorer sleep quality at 3 months postpartum was associated with increased

odds of belonging to a moderate depression-anxiety comorbidity trajectory, rather than a low-symptom trajectory. This pattern is consistent with findings from other postpartum cohorts showing that worse PSQI-assessed sleep quality co-occurs with greater depression and anxiety symptom severity, underscoring that perceived sleep quality captures a clinically meaningful dimension of maternal wellbeing that is not reducible to sleep duration alone (Baattaiah et al., 2023; Dorheim et al., 2009; Okun et al., 2018). Evidence from smaller longitudinal studies points in the same direction. For example, Park et al. (2013) found that poorer perceived sleep was consistently associated with higher postpartum depressive symptoms across pregnancy and the first 14 weeks postpartum, and that objective actigraphy markers of poorer sleep maintenance, including greater fragmentation, lower sleep efficiency, and more wake after sleep onset, were also correlated with EPDS scores postpartum, whereas sleep duration was not. Taken together, these studies demonstrate that the relationship between individual facets of sleep health and maternal mental distress is present but complex.

Intervention studies further confirm the bidirectional relationship between sleep and mental distress, whereby interventions targeted to improve perinatal sleep health have been shown to reduce depressive symptoms, and conversely, interventions targeted to improve depressive symptoms have been shown to improve sleep (Ladyman et al., 2022). Non-pharmacological interventions range in their focus, with Ladyman et al. (2022) noting in their scoping review that psychological, educational, lifestyle, and chronotherapeutic intervention studies support positive changes in maternal mental distress and sleep.

For example, Liu and Yang (2021) implemented a cognitive behavioural intervention with postpartum first time mothers who were at risk of depression. During this randomised controlled trial, the intervention group received psychoeducation, cognitive restructuring and activity scheduling (core cognitive behavioural therapy practices). Mental distress was

measured using the Hamilton Depression Scale (Hamilton, 1960), the Hamilton Anxiety Scale (Hamilton, 1959) and the EPDS. Sleep was measured by the PSQI. After the 6-week intervention, the intervention group showed improved scores on the mental distress measures and PSQI compared to their baseline and the control group. Further, Ozcan and Eryilmaz (2021) employed an educational intervention in a randomised control trial, which included information on sleep. Participants who received the educational intervention reported better 'psychological health' than the control group post intervention. Other types of interventions such as mindfulness have also proven to be effective for sleep and maternal depression. For example, in a sample of women who experienced postpartum depression symptoms, a mindfulness intervention using the Headspace application showed improved sleep and reduced depressive symptoms (Avalos et al., 2020). However, this preliminary study did not include a control group.

In summary, the current evidence demonstrates a robust and bidirectional relationship between maternal sleep and mental distress. Crucially, this relationship identifies sleep as a potential intervention target. Findings from longitudinal, cross-sectional, and intervention studies suggest that improvements in sleep can alleviate mental distress, while treatments for mental distress often result in better sleep outcomes. However, maternal sleep during the perinatal period is shaped not solely by individual behaviour but also by caregiving demands, relational circumstances, and broader contextual factors. Accordingly, interventions are likely to be most effective when they take account of these external constraints, rather than treating sleep as an entirely individual and freely modifiable behaviour.

2.4 Support

The concept of support is broad and multifaceted, encompassing a range of actions and resources that help individuals to cope with challenges and maintain wellbeing. According to the Oxford Dictionary (Oxford University Press, 2026), the word support can be defined as:

“2 give assistance to, especially financially;

- provide with a home and the necessities of life: *my main concern was to support my family.*
- produce enough food and water for; be capable of sustaining: *the land had lost its capacity to support life.*
- give approval, comfort, or encouragement to: *the proposal was supported by many delegates* | *I like to visit her to support her.*

Within the maternal context, support is particularly critical due to the substantial physical, emotional, financial and social demands associated with the perinatal period and beyond. Mothers frequently encounter challenges that can impact sleep health and mental distress, and positively, adequate support during this time has been linked to improved maternal wellbeing (Leahy-Warren et al., 2012; Logsdon & Davis, 2003). However, the support literature is methodologically and conceptually complex: “support” is variably defined across disciplines, operationalised at different levels (e.g., relationship structure, functional resources, subjective appraisals), and sometimes treated as uniformly beneficial despite evidence that supportive interactions can be mismatched, difficult to access, or inadvertently harmful (Gottlieb & Bergen, 2010; Langford et al., 1997; Williams et al., 2004).

2.4.1 Theoretical Understandings of Support

Several theoretical models have been proposed to explain how support can influence health outcomes. One of the most widely cited is the stress buffering hypothesis (Cohen & Wills, 1985), which suggests that support is particularly protective for people under stress. In this framework, support helps mitigate the adverse effects of stress by alleviating mental and emotional burdens. High levels of support can buffer against stress-related outcomes such as anxiety, low mood, or physiological strain. When stress is low, the buffering effect is seen as less relevant because the protective mechanisms are not actively needed. The main effects model, also proposed by Cohen and Wills (1985), offers a slightly different perspective. It suggests that support benefits wellbeing regardless of stress levels. Being embedded in supportive networks can promote better overall health by providing a sense of belonging, social norms for self-care, emotional validation, and opportunities for engagement in health-promoting behaviours. Supportive connections can boost self-worth, generate positive affect, and even improve immune functioning, all of which contribute to better physical and mental health over time (Miyazaki et al., 2003; Rodriguez & Cohen, 1998).

In the context of maternal sleep health, both of these models are highly relevant. The postpartum period is a time when sleep is often disrupted due to infant care, hormonal changes, and competing social roles. From a stress-buffering perspective, emotional and practical support from partners, whānau, or peers can help mothers manage the mental and emotional demands of these challenges (Williamson et al., 2013). For example, sharing nighttime caregiving responsibilities or receiving reassurance about parenting can reduce worry and hyperarousal, making it easier to fall and stay asleep. Emotional support may also help lessen the burden of adversity at this time. The main effects model, on the other hand, highlights the ongoing benefits of social connections beyond periods of acute stress.

Mothers embedded in supportive social or professional networks may be more likely to maintain consistent routines, prioritise self-care, and take opportunities to rest, all of which can promote better sleep health over time. Feeling connected and supported may also increase a sense of security and belonging, further protecting maternal wellbeing and, in turn, sleep health (Balaji et al., 2007).

Together, these models posit that support can influence maternal sleep and mental distress in multiple ways, by directly promoting adaptive behaviours and emotional regulation (main effects) and by reducing the negative impact of stress (stress buffering). This dual perspective is particularly important during the postpartum period, when mothers' sleep and mental health are highly vulnerable but also responsive to social resources. Despite this, research explicitly linking these theoretical models to maternal sleep and mental distress is still limited.

2.4.2 Support Definitions and Operational Distinctions

Support is an umbrella construct that is variably defined and operationalised across disciplines, contributing to inconsistent measurement and interpretation (Gottlieb & Bergen, 2010). To reduce ambiguity, this thesis distinguishes support across three dimensions: source (social or professional), function (also called domain or the type of support provided), and adequacy.

There are many different definitions of social support. Cohen and Syme (1985 p. 4), argue the simplest definition is "the resources provided by other persons". To clarify what is meant by "resources" in this thesis, social support is organised into support domains, defined here as functionally distinct categories of supportive resources reflecting what support does for the recipient (i.e., the type of need it targets). Consistent with family-focused literature, four domains are emphasised: emotional, advice, practical/concrete, and

financial support (Houston & Dolan, 2008). Emotional support includes components of interpersonal affection, care, concern, feeling comforted and/or listened to (Houston & Dolan, 2008; Langford et al., 1997). Advice support refers to guidance that helps a mother interpret situations and make decisions (Houston & Dolan, 2008), whereas practical/concrete support involves tangible assistance, such as providing childcare so a mother can attend to errands or appointments (Gottlieb & Bergen, 2010). Lastly, financial support refers to monetary or material assistance that reduces economic strain.

Social support may also be considered dynamic in nature (Cornwell, 2003). That is, support networks and their effectiveness may change over time, shaped by life transitions, shifting social roles, and evolving needs. As a result, the availability of support, and the extent to which it is experienced as helpful, may fluctuate, and individuals may actively seek, accept, or withdraw from support depending on situational demands and personal factors. This dynamic perspective highlights that support is continually negotiated within relationships rather than simply present or absent (Cornwell, 2003).

Professional maternal support is considered separately in this thesis because it differs in structure and expectations. It refers to assistance provided by professionally trained healthcare providers and is often characterised as being more unilateral, with support flowing primarily from the professional to the recipient and with less expectation of reciprocity than in informal social networks (Hupcey & Morse, 1997).

Across both social and professional contexts, it is also important to distinguish perceived support (beliefs about availability), received/enacted support (what was actually provided), and support adequacy, defined as “evaluations of the quantity and/or quality of received support” (Gottlieb & Bergen, 2010 p. 512). The emphasis on adequacy in this thesis is intentional, as it shifts attention from whether support is available to whether support is experienced as sufficient and helpful in context.

2.4.3 Support Measurement

Measuring support is methodologically challenging because the construct is often underspecified and operationalised inconsistently across studies (Langford et al., 1997). Many studies treat support as a self-evident, uniformly beneficial exposure, yet definitions vary from structural indicators (e.g., partner status, household composition, size of social network) to functional accounts (e.g., emotional reassurance, practical help), to more global perceptions (e.g., “I feel supported”; Williams et al., 2004). When these distinct concepts are collapsed into a single label of ‘support’, it becomes difficult to compare findings across studies or to interpret what an observed association with sleep health or mental distress actually reflects (Barrera Jr, 1986).

One of the most frequently used psychometric instruments for assessing social support is the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). The MSPSS is a brief self-report instrument designed to assess an individual’s subjective appraisal of the support available to them from three relationship sources: family, friends, and a significant other. The MSPSS is valuable for its brevity and for capturing global perceived support, which is strongly linked to health outcomes. However, it does not directly assess enacted support transactions, support quality, or negative/ambivalent interactions, and its source-based structure can be limiting when the hypothesised mechanism depends on support function (e.g., practical nighttime caregiving help versus emotional validation). In other words, the MSPSS can indicate who is perceived as supportive, but it is less informative about what kind of support is being provided and whether it fits the person’s needs.

To provide a more nuanced understanding of support, the Social Support Effectiveness (SSE) framework focuses on whether enacted support is experienced as effective by the recipient (Rini & Schetter, 2010). In practice, SSE is commonly assessed using the 25-item

Social Support Effectiveness Questionnaire (SSE-Q), which asks respondents to rate the effectiveness of support from a specified provider (often an intimate partner) over the prior three months. For each of three functional support domains (emotional, informational, instrumental), respondents rate (a) how well the amount received matched what was needed, (b) whether they wished it had been different, (c) skilfulness of delivery, (d) difficulty obtaining it, and (e) whether it was offered without being asked, along with unintended negative by-products (e.g., guilt or indebtedness). However, SSE measures typically rely on retrospective self-report and may be vulnerable to mood-congruent appraisal (e.g., elevated distress reducing perceived effectiveness), complicating interpretation in cross-sectional analyses. Further, SSE is often provider-specific (commonly partner-focused), which may under-represent wider social networks and professional supports that are salient in perinatal contexts.

2.4.4 Service User Perspectives and Co-Design

Given ongoing definitional ambiguity and measurement limitations, there is a strong rationale for incorporating service user evaluation and co-design when developing, selecting, and interpreting support constructs and related outcomes in health research and service delivery (Bate & Robert, 2006). Where support is underspecified and operationalised inconsistently, service user input helps ensure that what is being measured aligns with the lived reality of receiving (or lacking) support, particularly the quality, fit, and unintended consequences of supportive interactions that are often missed by conventional scales (Bate & Robert, 2006). Experience-based and co-design approaches explicitly treat service users as experts on the care experience, enabling researchers and service providers to identify which aspects of support are most salient (e.g., emotional safety, judgement-free communication, practical feasibility) and to refine tools or service components accordingly. Patel and Rajasingam (2013) argue that user engagement should be treated as a core

mechanism for improving the quality and sustainability of maternity services, rather than as an optional patient experience add-on. They define user engagement as a mutual exchange of information and ideas between health professionals and service users that builds an empathic, trusted relationship and supports women to balance clinical information with their own needs and preferences.

2.5 Professional Support

Professional support is often structured and regulated, delivered in accordance with clinical guidelines, policies, or standards of practice, which define the scope, boundaries, and nature of interactions between provider and recipient (Hupcey & Morse, 1997). This type of support is generally readily available within service frameworks and does not require establishing a pre-existing personal relationship between the professional and the recipient. In contrast, social support may be reciprocal, developed over time, not based on professional standards, and much broader than professional support.

These differences matter for the present thesis because professional support is not only a relational resource but also a system-level exposure shaped by service design (e.g., continuity, accessibility, cultural safety, and care priorities). In NZ, professional maternal support is commonly delivered through universal services in the early parenting period, including the Well Child Tamariki Ora (WCTO) programme. This programme is a free universal child health service designed to support mothers, infants, and whānau during the early years of a child's life. This service includes scheduled health checks, developmental screening, and parenting support, delivered primarily by registered nurses, in accordance with nationally mandated protocols (Ministry of Health, 2013a, 2013b).

2.5.1 Professional Support in Aotearoa: Opportunities and Gaps

The World Health Organization's postpartum care recommendations were developed through evidence review processes that incorporated quantitative and qualitative research and aimed to improve postpartum experiences, service delivery, and care utilisation (World Health Organization, 2014, 2022). Although the WHO defines the postpartum period as the first six weeks following birth, the guidance emphasises principles that are relevant beyond this window, including the importance of respectful care, psychosocial support, and health system arrangements that enable women and whānau to access and benefit from services (World Health Organization, 2022).

Within maternal care, many recommendations focus on clinical assessment and medical management. However, the guidelines also include recommendations related to maternal mental health. They support screening for postpartum depression and anxiety using validated instruments (e.g., EPDS, PHQ-9) and highlight the need for appropriate training for practitioners and follow-up pathways where screening indicates elevated risk (World Health Organization, 2022). In addition, the WHO recommends psychoeducation and support to strengthen coping and social resources, with psychological interventions indicated when clinically warranted. At the system level, the guidance frames high-quality postpartum care as dependent not only on discrete clinical interventions, but also on the broader structures and processes through which care is delivered. The guidelines also endorse models that promote continuity of care (e.g., midwife-led continuity-of-care where contextually feasible), while noting that implementation is complex and resource-dependent (World Health Organization, 2022). Overall, this guidance positions professional postpartum care as both a set of clinical practices and a relational/systemic platform through which mothers can be screened, supported, and linked to resources. This is directly relevant to this thesis, which examines whether professional support structures

meaningfully address maternal wellbeing needs, particularly sleep health and mental distress, rather than focusing solely on infant outcomes.

Engagement with professional maternal care functions as a determinant of health outcomes in its own right. Poor or inconsistent engagement, whether due to barriers in access, systemic inequities, or psychosocial factors, has been consistently linked to adverse outcomes, even when demographic characteristics such as age, ethnicity, or socioeconomic deprivation are controlled for (Dawson et al., 2022). Inadequate engagement may lead to delayed detection of complications, poorer management of chronic conditions, and insufficient support during pregnancy and the postpartum period, each of which increases the likelihood of adverse maternal and perinatal outcomes (World Health Organization, 2022). Importantly, maternal care engagement is not simply a matter of individual motivation or preference. Barriers to engagement are multifactorial and include practical constraints (e.g., transport, childcare, work demands), financial barriers, stigma, discrimination, and cultural misalignment between health services and the needs of diverse populations. Research in NZ has shown that Māori and Pasifika mothers, in particular, experience systemic barriers that limit their access to culturally safe and responsive care, despite having similar or greater levels of need than Pākehā mothers (Matheson & Ellison-Loschmann, 2017). When healthcare needs are left unmet, it can create health inequities that exacerbate existing disparities (Gauld et al., 2014).

2.5.2 Well Child Tamariki Ora

In NZ, the WCTO programme provides free support and health visits for tamariki from birth to age five and their whānau (Health New Zealand, 2025). According to the Well Child Tamariki Ora National Schedule and the Well Child/Tamariki Ora Quality Improvement Framework (Ministry of Health, 2013a, 2013b), the programme is designed to provide services to all, with additional services offered to those who are most in need. Visits may

include health and development assessments, family/whānau care and support, and health education. For example, during a typical visit a WCTO practitioner (often nurses) may measure the child's height and weight, assess the family's health and wellbeing, and provide advice on breastfeeding and maternal nutrition (Health New Zealand Te Whatu Ora, 2024). The WCTO programme offers a unique opportunity to deliver frontline support and care to most new mothers in NZ.

Sleep guidance within the WCTO programme is primarily centred on promoting safe infant sleep practices to reduce the risk of sudden unexpected death in infancy (SUDI). Current recommendations discourage co-sleeping and encourage placing the infant in a separate but nearby sleep space (Ministry of Health, 2013a, 2014). The delivery of this guidance is largely checklist-driven, for example, through routine questions that confirm whether the infant sleeps separately, rather than encouraging practitioners to foster a broader dialogue about the range of safe sleep practices (Ministry of Health, 2013a). This approach often overlooks the complexities of co-sleeping or the wider contextual factors that contribute to SUDI. Risks are influenced by an interplay of determinants such as poverty, parental engagement, maternal smoking during pregnancy, infant health conditions, maternal mental wellbeing, and fragmented services (Tipene-Leach & Fidow, 2022). Consequently, scholars have argued that in order to more effectively reduce SUDI it is important to move beyond an 'abstinence-only' message and instead adopt approaches that acknowledge and respond to these diverse risk factors (Altfeld et al., 2017). Such recommendations point to the importance of a more nuanced and comprehensive exploration of safe sleep practices within the programme.

While infant sleep safety is emphasised, advice relating to maternal sleep is notably absent from the WCTO programme (Ministry of Health, 2013a, 2014). Despite the well-established role of maternal sleep in supporting both maternal health and child wellbeing, the

guidelines do not require providers to assess or provide information about maternal sleep health, patterns, or challenges (Ministry of Health, 2013a). The emphasis remains almost exclusively on infant safety, particularly regarding co-sleeping, while maternal sleep health receives little to no attention. This absence extends to online resources from the Ministry of Health (2024c). The website includes extensive material on infant safe sleep, but it lacks meaningful content on maternal sleep or practical strategies to support maternal rest. Taken together, these limitations reveal a significant gap in the WCTO programme's approach to sleep. By prioritising infant safety while overlooking maternal sleep health, the current framework fails to account for the interdependent wellbeing of mothers and their babies. There is a clear need for a more comprehensive, inclusive model that addresses both infant and maternal sleep, recognising sleep as a critical determinant of maternal and child health outcomes.

The WCTO national schedule calls for screening and referral pathways for maternal mental distress (Ministry of Health, 2013a). While practitioners are encouraged to do a general wellbeing check where they may ask “‘How’s your sleep?’, ‘How’s your mood?’, ‘How are you managing?’”, the schedule requires practitioners to screen for postpartum depression twice. The first instance occurs around 4-6 weeks postpartum, and the second at 3-4 months postpartum. For screening, the schedule permits the use of the Patient Health Questionnaire 3 (PHQ-3; MacGregor et al., 2012), which is a shortened version of the widely used PHQ-9. This comprises three questions: “1. During the past month, have you often been bothered by feeling down, depressed or hopeless? 2. During the past month, have you often been bothered by little interest or pleasure in doing things? 3. Additional support question - Is this something with which you would like help?.” A recent study examined the confidence of WCTO practitioners in using the PHQ-3 and found that 95% of practitioners were confident in their ability to use the tool. However, 70% believed it supported the identification of postpartum depression, while only 64% thought it was suitable for use with

Māori mothers (Faulkner & Moir, 2023). The PHQ-3 is indicated before the use of the EPDS due to the brevity of the measure and ease of use.

Additionally, the WCTO practitioner handbook provides further detail on the risk factors for depression, anxiety, and bipolar disorder, and the impact of maternal mental distress on the child-parent relationship and child development (Ministry of Health, 2014). Practitioners are instructed to observe attachment and interactions between the infant and mother and, when maternal mental health concerns are identified, to provide information about local services and refer parents if appropriate. The handbook also provides a small section on interventions for mental distress (Ministry of Health, 2014). Practitioners are encouraged to build trust with mothers, fathers, and whānau by linking them to agencies that can alleviate financial and social stress. Information on local antenatal and postpartum depression support groups is provided, alongside encouragement of strategies such as rest, exercise, and relaxation where feasible. A flexible approach to breastfeeding is recommended, recognising both its potential protective effects and the risk of exacerbating guilt if difficulties arise. Finally, practitioners are advised to guide parents in meeting their infant's social interaction needs, acknowledging that depression can make this more complicated (Ministry of Health, 2014).

A recent review of the WCTO programme highlighted inequities in access and efficacy of the programme, particularly for Māori and Pacific pēpi, tamariki, and whānau (Ministry of Health, 2020). These inequities contribute to poorer mental health outcomes for Māori and Pasifika in NZ. This was evidenced by lower engagement with services, difficulties accessing services, and anecdotal feedback that the programme did not provide culturally responsive models of care. Importantly for sleep, the review found that services place emphasis on outputs (such as giving SUDI prevention advice) rather than outcomes (safe sleeping practices). Common barriers to accessing the service include financial constraints,

transportation barriers, perceptions of a lack of cultural responsiveness, and negative experiences with healthcare (Smith, 2020). A Māori health review of the WCTO highlighted consistently lower service coverage for Māori and Pasifika families living in higher levels of deprivation (Smith & Stevens, 2022). The current approach is based on an international framework for child wellbeing surveillance, and this now needs to be adapted to NZ by producing Kaupapa Māori and indigenous-led frameworks (Leversha et al., 2025).

A qualitative study recently explored the experiences of mothers who faced unmet mental health needs while engaging with the WCTO service (Clapham et al., 2024). Thematic analysis identified three key themes: mothers feeling pressure to appear as if they were coping, the desire to establish meaningful connections with WCTO providers to share personal information, and the wish for recognition and support for themselves beyond just the baby's development. These findings highlight missed opportunities for WCTO providers to proactively address maternal mental health and suggest that a relational, family and whānau focused approach could improve support during routine visits. The study underscores the importance of considering maternal wellbeing alongside child health in a structured support service.

2.6 The Overlap Between Professional and Social Support

Some evidence suggests that professional support may, in certain contexts, overlap with and contribute to maternal social support. Rowe et al. (2013) investigated mothers' experiences of attending a newborn and family drop-in service and explored why they attended and how useful they found the service. The service is aimed at providing professional support to potentially vulnerable women transitioning from hospital to early parenting at home in Australia. Qualitative data showed that participants found the professional service provided both informational support and unintentional emotional support for mothers through

conversation and reassurance. These findings align with more recent qualitative research from England, where appraisal and informational support from healthcare providers were also identified as important factors in helping new mothers cope (McLeish et al., 2021).

These findings have important implications for healthcare practice. Professional support is often conceptualised as unidirectional, formal, and goal-oriented, whereas social support is typically viewed as relational, reciprocal, and ongoing. However, there are indications that professional support can also provide elements of social support, through reassurance, validation, and fostering confidence. While these effects are not yet consistently documented, they point to a potential dual function of professional support in supporting mothers both professionally and socially. At the same time, there are important conceptual and methodological reasons to avoid collapsing professional and social support into a single construct, as combining them can obscure mechanisms and complicate interpretation (Hupcey & Morse, 1997). Accordingly, this thesis treats professional and social support as analytically distinct, while recognising that professional support may sometimes perform social support functions (e.g., reassurance and validation) relevant to maternal sleep and mental distress.

2.7 Social Support

In the general population, the broader empirical literature has demonstrated the importance of social support for a range of health outcomes, including protection against depression (Garipey et al., 2016), heart disease (Barth et al., 2010), cancer progression (Nausheen et al., 2009), and even mortality (Shor et al., 2013). Meta-analytic research has demonstrated a robust association between social support and sleep outcomes (Kent de Grey et al., 2018). From an evolutionary perspective, social support is thought to provide a safe context for sleep, where sleepers are protected from danger (Nunn et al., 2016).

Research suggests that social support may have both a direct and indirect impact on sleep. Greater amounts of social support have been associated with fewer depressive symptoms, which in turn increase the likelihood that individuals obtain sufficient sleep (Krause & Rainville, 2020). Mesas et al. (2020) observed that higher perceived social support was associated with a lower risk of poor sleep quality and short sleep duration (≤ 6 hours). The authors speculate that perhaps going to bed with a trusted and supportive partner may facilitate detachment from the day's stressors, promoting better sleep quality and duration, or that higher perceived social support can buffer against psychological distress and encourages individuals to engage in positive health behaviours that are sleep supporting.

2.8 The Relationship Between Maternal Support and Mental Distress

Across the perinatal literature, support shows a robust inverse association with maternal mental distress, with lower support consistently linked to higher risk of postpartum depression and, in several studies, anxiety symptoms (Balaji et al., 2007; Cho et al., 2022; Wang et al., 2021a; Heh, 2003; Leahy Warren, 2005; Spry et al., 2021). This association is supported by evidence across study designs, including longitudinal analyses showing that postpartum support predicts trajectories of maternal mental health over time, even after accounting for antenatal distress and earlier levels of support. These findings suggest that support is dynamic rather than static, and that reductions in support may represent a clinically meaningful risk factor (Seymour-Smith et al., 2021). Meta-analytic synthesis also confirms a consistent negative association between poorer social support and postpartum depression (Ardiani et al., 2020).

A second finding from current literature is that how support is conceptualised and operationalised affects which associations emerge, particularly when support is

decomposed into domains or sources. Studies distinguishing functional components of support suggest that not all support types are equally protective for all outcomes. For example, in early postpartum mothers, functional support domains (informational, instrumental, emotional, appraisal) and informal structural support were associated with lower depressive symptoms and higher maternal self-efficacy, with appraisal support appearing particularly salient (Leahy-Warren et al., 2012). However, other cohort evidence indicates that domain effects may be more specific to anxiety than depression when multiple domains are modelled simultaneously. In Hetherington et al.'s (2018) research, several support types were associated with distress in univariate analyses, but after adjusting for multiple domains, only low emotional and informational support remained associated with higher postpartum anxiety risk, and no single domain independently predicted depression. This suggests that domain-specific support may be especially relevant for anxiety-related distress, while depression may be more strongly linked to cumulative support patterns, shared variance across domains, or unmeasured aspects of support quality.

Thirdly, there is increasing evidence that perceived support adequacy and satisfaction may be as important as nominal availability. For example, mothers who feel adequately supported have been shown to report fewer depressive and anxiety symptoms, supporting the interpretation that subjective appraisal, fit, and perceived reliability of support may be core mechanisms linking support to maternal wellbeing (Inekwe & Lee, 2022). Longitudinal within-person modelling further shows bidirectional coupling between distress and support, with elevations in stress and anxiety predicting subsequent decreases in perceived support from friends and family, and increases in partner and family support predicting subsequent reductions in stress and anxiety (Racine et al., 2019). Together, these findings imply that maternal distress can erode perceived support over time, while supportive

relationships, particularly partner and family support, may function as protective resources that dampen distress trajectories.

Finally, intervention evidence indicates that both informal and formal support can reduce postpartum depression risk, and that the salient mechanisms may lie in the content and quality of supportive interactions rather than the source of support. In a Cochrane review, both lay support and professional support interventions were associated with reduced risk of developing postpartum depression, despite differences in delivery mode, with lay interventions often emphasising emotional reassurance and practical assistance (Dennis & Dowswell, 2013). Complementing this, mixed-methods synthesis suggests that multiple sources of support, such as partners, family, friends, and digitally delivered informational or emotional supports, can be protective for both depression and anxiety, highlighting that source and mode of delivery are relevant but not determinative (Sufredini et al., 2022). Overall, the literature supports social support as a meaningful protective factor for maternal mental health, while also indicating that effects are contingent on how support is measured (global versus domain-specific), the outcome considered (depression versus anxiety), and dynamic feedback processes between distress and perceived support over time.

2.9 Sleep, Mental Distress and Support in the Maternal Population

While research has considered the links between social support and maternal mental distress, growing evidence highlights the need to consider sleep as a critical factor within this relationship. As previously mentioned, sleep disturbances are highly prevalent in the perinatal period. They are strongly associated with both depressive and anxiety symptoms, yet the role of support within this relationship has only recently been explored. Considering sleep, mental distress, and support together provides a more holistic understanding of maternal wellbeing, and recognises that these domains interact during the postpartum

period. Several recent studies have begun to disentangle these relationships, however they vary in their methodological approaches, conceptualisations of support, and outcome variables, leading to both converging and conflicting findings.

Across diverse designs, findings from a number of studies have converged to highlight that poorer sleep, higher distress, and lower support tend to co-occur. In a rural U.S. maternal sample, correlational analyses indicated that poor overall sleep health clustered with low perceived social support and elevated distress, with this pattern particularly evident among women with lower socioeconomic status, accompanied by a high prevalence of insomnia symptoms (Fischer et al., 2024). Similarly, in early pregnancy in a Chinese sample, higher perceived social support was associated with better subjective sleep quality (lower PSQI scores) and fewer depressive symptoms Zhang et al. (2023). Extending this pattern across the perinatal period, trajectory analyses by Tomfohr et al. (2015) using four assessments from early pregnancy to 6 months postpartum, showed that trajectories of sleep quality measured by the PSQI were associated with differing results on the EPDS and SSE. Women in the stable low-PSQI trajectory reported the highest levels of social support on the SSE scale and the lowest levels of depressive symptoms and anxiety. In contrast, women in the persistently high-PSQI trajectory reported lower SSE scores alongside the highest EPDS and maternal anxiety scores. Overall, these findings suggest a consistent clustering of sleep, mental distress, and support even though most studies operationalise support globally and emphasise sleep quality or composite sleep health rather than testing domain-specific support mechanisms or unique relationships with specific sleep health facets.

Beyond simple co-occurrence, pathway-oriented studies suggest that sleep, mental distress, and support may be linked through interlocking mechanisms, including mediation, moderated effects, and context-dependent interactions. For example, in early pregnancy, perceived social support has been associated with fewer depressive symptoms in part

through better sleep quality, with sleep quality showing a partial mediating role, which implies that support may influence mood both via sleep-related processes (for example, reduced cognitive arousal, improved perceived rest) and via additional non-sleep pathways (Zhang et al., 2023). In the early postpartum period, a multiple mediation model indicated that the association between social support and postpartum anxiety operated fully through resilience, postpartum stress, and sleep problems (Wang et al., 2024). This suggests that support may reduce anxiety by strengthening coping capacity, reducing stress exposure or appraisal, and lowering sleep disruption, with sleep positioned as one component of a broader stress-regulatory pathway. Relatedly, relationship context appears to shape these pathways by altering both support and distress processes. In a study of Chinese postpartum mothers, marital satisfaction and perceived caring from a mother-in-law were linked to postpartum depression directly and indirectly via social support, and sleep quality was influenced indirectly through depression. This pattern is consistent with a relational model in which family dynamics shape the availability or meaning of support, which then affects depressive symptoms, with downstream effects on sleep appraisal and disturbance (Qi et al., 2022).

When sleep is positioned as the initiating exposure, several studies suggest that support can alter the downstream effects of sleep disruption, though not always in a uniform “buffering” manner. In a moderated mediation model at one month postpartum, perceived social support reduced the extent to which sleep difficulties were associated with depressive symptoms and parenting stress, and it attenuated the indirect pathway from sleep difficulties to parenting stress via depressive symptoms, supporting a stress-buffering interpretation (Camisasca et al., 2021). Similarly, among adolescent mothers, poorer sleep quality and shorter sleep duration were associated with higher depressive and anxiety symptoms, and friend support buffered the association between poor sleep and depressive symptoms, whereas family support did not. This points to source-specific moderation and

suggests that the protective function of support may depend on which relationships are most developmentally salient or practically available (Yung et al., 2021).

However, evidence is not fully consistent with classic buffering. In a longitudinal study of postpartum mothers, social support, but not depressive symptoms, moderated the relationship between maternal sleep and maternal sensitivity, yet the direction was counterintuitive: poorer sleep predicted lower sensitivity only among mothers with higher support, while the association was non-significant among those with lower support (Ran-Peled et al., 2025). Overall, these pathway studies indicate that sleep can function both as a mechanism linking support to distress and as an exposure whose consequences depend on social context, but the direction and strength of moderation appears sensitive to timing, population and how support is operationalised, which may help explain heterogeneity across the perinatal literature.

2.10 Research Gaps and Inconsistencies

Overall, this review of current literature illustrates that the relationships between maternal sleep, mental distress, and support are complex, multidirectional, and influenced by developmental stage and cultural context. However, several gaps and inconsistencies remain. First, while maternal depression is the most frequently studied outcome, fewer studies have examined anxiety, stress, or the co-occurrence of multiple forms of mental distress (Wang et al., 2024; Yung et al., 2021). This narrow focus risks overlooking the broader emotional landscape of the perinatal period.

Second, findings are not always consistent with traditional buffering models. While studies such as Camisasca et al. (2021) and Yung et al. (2021) support a buffering role for support, Ran-Peled et al. (2025) reported a counterintuitive pattern, with poorer sleep predicting lower maternal sensitivity only among mothers with higher support. This suggests that

support is not universally protective, and that effects may depend on timing, context, or the type of support captured.

A likely contributor to this heterogeneity is measurement. Most studies operationalise support using global perceived support instruments, most commonly the MSPSS, which indexes perceived availability of support from broad sources (Camisasca et al., 2021; Fischer et al., 2024; Wang et al., 2024; Yung et al., 2021). While valuable for capturing overall perceived support, these measures provide limited information about the functional domain of support (emotional, informational, practical, financial) and rarely assess support adequacy, meaning whether the amount, type, and delivery of support match mothers' needs in context. As a result, studies can demonstrate that "higher support" is associated with better sleep or lower distress, but they are less able to specify which support functions matter most for particular sleep health outcomes, or whether unmet needs and poor fit are the active mechanisms.

Some research on maternal support and mental distress has examined support domains (Hetherington et al., 2018; Leahy-Warren et al., 2012; Sufredini et al., 2022). However, support domains have not been the focus of studies that investigate sleep concurrently. This represents a notable gap, as identifying which domains are most influential could clarify mechanisms linking support with sleep and mental distress and inform targeted interventions.

Additionally, it remains unclear whether maternal outcomes are more strongly shaped by support adequacy within specific domains, or by the cumulative burden of unmet support needs across domains. This uncertainty is consistent with emerging evidence from the general population suggesting that relationship quality and support adequacy may be more predictive than global support levels alone (Kent et al., 2015).

Most research focuses on informal social support from family and friends, with relatively little attention given to professional or formal support. This remains largely unexplored in the empirical literature and represents a critical gap, given that professional support is a potential intervention point and can shape access to resources, screening, and referral pathways.

Another limitation is the restricted postpartum timeframe studied in most sleep and wellbeing research (Filtiness et al., 2014). Many studies focus on the first 12 months postpartum, capturing a period of intense adjustment but potentially overlooking longer-term sleep and mental health trajectories. Of the studies discussed above, only Fischer et al. (2024) and Yung et al. (2021) included participants beyond this initial period. This narrow focus limits understanding of how sleep, mental distress, and support interact as new stressors emerge, including returning to work, changes in family dynamics, and the developmental demands of older infants and toddlers.

There is also limited diversity in samples and inconsistent reporting of ethnicity and social determinants of health, including socioeconomic deprivation. Indigenous and socioeconomically disadvantaged groups remain under-represented in health research (Routen et al., 2022). In NZ, under-representation of Māori in research perpetuates inequities and breaches commitments under Te Tiriti o Waitangi. Sampling predominantly from more privileged groups may reduce capacity to detect patterned differences and may fail to reflect populations most affected by poor sleep health, mental distress, and unmet support needs.

Finally, qualitative and mixed-methods research remains scarce in this area (Fischer et al., 2024). Most studies rely on quantitative sleep indices, such as PSQI scores or hours slept, without examining how mothers interpret sleep disruption, negotiate caregiving responsibilities, and experience support from whānau, peers, or professionals. Qualitative

approaches could clarify mechanisms (for example perceived adequacy, relational safety, and barriers to accessing support) and support more culturally responsive and feasible interventions to improve maternal sleep health and mental distress informed by lived experiences.

2.11 Chapter Summary and Thesis Positioning

This chapter has synthesised evidence on maternal sleep health, maternal mental distress, and support, situating these domains within socioecological models and the social determinants of health that shape mothers' lives in NZ. Across the literature, sleep, mental distress, and support are consistently shown to be interconnected. However, they are often examined in isolation, within narrow timeframes, or without adequate attention to broader structural and cultural contexts.

Research on maternal sleep has increasingly adopted a multidimensional sleep health framework, recognising that sleep duration, timing, continuity, regularity, daytime alertness, and satisfaction represent distinct but related facets of sleep. Despite this conceptual shift, much maternal sleep research remains focused on the early postpartum period and often centres on single facets of sleep health. As a result, less is known about maternal sleep health beyond infancy, particularly in relation to how different facets of sleep health relate to support experiences and mental distress.

Similarly, the literature on maternal mental distress has primarily focused on postpartum depression, with comparatively less attention to anxiety, broader psychological distress, and the co-occurrence of symptoms. While the bidirectional relationship between sleep and mental distress is well established, sleep is frequently conceptualised as either a symptom or secondary outcome, rather than as a multidimensional exposure that may independently shape maternal wellbeing.

The support literature highlights the protective role of both social and professional support for maternal mental health. However, definitions and measurements of support vary considerably. Many studies rely on global measures of perceived support, which limits understanding of whether different domains of support (e.g., emotional, advice, concrete, financial) relate differently to specific sleep health facets and mental distress outcomes. Additionally, professional support structures, including universal services such as WCTO, have rarely been examined in relation to maternal sleep, despite their central role in supporting mothers in NZ.

Importantly, much of the existing literature gives limited attention to social determinants of health and Indigenous inequities. Evidence from NZ demonstrates persistent sleep and health inequities for Māori, yet maternal sleep and support research has not consistently centred equity, nor examined how structural conditions shape sleep opportunity, support adequacy, and mental distress.

Taken together, these gaps indicate the need for research that:

- Examines maternal sleep using a multidimensional sleep health framework;
- Investigates domain-specific and cumulative support adequacy in relation to both sleep and mental distress;
- Considers professional support experiences alongside social support;
- Extends beyond the early postpartum period; and
- Explicitly situates maternal sleep and wellbeing within the socioecological and equity context of NZ.

This thesis responds to these gaps through two complementary components. The qualitative component explores mothers' lived experiences of professional support in relation to sleep and mental wellbeing using data from the *Wāhi Kōrero* platform. The

quantitative component examines associations among different domains of social support, support adequacy, multidimensional sleep health, and maternal mental distress at approximately 3 years postpartum, using data from the *Moe Kura* study, with explicit attention to social determinants and ethnic inequities.

CHAPTER 3 METHODOLOGY

This chapter outlines the methodological approach, theoretical lenses, and design of this mixed methods thesis. Both the quantitative and qualitative studies in this thesis utilised data from two large existing datasets. As the quantitative and qualitative studies are prepared in journal manuscript format and required word limits, there was limited opportunity to provide a detailed description of the methods. Therefore, this chapter presents full details of the study backgrounds and methods of *Wāhi Kōrero* and *Moe Kura*.

3.1 Pragmatic Paradigm

A paradigm can be defined as a set of assumptions, practices and views that inform a research approach. This thesis is guided by the pragmatic paradigm, which emphasises real-world applications and the use of the most appropriate methods to address practical problems (Creswell & Clark, 2011; Hall, 2013; Kaushik & Walsh, 2019; Morgan, 2007; Shannon-Baker, 2016). From an ontological perspective, pragmatism asserts that there are both singular and multiple truths and that answers can provide multiple perspectives to a question. In essence, pragmatism is concerned with solving practical problems rather than building on assumptions about the nature of knowledge (Creswell & Clark, 2011; Hall, 2013; Shannon-Baker, 2016). This means that from an epistemological standpoint, a researcher may use any research method “that works” to answer the research question, based on practical value as opposed to the method’s underlying philosophy.

The pragmatic approach adheres to abductive reasoning, intersubjectivity, and transferability (Morgan, 2007). An abductive approach involves the researcher manoeuvring back and forth between inductive and deductive reasoning. Intersubjectivity is the assertion that both the “single real world” and an individual’s unique interpretation

of the world are not mutually exclusive, recognising the complexity of perspectives. Transferability refers to the extent that new knowledge can be transferred to other settings, whereby generalisability is not assumed. This combination of abductive reasoning, intersubjectivity, and transferability can serve as a guiding framework for a mixed methods approach. As Feilzer (2009) notes, this approach involves a deliberate navigation through theory and data, with the ultimate goal of generating socially valuable and practical knowledge.

3.2 Theoretical Lenses

In addition to the pragmatic paradigm, this thesis was guided by social determinants of health, socioecological and strengths-based lenses (Howden-Chapman et al., 2000; Maton et al., 2004; Solar & Irwin, 2010). Social determinants of health are the non-medical factors and conditions of daily life that impact health. They refer to the conditions shaping people's daily lives, such as socioeconomic position, housing, education, and access to resources which are shaped by the broader social, political, and economic systems in which these conditions are produced (World Health Organization, 2025b). Consequently, it is important to recognise that the domains of sleep and mental distress are intrinsically intertwined within the framework of social determinants of health and should not be considered in isolation from these broader contextual factors.

The socioecological lens complements a social determinants approach by conceptualising health and wellbeing as shaped by interacting influences across multiple levels of a person's environment (Bronfenbrenner, 1977; McLeroy et al., 1988). Rather than locating sleep health or mental distress primarily within individual behaviour, this lens emphasises how individual factors are embedded within interpersonal relationships, organisational and service contexts, community conditions, and broader structural and policy settings. From a

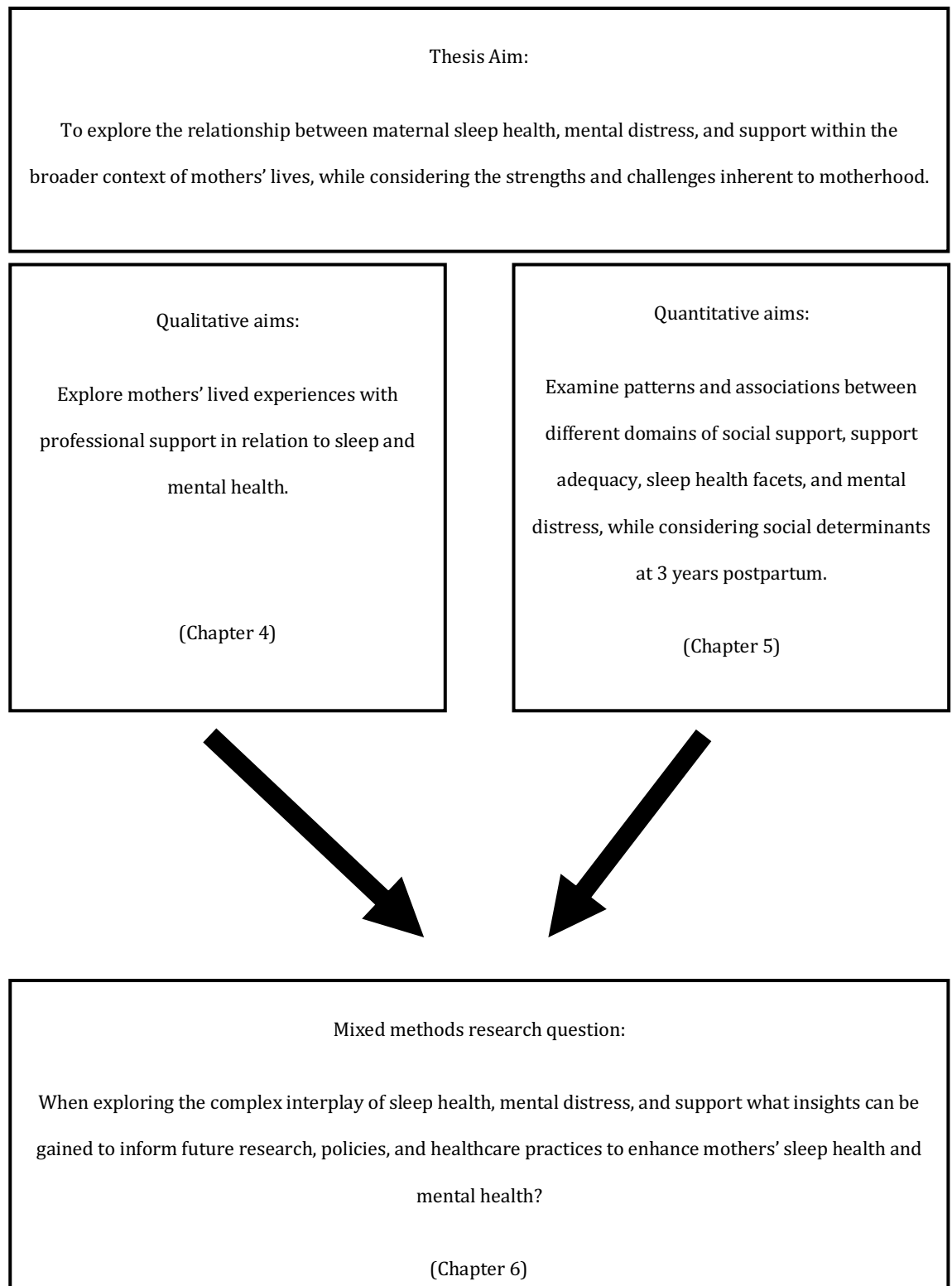
socioecological perspective, these levels are interdependent and mutually reinforcing. For mothers, this means sleep opportunity and sleep disruption can be understood as products of caregiving arrangements, household and housing environments, work schedules, and service systems, alongside individual sleep practices (Grandner, 2022). In this thesis, the socioecological lens informed interpretation by situating support as a multi-level construct, encompassing not only interpersonal support but also institutional and structural supports, and by framing inequities in sleep health and mental distress as consequences of contextual constraints and service environments rather than individual deficit.

The strengths-based lens is a relatively new and developing approach to research (Fenton et al., 2014). The strengths-based approach utilises frameworks from psychology and social work in response to practice and research that used deficit discourse and was disempowering. Deficit discourse refers to discourse that emphasises people or groups in terms of deficiency, such as absence, lack, or failure, and places responsibility for problems on the affected individuals or communities while overlooking the broader socio-economic structures that shape their circumstances (Fogarty et al., 2018). Over time, the strengths-based approach has become embedded in modern research, with no seminal paper or consensus across definitions, rationales and methods, due to the approach emerging across multiple disciplines and through practice rather than one theoretical school (Maton et al., 2004). Nevertheless, a strengths-based lens features commonalities, such as an emphasis on self-determination, growth, dignity, and the empowerment of people and communities (Fenton et al., 2014; Zimmerman, 2013). The strengths-based lens informed the research questions of this thesis and guided the interpretation and discussion of findings. It also shaped the approach to working with secondary data by influencing the analytic lens, emphasising patterns of wellbeing, support, and resilience rather than focusing solely on distress or deficit.

3.3 Mixed Methods Methodology

Mixed methods methodology is often referred to as the third methodological movement, whereby mixed methods are positioned in the middle of the quantitative to qualitative continuum (Creswell & Clark, 2017; Johnson & Onwuegbuzie, 2004). The pragmatic paradigm supports mixed methods research, as the researcher implements methods based on practical value to answer the research questions. This thesis employed a “convergent parallel mixed method design,” in which both quantitative and qualitative studies were conducted simultaneously, followed by integration of the results from both methods (Creswell & Clark, 2011). Figure 2 contextualises the design with the aims of this thesis. This design leverages the complementary strengths of each method, effectively mitigating the weaknesses of one with the other (Hafsa, 2019; Sale et al., 2002).

Figure 2 Thesis aims



Both the quantitative and qualitative components were given equal weighting in this mixed methods design. Neither approach was prioritised over the other; instead, each contributed complementary insights to address the research questions. This balanced integration allowed for a more comprehensive understanding of the relationships between maternal sleep health, mental distress, and support.

3.4 Qualitative Study Methods

The following section provides an overview of the approach, development, ethical approval, participants, recruitment, inclusion criteria, and data collection for *Wāhi Kōrero*. This is followed by a description of the analytical approach undertaken for the qualitative component of this thesis.

3.4.1 Wāhi Kōrero

Wāhi Kōrero is a bespoke online story sharing platform which was designed to explore experiences of unmet health needs that have been underrepresented. This qualitative research tool provides a space for individuals to share their personal health experiences. The platform is designed to elicit narratives that can illuminate how structural inequities shape individual and population experiences (Breheny et al., 2021). To see the website visit: <https://wahikorero.co.nz>

The name *Wāhi Kōrero* is embedded in te ao Māori (Severinsen et al., 2025). It combines *wāhi*, meaning place or location, with *kōrero*, encompassing the act of telling, talking, or speaking (Williams, 1971). The name reflects the platform's kaupapa: to create a place where people can safely share their stories and have their voices heard. This inclusive ethos is also reflected in the platform's visual identity, which draws inspiration from Māori cultural concepts. For example, branding elements were designed to resemble the shapes

and symbols of a wharehau, the Māori meeting house, which holds cultural and community significance as a site of gathering and kōrero. By incorporating these patterns and symbolism, the platform was intentionally designed to evoke a sense of community, safety, and belonging, aligning with Māori values and aspirations (Severinsen et al., 2025).

3.4.2 Approach

The *Wāhi Kōrero* research team is comprised of Indigenous and non-Indigenous researchers who work together to create a safe and inclusive online space (Severinsen et al., 2025). This research collaboration is rooted in Te Tiriti o Waitangi (Aotearoa New Zealand's founding agreement) to ensure equitable contributions and power-sharing. It enables the merging of two distinct worldviews, which is embodied by the Māori metaphor "he awa whiria", braided river (Macfarlane et al., 2024). This perspective acknowledges that Western knowledge alone is insufficient to address issues that impact Indigenous peoples. The approach of *Wāhi Kōrero* ensures that Māori researchers have the autonomy to use Māori methodologies and participate in research that benefits Māori communities, while preserving data sovereignty.

The development of *Wāhi Kōrero* was a collaborative, multi-stage process. The kāhui rangahau (expert advisory group) encompassed representatives from diverse backgrounds, combining a wide range of expertise and community connections to ensure meaningful representation of different perspectives. Members included Māori and Pacific leaders, advocates and service users from mental health and addiction and LGBTQIA+ spaces, medical professionals, maternal and child health experts, and youth health and development specialists. The kāhui rangahau played an active role throughout the research process, including shaping prompts, guiding ethical discussions, and contributing to analysis, ensuring that the platform reflected the needs and viewpoints of diverse communities.

Stage 1 of developing the *Wāhi Kōrero* platform involved working with a creative agency to design the platform in ways that were both visually engaging and aligned with public health values. For example, casual text styles were chosen to reflect the emphasis on *kōrero* and open dialogue, while the font conveyed the weight and influence of individual voices. Stage 2 focused on developing user profiles to anticipate how different types of contributors might engage with the site. These profiles – *non-sharer*, *coaxed sharer*, *cautious sharer*, *immediate sharer*, and *external researcher or policymaker* – represented potential user journeys and informed design decisions that aimed to encourage participation from voices often excluded in traditional research forums. Stage 3 involved technical development, cross-browser testing, research team training, and finalising Terms of Use and the Privacy Policy in accordance with ethical requirements (Severinsen et al., 2025).

3.4.3 Ethical Approval

Ethical approval for *Wāhi Kōrero* was granted by the Massey University Human Ethics Committee (Application SOB 21/30). Given the potentially sensitive nature of narratives shared online, ethical safeguards were prioritised throughout the design and development of *Wāhi Kōrero*. Measures were implemented to support the safety (such as a quick exit button, which redirects to a news website) and wellbeing of participants and to foster a respectful, trustworthy environment in which individuals could share their experiences openly, with confidence that their stories would be handled appropriately and without judgment or misuse.

3.4.4 Study Development

While the platform development established the broader kaupapa and infrastructure for online story sharing, the qualitative component of this thesis project centred on a specific prompt within *Wāhi Kōrero*: “*Kōrero I wish I could’ve had with the Well Child nurse*”. This

prompt was developed in direct response to earlier research by the *Wāhi Kōrero* team, which found that young parents often experienced whakamā (shame) or fear that prevented them from seeking support (Severinsen et al., 2024; Ware et al., 2018). The kāhui rangahau played a key role in shaping the prompt to ensure it was open enough to capture diverse experiences, while being focused enough to reveal stories of unmet needs and inequities in service delivery.

3.4.5 Recruitment and Inclusion Criteria

A grassroots approach was taken to engagement, to ensure participants heard about the project from trusted sources. Participants were recruited through social media platforms, including Instagram, Facebook, and TikTok, targeting underserved groups such as young mothers and the Māori community. Collaboration with Action Station, a community campaigning organisation, along with a social media campaign, and word of mouth, facilitated participant recruitment.

3.4.6 Participants

Among all 420 *Wāhi Kōrero* respondents, 61% disclosed their ethnicity: 81% identified as NZ European Pākehā, 18% as Māori, 3% as Pasifika, and 6% as other ethnicities. Participants were able to select multiple ethnicities. The average age of participants was 34, and most identified as women. The term “mother” is used throughout this study as it reflects the language participants themselves used in their stories. However, it is acknowledged that not all caregivers may identify with the term “mother” outside the context of this research.

3.4.7 Prompt

In the present study, the following prompt: “Kōrero I wish I could’ve had with the Well Child nurse” was presented to participants. A Well Child nurse is a healthcare professional or service provider responsible for delivering the Well Child/Tamariki Ora (WCTO)

programme in NZ. This prompt encouraged participants to share stories of nondisclosure in relation to their Well Child provider. It aligns with the strengths-based approach by inviting participants to speak from their own experiences, giving voice to perspectives often silenced in traditional surveys. Traditional surveys often rely on fixed-response categories, closed questions, or researcher-led framing, which can limit participants' ability to express their priorities, language, and emotions, and can reproduce power imbalances by privileging the researcher's agenda (Severinsen et al., 2025). In contrast, *Wāhi Kōrero* created a culturally grounded, low-barrier, participant-led space that amplified voices typically excluded from conventional data collection methods.

3.4.8 Data Collection

The data collection period began in August 2021 and ran for a total of 9 weeks, with 420 responses received in total. The responses varied from 15 to 1,255 words with a median of 135 words. Each story submitted went through moderation by a member of the *Wāhi Kōrero* research team to ensure any identifying details of people, places and providers were removed. The moderation process also removed inappropriate, destructive or inflammatory content, to safeguard against website misuse. Participants provided informed consent and permission to use their stories for research upon story submission.

3.4.9 Analyses (current thesis project)

For the purposes of this research, only stories that referenced the word "sleep" were included, resulting in 181 participant stories (43.1% of total stories collected). This decision ensured the dataset directly aligned with the analytic aim of examining how mothers described sleep within their broader perinatal experiences, while retaining the narrative context in which sleep was embedded. These were analysed using reflexive thematic analysis (Clarke & Braun, 2021) supported by NVivo (Release 1.7.1) software. Thematic

analysis was selected because it offers a flexible yet systematic approach for identifying and interpreting patterns of meaning across a large set of brief narrative accounts. It supports a transparent analytic process, while enabling analysis that goes beyond surface description to develop nuanced, interpretive accounts of participants' experiences (Braun & Clarke, 2008).

In line with reflexive thematic analysis practice, the process occurred iteratively and recursively rather than as a strictly linear sequence of steps 1-6 (Clarke & Braun, 2021):

1. Familiarisation with the data: I immersed myself in the data by reading each story multiple times and used the read-aloud function to listen to entries. This engagement helped situate the content within the broader context of participants' stories. Reflective notes were written throughout this process to capture initial impressions and early analytic thoughts.
2. Coding: I took an inductive approach to coding, focusing on semantic meaning. Semantic codes capture the explicit or surface meaning of the data, rather than underlying assumptions or interpretations. I generated initial codes using NVivo software, which were iteratively refined as familiarity with the data increased. Codes reflected both participants' language and my interpretive insights. Analytic memos were maintained to document reflections, coding decisions, and evolving interpretations. Collaboration and reflexive discussion with coauthors regarding boundaries of codes was consistent.
3. Generating initial themes: Codes were grouped into potential themes based on patterns of shared meaning across the dataset. Themes were conceptualised as central-organising concepts that give coherence to related codes. At this stage, I developed a draft thematic map (a visual or conceptual representation of how codes clustered into themes and how themes related to each other). The map served as a

tool for exploring connections, identifying gaps, and planning further refinement of themes.

4. Developing and reviewing themes: Theme development was an active, collaborative process. Draft themes and the thematic map were iteratively reviewed against the codes and raw data to ensure alignment and coherence. Through ongoing dialogue with all authors via meetings, themes were refined, combined, or split as necessary, with attention to capturing meaningful, data-driven patterns. Themes were critically interrogated to ensure they reflected structural patterns and lived experiences rather than researcher assumptions.
5. Defining and naming themes: Final theme labels and definitions were developed to provide clarity, coherence, and interpretive depth. Each theme was defined in terms of its central-organising concept and the story it told about participants' experiences. To support reflexive accountability, I maintained a written audit trail (reflective notes, analytic memos, and saved iterations of the thematic map) that documented how interpretations developed over time, including decisions about code definitions, theme boundaries, and the relative emphasis given to particular patterns. Regular discussions with the author team were used to surface assumptions, test analytic claims, and strengthen coherence, while retaining the final interpretive responsibility of the lead analyst in line with reflexive thematic principles.
6. Producing the report: Findings were structured around the final themes, illustrated with participant quotes reproduced with original spelling and grammar to preserve authenticity and voice. Drafting the manuscript, and iterative discussion of successive drafts with coauthors, supported ongoing refinement of the themes and strengthened interpretation of their meanings in relation to the qualitative study

aims and the broader thesis. Accordingly, writing functioned as an integral component of the analytic process rather than a final step (Braun & Clarke, 2008).

This rigorous and collaborative process supported the development of themes that provide a meaningful and well-reasoned interpretation of the data. At the same time, I acknowledge that theme development was shaped by my worldviews and positionalities, which is a core principle of reflexive thematic analysis. As such, the themes are presented as one possible interpretation rather than a definitive or universally replicable account.

3.5 Quantitative Study Methods

The second component of this research draws on quantitative data from *Moe Kura*. An overview of *Moe Kura*'s approach, development, ethical approval, study design, participants, measures and analyses are provided below:

3.5.1 Moe Kura

The “*Moe Kura: mother and child sleep and well-being in Aotearoa New Zealand*” study (*Moe Kura*; Signal et al., 2022), is a prospective longitudinal pregnancy-birth cohort study. The study aimed to investigate the relationship between sleep health and health outcomes in mothers and children across the perinatal period and early childhood. The name *Moe Kura* was gifted by Dr Te Huirangi Waikerepuru (Taranaki, Ngāpuhi). He described “*Moe Kura*” as being “based in the concept of *te au moe kura i te ao mārama*: the peaceful treasured sleep as of the child into the world of ancient wisdom, wonderment and light” (Moe Kura, n.d.).

3.5.2 Approach

The methodological approach of *Moe Kura* is grounded in Kaupapa Māori epidemiological research principles (Paine et al., 2013). This approach serves as a mechanism through which

Māori can uphold their fundamental right to scrutinise the actions and inactions of the Crown, and it views inequities as breaches of Te Tiriti o Waitangi and the United Nations Declaration on the Rights of Indigenous Peoples (Paine et al., 2020). Three principles underpinned the study development, data analysis, and findings.

1. Equal explanatory and analytical power for Māori and non-Māori: The principle of Mana Whakamārama, or equal explanatory power, challenges “representative” sampling methods that privilege dominant groups and obscure Māori experiences (Simmonds et al., 2008). Increasing Māori representation enables robust, comparable analyses for Māori and non-Māori, supporting the development of meaningful, equity-focused interventions. This approach upholds Māori rights under Te Tiriti o Waitangi. Mana Whakamārama informed all stages of *Moe Kura*, from sampling and recruitment to analysis, supporting a structural, rather than individual, exploration of sleep health inequities.
2. Māori participation and control at all levels and stages of the research: including research being led by Māori and non-Māori Co-Principal Investigators. Dr Sarah-Jane Paine serves as the kaitiaki (guardian) of Māori participants and their data for all *Moe Kura* research and also supervised this thesis.
3. Appropriate collection of ethnicity data to monitor and identify health disparities, and rejection of deficit framed interpretations of the data. This extends from the first two principles, and reflects Māori rights to monitor Crown inaction. It moves beyond identifying where inequities exist to examining why they occur, including the roles of systemic racism, power, and privilege. To support this, the study utilised the standard NZ Census ethnicity question, collected self-identified ethnicity at every data wave, and applied Māori/non-Māori analytical frameworks to ensure robust and culturally meaningful analyses.

3.5.3 Study Development

The original study was named “*E Moe, Māmā: Maternal Sleep and Health in Aotearoa/New Zealand*” and aimed to investigate maternal sleep changes and their impact on maternal mental health and birth outcomes from late pregnancy until early postpartum. However, as the study developed, the research team and advisors extended the scope to also investigate child sleep and wellbeing. In 2013, the study was renamed “*Moe Kura: Mother and child sleep and well-being in Aotearoa New Zealand*” (Signal et al., 2022). This programme of work was conducted by a team of researchers from the Sleep/Wake Research Centre at Massey University, Wellington, in collaboration with researchers from other institutions and a panel of Māori and non-Māori advisors with expertise in maternal and child sleep, health, and development.

3.5.4 Ethical Approval

Ethical approval for *E Moe, Māmā* was granted by the NZ Central Health and Disability Committee (HDEC) in October 2009 (CEN/09/09/070). Ethical approval for *Moe Kura* was granted as an amendment in November 2012 (CEN/09/09/070/AM02).

3.5.5 Recruitment and Inclusion Criteria

Recruitment for *E Moe, Māmā* commenced in the lower North Island of NZ in 2009, before expanding nationwide to enhance Māori representation. Study criteria required participants to be over 16 years old, pregnant with a single foetus, and able to respond in English to the questionnaires. Minimal barriers were put in place to capture a broad community sample, which means that the study sought to include participants from diverse socio-economic backgrounds, geographic locations, and levels of healthcare access, without imposing restrictive eligibility requirements beyond the core criteria. *E Moe, Māmā* participants were invited to join the *Moe Kura* study.

3.5.6 Participants

In 2009 and 2010, 1,186 pregnant women (423 Māori and 763 non-Māori) were enrolled in the *E Moe, Māmā* study. Over the course of the study some women dropped out, were uncontactable or only completed some of the questionnaires. Overall, 865 (262 Māori and 594 non-Māori) mothers completed all questionnaires. Participants were gifted a \$40 voucher at each data collection wave as a token of appreciation for their time.

3.5.7 Data Wave Collections and General Overview of Questionnaires

The *Moe Kura* study collected data across four waves. The initial wave occurred during late pregnancy (35–37 weeks gestation), the second wave between 4-6 weeks postpartum, the third wave at approximately 12 weeks postpartum and the fourth wave when *Moe Kura* children were 3-4 years old. Data collection waves 1, 3 and 4 were mail questionnaires which were completed by participants at home and data collection wave 2 was collected via a brief telephone call. For a summary of questions collected during each data collection wave, see Signal et al. (2022).

3.5.8 The Current Study

This thesis utilised data from collection wave 4, when *Moe Kura* children were 3-4 years old. Mothers were sent a 90-item, 26-page questionnaire titled *Your Sleep and Health* and a 67-item, 19-page questionnaire titled *Your Child's Sleep and Health at 3 Years*. This thesis focused on selected measures from the *Your Sleep and Health* questionnaire, which covered demographics, sleep health, mental distress and general health (see Appendix B for details). In this data wave, there were 294 Māori and 618 non-Māori participants who completed the *Your Sleep and Health* questionnaire.

3.5.9 Measures

Outcome Measures

Outcome measures were selected from the *Your Sleep and Health* questionnaire to align directly with the central constructs of this thesis: sleep health, mental distress, and support.

Sleep Duration

Sleep duration was collected by asking participants “In the last week how many hours sleep, including naps, do you usually get in 24 hours?” with responses categorised as short (<7 hours) and recommended (≥ 7 hours and <9 hours) sleep in line with current public health guidelines in NZ (Ministry of Health, 2024c) based on Hirshkowitz et al. (2015) recommendations. Participants reporting long sleep (>9 hours) were excluded from multivariable analyses due to the small sample size (n=40) and limitations associated with events per variable and associated limited statistical power (Greenland et al., 2016; Vittinghoff & McCulloch, 2007). Therefore, a dichotomous variable (short versus recommended) was used in analyses.

Sleep Quality

The General Sleep Disturbance Scale (GSDS) quality subscale was used to measure sleep quality (Lee, 1992). The GSDS Quality Subscale has three items: “How often in the last week did you feel rested upon awakening at the end of a sleep period?”, “How often in the last week did you sleep poorly?” and “How often in the last week did you feel satisfied with the quality of your sleep?” Each item in the GSDS was rated from 0 (never) to 7 (every day) with the first and last items in the quality subscale reverse scored. The mean score across the 3 items was calculated and then dichotomised as at risk for sleep disturbance (≥ 3) versus no sleep disturbance (<3). The GSDS (English) was originally developed and used in a large

cohort of employed women (registered nurses; N = 760), supporting its applicability outside clinical populations (Lee, 1992). In the initial psychometric evaluation, the GSDS demonstrated good internal consistency for the total scale ($\alpha = .88$), with subsequent studies in similar non-clinical samples reporting internal consistency in the acceptable-to-good range ($\alpha \approx .85$; Lee, 2007).

Social Jetlag

We used social jetlag as a measure of sleep regularity (Buysse, 2014). Social jetlag was calculated using the difference between midsleep on weekdays and weekends. Midsleep times were derived from questions on sleep onset and wake time items from the Munich Chronotype Questionnaire (Roenneberg et al., 2003). Midsleep was calculated for each day by finding the midpoint between sleep onset and wake time. The final weekday-weekend midsleep difference was dichotomised as >1 hour versus ≤ 1 hours (Levandovski et al., 2013; Wittmann et al., 2006). The MCTQ is a behavioural timing measure (not a summed “scale”), so its psychometric support is typically reported as agreement with external sleep/circadian indicators rather than internal consistency. In the original MCTQ paper, Roenneberg et al. (2003) presented preliminary validation in which participants’ reported sleep times showed high correlations with sleep-log times over five weeks, and that reported sleep timing corresponded well with self-assessed chronotype. This measure has been successfully utilised in previous epidemiological studies of Māori and non-Māori sleep health in NZ (Paine et al., 2014)

Daytime Sleepiness

The Epworth Sleepiness Scale (ESS; Johns, 1991) was used to assess daytime sleepiness. The ESS is a self-report measure consisting of 8 scenarios: sitting and reading, watching television, sitting inactive in a public space (e.g. a theatre or a meeting), as a passenger in a

car for an hour without a break, lying down to rest in the afternoon when the circumstances permit, sitting and talking to someone, sitting quietly after a lunch without alcohol, and in a car while stopped for a few minutes in traffic. Respondents rate their likelihood of “dozing off” in each of these scenarios on a Likert scale from 0-3, 0 (would never doze off), 1 (slight chance of dozing off), 2 (moderate chance of dozing off), and 3 (high chance of dozing off). In the present study, scores were dichotomised as >10 , indicating excessive daytime sleepiness, versus <10 (Johns, 1991). Psychometric evaluation shows high internal consistency (Cronbach’s $\alpha \approx .88$) and substantial test-retest reliability over ~ 5 months in healthy adults ($r \approx .82$), with factor-analytic work supporting a largely unidimensional structure (Johns, 1992). This measure has been successfully utilised in previous epidemiological studies of Māori and non-Māori sleep health in NZ (Gander et al., 2005).

Insomnia Symptoms

The Insomnia Severity Index (ISI) was used to measure the impact of insomnia symptoms on participants’ daily functioning (Morin, 1993; Morin et al., 2011). Participants who indicated they had a sleep problem on the screening item (“Do you consider that you have a sleep problem?”) completed the ISI. Seven items were responded to using a Likert scale from 0-4. The items cover 1) the severity of problems falling and staying asleep and waking up early, 2) satisfaction with current sleep pattern, 3) interference with daily functioning, 4) how noticeable sleep problems are to others and, 5) worry/distress about sleep problems. Total scores were categorised as “no clinically significant insomnia (0–7), “subthreshold insomnia” (8–14), “clinical insomnia (moderate severity)” (15–21), and “clinical insomnia (severe)” (22–28), as per the original scoring guidelines (Morin, 1993). For analyses, a categorical insomnia variable was derived with four levels: (1) no self-identified sleep problem (participants who did not endorse a sleep problem and therefore did not complete the ISI; reference group); (2) no clinically significant insomnia, (3)

subthreshold insomnia, and (4) moderate–severe insomnia. Moderate (n=75) and severe (n=15) categories were combined in multivariable analyses due to the small sample sizes, limitations associated with event per variable thresholds, and the associated limited statistical power (Greenland et al., 2016; Vittinghoff & McCulloch, 2007). Psychometric evaluation in both community (n = 959) and clinical samples found excellent internal consistency (Cronbach’s $\alpha = .90-.91$) and convergent validity via significant correlations with related constructs such as fatigue, quality of life, anxiety, and depression (Morin et al., 2011). Morin et al. (2011) also reported strong case-detection accuracy in the community sample, with a cutoff score of 10 yielding 86.1% sensitivity and 87.7% specificity. The ISI measure has been successfully utilised in previous epidemiological studies of Māori and non-Māori sleep health in NZ (Falloon et al., 2015).

Mental Distress

The Kessler 10 Psychological Distress Scale (K10), originally developed for use in the US National Health Interview Survey, is a short screening scale of non-specific psychological distress and is not a diagnostic tool (Kessler et al., 2002). Participants respond on a 5-point Likert scale (0=none of the time, 1=a little of the time, 2=some of the time, 3=most of the time or 4=all of the time in the last 30 days), in relation to 10 questions regarding: feeling tired for no good reason, feeling nervous, feeling so nervous that nothing could calm you down, feeling hopeless, feeling restless or fidgety, feeling so restless you couldn’t sit still, feeling depressed, feeling that everything was an effort, feeling so sad that nothing could cheer you up, and feeling worthless. Scores of 12 or more are strongly associated with having a depressive disorder in the previous year (Oakley Browne et al., 2010). Scores were dichotomised as “distressed” (≥ 12) versus “low distress” (< 12). In their original report, Kessler et al. (2002) concluded the K10 had strong psychometric properties and could discriminate diagnosable cases from non-cases, supporting its use in population health

surveys. Reliability evidence across studies is typically high; a recent reliability generalisation meta-analysis reported a mean Cronbach's α of $\sim .90$ for the K10 (Wojujutari & Idemudia, 2024). The K-10 has been used in the annual New Zealand Health Survey since 2006/2007 and in the New Zealand Mental Health Survey since 2003/2004 (Ministry of Health, 2008; Oakley Browne et al., 2010).

Predictor Variables

Support questions were based on the Social Support Questionnaire (SSQ; Sarason et al., 1983), and Pinkerton and Dolan's (2007) conceptual model. This model was originally developed to understand how social support, social capital, and resilience within families and communities can help adolescents cope with challenges. It emphasises that strengthening these networks through interventions can enhance coping and overall wellbeing. In previous *Moe Kura* data collection waves, support questions were relatively complex and items were completed inconsistently, suggesting that the wording was not clear to participants. Therefore, in the 4th wave of data collection, the questions were simplified after consultation with the wider advisory group members. Participants were asked: "Do you have the following types of support? (please tick one circle on each line)". Each domain of support was listed on a single line: "Financial support", "Emotional support (e.g. someone who listens or is 'there' for you)", "Advice (e.g. someone you can go to for information or guidance)", and "Concrete/Practical support (e.g. childcare, housework, cooking)". Participants selected from the following options on each line in relation to each domain: "I don't need any support", "I would like a lot more support", "I would like some more support", and "I have enough support".

Domains of Support

Categorical variables were created for each domain (financial, emotional, advice, concrete/practical) by dichotomising answers: “I don’t need any support” and “I have enough support” was coded as: “sufficient support”, while “I would like a lot more support” and “I would like some more support” were coded as “needs more support”. This recoding was undertaken because the paired options were conceptually similar in indicating either adequacy versus unmet need, and because the primary analytic focus was whether support was experienced as sufficient rather than the intensity of additional support desired. Dichotomisation also reduced sparse cell sizes that can arise when modelling multiple response categories across several domains.

Support Adequacy

Responses to the four original support items (responses to “Do you have the following types of support”) were used to create a “support adequacy” variable. This was calculated by summing the number of domains in which participants indicated that they needed more support. The variable was categorised into three levels: 0 (no additional support needed), 1–2 (some additional support needed), and 3–4 (most additional support needed). The reference category for analyses was 0 (no additional support needed). For example, if a participant indicated either “I would like a lot more support” or “I would like some more support” for financial and emotional support, but responded “I don’t need any support” or “I have enough support” for advice and concrete support, their final “support adequacy” value would be 2, placing them in the 1–2 additional support needed category.

Covariates

Maternal Ethnicity

Self-reported maternal ethnicity was measured using the 2006 New Zealand Census ethnicity question “Which ethnic group do you belong to?” (Stats NZ, 2006). Participants

could select more than one ethnic group to reflect their diverse identities, in line with official NZ guidelines for reporting ethnicity (Ministry of Health, 2017). Mothers who identified as Māori, either exclusively or alongside other ethnic groups, were classified as “Māori,” while all other respondents were classified as “non-Māori.” This dichotomisation aligns with *Moe Kura’s* approach to data analysis.

Maternal Age

A continuous variable was created for maternal age. This was calculated from the participants’ date of birth provided in data collection wave 1.

Socioeconomic Position

Socioeconomic position (SEP) refers to the social and economic factors that determine the position or positions an individual or group occupies within society (Lynch & Kaplan, 2000). SEP includes both resource-based measures, such as material and social resources and assets, and prestige-based measures, which reflect a person’s rank or status within social hierarchies (Krieger, 2001). In NZ, SEP is commonly measured using either area-level indices, such as the New Zealand Index of Deprivation (NZDep), or individual-level measures, such as NZiDep (a non-occupational, deprivation-based, socioeconomic index for individuals). NZDep is derived from census data and provides a measure of socioeconomic deprivation based on geographic areas, while NZiDep captures individual experiences of material hardship and access to resources, offering more detailed insight into lived realities (Salmond & Crampton, 2012). The NZiDep was selected to provide detail on the lived realities of material hardship and access to resources, offering more detail than area-level indices. The NZiDep was developed and validated using a sample of approximately 300 Māori, 300 Pacific and 300 non-Māori, non-Pacific adults (Salmond et al., 2006). Participants provide yes/no responses to the following situations in the last year: being out of paid work,

receiving a means-tested benefit, having to buy cheaper food, feeling cold to save money on heating, wearing worn out shoes due to cost, foregoing fresh fruit and vegetables to pay for other necessities, getting help from a community organisation in the form of clothes or money, and seeking assistance to obtain food e.g., a food bank. Items were summed and categorised to produce a score from 1 to 5 (1 = 0 deprivation characteristics, 2 = 1 deprivation characteristic, 3 = 2 deprivation characteristics, 4 = 3 or 4 deprivation characteristics, and 5 = 5 or more deprivation characteristics).

Waking for Childcare

Participants were presented with a list of possible nighttime disturbances and asked, "In the last week, what, if anything, woke you up during the night?", with response options of "yes" or "no". The item "giving care to a child" was included in analyses and categorised as a dichotomous yes/no variable. This variable was included to account for a mother's sleep being disrupted by caregiving.

Prior History of Mental Distress

A prior history of mental distress variable was created using data from previous data collection waves, where participants were asked if they had a history of anxiety or depression, or if they were currently experiencing anxiety or depression. Responses from these waves were combined to create a single prior history of mental distress variable. If a participant answered yes to any time points they were coded "yes". The variable was dichotomised as yes/no.

3.5.10 Statistical Analyses

Data preparation and analyses were conducted using IBM SPSS Statistics (Version 29.0; IBM Corp., Armonk, NY). Data cleaning involved screening for duplicate entries, checking for

missing values, and assessing data accuracy. To verify accuracy of data entry, I cross-checked a random 10% sample of hard-copy questionnaires against the SPSS dataset. No discrepancies were identified in the checked records, and no duplicate entries were detected. Several variables were created or transformed to support the planned analysis. Continuous variables were transformed into categorical groups, which were conceptually or clinically meaningful (e.g., coding of the ISI scores into clinically relevant categories). Missing data arose primarily because some participants did not respond to all questionnaire items. For inferential analyses, we used complete-case analysis (listwise deletion), such that participants were included in a given regression model only if they had complete data on the outcome, predictors, and covariates in that model. As a result, the analytic sample size varied slightly across models. Missingness was examined descriptively for key variables, and patterns were consistent with item non-response rather than data entry error.

Descriptive statistics were first calculated to summarise the sample's characteristics. Means and standard deviations were computed for the continuous variable (maternal age) and frequencies and percentages were calculated for the categorical variables. These analyses provided an overview of the distribution of key demographic, sleep, mental distress, and support variables.

To examine group differences at the univariate level, independent t-tests were conducted for the continuous variable (maternal age) and chi-square tests were used for the categorical variables (all other variables). Ninety-five per cent confidence intervals (CIs) were also calculated for group percentages to provide an estimate of the precision of the observed differences and to aid in the interpretation of comparisons between groups.

Following this, a series of binary and multinomial logistic regression models were calculated to investigate the independent relationships between domains of support, support adequacy and facets of sleep health and mental distress, summarised in Table 1.

Model 1 examined associations between the four support domains (financial, emotional, advice, and concrete/practical) and each sleep health and mental distress outcome, adjusting for maternal ethnicity, maternal age, individual deprivation, and nighttime awakenings due to childcare. Covariates were selected a priori based on existing literature on social determinants of health and sleep. For mental distress outcomes, prior history of mental distress was also included. Model 2 extended this analysis by additionally adjusting for sleep health facets when predicting mental distress. Models 3 and 4 examined the same outcomes using the composite support adequacy variable.

Table 1 Summary of regression models examining support and sleep/mental distress outcomes

Model	Outcome Variable(s)	Predictor Variable(s)	Covariates
1	Sleep duration, Sleep quality, Social jetlag, Daytime sleepiness, Insomnia symptoms, Mental distress	Four support domains entered simultaneously: Financial, Emotional, Advice, Concrete/Practical	Maternal ethnicity, Maternal age, Individual deprivation, Nighttime awakenings due to childcare; for mental distress outcomes, prior history of mental distress was included
2	Mental distress	Four support domains entered simultaneously: Financial, Emotional, Advice, Concrete/Practical	Maternal ethnicity, Maternal age, Individual deprivation, Nighttime awakenings due to childcare, prior history of mental distress, Sleep duration, Sleep quality, Social jetlag, Daytime sleepiness, Insomnia symptoms
3	Sleep duration, Sleep quality, Social jetlag, Daytime sleepiness, Insomnia symptoms, Mental distress	Support adequacy	Maternal ethnicity, Maternal age, Individual deprivation, Nighttime awakenings due to childcare; for mental distress outcomes, prior history of mental distress was included
4	Mental distress	Support adequacy	Maternal ethnicity, Maternal age, Individual deprivation, Nighttime awakenings due to childcare, prior history of mental distress, Sleep duration, Sleep quality, Social jetlag, Daytime sleepiness, Insomnia symptoms

Note. Covariates were selected a priori based on literature regarding social determinants of health and sleep.

Prior to running regression models, collinearity diagnostics were calculated to check for potential multicollinearity among predictor variables. Variables were considered potentially problematic if variance inflation factor (VIF) statistics exceeded 10, correlations between predictors were greater than 0.7, or conditioning indices were above 0.3 with at least two variance proportions for a single variable exceeding 0.5 (Belsley et al., 2005). An event per variable threshold of 5 was selected based on recommendations from Vittinghoff and McCulloch (2007), to avoid sparse data bias (Greenland et al., 2016).

Table 2 provides an overview of the qualitative and quantitative components that make up this mixed methods thesis. The qualitative study, *Wāhi Kōrero*, explored mothers' lived experiences of unmet health needs and drew on a strengths-based, Kaupapa Māori, and reflexive thematic approach. The quantitative study, *Moe Kura*, examined maternal sleep health, mental distress and support using data from one wave of a large longitudinal cohort guided by Kaupapa Māori epidemiological principles. Together, these studies offer complementary perspectives, with *Wāhi Kōrero* amplifying participant voices and contextual lived experiences, and *Moe Kura* providing population-level insights into the relationships between sleep health, mental distress and support.

Table 2 Overview of qualitative and quantitative study components

	Qualitative Study: <i>Wāhi Kōrero</i>	Quantitative Study: <i>Moe Kura</i>
Study focus	Experiences of unmet health needs (prompt: " <i>Kōrero I wish I could've had with the Well Child nurse</i> ")	Maternal sleep and wellbeing (wave 4, when children were aged 3–4 years)
Study design	Online story-sharing platform (cross-sectional narrative collection)	Prospective longitudinal pregnancy–birth cohort
Approach	Rooted in Te Tiriti o Waitangi	Kaupapa Māori epidemiological principles
Data source for this thesis	Secondary qualitative data collected via <i>Wāhi Kōrero</i> platform (2021, 9 weeks)	Secondary quantitative data from <i>Moe Kura</i> study (wave 4)

	Qualitative Study: <i>Wāhi Kōrero</i>	Quantitative Study: <i>Moe Kura</i>
Participants	181 stories referencing sleep from 420 total submissions	294 Māori and 618 non-Māori participants who completed the <i>Your Sleep and Health</i> questionnaire
Recruitment	Grassroots, social media, ActionStation, community networks	Nationwide recruitment through antenatal services (2009–2010)
Data collection methods	Anonymous story submissions via online platform	Mail and telephone questionnaires (4 waves)
Analytical approach	Reflexive thematic analysis (Braun & Clarke, 2022)	Descriptive and inferential statistical analyses guided by Kaupapa Māori epidemiological principles
Ethics	Massey University HEC (SOB 21/30)	NZ Central HDEC (CEN/09/09/070 and AM02)

3.6 Mixed Methods

3.6.1 Research Question

Integration through data “merging” occurs when researchers combine the qualitative and quantitative datasets so they can be analysed together and directly compared (Fetters et al., 2013). Integration in this thesis occurred at the interpretive level, as the qualitative (*Wāhi Kōrero*) and quantitative (*Moe Kura*) datasets were not directly linked through sampling or matched measures. The overarching mixed methods research question guiding this integration was:

“When exploring the complex interplay of sleep health, mental distress, and support what insights can be gained to inform future research, policies, and healthcare practices to enhance mothers’ sleep health and mental health?”

This question reflected the pragmatic paradigm underpinning the thesis, which aimed to generate knowledge that is both practically valuable and grounded in lived experiences. By combining qualitative and quantitative perspectives, this approach offered complementary

insights into the relationships between maternal sleep health, mental distress, and support while also amplifying the voices and experiences of mothers.

3.6.2 Data

The integration drew on secondary data from the two studies detailed above. From *Wāhi Kōrero*, 181 stories referencing sleep were included, collected via the online story-sharing platform over nine weeks in 2021. From *Moe Kura*, data from wave 4 of the cohort study (when children were aged 3–4 years) were used, including 912 participants (294 Māori and 618 non-Māori) who completed the *Your Sleep and Health* questionnaire. Both datasets were selected for their relevance to maternal sleep, mental distress, and support providing complementary lenses for examining the research question (Creswell et al., 2011; Fetters et al., 2013).

3.6.3 Analyses

Integration occurred through a narrative discussion of findings (Creswell & Clark, 2011). Using the “weaving approach”, qualitative and quantitative results were interlaced and reported together, organised concept by concept (Fetters et al., 2013).

The narrative discussion showed instances of confirmation, expansion or discordance between the findings from analyses of the two datasets to draw meta-inferences (Creswell, 2021; Creswell & Clark, 2017; Fetters et al., 2013; Guetterman et al., 2015). Meta-inferences are additional coverage that can be conclusions, interpretations, or insights that emerge when findings from the qualitative and quantitative components of a mixed-methods study are combined (Morgan, 2014; Tashakkori & Teddlie, 2003). Confirmation (sometimes called convergence) refers to instances where qualitative insights and quantitative findings aligned conceptually, reinforcing one another. Expansion occurs when the datasets provided complementary insights into mothers’ experiences, highlighting different aspects

of sleep health, mental distress, or support. Discordance (sometimes called divergence) occurs when findings appear to contrast or address different phenomena, prompting deeper interpretation.

Within each integrated subsection, quantitative results were presented first to summarise the relevant statistical patterns, followed by qualitative results, illustrated with excerpts. A brief interpretive comparison then specified whether findings from the quantitative and qualitative studies were shared (confirmation), complementary (expansion) or divergent (discordance).

The following chapters present the results of the analyses described above. Chapter 4 presents the qualitative findings, which explore the kōrero mothers' wished they could have had with their Well Child nurse regarding sleep. Chapter 5 then presents the quantitative findings, examining statistical associations between sleep health, mental distress, and social support. Finally, Chapter 6 presents the mixed methods findings alongside a discussion of their implications.

CHAPTER 4 ENHANCING MATERNAL SLEEP HEALTH IN AOTEAROA NEW ZEALAND: INSIGHTS FROM THE WĀHI KŌRERO PLATFORM

Chapter 4 presents the first paper of this thesis, which aimed to explore mothers' experiences of sleep-related unmet needs within Well Child Tamariki Ora services in NZ. Using qualitative data from the *Wāhi Kōrero* online story-sharing platform, this paper examined the kōrero that mothers wished they could have had with their Well Child nurse that related to sleep. The aim was to generate practice-relevant insights into how professional services could better support the maternal sleep health and mental wellbeing relationship. This chapter is presented in the form of a manuscript that has been published by *Kōtuitui: New Zealand Journal of Social Sciences Online*.



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STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the student and the student's main supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the student's contribution as indicated below in the Statement of Originality.

Student name:	Zoe Walsh		
Name and title of main supervisor:	Professor Leigh Signal		
In which chapter is the manuscript/published work?	4		
Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work:¹ The candidate led the analysis and incorporated feedback from co-authors. The candidate wrote the original and subsequent drafts of the manuscript in response to co-author feedback and formatted the manuscript according to journal guidelines.			
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☒	The manuscript/published work is published or in press Please provide the full reference of the research output: Walsh, Z., Muller, D., Signal, T. L., Breheny, M., Severinsen, C., Ware, F., & Reweti, A. (2025). Enhancing maternal sleep health in Aotearoa New Zealand: Insights from the Wāhi Kōrero platform. <i>Kōtuitui: New Zealand Journal of Social Sciences Online</i>, 20(4), 1229-1246. https://doi.org/10.1080/1177083X.2025.2519168		
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4.1 Abstract

Maternal sleep health is crucial for maternal wellbeing, particularly maternal mental health which has implications for the wellbeing of children, families and whānau. In Aotearoa New Zealand, the Well Child Tamariki Ora (WCTO) service provides a unique opportunity to support mothers, their families, and whānau by providing education on sleep health for both mothers and children. However, there is a need for a deeper understanding of mothers' experiences with WCTO and the sleep information they receive to enhance these services. This primary research used data gathered from the *Wāhi Kōrero* online story-sharing platform, with 181 stories focusing specifically on sleep. Using thematic analysis, three key themes were identified: maternal instinct as a guide in navigating child sleep practices, promoting strength-based rather than deficit-focused approaches, and the necessity to move beyond rigid, monocultural service models. Findings underscore the importance of tailoring maternal and child health services to better meet the needs and perspectives of mothers, their families, and whānau, particularly in the areas of sleep and maternal mental health. Implications of findings for future policy and practice are discussed, including developing strength-based, culturally responsive approaches within services like WCTO, and adapting policy to support more flexible, whānau-centred models of care.

Keywords: maternal sleep health, health equity, infant, maternal wellbeing, maternal support

Glossary of Kupu Māori words: Aotearoa: Māori name of New Zealand; hapū: pregnant; kaupapa Māori: Māori ideology - a philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society; kōrero: to tell, say, speak, read, talk, address; Māori: Indigenous people of Aotearoa-NZ; Pākehā: New Zealander of European descent; Kāhui Rangahau: Expert advisory group; wāhine: Female, women; whānau: family or closely connected kin group.

4.2 Introduction

Effective professional support and guidance can play a crucial role in the wellbeing of mothers during the postnatal period, offering substantial benefits to both mother and child. Such support has been shown to enhance breastfeeding practices (Renfrew et al., 2012), strengthen mother-child bonds (Finlayson et al., 2020), boost parental confidence and skills (Lin et al., 2008), and increase overall satisfaction with parenting (Finlayson et al., 2020; Rowe et al., 2013).

However, alongside these benefits, it is also essential to acknowledge and respond to the heightened risks that mothers may face during this time. These include not only biomedical risks such as mental distress (Norhayati et al., 2015), hypertension (Katsi et al., 2020), and venous thromboembolism (Jackson et al., 2011), but also psychosocial and cultural risks. Mothers may experience social isolation, financial insecurity, housing stress, relationship strain, and loss of personal identity – all of which can undermine their ability to care for themselves and their children (Finlayson et al., 2020).

Complex personal circumstances and systemic pressures can exacerbate these risks, often resulting in unhealthy behaviours such as smoking, poor nutrition, and physical inactivity (Fahey & Shenassa, 2013; Walker & Wilging, 2000). It is crucial to recognise and address broader socio-economic determinants of health, rather than attributing these challenges solely to individual choices or perceived self-neglect. By shifting focus toward structural factors and lived realities, we can better support maternal health and wellbeing during this critical postpartum period.

Recognising these challenges, the World Health Organization (2025a) emphasizes the importance of maternal care that prioritises mothers' preferences and needs alongside that of their child. Low engagement in maternal care is linked to adverse maternal outcomes

(Dawson et al., 2022; Singh et al., 2023), underscoring the importance of effective support. Among the various challenges new mothers encounter, sleep loss and disruption are critical yet often overlooked aspects of postpartum care. Adequate sleep is vital for both maternal and child health, making it essential to address sleep issues within the broader context of maternal and child wellbeing (Signal et al., 2022).

4.2.1 Sleep Health

Research highlights the critical importance of sleep health throughout a person's life (Buysse, 2014). Adequate sleep has been linked to vital health outcomes, including mortality (Elder et al., 2008), obesity (Buxton & Marcelli, 2010), immune function (Del Gallo et al., 2014), and mental distress (Baglioni et al., 2011). In their early years, infants and children spend more time asleep than awake (Iglowstein et al., 2003), with adequate sleep being essential for their development and for maintaining harmony within the family (El-Sheikh & Buckhalt, 2015; Muller et al., 2019).

The sleep patterns of mothers and their children are interconnected, with the sleep and feeding schedules of children often leading to sleep disturbances in mothers (Hunter et al., 2009; Nishihara et al., 2000). Beyond these immediate disruptions, mothers' sleep health during this period is also influenced by a variety of factors such as other caring responsibilities, employment, and life stressors (Signal et al., 2022). This demonstrates the complexity of sleep issues during the postpartum period (Goyal et al., 2007; Hunter et al., 2009).

In addition to the impact of sleep on overall health outcomes, a bidirectional relationship between sleep and maternal mental health has been well-established in the empirical literature (Baglioni et al., 2011; Hunter et al., 2009; Lawson et al., 2015). Mothers experiencing depression often face greater sleep disruptions, while those who face

challenges with sleep are at a higher risk of developing depressive symptoms (Bhati & Richards, 2015; Goyal et al., 2007). This interconnection persists into the early childhood years, with the sleep quality of children influencing maternal sleep and mental health, and vice versa (Meltzer & Mindell, 2007; Meltzer & Montgomery-Downs, 2011). Intervention studies have further validated this reciprocal relationship, demonstrating that efforts to improve sleep in the perinatal period can lead to reductions in depressive symptoms (Avalos et al., 2020; Hollenbach et al., 2013; Ladyman et al., 2022; Liu & Yang, 2021; Manber et al., 2023). Similarly, interventions aimed at alleviating depressive symptoms have been shown to improve sleep quality. This highlights the potential of maternal sleep as a modifiable risk factor for depression, offering a valuable opportunity for preventative and therapeutic interventions.

Given the intertwined nature of sleep and maternal mental health, it is critical that mothers are provided with comprehensive support and advice not only for infant and child sleep but also for their own sleep. Addressing maternal sleep issues is not just about improving sleep health but is also a proactive step towards enhancing maternal mental health. This underscores the need for a holistic approach in maternal and child health programmes, ensuring that sleep guidance and mental health support are integral components of care for mothers and their whānau and families.

4.2.2 Well Child Tamariki Ora (WCTO)

In Aotearoa New Zealand, the WCTO programme provides crucial support and health services to children from birth to age five. This programme, established under the guidelines of the Well Child Tamariki Ora National Schedule (Ministry of Health, 2013a) and the Quality Improvement Framework (Ministry of Health, 2013b), is designed to deliver a wide range of care primarily centered around the child's health and development needs. This includes regular visits where a WCTO provider checks the child's growth and

development, evaluates the family's health and wellbeing, and provides valuable advice on key areas such as breastfeeding, nutrition, and safe sleeping practices (Ministry of Health, 2014).

While the programme aims to support families comprehensively and provide additional help for those most in need, its primary focus remains to monitor and promote the health and development of the child (Ministry of Health, 2013a). Consequently, there is less focus on maternal health. Despite the intent of being available for all children in Aotearoa New Zealand, the WCTO programme has struggled to effectively reach and meet the needs of the most underserved communities, thereby exacerbating existing health inequities. Recent evaluations reveal significant gaps, particularly for Māori and Pacific whānau and families (Ministry of Health, 2020). These gaps manifest as lower levels of service engagement, difficulties in accessing care, and a lack of culturally appropriate and responsive services.

Sleep advice within the WCTO programme primarily focuses on ensuring safe infant sleeping practices to mitigate the risk of sudden unexpected death in infancy (SUDI). This advice emphasises guidelines that discourage co-sleeping and advocates for infants to sleep in separate but proximate spaces. The method of advocacy predominantly uses checklist-based inquiries, such as verifying the infant's separate sleeping arrangement, rather than prompting a comprehensive discussion on various safe sleep practices (Ministry of Health, 2013a). The intricacies of co-sleeping and the underlying reasons for these recommendations are often overlooked and this approach may not fully address the complexity of SUDI causes. Factors such as poverty, family engagement, maternal smoking during pregnancy, infant health issues, maternal mental wellbeing, and the fragmentation of services can all contribute to the multifaceted nature of SUDI risks (Tipene-Leach & Fidow, 2022). This has led to recommendations which move beyond the “abstinence only”

messaging to reduce SUDI (Altfeld et al., 2017). This suggests a need for a more nuanced and thorough exploration of safe sleeping practices within the programme.

Beyond a focus on reducing SUDI risks, the provision of maternal sleep advice within the WCTO programme is limited, overlooking the significant role that sleep plays in the health and wellbeing of mothers and in turn that of the child. The programme guidelines do not require providers to offer guidance or monitor maternal sleep quality or habits, thereby neglecting an essential component of maternal health care (Ministry of Health, 2013a). The focus remains heavily on infant sleep, with directives primarily cautioning against co-sleeping, while comprehensive advice or support concerning maternal sleep is conspicuously absent. This gap extends to online resources, where both the New Zealand Ministry of Health (2024b) and Health New Zealand Te Whatu Ora (2023) have dedicated websites that offer extensive safe sleep information for infants but fail to address the significance of sleep for maternal health or provide any practical advice aimed at improving the sleep of mothers. These limitations in the WCTO programme's approach to sleep underscore the need for a more comprehensive and inclusive framework that prioritises the wellbeing of both mothers and babies.

4.2.3 Wāhi Korero

To explore these issues further, stories submitted to *Wāhi Kōrero* (<http://www.wahikorero.co.nz>) were analysed. *Wāhi Kōrero* is a unique online story-sharing platform that allows people to anonymously share their healthcare experiences including difficulties in accessing care, gaps in care, and the appropriateness of the care received (Severinsen et al., 2025). In 2021, the first *Wāhi Kōrero* project was launched with the prompt: “Kōrero I wish I could’ve had with the Well Child nurse,” encouraging people to share their experiences of nondisclosure with their Well Child provider.

This article presents findings from the *Wāhi Kōrero* project specifically related to participants' experiences with sleep and maternal mental wellbeing. By examining the interactions between mothers and Well Child Tamariki Ora (WCTO) providers, this study aimed to provide insights that could inform future research, shape policy, and enhance the support provided by healthcare professionals to improve the sleep and mental wellbeing of both mothers and their babies.

4.3 Method

4.3.1 Approach

This study employed a qualitative approach underpinned by a pragmatic paradigm, focusing on the practical applications of research findings. Pragmatism emphasises solving real-world problems with methods that deliver the most useful results (Creswell, 2021; Morgan, 2007). Pragmatism is distinct from other epistemological paradigms such as positivism, realism, and constructivism, which each offer different ways of understanding knowledge and its production. The pragmatic paradigm was selected to align with the aim of producing actionable knowledge that enhances maternal and child health services. By prioritising real-world problem-solving, methodological flexibility, and the incorporation of diverse perspectives, the pragmatic approach is useful for navigating the complexities of health service experiences and generating actionable insights (Kaushik & Walsh, 2019; Morgan, 2007). This paradigm enables research that is responsive to the needs and priorities of the communities we serve, generating knowledge that can inform meaningful improvements in policy and practice (Feilzer, 2009).

Positivism, with its emphasis on objective certainty and quantifiable results, often relies on rigid methodologies to ensure reliability and validity (Onwuegbuzie & Leech, 2005). In contrast, pragmatism is less concerned with the rigid application of methods and more

focused on the usefulness and applicability of findings in real-world contexts (Feilzer, 2009; Lincoln et al., 2011; Morgan, 2007). While positivism seeks to uncover objective truths, pragmatism prioritises practical outcomes and actionable knowledge, allowing for methodological flexibility in response to research needs (Onwuegbuzie & Leech, 2005). Realism, which posits that reality exists independently of human perception but can be understood through both objective and subjective lenses, shares some similarities with pragmatism in its acknowledgment of multiple perspectives. However, realism maintains a more fixed understanding of reality, whereas pragmatism is more fluid, adapting methods and approaches to address practical problems effectively (Cornish & Gillespie, 2009). Constructivism, on the other hand, focuses on the subjective nature of knowledge, emphasising how individuals construct their own understanding of reality through their experiences. While constructivism aligns with pragmatism in valuing diverse perspectives, it differs in its focus on the subjective construction of knowledge rather than on practical problem-solving (Cornish & Gillespie, 2009; Lincoln et al., 2011; Morgan, 2014).

Throughout the research process, we employed abductive reasoning, moving back and forth between inductive and deductive thinking. This allowed us to generate insights from the data while considering existing theories and knowledge related to maternal and child health. For instance, when analysing the data, we inductively identified themes, such as the importance of following maternal instinct in sleep practices, and then deductively examined how these themes aligned with or challenged existing literature on the topic.

4.3.2 Data collection

Data for this study were collected using the *Wāhi Kōrero* research platform, which invites people to share personal accounts in response to specific prompts developed by the *Wāhi Kōrero* research team and Kāhui Rangahau (expert advisory group). For this study, the prompt was "Kōrero I wish I could've had with the Well Child nurse". This prompt was

designed to encourage participants to discuss their experiences of nondisclosure with their Well Child provider.

4.3.3 Recruitment and participants

Recruitment was conducted through social media platforms (Instagram, Facebook) and community networks, including collaboration with ActionStation, specifically targeting under-served groups such as young mothers and the Māori community. Participants were directed to the *Wāhi Kōrero* platform via a shared link, where they could respond directly to the prompt. Over a nine-week period, the platform collected 420 stories, demonstrating its effectiveness and participants' willingness to engage. For the purposes of this research, only stories that referenced sleep were included, resulting in 181 sleep-related stories for analysis. Among respondents, 61% disclosed their ethnicity: 81% identified as NZ European Pākehā, 18% as Māori, and 3% as Pasifika. The average age of participants was 34, and most identified as women. The term 'mother' is used throughout this study as it reflects the language participants used in their stories. However, we acknowledge that not all caregivers may identify with the term 'mother' outside of the context of this research.

4.3.4 Ethics

Approval for the *Wāhi Kōrero* platform was obtained from the Massey University Human Ethics Committee (Application SOB 21/30). All submitted stories were reviewed by the research team: identifying details of people, places, or health services were removed, and inappropriate, destructive, or inflammatory content was edited out. To enhance safety, the platform includes a safe-exit function (similar to those used in family violence websites) allowing users to quickly leave the site if needed. Participants consented to the use of their stories for research purposes prior to submission, with clear terms of use and privacy policies outlined on the platform. All participants were given pseudonyms to protect their

privacy. All stories submitted as part of this project are accessible on the *Wāhi Kōrero* website (<https://wahikorero.co.nz/projects/korero-i-wish-i-couldve-had-with-the-wellchild-nurse/>).

4.3.5 Data Analysis

Thematic analysis followed Clarke and Braun's (2021) six-step iterative process. Initially, the research team familiarised themselves with the data by reading through stories and using the 'read aloud' function to listen to each entry multiple times. This engagement with the data brought the context and content of the stories into sharper focus. Next, Author 1 generated initial semantic codes using NVivo software (Release 1.7.1). These initial codes were then refined and discussed with the broader research team. This collaborative discussion led to the development of a draft thematic map, which was iteratively reviewed by going back and forward through the data, codes and themes and refined through multiple discussions among all authors.

The process included:

1. Familiarisation with the data: Reading and listening to stories multiple times.
2. Generating initial codes: Author 1 coded the data using NVivo, focusing on meaningful segments of text.
3. Searching for themes: Initial codes were grouped into potential themes, forming a draft thematic map.
4. Reviewing themes: The research team collaboratively reviewed and refined the themes to ensure they accurately represented the data.
5. Defining and naming themes: Final themes were defined, named, and reviewed to ensure clarity and coherence.

6. Producing the report: The final themes were used to structure the findings, with illustrative quotes retained to preserve the voices of the participants. Quotes were reproduced with the spelling and grammatical constructions used by the participants.

This rigorous, collaborative process ensured that the themes provided a meaningful and practical representation of the data. While recognising that theme identification was influenced by the researchers' worldviews and positioning within the study—a central tenet of reflexive thematic analysis—we approached the data with openness and critical reflection. As such, the themes are not intended to be definitive or universally replicable, but rather one possible interpretation shaped through our collective lens. By clearly documenting each step of the thematic analysis, we aimed to make the analytical process transparent.

4.4 Results

Three themes were identified from the data, namely: maternal instinct as a guide in navigating child sleep practices, shifting from deficit-focused messaging to strength-based approaches, and moving beyond rigid, monocultural service models.

4.4.1 Maternal instinct as a guide in navigating child sleep practices

The term 'instinct' is used here to describe the ways mothers spoke about following their innate instinct and/or intuition. Mothers conveyed a profound sense of their own innate instinct when it came to understanding their child's needs, especially around sleep. While they did not claim to understand the complexities of sleep physiology, their *kōrero* emphasised the importance of maternal instinct as a valuable guide for making sleep-

related decisions. This instinct involved mothers trusting their innate motherly sense to determine what is best for themselves and their children. Maternal instinct was seen to play a pivotal role in sleep practices. Mothers often distinguished between their innate instinct and the advice given by WCTO providers, frequently pointing out discrepancies and/or contradictions between the two.

"I was very keen to do right by my baby and one thing I discovered early on was to listen to my instinct for what he needed. Sometimes this instinct was different to what I knew to be conventional advice. For example, I did not want to put my very young baby down to nap - he needed to be held"

Sarah

Instinct was also central to decisions affecting attachment and bonding during sleep, with many mothers viewing bonding as a continuous process that includes both waking and sleeping periods. At times they described this instinct as contravening accepted sleep advice.

"...our decision to let our child sleep in between me and my partner was always asked, not that I listened to it as I simply followed my motherhood instincts to do what I think is best for us to bond as a family and enjoy this journey"

Jackie

"I wish my nurse could have supported me in my decision to co-sleep. It was such an important way to bond, and it was so much easier for feeding in the night. It also made me feel more connected to the traditions in my culture, and with my own parenting instincts."

Tūi

When external advice conflicted with maternal instincts, it created stress and negatively impacted mental health. Mothers often felt unsupported and judged by providers when their natural inclinations differed from the advice given. They often persisted in attempting to follow the advice and in doing increased their distress:

"I wish we were supp[or]ted to trust our intuition more.. with my son I did all they said with regards to sleeping, drowsy but awake, sleep training etc etc.. my son would scream for ages and I'd be crying too not picking him up so he wouldt get spoilt. Going against all intuition etc etc.. I ended up with post natal depression and realise now I would have anxiety attacks before bedtimes."

Kaye

These ongoing difficulties led participants to conduct their own research and follow their instinct despite feeling guilty. This tension between following maternal instinct for bonding and navigating professional advice and expectations around sleep practices highlights the power dynamics between mothers and healthcare providers. This power imbalance can lead to feelings of guilt, anxiety and distress as mothers struggle to reconcile their instinct with external expectations.

4.4.2 Shifting from deficit-focused messaging to strength-based approaches

Fear-based health messaging and deficit approaches negatively impacted mothers' feelings about the sleep practices they engaged in to support their children's sleep. This theme encompassed mothers' emotional responses to the messages they received from WCTO providers. Strengths-based and empowerment approaches were seldom present in the kōrero shared by mothers, while the use of fear-based approaches notably harmed the provider-whānau relationship. This often left mothers feeling disempowered and

unsupported. These feelings contributed to mental distress and breakdowns in relationships, leading mothers to withhold information about their experiences, creating further division in the provider-whānau relationship.

"I feel like I was made to be scared of co-sleeping. I really wish my [Provider] nurse would have explained how to safely co-sleep and shown me how to breastfeed lying down. Instead I got stern words around making sure I never fell asleep when my baby fell asleep and always sitting up to feed"

Laura

"I wish I could have been able to tell my [Provider] nurse that I was cosleeping and instead of being shamed was educated in the subject. The one time I brought it up my [Provider] nurse acted like it was the end of the world and told me I would kill my baby. It made me carry so much shame for doing something so natural"

Michelle

Conversely, using a strengths-based approach by establishing a trusting, adaptive and supportive relationship between healthcare providers and mothers positively influenced sleep outcomes and mental wellbeing. When healthcare providers acknowledged and respected maternal decisions regarding sleep practices, it cultivated trust between providers and whānau. This trusting relationship and strengths-based approach improved wellbeing and alleviated mothers' feelings of guilt and judgement.

"She empowered me as a parent every step of the way. She supported my breastfeeding goals and didn't judge me when I said we bed shared, simply checked we were doing it safely."

Josie

"With [First Provider] they told me everything they thought I was doing wrong, [Second Provider] told me everything I was doing well. Big change for maternal mental health"

Tiffany

These contrasting experiences highlight the power dynamics between mothers and healthcare providers. Fear-based messaging and deficit approaches often fail to consider the complex realities of mothers' lives and can exacerbate feelings of powerlessness and shame. The stories highlighted how deficit messages could make mothers feel reprimanded and inadequate. Strengths-based approaches that prioritise trust, respect, and empowerment can foster more positive provider-whānau relationships and improve maternal mental health outcomes. When providers approached mothers respectfully, acknowledged their experiences, and offered support without inducing shame, they built stronger relationships.

4.4.3 Moving beyond rigid, monocultural service models

Many mothers felt that the WCTO providers were adopting a 'tick box' approach to their care, adhering to a predetermined script that resulted in a generic 'one-size-fits-all' strategy. This approach appeared particularly inflexible regarding advice on sleep, lacking customisation or adaptation to meet individual needs. Additionally, this rigid, surveillance-oriented attitude towards sleep practices caused mental distress and feelings of disempowerment among mothers. One mother described their Well Child visits as interview-like, driven by checklists without a foundation of trust, making it difficult for them to reveal their struggles with their child's sleep. They felt worse for not disclosing their attempts at sleep training and felt guilty for bedsharing, even though it was a solution they found effective after their own research.

"I found each well child visit more like an interview, its literally a check list. As there was no pre existing relationship between the nurse and I, I found it very hard to be honest about my struggles with settling my baby and lack of sleep. I was dabbling in sleep training which I didn't tell the nurse. It only made me feel worse. The "does your baby sleep in a cot or bassinet" question always made me feel guilty since I was bedsharing a lot of the time. I had looked into safe bedsharing myself after the disaster of sleep training."

Alice

Another mother expressed a wish to communicate openly with providers about bedsharing as a response to their child's sleep troubles at four months, emphasising the positive impact it had on both their sleep and their mental health. They highlighted the need for discussions on safe bedsharing to prevent SUDI, suggesting that a lack of guidance on safe practices is a significant oversight.

"I wish I could have told the [Provider] nurses that after my baby hit 4 months, his sleep became so terrible that he was waking every 45 mins and I had no choice but to bedshare with him. He slept SO MUCH better in my bed and I stopped feeling like a broken woman. I felt like they would tell me off for this, despite the fact that I had researched safe bedsharing and was following all the guidelines. Had I not bedshared, my mental health would have continued to decline. I wish the [Provider]Nurses could discuss safe bedsharing as SIDS occurs when safe bedsharing isn't followed (which is because no one tells mothers how to do it safely)."

Kate

The stories also highlighted the importance of healthcare practices that are culturally sensitive with an ability to acknowledge diverse perspectives on sleep and care. The current

approach, heavily influenced by Western norms, fails to accommodate the broad range of needs and worldviews of whānau and families, including Indigenous Māori and Pasifika communities. Mothers stressed that incorporating these cultural perspectives from the onset of care could improve sleep and mental health outcomes for them and their whānau and families.

One mother shared their discomfort within a system that did not align with the holistic needs of being Māori, feeling labelled as a failure for practices such as bedsharing, which conflicted with mainstream healthcare advice. Another emphasised the historical and cultural importance of co-sleeping within their community, likewise encountering difficulties reconciling these practices with the prevailing healthcare advice.

“A lot of the time during being hapū and after having my baby, I felt guilty I could not be up to par in the pākehā worldview. I was told sleeping with my baby was bad and not only in terms of cot death, I felt like a failure ... I have never felt comfortable within a system that doesn’t share the same holistic overview Māori wahine need to feel safe and nurtured. Although not all nurses and [Provider] people were bad. This just goes to show the difference between what Māori need and how we aren’t getting that from current health systems. Things need to change. More cultural awareness should be mandatory for all in any social mahi.”

Hinemoa

“My husband and I co-slept with my daughter right from when she was a newborn. It is what my people always did until colonisation, and felt most natural and right to me. Before she was born, I read books about co-sleeping to learn how to do it safely (although really, it was as much to be able to say I had done that, and argue my case, when people questioned it). My well child nurse was a middle-aged white woman. At

first I pretended my daughter was sleeping in the baby hammock we had, but eventually told her our sleeping arrangement. Her response was not unkind, but she was clear that the official line was that it wasn't safe"

Tūi

This theme underscores the importance of healthcare professionals recognising and respecting a range of cultural practices in maternal care. The impact of their advice on mothers' feelings of empowerment and the wellbeing of the child were powerful. Instances where mothers felt the need to lie to the WCTO provider or to go against advice to pursue what they believed was best for their children underscores the adverse impacts of unsupportive or uninformed advice. The stories demonstrate how strict adherence to a monocultural approach can foster feelings of guilt, shame and disempowerment among mothers who adhere to different cultural practices and/or have different understandings about sleep and care. Furthermore, inflexible and culturally insensitive sleep advice can significantly affect maternal mental health and child wellbeing.

4.5 Discussion

Professional support and guidance during the postpartum period can play a crucial role in promoting maternal wellbeing, offering substantial advantages for both mother and child (Barlow et al., 2010). Given the close relationship between sleep and mental health, comprehensive support that addresses both the mother's and child's sleep needs is vital. This study used thematic analysis to explore the discussions mothers wished they could have had with their WCTO providers about sleep. The findings demonstrate the importance of aligning maternal and child health services with the needs and perspectives of mothers, families, and whānau, particularly in the areas of sleep and maternal mental health.

Three key themes were identified from our analysis - maternal instinct as a guide in navigating child sleep practices, the need for a shift towards strength-based rather than deficit-focused approaches, and the necessity to move beyond rigid, monocultural service models. These themes indicate a misalignment between the services currently offered by WCTO providers and the needs and perspectives of mothers, families and whānau. Our results emphasise the intersubjective nature of maternal and child health experiences, recognising the common challenges, such as the need for culturally sensitive and supportive care, alongside diverse personal experiences and perspectives. The stories shared by mothers in this study contribute to a deeper understanding of the complexities and opportunities in the WCTO service, highlighting the need for providers to engage in open dialogue with mothers, whānau and families to co-create meaningful solutions.

The role of maternal instinct and/or intuition in promoting positive health outcomes for both mothers and babies is still an evolving area of research. This study highlights the tension mothers experience when professional advice contradicts their instincts, often leading to distress. This echoes recent research from Moon et al. (2024) who identified that mothers often engaged in non-recommended sleep advice to better their own sleep and their baby's sleep. Osorio and Martin (2023) also observed that discrepancies between professional sleep recommendations and a mother's preferred methods can elevate stress levels, emphasising the need to support mothers in their intuitive decision-making. Gardner et al. (2020) similarly found that greater confidence in maternal intuition is associated with fewer depressive symptoms, demonstrating the protective effect of trusting one's instincts during the perinatal period. The stories shared by mothers in our study align with these findings, with many mothers expressing a desire for healthcare providers to acknowledge and value their intrinsic understanding of their children's sleep and well-being.

Acknowledging and valuing maternal instinct can lead to more respectful and effective healthcare interactions, empowering mothers and enhancing their confidence and wellbeing (Pease et al., 2021; Price et al., 2018). The experiences shared by mothers emphasise the need for a more nuanced approach when discussing sleep practices, advocating for healthcare providers to be trained in methods that respect and support, rather than dismiss, mothers' caregiving instincts. By integrating maternal instincts with evidence-based advice safe practice, providers can foster a collaborative environment that respects family dynamics and values, improving bonding experiences and maternal mental health outcomes.

However, it is also important to recognise that maternal instinct is not always aligned with safe sleep recommendations. For instance, as Salm Ward (2025) describes some mothers place pillows on adult beds to prevent their babies from rolling off, inadvertently increasing the risk of suffocation. These tensions highlight why a shift is needed — away from rigid, “tick-box” approaches that tell parents what to do, and toward relational, context-aware conversations that explore *why* certain practices are recommended. When providers take the time to explain the reasoning behind safe sleep advice and remain open to culturally grounded practices such as co-sleeping, they create space for honest dialogue and shared understanding. In doing so, best-practice advice becomes more meaningful, more trusted, and ultimately more effective.

Transitioning from deficit-focused messaging to strength-based approaches is supported by an expanding body of research underscoring the effectiveness of these methods in enhancing health outcomes (Reweti, 2023; Tipene-Leach & Fidow, 2022; Wepa & Wilson, 2020). In our study, mothers' narratives revealed the detrimental effects of fear-based and deficit-oriented messaging on their sleep practices and mental health, frequently resulting in feelings of disempowerment and a lack of support. This finding resonates with and

extends previous studies that have identified how deficit-based approaches can not only perpetuate health disparities but also erode trust in healthcare systems (Silverman et al., 2023).

Our findings advocate for adopting a strength-based approach that fosters resilience, empowerment, and self-determination, which, in turn, leads to more constructive engagements between WCTO providers and mothers. By focusing on the assets of individuals, families, and whānau, health practitioners can foster these positive engagements, as evidenced by recent studies (Reweti, 2023; Tipene-Leach & Fidow, 2022; Wepa & Wilson, 2020). This method emphasises collaboration with mothers, families, and whānau in setting health goals, while highlighting the importance of respectful, supportive relationships. Neglecting the strengths and needs of families can compromise health outcomes, including those related to sleep and mental health (Stevenson et al., 2020). Furthermore, culturally responsive care is crucial for respecting and integrating the diverse traditions and strengths of all families (Bryant et al., 2021), necessitating healthcare practices that are informed by and tailored to the communities they serve (Tipene-Leach & Fidow, 2022).

Standardised, monocultural approaches to sleep advice often fail to meet the diverse needs of whānau and families, particularly within Māori and Pasifika communities (Perese et al., 2020). The limitations of a one-size-fits-all approach, are clear from the stories shared by mothers. When mothers feel unsupported or judged for their sleep practices, they may be less inclined to seek assistance or share information with healthcare providers, compromising the quality of care they receive and exacerbating health inequities. These findings are consistent with previous research showing that sleep practices, including the broad acceptance of co-sleeping, the vital role of whānau and family in decision-making, and the comfort and security that these practices provide, differ widely across cultures

(Airhihenbuwa et al., 2016). Additionally, qualitative research in Aotearoa New Zealand emphasises the emotional and psychological benefits of co-sleeping with preschool-aged children, corroborating these broader observations (Baddock, 2010; D'Souza et al., 2023; Diane Muller et al., 2019). It is crucial to provide sleep guidance that respects family values and circumstances, rather than imposing rigid, one-size-fits-all directives (Crane & Ball, 2016; Cunningham et al., 2018).

Furthermore, healthcare communication can be ineffective if it does not relate advice to the specific contexts of the lives of mothers, their whānau and families', which can lead to misunderstandings and non-compliance (Perese et al., 2020). The "tick-box" approach of the WCTO programme has been criticised for prioritising organisational objectives over the needs of mothers, their whānau and families (Clapham et al., 2024; Severinsen et al., 2022). This tension becomes especially problematic in complex areas such as bed-sharing. Health providers are required to follow the WCTO schedule, which sets out what must be checked, discussed, and documented during each visit. While this ensures consistency, it can constrain providers from engaging more flexibly or responsively. As a result, advice may be delivered in ways that conflict with mothers' deeply held cultural or familial values, leading some to dismiss the guidance—not due to a lack of understanding, but because of the disconnect between standardised messaging and their lived realities (Crane & Ball, 2016; Cunningham et al., 2018). A shift towards a more holistic model that moves away from paternalistic health perspectives could lead to services more attuned to diverse health beliefs, ultimately improving both the inclusivity and effectiveness of care.

The findings of this study have significant implications for both policy and practice in the field of maternal and child health. At a policy level, this study highlights the necessity for a more comprehensive and inclusive approach to maternal and child health services. Such an approach could prioritise the wellbeing of both mothers and children and include the

diversity of whānau and family and cultural contexts. This might involve a paradigm shift in how services are funded, designed and delivered, with a greater emphasis on collaboration, partnership, and co-design with mothers, their whānau, families, and communities.

At the practice level, the importance of delivering culturally responsive and whānau/family-centered care is evident. This entails building trusting and empowering relationships between healthcare providers and mothers along with their whānau and families. Achieving this may require additional training and support for healthcare providers to develop the skills needed to provide culturally safe and responsive care. Effective communication strategies within the WCTO programme may be an important component of this practice development. Communication which is culturally responsive and tailored to the specific needs and realities of the communities they serve, is vital. This may be best developed through engagement with community leaders and end users of health services. Developing health messaging which prioritises clear explanations for health advice and ensures that health services are delivered in a way that builds trust and respect may increase engagement with health services (Tipene-Leach & Fidow, 2022). Additionally, allied health professionals must be supported and educated well so that they are, in turn, able to support mothers (Meaklim et al., 2020).

Furthermore, these findings indicate the need for a holistic and integrated approach within the WCTO programme to effectively address the complex factors that influence maternal sleep and mental well-being, such as child sleep patterns and cultural views on sleep. Providers would benefit from an approach that recognises the multifaceted nature of these decisions and integrates strategies to promote overall sleep and well-being. It also calls for the development of new, more flexible and adaptable models of care that can better address the diverse needs and circumstances of mothers, their whānau and families.

While our findings are specific to the context of Aotearoa New Zealand and the WCTO programme, the insights generated have potential applicability in other settings where maternal and child health services are provided. Nurturing maternal instincts, adopting strength-based approaches, and embracing cultural inclusivity are lessons which could inform the enhancement of maternal and child health services in various contexts.

4.5.1 Limitations and Considerations

The *Wāhi Kōrero* prompt did not explicitly focus on sleep or mental health but instead invited mothers to share what they wished had been addressed with their Well Child providers. A notable limitation of this approach is that the data were not gathered through targeted questions about sleep or mental health, which means the insights may not capture the full scope of issues in these areas. However, many mothers independently raised concerns about sleep and mental health, highlighting these as significant and unmet needs. This underscores their fundamental importance in child health discussions and points to a substantial communication gap between healthcare providers and parents. It suggests a need for more direct and explicit conversations about sleep and mental health during routine healthcare visits to enhance health outcomes. Furthermore, initiating discussions about sleep may serve as an important entry point for addressing other sensitive topics such as mental health.

Our findings also suggest valuable avenues for future research, particularly in how parental choices about sleep positions are influenced. A thorough exploration of this subject could provide insights into how health messaging on sleep practices evolves and how it interacts with established beliefs and practices within whānau, families, and communities. Such understanding could help healthcare providers customise their guidance to better resonate with and support parents.

4.5.2 Conclusion

This study emphasises the critical need to align maternal and child health services with the needs and perspectives of mothers, their whānau and families, particularly in the areas of sleep and maternal mental health. By nurturing maternal instinct, employing strength-based approaches, and moving away from rigid monocultural service models, the WCTO programme has the potential to cultivate a more nurturing, supportive and empowering environment for mothers, their whānau and families. This analysis reaffirms the importance of integrating sleep and mental health into child healthcare discussions. It also stresses the need for health professionals to consider the broader context in which health behaviours and decisions occur. By examining these factors more closely, future research can develop more effective health communication strategies that align with the experiences and needs of mothers, their whānau and families. Moving forward, ongoing research and collaborative efforts will be crucial to ensure that these recommended changes are not only implemented but are effective and sustainable over time. A commitment to continuous improvement and responsiveness within health services is vital for achieving lasting benefits in maternal and child health outcomes.

CHAPTER 5 THE INTERPLAY BETWEEN SUPPORT, SLEEP HEALTH AND MENTAL DISTRESS: A CROSS-SECTIONAL STUDY OF INDIGENOUS AND NON-INDIGENOUS MOTHERS IN AOTEAROA NEW ZEALAND

Chapter 5 presents the second paper of this thesis, which aimed to examine associations between sleep health, mental distress, and support among Māori and non-Māori mothers in NZ. Using quantitative data from the *Moe Kura* study, this paper investigated whether unmet needs across different support domains, and the cumulative adequacy of support, were associated with distinct sleep health facets and maternal mental distress. The aim was to clarify how support may relate to maternal sleep and wellbeing, and to identify patterns relevant to inequities and future intervention. This paper will be submitted to *Sleep Health: Journal of the National Sleep Foundation* for peer review.



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STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the student and the student's main supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the student's contribution as indicated below in the Statement of Originality.

Student name:	Zoe Walsh		
Name and title of main supervisor:	Professor Leigh Signal		
In which chapter is the manuscript/published work?	5		
Describe the contribution that the student and members of the supervisory team have made to the manuscript/published work: ¹ The candidate conducted statistical analysis and wrote the manuscript and subsequent drafts in response to feedback from co-authors.			
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5.1 Abstract

Objectives: To enhance understanding of interconnections between types of support, support adequacy, sleep and mental distress among Indigenous and non-Indigenous mothers.

Methods: Data from the *Moe Kura* cohort study were analysed. Multivariable logistic regression models investigated relationships between four support domains (emotional, advice, concrete, financial), cumulative support adequacy (additional support domains needed: none/1-2/3-4), and maternal sleep health and mental distress. Models were adjusted for ethnicity, socioeconomic deprivation, age and awakenings due to childcare. Mental distress models were additionally adjusted for prior history of mental distress (Model 1) and sleep health (Model 2).

Results: The sample comprised 294 Māori (Indigenous) and 618 non-Māori mothers. Māori mothers were disproportionately impacted by socioeconomic deprivation, social jetlag and mental distress. Associations varied by support domain, whereby needing more concrete support was associated with increased odds of short sleep, emotional support with increased odds of poor sleep quality and advice support with increased odds of daytime sleepiness and insomnia symptoms. A dose-response pattern was observed, with greater numbers of unmet support domains associated with progressively higher odds of poor sleep and mental distress. Adjustment for sleep partially attenuated associations between inadequate support and mental distress.

Conclusions: Findings indicate domain-specific and cumulative associations between unmet support needs, sleep health, and maternal mental distress. Sleep health may represent one pathway linking unmet support needs to maternal mental distress, alongside social determinants. These findings highlight the importance of comprehensive, Indigenous-led

maternal support services and addressing the structural drivers of social, sleep and mental distress inequities.

What Was Known

Social support is associated with maternal mental health and sleep health, but most studies conceptualize support as a single, global construct. Sleep disturbance and maternal mental distress are known to be closely interrelated, and both are unequally distributed across populations due to social and structural determinants, including socioeconomic deprivation and racism. However, little is known about how specific support domains or cumulative unmet support needs relate to distinct aspects of sleep health and mental distress.

What This Study Adds

This study demonstrates that unmet support needs show domain-specific associations with different facets of sleep health and a dose-response relationship with both poor sleep and maternal mental distress. Findings suggest that sleep health may represent one pathway linking cumulative unmet support needs to maternal mental distress. The study also highlights persistent inequities for Māori mothers, reinforcing the importance of comprehensive, Indigenous-led approaches to maternal support.

5.2 Introduction

It is well-established that social support plays a crucial role in promoting health and wellbeing. Support is a key social determinant of health (World Health Organization, 2023), encompassing multiple domains including emotional support (someone who listens or is “there” for you), advice-giving support (information or guidance), concrete/practical support (child care assistance, housework), and financial support (monetary assistance) (Cutrona, 2000; Houston & Dolan, 2008). For the maternal population specifically, social

support has been linked to improved outcomes in multiple health and wellbeing domains such as protection against mental distress and economic hardship (Balaji et al., 2007; Gjesfjeld et al., 2010; Radey, 2018). Support is a modifiable target for intervention, so clarifying how it relates to key maternal outcomes is clinically and policy relevant. However, there is limited understanding of how different support domains (emotional, advice, concrete, and financial) uniquely relate to maternal sleep health and mental distress, as many studies conceptualize social support as a unitary construct. It is also unclear whether the cumulative adequacy of support (amount of additional support needed across domains) differs with these outcomes, and the role that sleep plays in linking unmet support needs to maternal mental distress.

Sleep health is a multi-faceted construct, encompassing sleep duration, timing, continuity, efficiency, quality, daytime alertness and regularity (Buysse, 2014). Meta-analytic research has shown that greater social support is associated with better sleep health facets in the general population. For example, Mesas et al. (2020) reported that higher perceived social support was linked to a lower risk of poor sleep quality and short sleep duration (≤ 6 hours). Kent et al. (2015) found that stronger social relationships were positively related to sleep quality, and that depressive symptoms mediated the link between strong social relationships and sleep quality.

In relation to the maternal population, among mothers from low-income backgrounds, low social support and poor mental health are established predictors of sleep disturbance (Mersky et al., 2020). Additionally, using the SATED scale (sleep satisfaction, daytime alertness, timing, efficiency, and duration), Fischer et al. (2024) found relationships between both low social support and maternal mental distress and poor sleep health. However, only the total SATED score, not any of the individual facets of sleep health, was significantly associated with low social support. Importantly, these studies have largely

relied on global measures of perceived support, rather than examining whether unmet needs in specific support domains differentially relate to distinct aspects of sleep health.

Studies have attempted to delineate the relationship between differing domains of support and mental distress in the maternal population, but have not examined the role of sleep in these relationships. For example, Leahy-Warren et al. (2012) noted correlations between functional social support (informational, instrumental, emotional, and appraisal support) and postpartum depression. All support domains were significantly associated with postpartum depression, with appraisal support (communication that acknowledges, praises and respects the mother) having the strongest association. Similarly, Hetherington et al. (2018) investigated tangible, emotional, informational and positive social interaction support and found that a need for emotional and informational support was associated with an increased risk of postpartum anxiety at 1-year postpartum, but no single domain of support was associated with an increased risk of postpartum depression. A recent review noted the importance of both social support from family and friends and professional support as a protection against postpartum depression and anxiety (Sufredini et al., 2022), highlighting the importance of multiple support domains for maternal wellbeing.

In addition to the demonstrated relationships between support and mental distress and support and sleep health, research consistently shows a bidirectional relationship between sleep health and maternal mental health (Lawson et al., 2015). For example, mothers with depression frequently experience disrupted sleep patterns, while those experiencing sleep difficulties are more likely to develop depression symptoms. However, less is understood about which domains of support are the most impactful or whether the adequacy of support across domains is important for these relationships.

Sleep health and mental health are not distributed equally across populations, driven at least partly by the unequal distribution of social determinants of health. Paine and Muller

(2023) highlight inequities in sleep duration, continuity/efficiency and satisfaction/quality for Indigenous Māori adults and sleep duration, timing and satisfaction/quality for Māori children compared to non-Māori in NZ. These sleep inequities are driven by structural forces such as economic and political systems, socio-economic position, institutional racism and colonization (Jean-Louis et al., 2022; Paine et al., 2022). Social determinants also play an important role in maternal mental health. For example, mothers experiencing food insecurity and poor physical health are at greatest risk of poor mental health (Linares et al., 2020), and mothers experiencing postpartum depression are more likely to be in lower socio-economic positions and without a partner (Simhi et al., 2019). Consideration of these structural determinants is therefore essential when examining interconnections between sleep health, maternal mental distress, and support.

We aimed to explore unmet support across four domains of support (emotional, advice, concrete, and financial), and the cumulative adequacy of support across these domains, in relation to sleep health and mental distress among Māori and non-Māori mothers in NZ. Specifically, we investigated whether unmet needs in individual support domains are associated with poorer sleep health and mental distress, and whether a greater number of unmet support needs has a cumulative effect. By situating these questions within the context of social determinants of health, we seek to clarify the role of support in shaping maternal sleep health and mental health inequities.

5.3 Methods

5.3.1 Participants

Data were obtained from the *Moe Kura: Mother and Child Sleep and Well-being in Aotearoa New Zealand (Moe Kura)* study (Signal et al., 2022). *Moe Kura* is a prospective longitudinal pregnancy-birth cohort designed to investigate relationships between sleep health and

health outcomes in mothers and children across the perinatal period and early childhood. Participants were 294 Māori and 618 non-Māori mothers who provided data when their *Moe Kura* child was approximately 3 years of age (wave 4).

Moe Kura was guided by Kaupapa Māori epidemiological research principles (a philosophical doctrine, incorporating the knowledge, skills, attitudes and values from Māori society), ensuring Māori participation and leadership throughout the research. These principles informed sampling, recruitment, and analysis to achieve equal explanatory power for Māori and non-Māori and to enable the identification and explanation of structural drivers of Indigenous sleep and health inequities (Paine et al., 2013; Signal et al., 2022). Ethical approval was granted by the Central Region Health and Disability Ethics Committee (protocol CEN 09/09/070).

5.3.2 Measures

Support Domains

Participants were asked “Do you have the following types of support?” about four domains: financial (monetary), emotional (e.g. someone who listens or is “there” for you), advice (e.g. someone you can go to for information or guidance) and concrete/practical support (e.g. childcare, housework, cooking). These domains were informed by the Social Support Questionnaire (Sarason et al., 1983) and Pinkerton and Dolan’s (2007) conceptual model. Response options for each domain were: “I don’t need any support”, “I would like a lot more support”, “I would like some more support” and “I have enough support”. Each variable (domain) was dichotomized as sufficient support (“I don’t need any support” or “I have enough support”)/ needs more support (“I would like a lot more support” or “I would like some more support”).

Support Adequacy

A global “support adequacy” variable was created by summing the number of support domains for which additional support was indicated to capture the cumulative burden of unmet support needs. The values were categorized as no additional domains of support needed/ 1-2 additional domains of support needed/ 3-4 additional domains of support needed.

Sleep Health

Sleep duration was measured by asking participants “In the last week how many hours sleep, including naps, do you usually get in 24 hours?” with responses categorized as short (<7 hours) and recommended (≥ 7 hours and ≤ 9 hours) sleep duration based on current guidelines (Hirshkowitz et al., 2015). Long sleep (>9 hours) was excluded from regression analyses due to the small number of participants (n=40), and limitations associated with events per variable.

Sleep quality was assessed using the General Sleep Disturbance Scale (GSDS) quality subscale (Lee, 1992) which has three items relating to feeling rested upon waking, sleeping poorly and satisfaction with sleep quality. Each item was rated from 0 (never) to 7 (every day), with the first and last items reverse scored. The mean of these 3 items was calculated and dichotomized as no sleep disturbance (<3)/ at risk for sleep disturbance (≥ 3).

A social jetlag variable was prepared by calculating the absolute difference between midsleep on weekdays and weekends, based on sleep onset and wake time items from the Munich Chronotype Questionnaire (Roenneberg et al., 2003), dichotomized as ≤ 1 hour/>1 hour (Wittmann et al., 2006).

Daytime sleepiness was measured using the Epworth Sleepiness Scale (ESS, Johns, 1991), a self-report measure consisting of 8 scenarios where individuals rate their likelihood of “dozing off” on a scale from 0 to 3 (0 = would never, 1 = slight chance, 2 = moderate 3 = high

chance). ESS total scores were dichotomized, with >10 indicating excessive daytime sleepiness.

Insomnia symptoms were measured using the Insomnia Severity Index (ISI; Morin, 1993). Seven items were rated on a 0–4 scale assessing severity of sleep difficulties, satisfaction with sleep, interference with daily functioning, noticeability of sleep problems to others, and worry or distress related to sleep problems. Participants first responded to a screening question (“Do you consider that you have a sleep problem?”), and only those who endorsed a sleep problem completed the ISI. A categorical insomnia variable was created with four levels: (1) no self-identified sleep problem (participants who did not endorse a sleep problem and therefore did not complete the ISI; reference group); (2) no clinically significant insomnia (ISI score 0–7); (3) subthreshold insomnia (ISI score 8–14); and (4) moderate to severe insomnia (ISI score ≥ 15), with moderate and severe categories combined due to small numbers.

Mental Distress

Mental distress was measured using the Kessler 10 (K10, Kessler et al., 2002), which is a 10-item screening scale of non-specific psychological distress. Participants responded on a 5-point Likert scale (none of the time, a little of the time, some of the time, most of the time or all of the time) to questions such as feeling sad, nervous, or worthless. Total scores were dichotomized as low distress (<12)/ distressed (≥ 12).

Sociodemographic and Contextual Measures

Self-identified maternal ethnicity was determined using the 2006 NZ Census ethnicity question: “Which ethnic group do you belong to? [Mark the space or spaces that apply to you]” (Stats NZ, 2006). Mothers who identified as Māori, either exclusively or alongside

other ethnic groups, were classified as Māori, while all other respondents were classified as non-Māori (Ministry of Health, 2017).

Individual-level experiences of socioeconomic deprivation were assessed using the NZiDep New Zealand index of socioeconomic deprivation for individuals (Salmond et al., 2006). Participants provided yes/no responses to eight indicators of material hardship, producing a score from 1 (no deprivation characteristics) to 5 (five or more deprivation characteristics).

Participants were asked, "In the last week, what, if anything, woke you up during the night?". Responses indicating "giving care to a child" were included as a dichotomous variable (yes/no).

Prior history of anxiety or depression was derived from earlier *Moe Kura* waves, where participants reported whether they had ever or were currently experiencing anxiety or depression.

Maternal age was calculated from the mother's date of birth.

5.3.3. Analyses

Cross-sectional analyses were conducted using IBM SPSS Statistical software (Version 29.0; Armonk, NY: IBM Corp). In line with Kaupapa Māori epidemiological research principles (Signal et al., 2022), descriptive summaries (% and 95% CI) of variables were produced separately for Māori and non-Māori participants. Differences in proportions were examined using chi-square tests and age was compared using a *t*-test.

Multivariable binary and multinomial logistic regression models examined associations between support domains and support adequacy with sleep health facets and mental distress. Sleep health models included either all four support domain variables

concurrently, or the three-level support adequacy variable, as predictors, adjusting for maternal ethnicity, age, NZiDep score, and nighttime awakenings due to childcare. Covariates were selected a priori based on existing literature on social determinants of health and sleep.

Mental distress models additionally adjusted for prior history of anxiety or depression (Models 1 and 3). To examine the potential contribution of sleep associations between unmet support needs and mental distress, subsequent models (Models 2 and 4) further adjusted for all sleep health measures.

Adjusted odds ratios (ORs) and 95% confidence intervals (95% CIs) were reported. Collinearity diagnostics and event-per-variable thresholds were assessed prior to modelling (Belsley et al., 2005; Vittinghoff & McCulloch, 2007).

5.4 Results

Descriptive statistics are presented for Māori ($n = 294$) and non-Māori ($n = 618$) mothers in the sample in Table 3. A significantly greater proportion of Māori mothers experienced higher individual-level socioeconomic deprivation (NZiDep scores of 4 and 5) compared to non-Māori mothers. A greater proportion of Māori mothers were more likely to report social jetlag, needing financial support, and mental distress. Māori mothers in the study were, on average, younger ($M = 32$, $SD = 6.21$) than non-Māori mothers ($M = 35$, $SD = 5.08$) and less likely to wake during the night for childcare. There were no differences by ethnicity in emotional, advice or concrete support domains or support adequacy.

Table 3 Demographic characteristics of Māori and non-Māori mothers in the study sample

Characteristic	Māori mothers		Non-Māori mothers		Māori vs. Non-Māori p
	n	% (95% CI)	n	% (95% CI)	
Age (years)	294	32 (6.21) ^a	618	35 (5.08) ^a	<.001
NZiDep score:^b					<.001
1 (least deprived)	45	15.3 (11.5-19.8)	201	32.5 (28.9-36.3)	
2	73	24.8 (20.2-30.0)	209	33.8 (30.2-37.6)	
3	57	19.4 (15.2-24.2)	101	16.3 (13.6-19.4)	
4	72	24.5 (19.8-29.6)	77	12.5 (10.0-15.2)	
5 (most deprived)	47	16.0 (12.1-20.5)	30	4.9 (3.4-6.8)	
Wake for child care:					.012
No	59	20.1 (15.8-24.9)	83	13.6 (11.1-16.5)	
Yes	235	79.9 (75.1-84.2)	534	86.4 (83.5-88.9)	
Mental distress:^c					.001
Low distress	232	78.9 (74.0-83.3)	539	87.2 (84.4-89.7)	
Distressed	62	21.1 (16.7-26.0)	79	12.8 (10.3-15.6)	
History of anxiety or depression:					
No	143	48.6 (43.0-54.3)	326	52.8 (48.8-56.7)	.246
Yes	151	51.4 (45.7-57.0)	292	47.2 (43.3-51.2)	
Sleep duration:					.366
Recommended	212	80.9 (75.8-85.3)	477	78.2 (72.8-81.3)	
Short	50	19.1 (14.6-24.2)	133	21.8 (18.7-25.2)	
Daytime sleepiness:^d					.919
Average	250	88.0 (83.9-91.4)	534	88.3 (85.5-90.6)	
Excessively sleepy	34	12.0 (8.6-16.1)	71	11.7 (9.4-14.5)	
Quality^e					.285
No risk for sleep disturbance	74	25.8 (21.0-31.1)	137	22.5 (19.3-26.0)	
At risk for sleep disturbance	213	74.2 (68.9-79.0)	471	77.5 (74.0-80.7)	
Social Jetlag^f					<.001
Less than or equal to 1 hour	201	74.2 (68.7-79.1)	494	85.6 (82.6-88.3)	
Greater than 1 hour	70	25.8 (20.9-31.3)	83	14.4 (11.7-17.4)	
Insomnia Severity Index^g					.311
No self identified sleep problem	113	38.4 (33.0-44.1)	265	42.9 (39.0-46.8)	
No clinically significant insomnia	84	28.6 (23.6-33.9)	142	23.0 (19.8-26.4)	
Subthreshold insomnia	68	23.1 (18.6-28.2)	150	24.3 (21.0-27.8)	
Moderate and severe insomnia	29	9.9 (6.8-13.7)	61	9.9 (7.7-12.4)	
Financial support^h					<.001
Sufficient support	182	61.9 (56.3-67.3)	471	76.2 (72.7-79.4)	
Needs more support	112	38.1 (32.7-43.7)	147	23.8 (20.6-27.3)	
Emotional Support^h					.817
Sufficient support	212	72.1 (66.8-77.0)	433	70.1 (66.4-73.6)	
Needs more support	82	27.9 (23.0-33.2)	185	29.9 (26.4-33.6)	
Advice Support^h					.912
Sufficient support	225	76.2 (71.4-81.1)	475	76.9 (73.4-80.1)	

Characteristic	Māori mothers		Non-Māori mothers		Māori vs. Non-Māori p
	n	% (95% CI)	n	% (95% CI)	
Needs more support	69	23.8 (18.9-28.6)	143	23.1 (19.9-26.6)	
Concrete Support^h					.366
Sufficient support	164	55.8 (50.1-61.4)	325	52.6 (48.6-56.5)	
Needs more support	130	44.2 (38.6-49.9)	293	47.4 (43.5-51.4)	
Support Adequacyⁱ					
No additional support needed	110	37.4 (32.0-43.0)	248	40.1 (36.3-44.0)	.715
1-2 categories of support needed	121	41.2 (35.6-46.8)	247	40.0 (36.2-43.9)	
3-4 categories of support needed	63	21.4 (17.0-26.4)	123	19.9 (16.9-23.2)	

Note. CI = confidence interval; Boldface indicates statistically significant group differences ($p < .05$); ^a Mean (SD); ^b New Zealand index of socioeconomic deprivation for individuals; ^c Kessler 10 scores categorised as low distress (<12) and distressed (≥ 12); ^d Epworth Sleepiness Scale scores categorised as average (≤ 10)/excessively sleepy (>10); ^e General Sleep Disturbance quality subscale dichotomized as no sleep disturbance (<3)/ at risk for sleep disturbance (≥ 3); ^f Munich Chronotype Questionnaire dichotomized as ≤ 1 hour/ >1 hour; ^g Insomnia Severity Index no self identified sleep problem (reference group)/no clinically significant insomnia (ISI score 0–7)/subthreshold insomnia (ISI score 8–14)/ moderate to severe insomnia (ISI score ≥ 15); ^h sufficient support (“I don’t need any support” or “I have enough support”)/ needs more support (“I would like a lot more support” or “I would like some more support”); ⁱ no additional domains of support needed/ 1-2 additional domains of support needed/ 3-4 additional domains of support needed

Results of models investigating relationships between domains of support and either sleep health or mental distress are presented in Table 4. Needing more concrete support was associated with increased odds of short sleep, emotional support with increased odds of poor sleep quality, and advice support with increased odds of daytime sleepiness and moderate to severe insomnia symptoms. Mothers who reported needing more concrete support had approximately one and a half times greater odds of short sleep, and those needing more emotional support had more than twice the odds of poor sleep quality compared to mothers with sufficient support. Needing more advice support increased the odds of moderate to severe insomnia symptoms by three and a half times and the odds of daytime sleepiness by approximately two and a half times.

Needing more advice support was also associated with increased odds of mental distress (Model 1), and this relationship was fully attenuated after adjusting for sleep health. In the fully adjusted model (Model 2), needing more emotional support was independently

associated with a greater likelihood of mental distress, as was poor sleep quality and moderate to severe insomnia symptoms.

Results of models examining support adequacy in relation to sleep or mental distress are presented in Table 5. Mothers needing support in 3 to 4 additional domains had greater odds of short sleep, daytime sleepiness, social jetlag, poor sleep quality, and subthreshold and moderate to severe insomnia symptoms. Needing additional support in 3 to 4 additional domains was also associated with approximately five times the odds of mental distress (Model 3) compared to no additional support needed. This relationship was partially attenuated by adjusting for all sleep health variables (Model 4), resulting in approximately threefold higher odds of mental distress.

Poor sleep quality and moderate to severe insomnia symptoms were also independently associated with increased odds of mental distress. A dose-response pattern between unmet support needs and poorer sleep health and mental distress was evident, with increasingly higher odds observed as the number of additional support domains needed increased.

Table 4 Results of multivariable binary logistic and multinomial logistic regression models investigating independent associations between types of support domains and maternal sleep health and mental distress

Multivariable model ^a	Sleep Duration ^b	Daytime Sleepiness (ESS) ^c	Quality (GSDS subscale) ^d	Social jetlag (MCTQ, mid sleep difference) ^e	Insomnia Severity Index ^f			Kessler 10 ^g	
	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	No clinically significant insomnia Model 1 AOR (95% CI)	Subthreshold Insomnia Model 1 AOR (95% CI)	Moderate to Severe Insomnia Model 1 AOR (95% CI)	Model 1 without sleep variables AOR (95% CI)	Model 2 with sleep variables AOR (95% CI)
Needs more Financial Support	1.07 (0.70-1.62)	1.47 (0.88-2.46)	1.59 (0.99-2.55)	0.90 (0.57-1.43)	1.08 (0.70-1.68)	1.19 (0.77-1.85)	0.87 (0.47-1.61)	1.54 (0.96-2.47)	1.41 (0.82-2.40)
Needs more Emotional Support	1.21 (0.76-1.94)	0.60 (0.32-1.13)	2.72 (1.53-4.87)	1.58 (0.93-2.68)	1.04 (0.63-1.73)	1.71 (1.05-2.78)	1.18 (0.57-2.47)	1.76 (1.00-3.12)	1.91 (1.02-3.56)
Needs more Advice Support	1.46 (0.89-2.38)	2.59 (1.35-4.62)	1.09 (0.59-2.01)	1.22 (0.70-2.10)	1.15 (0.66-2.01)	1.05 (0.62-1.78)	3.46 (1.66-7.22)	2.10 (1.19-3.74)	1.43 (0.75-2.70)
Needs more Concrete Support	1.55 (1.06-2.25)	1.29 (0.81-2.06)	1.37 (0.95-1.99)	1.02 (0.68-1.54)	1.01 (0.70-1.47)	1.12 (0.77-1.63)	1.62 (0.91-2.86)	1.18 (0.74-1.89)	1.15 (0.68-1.94)
NZiDep ^h :									
Score 1 (least deprived)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Score 2	2.23 (1.37-3.63)	0.75 (0.42-1.32)	1.52 (1.00-2.30)	0.57 (0.35-0.94)	1.21 (0.78-1.87)	1.19 (0.75-1.86)	1.31 (0.63-2.74)	1.71 (0.84-3.50)	1.88 (0.85-4.15)
Score 3	1.51 (0.84-2.71)	0.67 (0.34-1.35)	1.19 (0.71-1.97)	0.72 (0.40-1.28)	1.77 (1.05-2.97)	1.39 (0.80-2.41)	1.48 (0.63-3.48)	2.43 (1.15-5.15)	2.88 (1.24-6.67)
Score 4	2.09 (1.14-3.84)	0.80 (0.39-1.63)	1.57 (0.86-2.86)	0.76 (0.42-1.38)	0.91 (0.50-1.66)	1.06 (0.59-1.91)	1.70 (0.74-3.93)	4.76 (2.28-9.94)	4.21 (1.82-9.70)
Score 5 (most deprived)	3.41 (1.64-7.09)	1.50 (0.66-3.37)	0.94 (0.45-1.95)	1.10 (0.53-2.26)	1.16 (0.55-2.47)	1.48 (0.71-3.06)	0.89 (0.28-2.89)	3.84 (1.63-9.07)	4.65 (1.77-12.25)
Self identified ethnicity	0.72 (0.48-1.08)	0.97 (0.60-1.56)	0.72 (0.49-1.06)	1.92 (1.29-2.84)	1.40 (0.95-2.04)	0.99 (0.66-1.47)	0.93 (0.52-1.67)	1.31 (0.84-2.04)	1.26 (0.76-2.09)
Wake for child care	1.66 (0.95-2.89)	1.46 (0.76-2.82)	2.26 (1.48-3.46)	0.56 (0.35-0.88)	1.24 (0.77-1.99)	1.16 (0.71-1.88)	1.25 (0.59-2.63)	0.90 (0.50-1.61)	0.86 (0.44-1.68)

Multivariable model ^a	Sleep Duration ^b	Daytime Sleepiness (ESS) ^c	Quality (GSDS subscale) ^d	Social jetlag (MCTQ, mid sleep difference) ^e	Insomnia Severity Index ^f			Kessler 10 ^g	
	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	Model 1 AOR (95% CI)	No clinically significant insomnia Model 1 AOR (95% CI)	Subthreshold insomnia Model 1 AOR (95% CI)	Moderate to Severe insomnia Model 1 AOR (95% CI)	Model 1 without sleep variables AOR (95% CI)	Model 2 with sleep variables AOR (95% CI)
Age	1.00 (0.98-1.04)	1.03 (0.99-1.07)	0.99 (0.95-1.02)	0.98 (0.95-1.02)	1.00 (0.96-1.03)	1.01 (0.98-1.05)	1.02 (0.97-1.07)	0.95 (0.91-0.98)	0.93 (0.89-0.97)
Kessler 10 ^g	1.23 (0.77-1.95)	1.76 (1.02-3.03)	4.41 (1.96-9.93)	1.17 (0.71-1.92)	0.52 (0.26-1.02)	1.99 (1.19-3.32)	6.27 (3.41-11.50)		
History of Anxiety or Depression								4.45 (2.74-7.23)	3.59 (2.10-6.13)
Duration ^b									0.83 (0.48-1.43)
Daytime Sleepiness (ESS) ^c									1.35 (0.73-2.50)
Quality (GSDS subscale) ^d									2.47 (1.04-5.87)
Social jetlag (MCTQ, mid sleep difference) ^e									1.49 (0.85-2.62)
Insomnia Severity Index ^f :									
No self identified sleep problem (ISI not completed)									Ref
No clinically significant insomnia (ISI 0-7)									0.63 (0.30-1.31)
Subthreshold insomnia (ISI 8-14)									1.67 (0.93-2.98)
Moderate to severe insomnia (ISI ≥15)									4.50 (2.23-9.08)

Note. AOR = adjusted odds ratio; CI = confidence interval; Boldface indicates statistically significant group differences ($p < .05$); Ref = reference ^a Concurrently adjusted for NZiDep, self identified ethnicity, Wake for child care, Age, and Kessler 10; ^b Reference = recommended sleep duration; ^c Based on Epworth Sleepiness Scale scores, reference = ≤ 10 ; ^d General Sleep Disturbance quality subscale dichotomized as no sleep disturbance (< 3) / at risk for sleep disturbance (≥ 3); ^e Munich Chronotype Questionnaire

dichotomized as ≤ 1 hour/ >1 hour; ^f Insomnia Severity Index no self identified sleep problem (reference group)/no clinically significant insomnia (ISI score 0–7)/subthreshold insomnia (ISI score 8–14)/ moderate to severe insomnia (ISI score ≥ 15); ^g Kessler 10 scores categorised as low distress (<12) and distressed (≥ 12); ^h New Zealand index of socioeconomic deprivation for individuals.

Table 5 Results of multivariable binary logistic and multinomial logistic regression models investigating independent associations between support adequacy and maternal sleep health and mental distress

Multivariable model ^a	Sleep Duration ^b	Daytime Sleepiness (ESS) ^c	Quality (GSDS subscale) ^d	Social jetlag (MCTQ, mid sleep difference) ^e	Insomnia Severity Index ^f			Kessler 10 ^g	
	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	No clinically significant insomnia Model 3 AOR (95% CI)	Subthreshold Insomnia Model 3 AOR (95% CI)	Moderate to Severe Insomnia Model 3 AOR (95% CI)	Model 3 without sleep variables AOR (95% CI)	Model 4 with sleep variables AOR (95% CI)
Support Adequacy:									
0 (no additional support domains needed)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
1 and 2	1.33 (0.88-2.01)	1.46 (0.86-2.48)	1.78 (1.26-2.53)	1.37 (0.89-2.11)	1.09 (0.76-1.58)	1.84 (1.24-2.72)	1.66 (0.84-3.28)	1.65 (0.95-2.87)	1.53 (0.81-2.86)
3 and 4 (most support needed)	2.91 (1.81-4.66)	2.83 (1.58-5.07)	5.87 (3.06-11.29)	1.93 (1.15-3.22)	1.13 (0.67-1.90)	2.16 (1.30-3.59)	5.71 (2.81-11.57)	5.00 (2.85-8.77)	3.23 (1.67-6.23)
NZiDep ^h :									
Score 1 (least deprived)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Score 2	2.23 (1.37-3.64)	0.76 (0.43-1.35)	1.09 (0.53-2.21)	0.57 (0.34-0.94)	1.21 (0.79-1.87)	1.18 (0.75-1.86)	1.32 (0.63-2.74)	1.74 (0.85-3.55)	1.88 (0.86-4.13)
Score 3	1.45 (0.81-2.61)	0.66 (0.33-1.32)	1.68 (0.83-3.40)	0.68 (0.38-1.21)	1.79 (1.07-2.98)	1.38 (0.80-2.39)	1.28 (0.55-2.99)	2.42 (1.15-5.08)	2.93 (1.28-6.72)
Score 4	2.05 (1.13-3.72)	0.84 (0.42-1.67)	1.28 (0.61-2.71)	0.71 (0.40-1.28)	0.93 (0.52-1.68)	1.05 (0.59-1.88)	1.53 (0.67-3.45)	5.09 (2.48-10.48)	4.43 (1.96-10.01)
Score 5 (most deprived)	3.01 (1.49-6.09)	1.49 (0.68-3.24)	1.76 (0.81-3.82)	0.97 (0.49-1.94)	1.21 (0.58-2.51)	1.50 (0.75-3.04)	0.61 (0.20-1.92)	3.98 (1.75-9.05)	4.91 (1.94-12.42)
Self identified ethnicity	0.72 (0.48-1.07)	0.99 (0.62-1.60)	0.73 (0.50-1.07)	1.87 (1.27-2.77)	1.39 (0.95-2.04)	0.97 (0.65-1.44)	0.93 (0.52-1.66)	1.29 (0.83-2.01)	1.24 (0.75-2.05)
Wake for child care	1.70 (0.98-2.96)	1.52 (0.79-2.94)	2.20 (1.44-3.45)	0.53 (0.34-0.84)	1.23 (0.77-1.98)	1.09 (0.67-1.77)	1.21 (0.58-2.54)	0.88 (0.49-1.56)	0.82 (0.42-1.61)

Multivariable model ^a	Sleep Duration ^b	Daytime Sleepiness (ESS) ^c	Quality (GSDS subscale) ^d	Social jetlag (MCTQ, mid sleep difference) ^e	Insomnia Severity Index ^f			Kessler 10 ^g	
	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	Model 3 AOR (95% CI)	No clinically significant insomnia Model 3 AOR (95% CI)	Subthreshold Insomnia Model 3 AOR (95% CI)	Moderate to Severe Insomnia Model 3 AOR (95% CI)	Model 3 without sleep variables AOR (95% CI)	Model 4 with sleep variables AOR (95% CI)
Age	1.01 (0.98-1.04)	1.02 (0.98-1.06)	0.99 (0.96-1.02)	0.98 (0.95-1.02)	1.00 (0.96-1.03)	1.01 (0.98-1.04)	1.02 (0.97-1.07)	0.95 (0.91-0.98)	0.93 (0.89-0.98)
Kessler 10 ^g	1.21 (0.76-1.92)	1.66 (0.97-2.84)	4.51 (2.00-10.13)	1.20 (0.73-1.97)	0.53 (0.27-1.05)	2.10 (1.26-3.49)	6.43 (3.53-11.72)		
History of Anxiety or Depression								4.40 (2.73-7.08)	3.63 (2.14-6.14)
Duration ^b									0.82 (0.48-1.41)
Daytime Sleepiness (ESS) ^c									1.32 (0.72-2.44)
Quality (GSDS subscale) ^d									2.62 (1.11-6.19)
Social jetlag (MCTQ, mid sleep difference) ^e									1.53 (0.88-2.67)
Insomnia Severity Index ^f :									
No self identified sleep problem (ISI not completed)									Ref
No clinically significant insomnia (ISI 0-7)									0.65 (0.31-1.34)
Subthreshold insomnia (ISI 8-14)									1.69 (0.95-3.00)
Moderate to severe insomnia (ISI ≥15)									4.59 (2.30-9.14)

Note. AOR = adjusted odds ratio; CI = confidence interval; Boldface indicates statistically significant group differences ($p < .05$); Ref = reference ^a Concurrently adjusted for NZiDep, self identified ethnicity, Wake for child care, Age and Kessler 10; ^b Reference = recommended sleep duration; ^c Based on Epworth Sleepiness Scale scores, reference = ≤ 10 ; ^d General Sleep Disturbance quality subscale dichotomized as no sleep disturbance (< 3) / at risk for sleep disturbance (≥ 3); ^e Munich Chronotype Questionnaire

dichotomized as ≤ 1 hour/ >1 hour; ^f Insomnia Severity Index no self identified sleep problem (reference group)/no clinically significant insomnia (ISI score 0–7)/subthreshold insomnia (ISI score 8–14)/ moderate to severe insomnia (ISI score ≥ 15); ^g Kessler 10 scores categorised as low distress (<12) and distressed (≥ 12); ^h New Zealand index of socioeconomic deprivation for individuals.

5.5 Discussion

To the best of our knowledge, this is the first study to examine independent relationships between different domains of support, and the degree of multi-faceted support adequacy, in relation to sleep health and mental distress among Indigenous and non-Indigenous mothers. Our findings contribute to the literature by demonstrating (1) differential influences of support domains on specific sleep health facets, (2) a cumulative effect of unmet support needs on both sleep health and mental wellbeing, and (3) the potential role of sleep health in linking unmet support needs to an increased likelihood of maternal mental distress. Our findings also highlight notable inequities between Māori and non-Māori mothers, with a greater proportion of Māori mothers experiencing individual-level socioeconomic deprivation, social jetlag, and mental distress.

Our findings reveal several key patterns. Relationships between insufficient support and poor sleep health varied by the support domain, whereby needing more concrete support was associated with short sleep duration, needing more emotional support was associated with poor sleep quality, and needing more advice support was associated with excessive daytime sleepiness and insomnia symptoms. We also observed a dose-response relationship between support adequacy and sleep health facets, whereby needing additional domains of support was associated with increasingly greater odds of poor sleep across all measured dimensions of sleep health. This dose-response relationship was also evident for mental distress and was partially attenuated after adjustment for sleep health, suggesting that sleep may be one of the pathways linking unmet support needs to maternal mental distress.

Our finding that different domains of support are associated with specific aspects of sleep health suggests that the relationship between support and sleep is nuanced. While

emotional, advice, and financial support were not associated with sleep duration, unmet practical support was associated with a greater likelihood of short sleep. One interpretation is that assistance with everyday tasks may enable mothers to allocate more time to sleep. While Fischer et al. (2024) found no association between overall social support and sleep duration in a maternal sample, their measure did not capture practical support. Our results therefore extend previous research by highlighting the distinct role of practical support in enabling sufficient sleep duration for mothers.

Our findings for sleep quality are similar to those of Tomfohr et al. (2015) in a maternal population and Kent et al. (2015) in the general population. These studies also noted an association between social support and sleep quality, although in the present study only emotional support was significant in fully adjusted models. It is theorised that sufficient emotional support may buffer against stress and reduce nighttime rumination, resulting in better sleep quality.

We also identified an association between unmet advice support and excessive daytime sleepiness and insomnia symptoms. While Fischer et al. (2024) did not observe a significant association between social support and daytime sleepiness, their use of a global support measure may have obscured domain-specific relationships. Insufficient advice support may undermine maternal confidence and perceived self-efficacy in managing sleep and daily challenges, increasing cognitive arousal that interferes with sleep initiation and maintenance. Cumulative sleep disruption may then translate into greater daytime sleepiness.

Unmet emotional support was also associated with mental distress. Mothers reporting a need for greater emotional support had nearly twice the odds of experiencing elevated mental distress, and this association was partially but not fully attenuated after adjustment for sleep health. This suggests that emotional support may influence mental distress both

directly and indirectly through sleep-related pathways. Our findings expand on prior research that examined domains of support and maternal mental distress without considering sleep health (Hetherington et al., 2018; Leahy-Warren et al., 2012).

A consistent finding in this study was a dose-response relationship between support adequacy (the number of additional domains of support mothers reported needing) and all facets of sleep health. Mothers needing support in three to four additional domains had over five times greater odds of experiencing moderate to severe insomnia symptoms and poor sleep quality, compared to those with no additional support needs. These findings suggest a cumulative burden of unmet support needs, whereby multiple gaps across domains compound to negatively affect sleep health.

We also observed a cumulative effect between support inadequacy and maternal mental distress, which was partially attenuated by adjustment for sleep health variables. Given the bidirectional relationship between sleep disturbance and mental distress, sleep represents a plausible pathway linking unmet support to poorer mental health (Baglioni et al., 2011; Hunter et al., 2009; Lawson et al., 2015). However, the persistence of this association suggests that unmet support also contributes to distress through additional mechanisms beyond sleep disruption, highlighting the importance of addressing support needs holistically.

Consistent with prior research (Paine & Muller, 2023), Māori mothers in this study experienced higher levels of socioeconomic deprivation, social jetlag, and mental distress than non-Māori mothers. These inequities should be understood within the context of historical and ongoing impacts of colonization and structural racism in NZ (Loring et al., 2022), rather than being attributed to individual behaviours. Our findings reinforce the role of broader social and structural determinants in shaping the inequities in maternal sleep health and mental distress.

5.5.1 Implications for Policy and Practice

Our findings have several implications for policy, service providers, and communities. Assessments of maternal support needs should consider multiple domains of support rather than treating “support” as a unidimensional construct. Such assessments could be integrated into early pregnancy care and revisited across the perinatal period to ensure evolving needs are identified and addressed.

The dose-response relationship we observed suggests that priority should be given to mothers with multiple unmet support needs, as they appear to be at greatest risk for sleep disturbances and mental distress. Services that address several support domains simultaneously may be particularly beneficial for this high-risk group.

There are calls for healthcare providers to be trained in evidence-based practices that explicitly incorporate social support facilitation, recognizing the emotional and relational dimensions of care as essential components of maternal support (Leahy Warren, 2005). Our findings further suggest that allied health professionals should receive training in sleep health, given its consistent association with maternal wellbeing (Meaklim et al., 2020). Although our sample comprised mothers of three-year olds, support provision should ideally begin in pregnancy and extend across early childhood, reflecting the ongoing nature of maternal support needs.

Inequities observed for Māori mothers underscore the need to address the structural determinants of health inequities, including the ongoing impacts of colonization and racism. Unmet support needs may reflect structural constraints on access to material, relational, and informational resources. Interventions should be developed in partnership with Māori communities and guided by Kaupapa Māori principles to ensure they are grounded in Māori priorities and ways of working (Cram & Adcock, 2022). These findings reinforce the

importance of holistic, Kaupapa Māori-informed support and screening for mothers in NZ (Clapham et al., 2024; Hayward et al., 2025; Walsh et al., 2025).

5.5.2 Strengths, Limitations, and Future Research Directions

This study has several strengths, including being informed by Kaupapa Māori epidemiological research principles that prioritize equal explanatory power for Māori and non-Māori participants. The inclusion of multiple domains of both support and sleep health provides a more comprehensive understanding of these relationships than previous research. Additionally, focusing on mothers of three-year-old children extends existing literature beyond the immediate postpartum period, which has been the focus of much previous research.

Our study also had several limitations, including a cross-sectional design, which prevents the establishment of causality or determination of the direction of relationships between sleep, mental distress, and support. It is possible that poor sleep and mental distress influence perceptions of support as well as the reverse. Additionally, our measures of sleep, mental distress, and support were self-reported. Future longitudinal research, with support assessed earlier or at multiple time points and outcomes measured later, would provide clearer understanding of these relationships. Larger sample sizes and the inclusion of more objective measures of support, mental distress, and sleep would further strengthen understanding. Our dichotomization of support variables, while necessary for our analytical approach, may have obscured more nuanced associations, and future research could consider alternative measurement and analytic strategies that preserve this nuance.

5.5.3 Conclusion

This study advances understanding of the inter-connections between different domains of support, support adequacy, sleep health, and mental distress for Indigenous and non-

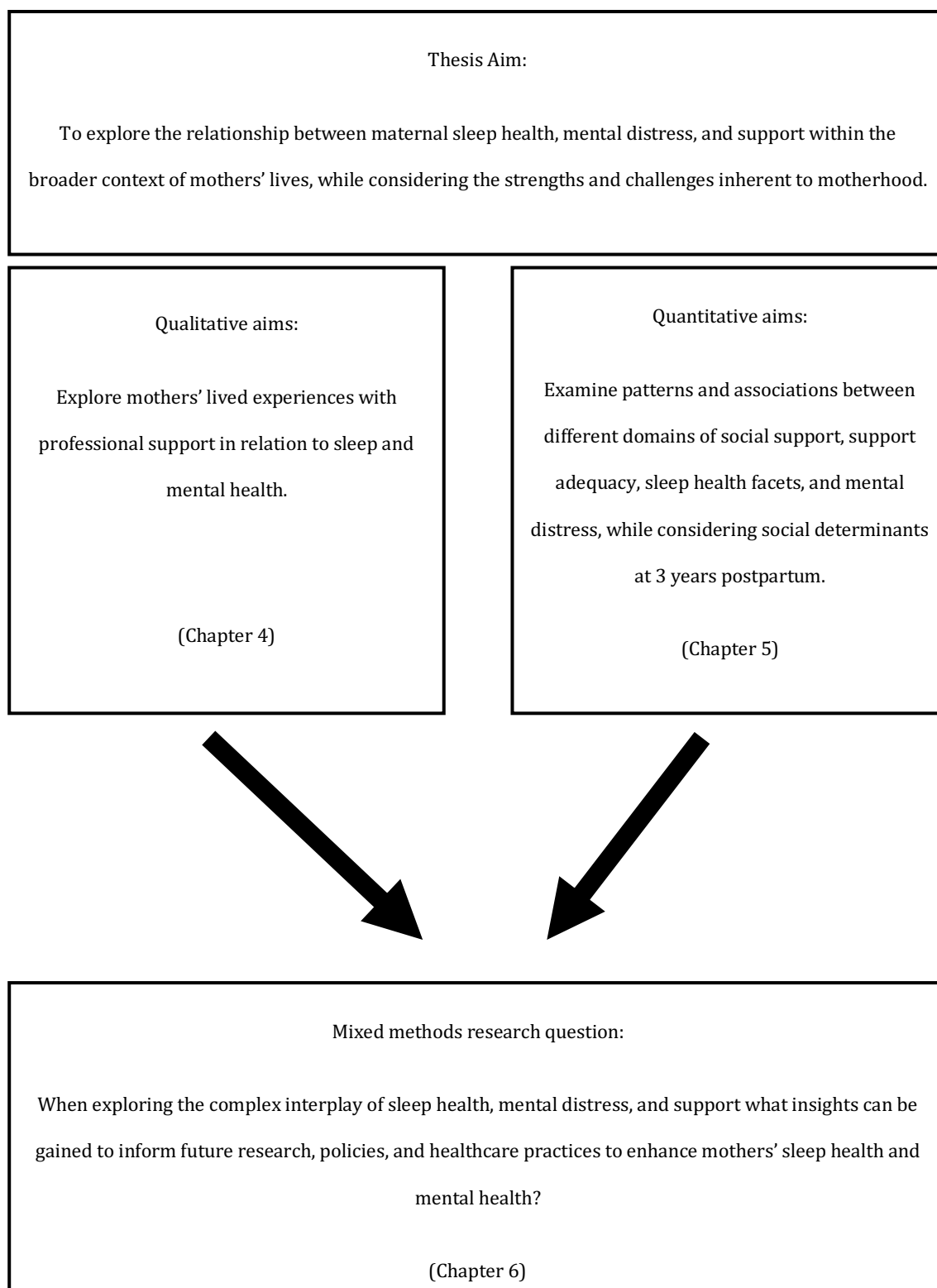
Indigenous mothers. Our findings highlight differential influences of specific support domains on specific sleep health facets, the cumulative effect of multiple unmet support needs, the role of sleep as a potential pathway linking inadequate support and maternal mental distress, and persistent social, sleep and mental distress inequities between Indigenous and non-Indigenous mothers.

The results underscore that, while individual support domains relate to particular aspects of sleep health, it is the collective, multi-faceted support network that most consistently relates to maternal wellbeing. Our findings reinforce the importance of comprehensive, multi-domain approaches to maternal support and the need for Indigenous-led interventions to meet the needs of Māori mothers.

CHAPTER 6 DISCUSSION

The primary aim of this research was to examine maternal sleep health, mental distress, and support in NZ using a mixed methods design. This chapter summarises and integrates the key findings from the qualitative (Chapter 4) and quantitative (Chapter 5) studies in relation to the overarching mixed methods research question (see Figure 3 below). This chapter discusses the contribution of the findings, the strengths and limitations of the research, and recommendations for future research.

Figure 3 Thesis aims



6.1 Summary of Qualitative Results

Reflexive thematic analysis of 181 sleep-related stories submitted to the *Wāhi Kōrero* platform identified three overarching themes: ‘maternal instinct as a guide in navigating child sleep practices’; ‘shifting from deficit-focused messaging to strength-based approaches’; and ‘moving beyond rigid, monocultural service models’. Together, these themes illustrated how mothers experience the Well Child Tamariki Ora (WCTO) service in relation to sleep, and the impact of these interactions on their mental wellbeing.

The first theme, ‘maternal instinct as a guide in navigating child sleep practices’, reflected mothers’ deep trust in their own intuition and lived experience. Many mothers described following their instincts when professional advice did not align with their child’s needs or their family’s circumstances. While these instincts often led to positive bonding and improved sleep, mothers also described guilt and distress when their approaches conflicted with providers. Several participants spoke of trying to adhere to prescriptive advice but feeling it went against their instincts, leading to anxiety and, in some cases, symptoms of postpartum depression. This tension underscored the emotional costs of advice that undermines parental confidence rather than supporting it.

The second theme, ‘shifting from deficit-focused messaging to strength-based approaches’, captured how fear-based or judgemental messaging from WCTO providers negatively affected mothers’ trust and willingness to disclose their sleep practices. Mothers reported feeling shamed or scolded, particularly when discussing co-sleeping, and many concealed their true experiences to avoid criticism. In contrast, when providers adopted an affirming, strengths-based approach that acknowledged mothers’ competence and offered practical guidance, mothers felt empowered, respected, and more able to engage in open dialogue. These positive experiences were linked to improved wellbeing and a greater sense of partnership in care.

The third theme, ‘moving beyond rigid, monocultural service models’, highlighted how mothers experienced the WCTO programme as overly standardised and inflexible. Many described it as a “tick-box” process that prioritised data collection over relational care, making it difficult to discuss sensitive topics like sleep or mental health. Māori and Pasifika mothers noted that the service often failed to reflect their values, beliefs, and traditional practices such as co-sleeping. These mothers spoke of feeling alienated or judged within a system grounded in Western norms, calling for more culturally responsive, whānau-centred care that acknowledges diverse ways of parenting and sleeping.

Collectively, these themes revealed how maternal sleep, mental health, and professional support are deeply interconnected. When care invalidates maternal intuition or ignores cultural context, mothers can experience distress and disengagement. Conversely, when care is relational, strength-based, and culturally attuned, mothers feel empowered to make decisions that support both their own and their baby’s wellbeing.

6.2 Summary of Quantitative Results

Cross-sectional analyses of wave 4 data from the *Moe Kura* cohort study ($n = 912$; 294 Māori and 618 non-Māori mothers of 3–4 year-old children) examined how unmet support needs across four domains (emotional, advice, concrete, financial) and overall support adequacy (cumulative unmet domains) were associated with multiple sleep health facets and maternal mental distress. Analyses were conducted using binary and multinomial logistic regression models, with concurrent adjustment for ethnicity, age, individual-level socioeconomic deprivation (NZiDep), and waking for childcare. Mental distress was modelled using logistic regression, additionally adjusted for prior history of anxiety/depression, and sequentially adjusted for sleep health facets to explore the potential role of sleep in relationships between support and maternal mental distress.

Overall, the findings indicated that associations differed by support domain, with distinct support needs mapping to different aspects of sleep health. Needing more concrete support was associated with increased odds of short sleep duration (OR 1.55, 95% CI 1.06–2.25), whereas needing more emotional support was associated with a greater likelihood of poor sleep quality (OR 2.72, 1.53–4.87). Needing more advice support was associated with increased odds of excessive daytime sleepiness (OR 2.59, 95% CI 1.35–4.62) and moderate to severe insomnia (OR 3.46, 95% CI 1.66–7.22). In contrast, unmet financial support was not associated with the sleep outcomes assessed in the fully adjusted models.

Domain specific support needs were also related to maternal mental distress. Unmet emotional support was associated with higher odds of mental distress, and this association persisted after adjustment for sleep health facets (Model 2 OR 1.91, 95% CI 1.02–3.56), suggesting that emotional support may influence distress through pathways not fully explained by sleep. Unmet advice support was associated with distress in models without sleep adjustment (OR 2.10, 95% CI 1.19–3.74), but this relationship was fully attenuated after adjusting for sleep health (OR 1.43, 95% CI 0.75–2.70), indicating that sleep may be a pathway in which unmet advice support links to an increased likelihood of maternal mental distress.

A consistent, policy-relevant pattern was observed in support adequacy (cumulative unmet support domains). Mothers reporting unmet needs across 3–4 domains had substantially higher odds of adverse sleep health across all facets assessed, including poor sleep quality (OR 5.87, 3.06–11.29), short sleep duration (OR 2.91, 95% CI 1.81–4.66), daytime sleepiness (OR 2.83, 95% CI 1.58–5.07), social jetlag (OR 1.93 95% CI 1.15–3.22) and moderate to severe insomnia symptoms (OR 5.71, 95% CI 2.81–11.57). They also had elevated odds of mental distress (OR 5.00, 95% CI 2.85–8.77), and the association remained significant after adjustment for sleep health (OR 3.23, 95% CI 1.67–6.23), indicating that cumulative unmet

support needs contribute to distress beyond measured sleep disruption. This pattern suggests that sleep explains part, but not all, of the relationship between multi-domain unmet support and maternal distress.

In addition, results of multivariable analyses highlighted broader contextual influences. Greater socioeconomic deprivation was strongly associated with mental distress, and waking for childcare was associated with poorer sleep quality. A significantly larger proportion of Māori mothers were impacted by socioeconomic deprivation, which is indicative of structural racism and ongoing impacts of colonisation (Loring et al., 2022). Māori mothers were also disproportionately impacted by social jetlag and mental distress, highlighting unfair sleep and mental health inequities experienced by Māori due to broader structural drivers. Together, the quantitative findings demonstrate that unmet support needs, particularly when multiple domains are unmet, are associated with poorer maternal sleep health and elevated distress, with implications for multi-domain support assessment and targeted interventions. For Māori mothers, these results underscore the need for responses that are both multi-domain and equity-oriented, including culturally safe, whānau-centred models of support and structural approaches that reduce deprivation and barriers to accessing support.

6.3 Mixed Methods Results

The mixed methods research question that this thesis addresses is:

“When exploring the complex interplay of sleep health, mental distress, and support what insights can be gained to inform future research, policies, and healthcare practices to enhance mothers’ sleep health and mental health?”

This study utilised a convergent parallel mixed-methods study design (Creswell & Clark, 2011). Accordingly, findings from cross-sectional quantitative analyses of the *Moe Kura* cohort are integrated with those from the qualitative *Wāhi Kōrero* narratives to examine how sleep health, mental distress, and support intersect for mothers.

As outlined in the Methodology Chapter (Section 3.6), qualitative and quantitative results were woven within a narrative discussion to generate meta-inferences (Creswell & Clark, 2011; Fetters et al., 2013). Meta-inferences are the overarching conclusions or interpretive insights generated by integrating qualitative and quantitative findings in a mixed methods study (Tashakkori & Teddlie, 2003). Confirmation refers to instances where qualitative themes and quantitative patterns align conceptually, providing converging evidence for the same underlying interpretation. Expansion describes situations where one dataset adds new insight that extends the other, for example by providing contextual detail, mechanism, or nuance that is not captured by the other method alone. Where results do not align, this is described as discordance (divergence), prompting closer consideration of whether findings reflect different operationalisations of constructs, different contexts, or subgroup-specific experiences.

Six key mixed methods findings are outlined below. They consider the socioecological context, measurement and visibility, cumulative burden, financial support, material hardship discordance, relational leverage points, and equity, drawing out implications for research, policy, and service design for each.

6.3.1 Sleep and Mental Distress Occur Within Constrained Socioecological Contexts and Social Determinants of Health (Confirmation)

Findings converge on the conclusion that maternal sleep health and mental distress are patterned by socioecological constraints and the social determinants of health, namely the

material, social, and service conditions that shape mothers' lives. Results of quantitative multivariable analyses show that socioeconomic deprivation and caregiving disruption are independently associated with distress and poorer sleep quality. Qualitative accounts from mothers show how socioecological factors can operate through lived experience. Considered together, this suggests that maternal poor sleep health and mental distress can be conceptualised as outcomes of upstream social determinants rather than primarily as individual choices or knowledge gaps.

In the quantitative analyses, social determinants of health were represented using indicators of mothers' structural and day-to-day contexts, including individual-level socioeconomic deprivation and waking for childcare. Socioeconomic deprivation was strongly related to mental distress in adjusted models. That is, NZiDep categories 3–5 showed elevated odds of distress compared with the least deprived, with category 4 (OR 4.21 95% CI 1.82–9.70) and category 5 (OR 4.65 95% CI 1.77–12.25) in the model adjusting for sleep facets. Caregiving disruptions also mattered, that is, waking for childcare was associated with poorer sleep quality (OR 2.26, 95% CI 1.48–3.46).

Qualitatively, the *Wāhi Kōrero* mothers described social determinants as lived constraints, including limited practical support, time scarcity, pain and recovery demands, relationship strain, and lack of nearby whānau. These accounts made visible how social determinants of health operate in practice. Mothers may be aware of advice and recommendations, but structural conditions determine what is feasible. One mother captured the gap between knowledge and feasibility:

"I had a traumatic birth with a significant tear and 6 month recovery, breast feeding was incredibly painful for 12 weeks (despite lactation help etc), and my baby cried, a lot. I was soooooo tired and sleep deprived and we had no local whānau. I knew

theoretically what I should be doing (I'd read all the research), but in practice I was sooooo tired. I needed respite, but there was no respite."

Rebecca

These narratives align with a socioecological framing of sleep health in the literature (Grandner, 2022). Fischer et al. (2021) argue that maternal sleep health should be understood within a social-ecological system, where individual factors interact with interpersonal supports, service environments, and broader structural conditions. This meta inference of confirmation provides empirical support for this framing in NZ, showing that deprivation and caregiving disruption are independently associated with sleep quality and distress, and that mothers' narratives describe how time scarcity, limited respite, and service experiences constrain what is feasible. Therefore, sleep is not merely a behaviour to be optimised, but an outcome of resources, caregiving realities, and the structural, relational and service environments which mothers are navigating (Hale & Hale, 2010). Therefore, sleep should be conceptualised through a broader lens that extends beyond individual-level behaviours and choices (Knutson, 2013).

Future research and interventions could test and treat contextual constraints as part of the causal architecture shaping mothers' sleep health and mental distress. Practically, this means designing support pathways that begin with an explicit assessment of the contextual drivers of sleep, including caregiving demands, safety and housing conditions, work schedules, and resource constraints, before offering sleep-focused guidance. At a policy and service level, this also requires addressing structural barriers such as socioeconomic deprivation, time poverty, and barriers to accessing coordinated maternal and behavioural health services, as these upstream conditions determine whether sleep-focused recommendations are feasible and whether mental distress is likely to resolve.

6.3.2 Support Measurement Shapes Meaning (Expansion)

Quantitative findings showed domain-specific unmet needs relate to distinct sleep health facets and maternal mental distress, whereas qualitative accounts showed that judgement, lack of relationship building, and checklist-style encounters with providers deterred mothers from disclosing information. Considered together, this suggests that “support measurement” is complex and inseparable from service design and delivery. Data obtained when screening mothers likely reflects the safety of the interaction as much as the true extent of need. The meta inference expansion from the quantitative and qualitative studies highlights that “support” is not a unitary construct and that measurement choices and delivery shape interpretation.

Quantitatively, domain-specific patterns provided direct evidence that different types of unmet support were associated with distinct facets of sleep health. Needing more concrete/practical support was associated with short sleep duration (OR 1.55, 95% CI 1.06–2.25). Needing more emotional support was strongly associated with poorer sleep quality (OR 2.72, 95% CI 1.53–4.87) and was also associated with mental distress even after adjustment for sleep health (Model 2 OR 1.91, 95% CI 1.02–3.56). Needing more advice support was associated with daytime sleepiness (OR 2.59, 95% CI 1.35–4.62) and moderate–severe insomnia (OR 3.46, 95% CI 1.66–7.22). This pattern demonstrated that the “support” construct behaves differently depending on which support domain was assessed, and which facet of sleep health was considered.

Qualitatively, mothers’ narratives added additional coverage. That is, even when services attempt to assess support, the service context shaped what mothers disclosed. Many mothers described WCTO interactions as checklist-driven or surveillance-like, creating conditions where they withheld information and avoided raising needs, for example:

“visits felt like an interview...as there was no pre-existing relationship... I found it very hard to be honest... I didn’t tell the nurse... It only made me feel worse.”

Nicola

Support measurement is therefore not only a research design issue, but also a service delivery issue. If the interaction is experienced as judgemental, rushed, or surveillance-like, mothers may withhold information, and the absence of reported need can be misread as adequacy. A checklist-style visit can therefore generate false reassurance, as the system does not note any additional support needs, while mothers may leave feeling worse and less willing to seek help.

This meta-inference relates to two longstanding measurement critiques in the literature. First, conceptual analyses argue that “social support” is frequently treated as self-evident, but is defined differently across studies, sometimes indexing network structure (e.g., partner status, number of contacts), sometimes perceived availability, and sometimes enacted or received help. This conceptual slippage means that studies can report “support effects” without clarity about what aspect of support is operating or through which mechanism (Langford et al., 1997; Williams et al., 2004). Further, when support is collapsed into a single global score, we lose information about what kind of support is present and/or absent and how distinct domains relate to different outcomes (Barrera Jr, 1986). Second, even conceptually precise and multifaceted measures can underperform if support needs are not safely elicited in the first place. The qualitative accounts of mothers in this thesis suggest that procedural, checklist-driven delivery can suppress disclosure, meaning the data captured by screening may reflect willingness to report rather than the full extent of need. A parallel literature on perinatal care and screening shows that what women report is shaped by the perceived safety of the interaction, including whether clinicians are experienced as non-judgemental, trustworthy, and relationship-oriented, as judgement and

surveillance dynamics can suppress disclosure and increase socially desirable responding (Moran et al., 2023). This aligns with critiques in NZ that procedural delivery within WCTO can crowd out relational engagement and create missed opportunities for supporting maternal wellbeing (Clapham et al., 2024; Leversha et al., 2025).

Together, the “support measurement shapes meaning” meta-inference suggests that improving how we “measure support” requires both greater construct specificity (both domains and adequacy rather than a single score) and attention to the relational conditions under which needs are identified (trust, perceived judgement, cultural safety). For practice, it indicates that screening is unlikely to be effective if delivered as a procedural tick-box and that needs identification requires a relational foundation that makes disclosure possible.

6.3.3 Accumulated Unmet Needs Across Domains Create a Compounding Burden on Maternal Sleep and Mental Distress (Expansion)

Quantitative results showed a dose-response relationship whereby multi-domain unmet need, especially 3–4 unmet domains, was associated with poorer sleep health and mental distress outcomes for mothers. Qualitative shared stories reflected what cumulative unmet needs can look like in practice, such as compounding sleep deprivation, isolation, lack of respite, relationship strain and minimal proactive service checking. A core integrative conclusion is that the cumulative burden of unmet needs across domains is a major marker of risk for both sleep problems and mental distress. This meta-inference represents expansion because, when considered together, the qualitative findings extend the quantitative dose-response pattern by illustrating how cumulative unmet needs may be experienced in everyday maternal life and the mechanisms through which they may intensify distress. Together, these findings suggest that cumulative unmet need creates a

broader burden than sleep disruption alone, and points toward multi-need, coordinated responses as the most plausible service direction.

Quantitatively, the support adequacy measure showed a pronounced dose-response relationship. Compared with mothers reporting no additional support needs, those needing support in 3–4 domains had elevated odds of short sleep (OR 2.91, 95% CI 1.81–4.66), daytime sleepiness (OR 2.83, 95% CI 1.58–5.07), poor sleep quality (OR 5.87, 95% CI 3.06–11.29), social jetlag (OR 1.93, 95% CI 1.15–3.22), and moderate-severe insomnia (OR 5.71, 95% CI 2.81–11.57). Importantly, the association with mental distress remained after adjustment for sleep facets (Model 4 OR 3.23, 95% CI 1.67–6.23). This indicates that cumulative unmet needs relate to distress through pathways beyond the measured sleep health facets alone. At the same time, the partial attenuation after sleep adjustment suggests that sleep disruption is one plausible pathway through which multi-domain unmet support needs translate into poorer mental health, underscoring the importance of supporting healthy sleep alongside addressing upstream support deficits.

Qualitatively, the multi-domain burden was evident in how mothers narrated compounding strain, such as simultaneous sleep deprivation, isolation, lack of practical help, and relational stress, with limited responsive support from services:

“I don’t recall the nurse checking to see if I was ok. My baby was waking throughout the night and would only nap for 25 minutes at a time in my arms. I was absolutely wrung out. The sleep deprivation intolerable.. I didn’t have time for tears as there was so much that needed doing. I had no time to myself... no family support and my partner worked out of town most of the time. He also failed to understand what I was going through...coming up with some support would have been really helpful at that time.”

Alex

These qualitative accounts elaborate on the dose–response finding by making compounding processes visible. Mothers’ narratives suggest feedback loops where fragmented sleep contributes to exhaustion, exhaustion and constant task load reduce recovery time, isolation removes respite, and relationship strain leaves emotional needs unmet, together sustaining both sleep disruption and escalating distress. This pattern is consistent with postpartum qualitative research showing that mothers continue to experience sleep problems beyond infant waking, due to cognitive hyperarousal and ongoing responsibilities such as family and work commitments (Zambrano et al., 2016). Existing postpartum research similarly emphasises that mothers’ wellbeing is shaped by interlinked demands, including adapting to motherhood, navigating changes in family and partner relationships, and regaining health and wellbeing, with support described as important for managing exhaustion and psychological stress (Finlayson et al., 2020). These compounding mechanisms may provide a partial plausible explanation for why distress remained elevated even after adjustment for sleep facets in the quantitative study

In terms of healthcare practice, this meta inference supports a stepped care approach, consistent with prior calls to organise perinatal support as a tiered response that escalates in intensity and coordination as needs accumulate (Fischer et al., 2021). Mothers reporting unmet needs across three or more domains should be treated as a high-priority group for integrated, multi-component support packages. These findings are also relevant for policy, and support models that can address multiple domains simultaneously, rather than fragmenting support across disconnected services. In relation to research, results suggest that adequacy (cumulative unmet needs across domains) warrants longitudinal investigation and may add more nuance when interpreting outcomes rather than global perceived support measures.

6.3.4 Perceived Financial Support and Structural Material Hardship Operate at Different Levels of Analysis (Possible Discordance)

A point of possible discordance emerged regarding the role of financial resources and how they were measured in both studies. In the *Moe Kura* analyses, unmet financial support was not associated with sleep health or mental distress outcomes in the fully adjusted models. In contrast, *Wāhi Kōrero* narratives made material strain and affordability pressures visible as part of the conditions within which sleep and wellbeing were managed.

For example, one mother described being told her house was not warm enough for her baby, and the financial impact of attempting to comply:

"My daughters [provider] nurse was extremely judgemental and I was always left feeling like a failure as a parent after one of her visits. My house was not warm enough. I HAD to make it warmer for the baby. My next two power bills added up to \$1100."

Shirley

Another mother explicitly noted the difficulty of affording infant formula, and the fear of disclosing this to providers:

"...mothers with no money... Would they be confident to tell them [provider] that they don't have enough money for formula and can't breast feed so are feeding them cows milk?"

Rosie

The qualitative findings are consistent with a broader perinatal literature demonstrating that material hardship, such as difficulty meeting basic needs or food insecurity, is associated with poorer maternal mental health postpartum. For example, Katz et al. (2018)

found that greater material hardship was associated with higher maternal depression and anxiety symptoms, and that hardship partially mediated the association between income and mental health symptoms in pregnant women. Consistent with this, research in low-income postpartum samples describes substantial burden of disrupted sleep alongside fatigue and depressive symptoms, indicating that contexts where economic constraint occurs, often involve co-occurring sleep and mood difficulties (Doering et al., 2017). Qualitative research shows that financial strain can force difficult trade-offs, undermine mothers' ability to parent in the way they want to, and fuel self-blame, all of which can contribute to mental distress (Marcil et al., 2020). This literature suggests the relationship between "financial circumstances" and postpartum wellbeing is complex and multi-pathwayed, and may not be well captured by a single perceived "financial support" adequacy item, particularly when structural deprivation is already modelled and when disclosure is inhibited by stigma.

This discordance meta-inference is most consistent with a construct and measurement mismatch rather than a true contradiction. The quantitative "financial support" item may assess perceived adequacy of financial help or support, whereas the qualitative accounts described broader structural and material living conditions, including housing warmth, affordability pressures, and the capacity to meet basic caregiving needs. While related, these constructs operate at different levels, perceived interpersonal support versus structural deprivation, and measurement critiques note that support is frequently underspecified and conflated with structural resources (Barrera Jr, 1986; Langford et al., 1997).

In *Moe Kura* analyses, material conditions were more directly represented by the NZiDep deprivation measure, which was strongly associated with distress. This suggests that socioeconomic constraint is indeed relevant in this population, but that perceived financial support may be an incomplete proxy for maternal hardship. This discordance therefore

supports a measurement inference: future research should differentiate perceived financial support from material living conditions and examine whether material hardship influences sleep indirectly (e.g., through housing quality, cumulative stress, or multi-domain need) rather than through perceived financial support alone.

The mixed-methods discordance, therefore, has practical implications suggesting that assessment frameworks should differentiate perceived support from structural deprivation, as each may influence maternal sleep and mental health through distinct pathways.

6.3.5 Emotional Support and Relational Safety as a Plausible Pathway for Sleep Quality and Mental Wellbeing (Confirmation)

Emotional support stands out as a salient domain. The quantitative models linked unmet emotional support to poorer sleep quality and maternal mental distress independent of sleep health facets, while the qualitative narratives showed that relational safety in professional encounters can either undermine or enable emotional support through shame versus validation. This mixed methods confirmation helps elucidate a plausible pathway to maternal sleep and mental wellbeing.

Beyond cumulative burden, emotional support emerged as a specific, high-leverage domain. Quantitatively, unmet emotional support showed a consistent association with poor sleep quality (OR 2.72, 95% CI 1.53–4.87) and remained associated with distress even when multiple sleep health facets were accounted for (Model 2 OR 1.91, 95% CI 1.02–3.56). This suggests emotional support may contribute to mental distress through pathways in addition to sleep.

The qualitative findings illustrated how emotionally supportive, and emotionally unsafe interactions are experienced within service encounters, and why these experiences matter for maternal wellbeing and help-seeking. Fear-based, judgement-oriented messaging produced shame, withdrawal, and relationship rupture.

"I wish I could have been able to tell my [provider] nurse that I was cosleeping and instead of being shamed was educated in the subject. The one time I brought it up my [provider] nurse acted like it was the end of the world and told me I would kill my baby. It made me carry so much shame for doing something so natural"

Michelle

In contrast, strengths-based and non-judgemental engagement was described as relieving guilt and improving wellbeing,

"She empowered me as a parent every step of the way... didn't judge me... simply checked we were doing it safely"

Josie

Another mother highlighted contrasting experiences with different providers explicitly:

"told me everything they thought I was doing wrong" versus "told me everything I was doing well... Big change for maternal mental health"

Tiffany

These accounts indicate mechanisms linking emotionally unsafe interactions to increased distress and reduced help-seeking, each plausibly detrimental to sleep quality and wellbeing.

The emphasis on emotional support aligns with perinatal evidence showing that inadequate emotionally salient forms of support, particularly appraisal and emotional support, are associated with poorer maternal mental health outcomes (Hetherington et al., 2018; Leahy-Warren et al., 2012). This meta-inference provides confirmation because both datasets in the present study independently point to emotional support playing an important role in maternal sleep quality and mental wellbeing. *Moe Kura* shows a robust association between unmet emotional support and both poor sleep quality and distress. *Wāhi Kōrero* then corroborates the direction of this relationship by showing that when interactions are judgemental and fear-based, mothers describe increased shame and withdrawal, whereas validation and strengths-based engagement are described as protective. The confirmation strengthens confidence that emotional support and relational safety are central mechanisms in this context.

Practically, this means services should provide emotionally safe care and use clinical contact as an entry point to help strengthen emotional scaffolding for a mother. For example, by supporting partner and whānau involvement, linking mothers with peer networks, and connecting them to culturally grounded community resources. When emotional support is conceptualised as a mechanism (rather than a setting), it becomes clear that bolstering mothers' wellbeing requires attention to how support is generated and sustained across the social system around the mother, not only within clinical interactions. This is consistent with research suggesting both lay and professional supports can reduce postpartum depression risk, implying value in building support ecosystems rather than relying on a single provider type (Dennis & Dowswell, 2013).

Implications of these findings for research include disaggregating emotional support by source (professional versus partner/whānau/peers), and testing other relational processes (e.g., shame, validation, trust, empowerment, loneliness) as mediators and moderators of

the support–sleep–distress association. Services should treat emotionally validating, strengths-based care as core infrastructure for sleep and mental health. The harms described are consistent with critiques of deficit-oriented health communication and calls for strengths-based approaches that prioritise dignity, trust, and partnership. For example, Tipene-Leach and Fidow (2022) argue that SUDI prevention should shift from a narrow, compliance-focused risk message to a hauora, wellbeing approach that recognises the multifaceted realities shaping infant care, including carer fatigue and financial insecurity, which supports whānau to achieve safety within real-world constraints rather than through fear-based messaging alone. This framing aligns with the narratives in this thesis, where judgement-oriented messaging produced shame and withdrawal, while validation and practical checking for safety supported confidence and engagement. Similarly, Wepa and Wilson (2020) describe how whānau engagement is shaped by relationship quality and power. When interactions are not relationally safe, whānau can feel unable to participate or disclose needs, whereas trust-based partnership supports engagement.

6.3.6 Beyond “More Support”, Whānau-Centred, Culturally Safe Delivery is Required for Equity Gains (Expansion)

Quantitative patterns showed that a higher proportion of Māori mothers experienced poorer outcomes in mental distress and social jetlag than non-Māori mothers despite similar distributions on the support adequacy measure (number of support domains needed). Qualitative accounts showed mothers experienced a misalignment with monocultural norms. They also spoke of reduced cultural safety and discomfort disclosing information, which can constrain the accessibility and effectiveness of support even when “support need” appears similar. In combination, these findings suggest mothers, and particularly Māori mothers, do not just need “more support” but instead support must be accessible, acceptable, and responsive. Put differently, improving outcomes may not require

increasing the volume of support but instead the existing supports must be reliably delivered in culturally safe, whānau-centred ways, and in parallel, structural barriers that limit engagement need to be reduced. This meta inference expansion indicates that inequity is not only a matter of support quantity, but also the conditions and service processes through which support is offered, including cultural safety, service fit, and continuity of care.

Quantitatively, a higher proportion of Māori mothers in this sample were impacted by socioeconomic deprivation and had higher mental distress and social jetlag. At the same time, overall support adequacy did not differ by ethnicity (Chapter 5. Table 3 shows similar distributions of “no additional,” “1–2,” and “3–4” unmet domains). This pattern suggests that observed inequities are not well accounted for by support adequacy. Instead, inequities may likely be shaped by upstream structural conditions.

Qualitatively, several Māori wāhine articulated this misfit directly. Hinemoa described guilt about not meeting a Pākehā worldview and feeling unsafe within systems that lack a holistic approach to Māori wellbeing:

“I have never felt comfortable within a system that doesn’t share the same holistic overview Māori wahine need.”

Hinemoa

Other narratives described monocultural norms and the need to conceal practices, as well as the cultural and relational significance of co-sleeping:

“My husband and I co-slept with my daughter right from when she was a newborn. It is what my people always did until colonisation, and felt most natural and right to me. Before she was born, I read books about co-sleeping to learn how to do it safely (although really, it was as much to be able to say I had done that, and argue my case,

when people questioned it). My well child nurse was a middle-aged white woman. At first I pretended my daughter was sleeping in the baby hammock we had, but eventually told her our sleeping arrangement. Her response was not unkind, but she was clear that the official line was that it wasn't safe."

Tūi

A key expansion from the two studies, is that equity gaps can persist even when support adequacy appears comparable. For example, if women are asked about domains of support they have and these are "counted" or "checked off" then what is being counted may not capture the cultural safety, relational trust, and service responsiveness required for needs to be recognised and met. This meta inference may be partly explained by differential cultural safety and fit, in which the same service offering does not have the same accessibility, acceptability, or relational safety across groups due to power dynamics and cultural mismatch (Curtis et al., 2019). Implications are therefore not simply to always provide "more support," but to consider how support is offered. Policy and service design should invest in culturally grounded, whānau-centred approaches developed in partnership with Māori communities, embedding whanaungatanga, relational continuity, and flexibility into routine care (Tipene-Leach & Fidow, 2022). The practical implication is that equity gains are unlikely to come from offering the same checklist and the same advice more often, instead they require upstream structural responses alongside redesign of routine services to improve cultural safety, relational continuity and fit, so that support can be disclosed, recognised and effectively mobilised.

6.4 Mixed Methods Summary

Overall, sleep health, mental distress, and support are tightly linked in this population, but the pattern does not reflect a simple pathway (e.g., low support leading to poor sleep, which

then leads to distress). Instead, the integrated findings suggest poor sleep and distress are co-produced by constrained socioecological conditions and relational processes, and may reinforce one another over time. Within this framing, “support” is not a unitary exposure, it is multidimensional, context-dependent, and partly shaped by service processes.

Across datasets, different support domains mapped onto different sleep facets and distress outcomes, and what becomes visible depends both on measurement choices and on whether needs can be safely disclosed. A key meta inference drawn from both data sources is cumulative burden: multi-domain unmet needs showed a dose-response pattern across sleep disruption and distress, and qualitative accounts suggest compounding feedback loops in which sleep fragmentation, exhaustion, isolation, and relational strain reduce recovery and sustain distress. This can help clarify why distress remained elevated even after accounting for sleep facets, and supports the need for stepped, coordinated responses that escalate in intensity as needs accumulate, in parallel with cultural responsiveness rather than isolated sleep advice. A further meta inference was the possible discordance regarding financial circumstances, which appeared to reflect different constructs being measured rather than a true contradiction.

Emotional support and relational safety emerged as practical leverage points, with validating interactions described as reducing shame, enabling disclosure, and supporting mobilisation of partner, whānau, and peer scaffolding. Finally, inequities were not explained by overall support adequacy alone. Instead, they appeared shaped by upstream structural conditions and service fit, including cultural safety, responsiveness, and continuity. Taken together, the overarching implication is not always “more support,” but support systems designed to fit mothers’ contexts, enable safe disclosure, and deliver coordinated, culturally safe responses to cumulative need.

6.5 Contribution of This Research

This thesis makes three linked contributions to enhancing our current understanding of maternal sleep health, mental distress and support in NZ. First, it advances how “support” is conceptualised and measured by demonstrating domain specificity, cumulative adequacy, and the central role of relational conditions in whether support needs can be validly identified. Second, it translates these findings into service and equity implications, shifting the focus from providing “more support” to redesigning how support is offered, including stepped and coordinated responses, relational safety, and culturally safe service fit. Third, it endorses socioecological and social determinants explanations of sleep health inequities by situating poor maternal sleep and distress within an environment that is not conducive to sleep and is influenced by structural disadvantage and service environments, rather than shaped primarily by individual behaviour or knowledge.

6.5.1 Conceptual and Measurement Advances in The Study of Support

A primary contribution of the thesis is to draw attention to the construct validity and intervention relevance of “support” in maternal sleep and mental health research. Across the quantitative and qualitative studies, support was shown to be both multidimensional and context dependent, which has direct implications for how it should be operationalised and interpreted in research and service settings.

First, the quantitative findings demonstrated that support’s impact on sleep health is domain-specific. Rather than a uniform relationship between “support” and “sleep,” different unmet support domains map onto different sleep facets, consistent with the argument that sleep health is itself multidimensional and shaped by distinct structural determinants (Buysse, 2014; Grandner, 2022). This pattern has two implications.

Substantively, it suggests that the relevant “support” pathway differs depending on whether the target outcome is sleep duration, daytime sleepiness, insomnia, or sleep quality. Methodologically, it provides an empirical rationale for disaggregating support by domain rather than relying on a single composite that risks masking heterogeneity (Barrera Jr, 1986). This addresses longstanding critiques that the support literature has been hampered by underspecified definitions and inconsistent operationalisation, limiting interpretability and cross-study comparison (Langford et al., 1997; Williams et al., 2004). It also extends prior research, which has investigated support domains in relation to mental distress (Hetherington et al., 2018; Leahy-Warren et al., 2012) and in relation to sleep and mood trajectories (Tomfohr et al., 2015) by showing that domain-specific support needs also differentiate between specific sleep health facets rather than only relating to distress outcomes or global sleep indices.

Second, the thesis advances support measurement by operationalising adequacy as a cumulative exposure across domains, rather than treating support as a single “high versus low” attribute. The dose–response pattern observed for multi-domain unmet need suggests that cumulative burden is a particularly important marker of risk, aligning with broader perinatal scholarship emphasising that maternal wellbeing is shaped by intersecting needs and pressures rather than single-issue vulnerabilities (Fischer et al., 2021). This builds on earlier maternal sleep and mental health studies that typically rely on global perceived support totals (e.g., MSPSS or SSQ total scores) or broad “low support” characterisations. In those designs, support is positioned as an overall correlate or buffer for sleep and mood outcomes (Camisasca et al., 2021; Fischer et al., 2024), but the measurement approach offers limited leverage for determining whether risk reflects a single gap or the accumulation of multiple unmet needs.

By contrast, conceptualising adequacy as the type and number of unmet domains makes the problem empirically visible. It also helps reconcile mixed or context-dependent findings in the wider support literature, where buffering effects can vary by population and outcome, and where “support” may operate differently depending on what else is happening in mothers’ lives (Ran-Peled et al., 2025). In practice, this cumulative framing is closer to how mothers narrate their experiences, where sleep disruption, isolation, practical strain, and relational stress co-occur and interact, consistent with qualitative accounts of postpartum constraint and complexity (Kennedy et al., 2007; Zambrano et al., 2016).

Third, the thesis demonstrates that the validity of support measurement depends on the relational conditions under which support needs are elicited. The qualitative data indicate that needs are not simply “reported” when asked, they are disclosed within a service interaction that can enable or suppress honesty. Accounts of checklist-driven or surveillance-like encounters suggest that what is captured by screening may partly reflect perceived safety, trust, and judgement during interactions with health providers, rather than the true extent of unmet need. This extends measurement critiques in a practical direction. Even domain-specific tools can underperform if they are embedded in interactions that do not support disclosure, because the apparent absence of need may represent nondisclosure rather than adequacy. In other words, measurement choices cannot be separated from delivery conditions, and “support measurement” is simultaneously a research design issue and a service delivery issue. This aligns with critiques that procedural, checklist-oriented models within WCTO can crowd out relational engagement and create missed opportunities to identify and respond to maternal wellbeing needs (Clapham et al., 2024; Severinsen et al., 2022). Taken together, the thesis contributes a more precise and service-relevant account of support by integrating domain specificity, cumulative adequacy, and relational disclosure conditions as integral components of measurement validity.

6.5.2 Translational Implications for Service Delivery and Equity

This thesis moves beyond documenting associations to articulating service design principles which are implied by the integrated mixed methods findings. The central shift is from a generic “more support” logic to an equity-oriented redesign logic, where outcomes depend on how support is structured, delivered, made accessible and is acceptable. First, the thesis supports stepped care and coordinated multi-domain packages as a response to cumulative unmet need. The quantitative dose-response pattern indicates that mothers with unmet needs across multiple domains represent a high-risk group for severe sleep disruption and elevated distress. The qualitative accounts add explanatory coverage by describing compounding loops. This idea is consistent with arguments that perinatal wellbeing requires coordinated responses that match the intensity and complexity of need (World Health Organization, 2022, 2025a)

Second, the thesis positions relational safety and emotional validation as mechanisms shaping engagement, help-seeking, and the practical effectiveness of support. Qualitatively, fear-based and judgement-oriented messaging can induce shame and withdrawal, while strengths-based, non-judgemental engagement can reduce guilt and support wellbeing. These patterns align with critiques of deficit-oriented health communication and the importance of dignity, trust, partnership, and cultural safety in care (Tipene-Leach & Fidow, 2022; Wepa & Wilson, 2020). The quantitative results strengthen this inference by showing that unmet emotional support is associated with poor sleep quality and remains associated with distress after adjustment for sleep facets. While directionality cannot be established with the use of cross-sectional analyses, the combined evidence supports treating emotionally safe, validating interactions as a plausible leverage point for improving both disclosure and uptake of support.

Third, the thesis advances equity-oriented redesign by arguing that service fit and cultural safety are central determinants of whether support can be recognised and effectively delivered. Māori wāhine describe misalignment with monocultural norms and discomfort in systems that do not reflect holistic approaches to wellbeing. This is consistent with a mechanism where a lack of cultural safety reduces disclosure, constrains help-seeking, and limits access to responsive support, compounding structural disadvantage. This aligns with established cultural safety frameworks that emphasise how power dynamics and cultural mismatch shape accessibility and acceptability (Curtis et al., 2019). The implication is not simply to always increase service volume, but to invest in whānau-centred, partnership-based models that embed relational continuity and flexibility in routine care.

A further translational implication concerns channels for mobilising emotional support. This thesis highlights that the effectiveness of support is determined not only by what providers offer, but by whether mothers can access it and experience it as responsive, acceptable, and sustained over time. Clinically, professional contact can be used as an entry point to help activate partner, whānau, peer, and community scaffolding, recognising that services cannot provide continuous emotional support and that sustainability depends on the wider relational ecosystem.

6.5.3 Endorsement of Socioecological and Social Determinants Explanations of Sleep Health Inequities

The third contribution is theoretical and explanatory. The thesis endorses socioecological and social determinant accounts of maternal sleep health inequities by showing that sleep and mental distress are patterned by structural conditions, and service environments, not solely by individual-level behaviour (Grandner, 2022; Hale & Hale, 2010; Knutson, 2013). Quantitatively, contextual measures such as socioeconomic deprivation and caregiving disruption show meaningful associations with outcomes, consistent with evidence that

sleep is socially patterned and shaped by unequal opportunity structures (Hale & Hale, 2010; Jean-Louis et al., 2022). Qualitatively, mothers describe the same constraint structure in lived terms, fatigue and recovery demands, caregiving load, limited practical help, time scarcity, relationship strain, and a gap between knowledge and feasibility. Together, these findings support a socioecological framing in which societal, social, and individual levels interact to shape maternal sleep and wellbeing (Fischer et al., 2021; Grandner, 2022).

Crucially, the thesis shows that inequities can persist even when checklist “support need” appears comparable. A greater proportion of Māori mothers experience higher deprivation exposure and higher distress and social jetlag, yet the distribution of cumulative unmet support domains does not differ by ethnicity. Considered alongside qualitative accounts of monocultural models and cultural unsafety, this pattern suggests inequities are unlikely to be explained only by support adequacy. Instead, inequities plausibly reflect structural constraint and differential service accessibility, acceptability, and relational safety (Curtis et al., 2019), aligning with NZ evidence that ethnic sleep inequities are shaped by structural forces linked to socioeconomic position, colonisation, and racism (Paine & Gander, 2013; Paine & Gander, 2016; Paine & Muller, 2023). Finally, this endorsement strengthens the argument that maternal sleep health inequities should be understood as avoidable and unjust, requiring policy and service responses that address material conditions and institutional fit alongside individual-level supports.

6.6 Clinical Implications

For clinical psychology, these findings suggest that maternal sleep difficulties should not be conceptualised only as a behavioural or lifestyle issue, but as a clinically meaningful indicator of broader relational, emotional, and structural strain. Psychologists working with mothers in the perinatal period and early childhood should assess sleep health alongside

mental distress, while also enquiring about unmet support needs across domains such as emotional, practical, and advice support. A formulation-driven approach is particularly important, as the findings indicate that different support deficits may relate to different aspects of sleep disruption and distress. For example, poor sleep quality may be more closely linked to unmet emotional support, whereas short sleep duration may reflect insufficient practical help and ongoing caregiving burden. Clinically, this supports formulations that locate maternal sleep and distress within the wider caregiving and relational system, rather than attributing difficulties primarily to individual vulnerability or poor coping.

The findings also highlight the importance of relational safety within clinical work. The qualitative narratives suggest that mothers may withhold important information when they anticipate judgement, shame, or surveillance, particularly around sensitive parenting practices or experiences of struggling. For psychologists, this underscores the need to create therapeutic contexts that emphasise validation, collaboration, and cultural safety, so that disclosure is possible and clinically useful formulations can be developed. In practice, this may involve explicitly exploring mothers' experiences of prior help-seeking, understanding whether support has been experienced as helpful or harmful, and attending to the effects of shame on engagement. A strengths-based stance is likely to be especially important, as invalidating or deficit-focused interactions may compound distress and reduce the likelihood that mothers access further support.

Finally, the findings support a broader role for clinical psychologists within integrated and equity-oriented models of care. Psychological intervention may need to extend beyond individual symptom reduction to include helping mothers mobilise partner, whānau, peer, and community support, while advocating for coordinated responses when needs span multiple domains. For Māori mothers in particular, the findings reinforce the importance of

culturally safe, whānau-centred practice that recognises the impact of structural inequities, colonisation, and service misalignment for both sleep and mental wellbeing. Overall, the clinical implication is that psychologists should approach maternal sleep and distress through a socioecological and formulation-based lens, where effective intervention depends not only on individual therapy, but also on addressing relational context, support systems, and barriers to safe engagement.

6.7 Strengths

The mixed-methods approach of this thesis has several strengths. The concurrent quantitative and qualitative strands enabled identification of patterned associations and inequities, while also generating explanatory depth about the day-to-day constraints and service interaction conditions that shape sleep opportunity, disclosure, and help-seeking. In combination, the design provided both breadth and depth, producing an integrated account that is more informative than either method alone and supporting meta-inferences that move beyond confirmation to expansion, consistent with mixed-methods design principles (Creswell & Clark, 2011). A further strength is the explicit translation of the integrated findings into service-relevant design implications, including domain-specific assessment, cumulative need triage, relationally safe engagement, and equity-oriented service fit. This responds to calls in sleep health research to move from identifying social patterning and inequities toward intervention and policy relevance (Hale et al., 2015). This integration strengthens the pragmatic value of the thesis, generating actionable implications for service delivery, screening, and culturally responsive practice, while maintaining fidelity to lived experience.

Second, the thesis is informed by Kaupapa Māori and Te Tiriti o Waitangi perspectives. *Moe Kura* prioritised Māori participation and leadership and was designed for equal explanatory

power for Māori and non-Māori, enabling inequities to be examined in a way that aligns with Indigenous epidemiological principles. *Wāhi Kōrero* is grounded in Te Tiriti o Waitangi and operationalises equitable partnership through a Māori and non-Māori research collaboration. These approaches also strengthened the interpretive validity of the mixed-methods integration by highlighting how service interactions and monocultural assumptions can shape sleep practices, wellbeing, and the likelihood that needs are safely disclosed.

A further strength is the thesis' extension of the empirical lens beyond the immediate postpartum period. In *Moe Kura*, the focus on mothers of 3–4-year-old children demonstrates that sleep disruption, support needs, and mental distress can persist across early childhood rather than being confined to the first postpartum year. In *Wāhi Kōrero*, participants were not restricted by a timeframe since their Well Child Tamariki Ora experience, enabling inclusion of accounts that reflect both recent and more distal interactions. This broad temporal scope strengthens the thesis by capturing how support, service fit, and wellbeing may unfold over time. This helps address the gap in the literature that often concentrates on the first year after birth.

6.8 Limitations

First, the quantitative analyses were cross-sectional, which cannot establish causality or the direction of effects between unmet support needs, sleep health, and mental distress. Although the observed patterns are consistent with unmet support contributing to poorer sleep and higher distress, the reverse is also plausible. Mothers experiencing insomnia, daytime impairment, or elevated distress may appraise their support as less adequate, have reduced capacity to mobilise support, or report greater need across multiple domains. Clarifying temporal ordering and pathways will require longitudinal designs that

repeatedly measure sleep, mental distress, and support and use analytic approaches capable of testing bidirectional and indirect effects.

Second, there are measurement limitations. In the quantitative study, key constructs were self-reported, including unmet support needs, sleep outcomes, and mental distress. Even where validated measures were used, self-report is susceptible to shared method variance and may be influenced by current mood, fatigue, and mothers' interpretations at the time of response. The support items captured perceived adequacy (wanting more support) rather than support received or the quality and cultural safety of that support. This matters given that the qualitative findings show support can be experienced as enabling or harmful depending on delivery. Dichotomising support variables was necessary for modelling but likely reduced nuance. The insomnia variable was conditional on a screening question, which may underestimate insomnia-like experiences among mothers who do not label their sleep as a "problem."

Third, the qualitative component has limitations inherent to anonymous, self-selected online story sharing. The dataset is not intended to be representative, and mothers may have been more likely to contribute when sleep or service experiences were particularly salient, potentially amplifying more intense encounters. The format limited opportunities for follow-up, clarification, or deeper probing, and the demographic context was limited. As with all qualitative research, thematic analysis is interpretive, even when systematic.

Finally, the mixed methods integration is limited by the datasets being independent and not linked at the individual level. Integration therefore occurred conceptually rather than through within-person comparisons, which precludes claims that particular qualitative experiences explain specific quantitative associations for the same mothers. Apparent discordance may reflect differences in measurement and focus rather than contradiction.

6.9 Future Research

To build on the findings of this thesis, recommendations for future research include:

- Longitudinal research across the perinatal period to clarify temporal ordering and possible bidirectional relationships between unmet support (by domain and cumulative adequacy), maternal sleep health facets, and mental distress, including how these relationships evolve as children age and caregiving demands change.
- Measurement research to strengthen construct validity of “support” including development and validation of domain-specific support need measures alongside indicators of support received, quality, fit, and cultural safety. Explicit examination of the limitations of global composite support scores are needed to guide intervention development.
- Mixed methods research linking service interaction conditions to support measurement validity, including how relational continuity, trust, perceived judgement, and cultural safety shape disclosure, what is captured by screening, and subsequent uptake of support. This should include testing for systematic under-detection of need under checklist-driven delivery models.
- Research on sustainable channels for emotional support comparing professional, peer, and partner or whānau-based supports, and testing whether clinical contact can function as a bridge to strengthen durable non-professional scaffolding around mothers, particularly in contexts where services cannot provide continuous emotional support.

6.10 Conclusion

This thesis examined how sleep health, mental distress, and support intersect for mothers in NZ, drawing on quantitative data from *Moe Kura* and qualitative narratives from *Wāhi Kōrero*, and integrating these strands using a mixed methods approach. Across studies, maternal sleep and wellbeing emerged as being shaped less by individual choice than by the sleep environment, caregiving load, socioeconomic deprivation, and service environments. The quantitative findings demonstrate that support is not unitary, unmet domains map onto distinct sleep facets, and cumulative multi-domain unmet need shows a clear dose-response pattern across sleep disruption and distress. The qualitative findings extend these patterns by showing how compounding pressures and service interactions influence disclosure, help-seeking, and whether support is experienced as validating or harmful. Inequities for Māori mothers were evident and were not explained by “support need” alone, underscoring the role of structural conditions and service fit. Overall, the thesis supports refinement of maternal support systems to be context-aware, relationally safe, culturally grounded, and able to respond to cumulative multi-domain need.

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INTRODUCTION

APPENDIX B. YOUR SLEEP AND HEALTH

QUESTIONNAIRE

E Moe, Māmā

Your Sleep and Health

This questionnaire is about your sleep and health.

This questionnaire should be completed when your “E Moe, Māmā” child is **3 years of age**.

Please complete it **no earlier** than one month before their 3rd birthday or **no later** than one month after their 3rd birthday.

Please fill this in between the following dates:

Please **tick one** option for questions with circles like this:

☐

Please **tick as many options as apply** for questions with boxes like this:

☐

1. What is **your** date of birth?

About your sleep

2. How many hours sleep, including naps, do you usually get in 24 hours?
(Just think about the **last week**)

3. In the last week, how often did you get a good night's sleep? (Please **tick one** option)

No nights Every night

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

4. On how many days in the last week did you have a daytime nap? (Please **tick one** option)

No days Every day

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

5. On days when you are scheduled to work, study, care for others or have other regular commitments:

a. I have to get up at:

(Please specify am/pm)

b. To wake up I need:

c. I regularly wake up:

- ☐ Before the alarm
☐ With the alarm
☐ Don't use an alarm

d. I am fully awake from:

(Please specify am/pm)

e. I have an energy dip at:

(Please specify am/pm)

f. On nights before scheduled (e.g. work) days, I go to bed at: (Please specify am/pm)

1

Your Sleep and Health



5.
cont'd.

g. To fall asleep when I go to bed takes me:

MINUTES

h. If I get the chance, I like to take a nap:

Yes ☐ No ☐

i. If **yes**, I like to nap at:

(Please specify am/pm)

HH:MM AM/PM

for:

MINUTES

6.

Imagine having free days (days when you are **not** scheduled to work, study, care for others or have no other regular commitments). On free days:

a. Ideally, I would sleep in until:

(Please specify am/pm)

HH:MM AM/PM

b. I normally wake up at:

(Please specify am/pm)

HH:MM AM/PM

c. If I wake up at around the normal (scheduled/work day) alarm time, I try to get back to sleep:

Yes ☐ No ☐

d. If I get back to sleep, I sleep for another:

MINUTES

e. I am fully awake from:

(Please specify am/pm)

HH:MM AM/PM

6.
cont'd.

f. I have an energy dip at around:

(Please specify am/pm)

HH:MM AM/PM

g. On nights before free days, I go to bed at:

(Please specify am/pm)

HH:MM AM/PM

h. To fall asleep when I go to bed takes me:

MINUTES

i. If I get the chance, I like to take a nap:

Yes ☐ No ☐

j. If **yes**, I like to nap at:

(Please specify am/pm)

HH:MM AM/PM

for:

MINUTES

7.

Do you usually watch TV or read in bed before falling asleep?

Yes ☐ No ☐

If you answered 'No' please continue to question 8.

If 'Yes', once I am in bed, I would like to watch TV or read for:

MINUTES

but I normally fall asleep after a maximum of:

MINUTES

Your Sleep and Health



8. Do you prefer to sleep in a completely dark room?

Yes ☐ No ☐

9. Do you wake up more easily when morning light shines into your room?

Yes ☐ No ☐

10. How long on average per day do you spend outside (**really outside**) exposed to daylight?

a: On scheduled days

HOURS

&

MINUTES

b: On free days:

HOURS

&

MINUTES

11. Are you an early type (morning) person or a late type (evening) person?

Early type people like getting up early in the morning but have trouble staying up late. Late type people like staying up late but find it hard to get up in the morning.

(Please **tick one** option on each line)

	Extreme early type	Moderate early type	Slight early type	Neither type	Slight late type	Moderate late type	Extreme late type
At present, I am	☐	☐	☐	☐	☐	☐	☐
As a child, I was	☐	☐	☐	☐	☐	☐	☐
As a teenager, I was	☐	☐	☐	☐	☐	☐	☐
My mother is/was	☐	☐	☐	☐	☐	☐	☐
My father is/was	☐	☐	☐	☐	☐	☐	☐
My partner* is/was	☐	☐	☐	☐	☐	☐	☐

(* boyfriend, girlfriend, spouse, significant other)

Your Sleep and Health



12. Are you satisfied with the amount, quality, and timing of your sleep?

☐ Yes

☐ No

Please go to question 13

If 'No', would you like to: (Please **tick any** that apply)

☐ sleep more

☐ go to sleep later

☐ sleep less

☐ get up earlier

☐ have more refreshing sleep

☐ get up later

☐ go to sleep earlier

13. Thinking about your sleep and sleep habits within **the past month**, how often have you done the following **in the hour** before you went to bed?

	Every night or almost every night	A few nights a week	A few nights a month	Rarely	Never	Not applicable
Did work relating to your job or study	☐	☐	☐	☐	☐	☐
Watched TV/movie	☐	☐	☐	☐	☐	☐
Listened to the radio or music	☐	☐	☐	☐	☐	☐
Were on the computer or internet	☐	☐	☐	☐	☐	☐
Read a book	☐	☐	☐	☐	☐	☐
Had sex	☐	☐	☐	☐	☐	☐
Exercised	☐	☐	☐	☐	☐	☐
Did activities with children	☐	☐	☐	☐	☐	☐
Did activities with family/friends	☐	☐	☐	☐	☐	☐
Drank a caffeinated beverage	☐	☐	☐	☐	☐	☐
Drank an alcoholic beverage	☐	☐	☐	☐	☐	☐
Took a hot bath or shower	☐	☐	☐	☐	☐	☐
Completed household chores	☐	☐	☐	☐	☐	☐

Your Sleep and Health



14. Do you have the following technology in your bedroom?
(Please **tick as many** boxes as apply)

- ☐ TV/computer/laptop/ DVD player
- ☐ Smartphone
- ☐ Cellphone (not a smartphone)/pager/Blackberry
- ☐ Gaming console
- ☐ Radio or other music **only** player (e.g. MP3 player)
- ☐ e-reader **with** a bright screen (e.g. Kobo, iPad, other tablet)
- ☐ e-reader **without** a bright screen (e.g. non-backlit Kindle)
- ☐ Other technology (Please specify)

PLEASE SPECIFY

- ☐ None

15. How frequently do you do the following in the **hour before** going to sleep?

	Every night or almost every night	A few nights a week	A few nights a month	Rarely	Never
Watch movies or television (e.g. on TV, portable DVD player, iPad, laptop, computer)	☐	☐	☐	☐	☐
Listen to radio or music (e.g. using radio, CD or MP3 player)	☐	☐	☐	☐	☐
Play games (e.g. using a computer, phone or gaming console)	☐	☐	☐	☐	☐
Read using an e-reader with a bright screen (e.g. Kobo, iPad, other tablet)	☐	☐	☐	☐	☐
Read using an e-reader without a bright screen (e.g. non-backlit Kindle)	☐	☐	☐	☐	☐
Surf internet or use social media (e.g. Facebook/texting)	☐	☐	☐	☐	☐
Other activities using technology (Please specify)	☐	☐	☐	☐	☐

PLEASE SPECIFY

Your Sleep and Health



16. How frequently do you do the following to help **fall asleep**?

	Every night or almost every night	A few nights a week	A few nights a month	Rarely	Never
Watch movies or television (e.g. on TV, portable DVD player, iPad, laptop, computer)	☐	☐	☐	☐	☐
Listen to radio or music (e.g. using radio, CD or MP3 player)	☐	☐	☐	☐	☐
Play games (e.g. using a computer, phone or gaming console)	☐	☐	☐	☐	☐
Read using an e-reader with a bright screen (e.g. Kobo, iPad, other tablet)	☐	☐	☐	☐	☐
Read using an e-reader without a bright screen (e.g. non-backlit Kindle)	☐	☐	☐	☐	☐
Surf internet or use social media (e.g. Facebook/texting)	☐	☐	☐	☐	☐
Other activities using technology (Please specify)	☐	☐	☐	☐	☐

PLEASE SPECIFY

17. Most nights, do you sleep...

(Please **tick as many** options as you like)

- | | |
|--|---|
| ☐ Alone | ☐ With other children |
| ☐ With your partner/significant other | ☐ With a pet |
| ☐ With an infant (child under 1 year) | ☐ Or with someone or something else? |
| ☐ With your "E Moe, Māmā" child | (Please specify) |

PLEASE SPECIFY

Your Sleep and Health



18. How often in the **last week** did you:
(Please **circle one** number in every row)

	No days/ no nights								Every day/ every night
Have difficulty getting to sleep	☐ 0	1	2	3	4	5	6	7	
Wake up during your sleep period	☐ 0	1	2	3	4	5	6	7	
Wake up too early at the end of a sleep period	☐ 0	1	2	3	4	5	6	7	
Feel rested upon awakening at the end of a sleep period	☐ 0	1	2	3	4	5	6	7	
Sleep poorly	☐ 0	1	2	3	4	5	6	7	
Feel sleepy during the day	☐ 0	1	2	3	4	5	6	7	
Struggle to stay awake during the day	☐ 0	1	2	3	4	5	6	7	
Feel irritable during the day	☐ 0	1	2	3	4	5	6	7	
Feel tired or fatigued during the day	☐ 0	1	2	3	4	5	6	7	
Feel satisfied with the quality of your sleep	☐ 0	1	2	3	4	5	6	7	
Feel alert and energetic during the day	☐ 0	1	2	3	4	5	6	7	
Get too much sleep	☐ 0	1	2	3	4	5	6	7	
Get too little sleep	☐ 0	1	2	3	4	5	6	7	
Take a nap at a scheduled time	☐ 0	1	2	3	4	5	6	7	
Fall asleep at an unscheduled time	☐ 0	1	2	3	4	5	6	7	
Drink an alcoholic beverage to help you get to sleep	☐ 0	1	2	3	4	5	6	7	
Use tobacco to help you get to sleep	☐ 0	1	2	3	4	5	6	7	
Use a herbal product to help you get to sleep	☐ 0	1	2	3	4	5	6	7	
Use an over-the-counter sleeping pill to help you get to sleep	☐ 0	1	2	3	4	5	6	7	
Use a prescription sleeping pill to help you get to sleep	☐ 0	1	2	3	4	5	6	7	
Use any pain medication to help you get to sleep (e.g. Panadol)	☐ 0	1	2	3	4	5	6	7	
Take anything else to help you sleep (please specify)	☐ 0	1	2	3	4	5	6	7	

PLEASE SPECIFY

Your Sleep and Health



19. In the **last week** what, if anything, woke you up during the night?

(Please **tick as many** options as you like)

- ☐ Noise
- ☐ Light
- ☐ Stress
- ☐ Too hot or too cold
- ☐ Pain/discomfort
- ☐ Pain/discomfort associated with current pregnancy
- ☐ Nightmares
- ☐ The need to go to the bathroom
- ☐ Wake up for no apparent reason
- ☐ Heartburn
- ☐ Giving care to child
- ☐ Giving care to elderly parent
- ☐ Giving care to someone else
- ☐ Spouse/bed partner
- ☐ Hungry/thirsty
- ☐ Medication side effects
- ☐ Pets
- ☐ Text messages or alerts from phone or other electronic device (not pre-set alarms)
- ☐ Can't breathe comfortably
- ☐ Worrying or thinking about your "E Moe, Māmā" child's behaviour
- ☐ Worrying or thinking about another child's behaviour
- ☐ Worrying or thinking about a disabled or ill family member (adult or child)
- ☐ Worrying or thinking about *current* housing difficulties
- ☐ Worrying or thinking about money/finance problems
- ☐ Worrying or thinking about world or current events
- ☐ Worrying or thinking about balancing work and family
- ☐ Worrying or thinking about family members not getting on
- ☐ Worrying or thinking about who does household chores
- ☐ Something else (Please specify)
- ☐ Nothing awakens me at night
- ☐ Don't know

PLEASE SPECIFY

Your Sleep and Health



20. During sleep in the **last week**, has anyone told you that you did any of the following? Please circle how often. (Please **circle one** number in every row)

	No nights							Every night
Loud snoring	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
Long pauses between breaths while asleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
Legs twitching or jerking while you sleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

21. In the **last week**, have you experienced an urge to move your legs (usually accompanied by unpleasant sensations)?

Yes ☐ No ☐

If you answered 'No', please go to question 23.

22. If you answered 'Yes' in question 21, is this:
(Tick all that apply to you)

- ☐ Worse at night?
☐ More noticeable when you rest?
☐ Relieved by movement?

23. Do you consider that you have a sleep problem?

- ☐ No (Please go to question 30)
☐ Yes, lasting less than 4 weeks
☐ Yes, for 1-6 months
☐ Yes, for more than 6 months

COMMENTS WELCOME

24. Please rate the **current (i.e. last 2 weeks) severity** of the following insomnia problem(s):
(Please **circle one** number in every row)

	None	Mild	Moderate	Severe	Very severe
Difficulty falling asleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
Difficulty staying asleep	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4
Problem waking too early	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4

25. How **satisfied/dissatisfied** are you with your **current** sleep pattern?
(Please **circle one**)

Very satisfied	Satisfied	Moderately Satisfied	Dissatisfied	Very dissatisfied
☐ 0	☐ 1	☐ 2	☐ 3	☐ 4

Your Sleep and Health



26. How **noticeable** to others do you think your sleeping problem is in terms of impairing your quality of life?

(Please **circle one**)

Not at all noticeable	A little	Somewhat	Much	Very much noticeable
0	1	2	3	4

27. How **worried/distressed** are you about your current sleep problem?

(Please **circle one**)

Not at all worried	A little	Somewhat	Much	Very much worried
0	1	2	3	4

28. To what extent do you consider your sleep problem to **interfere** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc) **currently**?

(Please **circle one**)

Not at all interfering	A little	Somewhat	Much	Very much interfering
0	1	2	3	4

29. Does your sleep problem interfere with...

	Yes	No	Don't know	Not applicable
Your relationship with your child or children	☐	☐	☐	☐
Your relationship with your spouse or partner	☐	☐	☐	☐
Caring for your family	☐	☐	☐	☐
Your relationship with your extended family or friends	☐	☐	☐	☐

30. Have you ever been told by a doctor or other health professional that you have a sleep disorder?

- ☐ No (Please go to question 33)
☐ Yes (Please go to question 31)
☐ Don't know (Please go to question 33)

31. What was the sleep disorder?

- ☐ Obstructive Sleep Apnea
☐ Insomnia
☐ Restless legs
☐ Other (Please specify)

PLEASE SPECIFY

- ☐ Don't know

Your Sleep and Health



32. What treatments do you now have for your sleep disorder(s)?

(Please **tick as many** boxes as apply)

- ☐ No treatment
- ☐ Medicines, tablets or pills
- ☐ Diet
- ☐ Exercise
- ☐ Other (please specify)
- ☐ Don't know

PLEASE SPECIFY

33. How likely are you to doze off or fall asleep in the following situations, in contrast to feeling just tired? (This refers to your usual way of life in recent times)

(Please **tick one circle** on each line)

	Would never doze	Slight chance	Moderate chance	High chance
Sitting and reading	☐	☐	☐	☐
Watching TV	☐	☐	☐	☐
Sitting inactive in a public place (e.g. movies, meeting)	☐	☐	☐	☐
As a passenger in a car for an hour without a break	☐	☐	☐	☐
Lying down in the afternoon when circumstances permit	☐	☐	☐	☐
Sitting and talking to someone	☐	☐	☐	☐
Sitting quietly after a lunch without alcohol	☐	☐	☐	☐
In a car, while stopped for a few minutes in traffic	☐	☐	☐	☐

34. a. Thinking about your typical day, what are you unable to do because **you are too sleepy**? Are you too sleepy to: (Please **tick one circle** on each line)

	Yes, too sleepy	No	Don't know
Do job - related work	☐	☐	☐
Spend time with family or friends	☐	☐	☐
Have sex	☐	☐	☐
Do leisure activities such as watching TV or reading	☐	☐	☐
Exercise	☐	☐	☐
Eat right or cook a healthy meal	☐	☐	☐

Your Sleep and Health



34.
Cont'd.

b. Thinking about your typical day, what are you unable to do because you **run out of time**? Do you wish you had more time to: (Please **tick one circle** each line)

	Yes, run out of time	No	Don't know
Do job - related work	☐	☐	☐
Spend time with family or friends	☐	☐	☐
Sleep	☐	☐	☐
Have sex	☐	☐	☐
Do leisure activities such as watching TV or reading	☐	☐	☐
Exercise	☐	☐	☐
Eat right or cook a healthy meal	☐	☐	☐

35.

How frequently does the sleep of your "E Moe, Māmā" child affect...

(Please **circle one** number in every row)

	No nights/ days							Every night/ day
Your bed time?	0	1	2	3	4	5	6	7
Your get up time?	0	1	2	3	4	5	6	7
The number of times you wake at night?	0	1	2	3	4	5	6	7
The amount of sleep you get at night?	0	1	2	3	4	5	6	7
How sleepy you are during the day?	0	1	2	3	4	5	6	7
Your mood during the day?	0	1	2	3	4	5	6	7
Your ability to do things during the day?	0	1	2	3	4	5	6	7

36.

If you have other children, how much does their sleep affect...

(Please **circle one** number in every row)

	No nights/ days							Every night/ day
Your bed time?	0	1	2	3	4	5	6	7
Your get up time?	0	1	2	3	4	5	6	7
The number of times you wake at night?	0	1	2	3	4	5	6	7
The amount of sleep you get at night?	0	1	2	3	4	5	6	7
How sleepy you are during the day?	0	1	2	3	4	5	6	7
Your mood during the day?	0	1	2	3	4	5	6	7
Your ability to do things during the day?	0	1	2	3	4	5	6	7

Your Sleep and Health



37. In the past year, how often have you driven a car or motor vehicle while feeling drowsy? Would you say you have driven drowsy...

- ☐ 3 or more times a week
- ☐ 1 to 2 times a week
- ☐ 1 to 2 times a month
- ☐ Less than once a month
- ☐ Never
- ☐ Don't drive/Don't have a license/
Don't have a car
- ☐ Don't know

Where you live and who you live with:

38. Where do you usually live?

NUMBER & STREET NAME

SUBURB OR RURAL DELIVERY NO.

CITY, TOWN OR DISTRICT

POSTCODE

CODE

TELEPHONE NUMBER

CODE

CELLPHONE NUMBER

39. Thinking back over the **past five years**, how many times has your family moved house? (Please **tick one** option)

- ☐ Have not moved house in the past 5 years
- ☐ Once
- ☐ Twice
- ☐ Three times
- ☐ Four times
- ☐ Five or more times
- ☐ Don't know

Your Sleep and Health

0%

100%



40. Who normally lives in your household?

Person	Age (Years)	Sex (M/F)	Their relationship to you (e.g. partner, friend, flatmate, parent, grandparent, brother, sister, auntie, uncle, cousin, your child, step-child, another person's child)	Nights per week they normally live there (1-7)	Are you required to care for them? (Y/N)
Me		F	Not applicable		Not applicable
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

Support

41. If you have a partner, how is your relationship with them at the moment?

(Please **circle one** number)Perfectly
happyExtremely
unhappy

0

1

2

3

4

5

6

7

OR ☐ not applicable

42. Do you have the following types of support?

(Please **tick one circle** on each line)I don't need
any supportI would like
a lot more
supportI would like
some more
supportI have
enough
support

Financial support

☐☐☐☐

Emotional support (e.g. someone who listens or is 'there' for you)

☐☐☐☐

Advice (e.g. someone you can go to for information or guidance)

☐☐☐☐

Concrete/Practical support (e.g. childcare, housework, cooking)

☐☐☐☐

Your Sleep and Health



Income

43. Are **you, yourself** currently receiving any of these types of income support?

(Mark the space or spaces which apply to you)

- ☐ Working for Families (Family Support, In Work Payment, Family Tax Credit)
- ☐ Unemployment benefit
- ☐ Domestic purposes benefit
- ☐ Sickness benefit
- ☐ Invalid's benefit
- ☐ Student allowance
- ☐ Disability allowance
- ☐ ACC (as income support, **not** reimbursement for health services)
- ☐ Other government benefits (independent youth benefit, war pension, etc)
- ☐ None of the above
- ☐ Don't know

44. What is the total income that **you yourself** got from **all sources**, before tax or anything was taken out of it, in the last 12 months?

- ☐ Loss
- ☐ Zero income
- ☐ \$1 – \$5,000
- ☐ \$5,001 – \$10,000
- ☐ \$10,001 – \$15,000
- ☐ \$15,001 – \$20,000
- ☐ \$20,001 – \$25,000
- ☐ \$25,001 – \$30,000
- ☐ \$30,001 – \$35,000
- ☐ \$35,001 – \$40,000
- ☐ \$40,001 – \$50,000

continues...

44.
Cont'd.

- ☐ \$50,001 – \$60,000
- ☐ \$60,001 – \$70,000
- ☐ \$70,001 – \$100,000
- ☐ \$100,001 – \$150,000
- ☐ \$150,001 or more
- ☐ Don't know

45. What is the total income that **your household** got from **all sources**, before tax or anything was taken out of it, in the last 12 months?

- ☐ Loss
- ☐ Zero income
- ☐ \$1 – \$5,000
- ☐ \$5,001 – \$10,000
- ☐ \$10,001 – \$15,000
- ☐ \$15,001 – \$20,000
- ☐ \$20,001 – \$25,000
- ☐ \$25,001 – \$30,000
- ☐ \$30,001 – \$35,000
- ☐ \$35,001 – \$40,000
- ☐ \$40,001 – \$50,000
- ☐ \$50,001 – \$60,000
- ☐ \$60,001 – \$70,000
- ☐ \$70,001 – \$100,000
- ☐ \$100,001 – \$150,000
- ☐ \$150,001 or more
- ☐ Don't know

Your Sleep and Health



46. The following few questions are designed to identify people who have had special financial needs in the last 12 months. These questions may not apply directly to you, but for consistency we need to ask them of everyone. For each we just require a 'Yes' or 'No' response.

a. In the last 12 months, did you yourself get income from any of the following sources: Domestic Purposes Benefit, Independent Youth Benefit, Sickness Benefit, Invalids Benefit?

Yes ☐ No ☐

b. In the last 12 months have you personally been forced to buy cheaper food so that you could pay for other things you needed?

Yes ☐ No ☐

c. In the last 12 months, have you been out of paid work at any time for more than one month?

Yes ☐ No ☐

If you answered 'No' to question 46c, please go to question 46e.

d. If you answered 'Yes' in question 46c, was this due to being a full-time care-giver and/or home maker?

Yes ☐ No ☐

e. In the last 12 months have you personally put up with feeling cold to save heating costs?

Yes ☐ No ☐

f. In the last 12 months have you personally made use of special food grants or food banks because you did not have enough money for food?

Yes ☐ No ☐

g. In the last 12 months have you personally continued wearing shoes with holes because you could not afford replacement?

Yes ☐ No ☐

h. In the last 12 months have you personally gone without fresh fruit and vegetables, often, so that you could pay for other things you needed?

Yes ☐ No ☐

i. In the last 12 months have you personally received help in the form of clothes or money from a community organisation (like the Salvation Army)?

Yes ☐ No ☐

Education

- 47.** What is your highest secondary school qualification?
- ☐ None
 - ☐ NZ School Certificate in one or more subjects **or** National Certificate Level 1 **or** NCEA Level 1
 - ☐ NZ Sixth Form Certificate in one or more subjects **or** National Certificate Level 2 **or** NZ UE before 1986 in one or more subjects **or** NCEA Level 2
 - ☐ NZ Higher School Certificate **or** Higher Leaving Certificate **or** NZ University Entrance
 - ☐ Bursary/Scholarship **or** National Certificate Level 3 **or** NCEA Level 3 **or** NZ Scholarship Level 4
 - ☐ Other secondary school qualification gained in NZ (*Please specify*)
- PLEASE SPECIFY
- ☐ Other secondary school qualification gained overseas

Your Sleep and Health



48. Apart from secondary school qualifications, do you have another completed qualification?
- (Please do not count incomplete qualifications or qualifications that take less than 3 months of full-time study to get. Please tell us your **highest** qualification)*
- ☐ No qualification beyond secondary school
 - ☐ Bachelors degree, for example, BA, BSc
 - ☐ Bachelors degree with honours
 - ☐ Masters degree, for example, MA, MSc
 - ☐ PhD
 - ☐ Diploma (**not** post-graduate)
 - ☐ Diploma – Postgraduate
 - ☐ Trade or technical certificate which took more than 3 months full-time study
 - ☐ Professional qualification, for example, ACA, teachers, nurses
 - ☐ Other *(Please specify)*

PLEASE SPECIFY

49. Are you attending, studying or enrolled at school or anywhere else?
- ☐ Full-time (20 hours or more a week)
 - ☐ Part-time (less than 20 hours a week)
 - ☐ Neither of these

Paid work

*(These questions refer to your work in the **last week**):*

50. Do you currently work for pay, profit or income?
- ☐ Yes, one paid job
 - ☐ Yes, more than one paid job
 - ☐ No

COMMENTS WELCOME

If you answered 'No' please go to question 54, if 'Yes' go to question 51.

51. In the **last week**, how many **hours** did you work for pay, profit or income?

HOURS

52. In the **last week**, on how many **nights** did you work for pay, profit or income for at least three hours between midnight and 5am?

*(Please **circle one**)*

No nights

Every night

0 1 2 3 4 5 6 7

53. Overall how satisfied are you with the balance between your work and other aspects of your life such as time with your family or leisure?

- ☐ Very dissatisfied
- ☐ Dissatisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Satisfied
- ☐ Very satisfied

Please now go to question 55.

Your Sleep and Health



54. If you are **not** currently working for pay, profit or income, are you at home to care for a child?

- ☐ Yes, and I have no plans to return to work
- ☐ Yes, and I plan to return to work but have no date in mind
- ☐ Yes, I expect to be back at work by
- ☐ No (please go to question 55)

D D M M Y Y Y Y

Ethnicity

55. Which ethnic group do **you** belong to?
(Mark the space or spaces which apply to you)

- ☐ New Zealand European
- ☐ Māori
- ☐ Samoan
- ☐ Cook Island Māori
- ☐ Tongan
- ☐ Niuean
- ☐ Chinese
- ☐ Indian
- ☐ Other such as DUTCH, JAPANESE, TOKELAUAN. Please state:

PLEASE SPECIFY

56. Have you ever been a victim of an **ethnically motivated attack** (verbal or physical abuse to the person or property) in New Zealand?

(Mark the space or spaces which apply to you)

- ☐ Yes, verbal - within the past 12 months
- ☐ Yes, verbal - more than 12 months ago
- ☐ Yes, physical - within the past 12 months
- ☐ Yes, physical - more than 12 months ago
- ☐ No
- ☐ Don't know/unsure

57. Have you ever been treated unfairly (for example, kept waiting or treated differently) by a health professional (that is, a doctor, nurse, dentist etc) **because of your ethnicity** in New Zealand?

(Mark the space or spaces which apply to you)

- ☐ Yes, within the past 12 months
- ☐ Yes, more than 12 months ago
- ☐ No
- ☐ Don't know/unsure

58. Have you ever been treated unfairly at work or been refused a job **because of your ethnicity** in New Zealand?

(Mark the space or spaces which apply to you)

- ☐ Yes, within the past 12 months
- ☐ Yes, more than 12 months ago
- ☐ No
- ☐ Don't know/unsure

Your Sleep and Health



59. Have you ever been treated unfairly when renting or buying housing **because of your ethnicity** in New Zealand?

(Mark the space or spaces which apply to you)

- ☐ Yes, within the past 12 months
☐ Yes, more than 12 months ago
☐ No
☐ Don't know/unsure

60. Over the past 12 months, how often have you felt emotionally upset (e.g. angry, sad or frustrated) as a result of **how people of your ethnicity were portrayed in the media** (e.g. newspapers, radio, television, movies)?

- ☐ Never
☐ Once or twice in the past year
☐ Most months
☐ Most weeks
☐ Most days

General health and wellbeing

61. What is your weight?

WEIGHT IN KGS

OR

WEIGHT IN STONE/LBS

OR

- ☐ Don't know

62. What is your height?

HEIGHT IN CENTIMETRES

OR

HEIGHT IN FEET/INCHES

OR

- ☐ Don't know

63. What is your neck size?

(Please use the tape measure provided to measure around your neck and write the number of centimetres in the space provided)

NECK IN CENTIMETRES

64. Which of the following describes you, if any?

Are you currently pregnant?

- Yes ☐ No ☐

Have had another baby (or babies) since your "E Moe, Māmā" baby?

- Yes ☐ No ☐

If 'Yes', please specify the dates of birth:

Baby 1

D D M M Y Y Y Y

Baby 2

D D M M Y Y Y Y

Baby 3

D D M M Y Y Y Y

Baby 4

D D M M Y Y Y Y

Your Sleep and Health



65. In general, would you say that your health is:

- ☐ Excellent ☐ Fair
☐ Very good ☐ Poor
☐ Good ☐ Don't know

66. Are you currently having any **treatment or monitoring** for any of these conditions?

(Please **tick one circle** on every line)

	Yes	No	Don't know/ can't remember
Heart disease	☐	☐	☐
Stroke	☐	☐	☐
Diabetes	☐	☐	☐
Asthma	☐	☐	☐
Arthritis	☐	☐	☐
Spinal disorder	☐	☐	☐
Osteoporosis	☐	☐	☐
Cancer	☐	☐	☐
Anxiety (Please describe)	☐	☐	☐
PLEASE DESCRIBE			
Depression	☐	☐	☐
Other mental illness (Please state)	☐	☐	☐
PLEASE STATE			
Chronic pain	☐	☐	☐
High blood pressure (hypertension)	☐	☐	☐
High cholesterol	☐	☐	☐
Low iron or anaemia	☐	☐	☐
Allergies	☐	☐	☐
Thyroid problem	☐	☐	☐
Respiratory illness	☐	☐	☐
Other (Please state)	☐	☐	☐
PLEASE STATE			

Your Sleep and Health



67. Since your “E Moe, Māmā” baby was born have you been distressed by feelings of anxiety or depression for 2 weeks or more?

Yes ☐ No ☐

If you answered 'No', please go to question 68.

If you answered 'Yes':

- a. Were the feelings of anxiety or depression related to the pregnancy or birth of another baby?

Yes ☐ No ☐

- b. Did this distress interfere with your ability to get things done or your relationships with family and friends?

(Please **circle one** number)

Not at all	Somewhat			Very much	
0	1	2	3	4	5

- c. Did this distress lead you to seek professional help?

Yes ☐ No ☐

68. Have you ever been told by a health professional that you had:
Antenatal depression (depression during pregnancy)

No ☐ Yes ☐

If 'Yes', when?

PLEASE SPECIFY WHEN

Postnatal depression (depression after having a baby)

No ☐ Yes ☐

If 'Yes', when?

PLEASE SPECIFY WHEN

68. Postpartum psychosis

Cont'd.

No ☐ Yes ☐

If 'Yes', when?

PLEASE SPECIFY WHEN

69. This question is about things that may have happened **during the last 12 months**.

(Tick **all** that apply to you - if none of these apply please go to question 70)

- ☐ A close family member was very sick and had to go into hospital
- ☐ I broke up with, got separated or divorced from my partner
- ☐ I moved to a new address
- ☐ I was homeless
- ☐ My partner lost their job
- ☐ I lost my job even though I wanted to go on working
- ☐ I argued with my partner more than usual
- ☐ My partner said they did not want me to be pregnant
- ☐ I had a lot of bills I couldn't pay
- ☐ I was in a physical fight
- ☐ My partner or I went to jail
- ☐ Someone very close to me had a bad problem with drinking or drugs
- ☐ Someone very close to me died

Your Sleep and Health



70. Considering the **past 6 months**, would you say that your menstrual cycles (periods) are:

- ☐ Regular (that is, predictable within 1-2 days)
- ☐ Somewhat irregular (that is, predictable between 2-7 days)
- ☐ Irregular (that is, more than 7 days)
- ☐ Unpredictable (that is, skipped a period)
- ☐ Very unpredictable (that is, skipped 2 or more periods in the past 6 months or no period in the past two months)
- ☐ You haven't had a period in the last 12 months
- ☐ Don't know

71. Do you suffer from premenstrual syndrome or PMS?

- ☐ Yes, with symptoms that completely disrupt my life
- ☐ Yes, but with symptoms that have a minor impact on my life
- ☐ No
- ☐ Don't know

72. Is your sleep disturbed during your period compared with other times of your menstrual cycle?

- ☐ Yes
- ☐ No
- ☐ Don't know

73. Is your sleep disturbed during the week before your period compared with other times of your menstrual cycle?

- ☐ Yes
- ☐ No
- ☐ Don't know

74. Do you or your doctor think that:

- ☐ You may be going through peri-menopause, that is, you have changes in your periods but have not gone 12 months in a row without a period
- ☐ You are postmenopausal, or
- ☐ You are neither peri- nor post-menopausal? *(Please go to question 76)*
- ☐ Don't know *(Please go to question 76)*

75. In the **past month**, how many nights did you have a hard time sleeping due to hot flushes or night sweats?

- ☐ Every night or almost every night
- ☐ A few nights a week
- ☐ A few nights a month
- ☐ Rarely
- ☐ Never
- ☐ Don't know

76. In the **last 12 months**, has there been any time when you needed to see a GP about your **own** health, but didn't get to see any doctor at all?

- ☐ Yes
- ☐ No *(Please go to question 8a)*
- ☐ Don't know *(Please go to question 8a)*

77. How many times has this happened in the past 12 months?

- ☐ One time
- ☐ Two times
- ☐ Three to five times
- ☐ More than five times

Your Sleep and Health



78. The **last time** you were **not** able to see a GP when you needed to, what was the reason you weren't able to?
- ☐ Costs too much
 - ☐ Had no transport to get there
 - ☐ Lack of childcare
 - ☐ Couldn't get an appointment soon enough/at a suitable time
 - ☐ It was after hours
 - ☐ Couldn't get in touch with the doctor
 - ☐ Couldn't spare the time
 - ☐ Didn't want to make a fuss
 - ☐ Other (Please specify)

PLEASE SPECIFY

79. The last time you were **not** able to see a GP, what did you do instead?
- ☐ Nothing
 - ☐ Went to see a GP at a later date
 - ☐ Phoned Healthline or another phone number for advice
 - ☐ Phoned an ambulance
 - ☐ Went to Emergency Department at public hospital
 - ☐ Went to an after-hours or 24 hour Accident and Medical centre
 - ☐ Went to a pharmacy or chemist shop
 - ☐ Something else (Please specify)

PLEASE SPECIFY

Feelings

80. In the past 30 days how often:
- a. Did you feel tired out for no good reason?
- ☐ All of the time
 - ☐ Most of the time
 - ☐ Some of the time
 - ☐ A little of the time
 - ☐ None of the time
- b. Did you feel nervous?
- ☐ All of the time
 - ☐ Most of the time
 - ☐ Some of the time
 - ☐ A little of the time
 - ☐ None of the time
- c. Did you feel so nervous that nothing could calm you down?
- ☐ All of the time
 - ☐ Most of the time
 - ☐ Some of the time
 - ☐ A little of the time
 - ☐ None of the time
- d. Did you feel hopeless?
- ☐ All of the time
 - ☐ Most of the time
 - ☐ Some of the time
 - ☐ A little of the time
 - ☐ None of the time

Your Sleep and Health



80.
Cont'd.

In the past 30 days how often:

e. Did you feel restless or fidgety?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

f. Did you feel so restless you could not sit still?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

g. Did you feel depressed?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

h. Did you feel that everything was an effort?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

80.
Cont'd.

i. Did you feel so sad that nothing could cheer you up?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

j. Did you feel worthless?

- ☐ All of the time
- ☐ Most of the time
- ☐ Some of the time
- ☐ A little of the time
- ☐ None of the time

Your Sleep and Health



81. Listed below are a few statements about your relationships with others. How much is **each** statement **true or false** for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
I am always courteous even to people who are disagreeable	☐	☐	☐	☐	☐
There have been occasions when I took advantage of someone	☐	☐	☐	☐	☐
I sometimes try to get even rather than forgive and forget	☐	☐	☐	☐	☐
I sometimes feel resentful when I don't get my way	☐	☐	☐	☐	☐
No matter who I'm talking to, I'm always a good listener	☐	☐	☐	☐	☐

82. Please indicate how much you agree with the following statements as they apply to you over the **last month**. If a particular situation has not occurred recently, answer according to how you think you would have felt.

	Not at all true	Rarely true	Sometimes True	Often true	True nearly all the time
I am able to adapt when changes occur	☐	☐	☐	☐	☐
I can deal with whatever comes my way	☐	☐	☐	☐	☐
I try to see the humorous side of things when I am faced with problems	☐	☐	☐	☐	☐
Having to cope with stress can make me stronger	☐	☐	☐	☐	☐
I tend to bounce back after illness, injury, or other hardships	☐	☐	☐	☐	☐
I believe I can achieve my goals, even if there are obstacles	☐	☐	☐	☐	☐
Under pressure, I stay focused and think clearly	☐	☐	☐	☐	☐
I am not easily discouraged by failure	☐	☐	☐	☐	☐
I think of myself as a strong person when dealing with life's challenges and difficulties	☐	☐	☐	☐	☐
I am able to handle unpleasant or painful feelings like sadness, fear and anger	☐	☐	☐	☐	☐

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Your Sleep and Health



83. Do you describe yourself as a:
(Please **tick the circle** that applies to you)
- ☐ regular smoker (I smoke one or more cigarettes per day)
- ☐ occasional smoker (I do not smoke every day)
- ☐ ex-smoker (I used to smoke but not any more)
- ☐ non-smoker (I have never smoked regularly)

84. Does anyone smoke inside your house?
(Please **tick the circle** that applies to you)
- ☐ Yes
- ☐ Sometimes
- ☐ No
- ☐ Don't know

85. How many people who live in your household smoke cigarettes? Please count yourself as well

PLEASE SPECIFY

86. Thinking about the car that you usually travel in, does anyone smoke in that car?
- ☐ Yes ☐ Sometimes ☐ No

87. How often do you drink alcohol? (Please **tick the circle** that applies to you)

Never ☐ Less than once a week ☐ Once every 3-7 days ☐ Once every 2 days ☐ Daily ☐

88. On a typical drinking occasion, how many drinks do you have? (One drink equals a glass of beer or a glass of wine or a nip of spirits)? (Please **tick the circle** that applies to you)

None ☐ Less than 2 drinks ☐ 2 to 4 drinks ☐ 5 to 6 drinks ☐ More than 6 drinks ☐

89. How often do you use street or recreational drugs, including party pills? (Please **tick the circle** that applies to you)

Never ☐ Less than once a week ☐ Once every 3-7 days ☐ Once every 2 days ☐ Daily ☐

90. Date questionnaire completed

D D M M Y Y Y Y

Your Sleep and Health



You have now completed the questionnaire.

Please take a moment now to flick through every page of this survey and check that you have answered all the questions you meant to.

A \$40 voucher, from the choice of three options below, will be posted to you when we receive **both** completed questionnaires. Please ensure you advise us if your address has changed.

Please indicate the type of voucher you would prefer (tick one):

- ☐ Petrol (MTA)
- ☐ Supermarket (New World)
- ☐ The Warehouse

Important note

If you feel concerned about any of the issues raised by completing this questionnaire, we suggest that you discuss these with your doctor, WellChild/Tamariki Ora provider or other health professional. There is also information available on our website www.mumsleep.co.nz

Return to:

Sleep/Wake Research Centre, Massey University, PO Box 756, Wellington 6140 in the reply paid envelope.

If you have lost your envelope, or have any other problems returning the questionnaire, please ring 0800 MUMSLEEP (0800 686 7537) and a member of the research team will assist you.

Thank You!

APPENDIX C. CLINICAL INTERNSHIP RESEARCH CASE STUDY

Case Study 5 - Research

Zoe Walsh

DClinPsych Candidate, Massey University

This case study represents the work of Zoe Walsh during her internship in 2025. Clinical Supervision was received during the assessment and therapy for the individual described within the case study. All names and identifiable information within the case study have been changed to protect the anonymity of the clients.

Candidate: Zoe WalshDate:14/11/25.....

Supervisor: Nicola GillanDate:14/11/25.....

Word count excluding title page: 3225

Abstract

The following case study provides an overview of my doctoral thesis and a reflection on my research in relation to my clinical psychology internship. Clinical psychology training emphasises the importance of the scientist-practitioner model; it is important for psychologists to connect the evidence base to their clinical practice. For my research, I used a mixed methods approach to investigate maternal sleep, support and mental distress. I completed my internship at the Massey Psychology Clinic in Wellington. The bidirectional relationship between sleep and mental distress was evident among my clients. During my internship, I was able to apply the skills and knowledge I gained from undertaking research to my work with clients.

Doctoral Research Overview

At a broad level, the topic of my doctoral research has centred around 3 key topics: maternal sleep, support and mental distress considering social determinants of health and use of a strengths-based lens to understand distress. I used a mixed methods approach to understand how these topics relate with the goal of providing practical, evidence-based insights to providers to ultimately better support the sleep mental distress relationship in mothers. This overview includes the background of my study, a rationale, methodology, and findings.

Study Background

Before undertaking my clinical training and doctoral research, I worked in a job that required shift work. This piqued my interest in sleep and its relationship to mental distress and health. My colleagues and I often reflected that our overall wellbeing improved when we were rostered on for a week of day shifts rather than night shifts. This inspired me to do some personal reading on sleep, and then I learnt of the bidirectional relationship between sleep and

mental distress. What was enticing to me was the idea that if you can improve a person's sleep you can then in turn improve their mental health. In a world where mental distress is often stigmatized both externally and internally, the idea of seeking help for sleep could be more accessible and comfortable for people to engage with. Once I was accepted into clinical training and doctoral research, I knew I wanted to contact the Sleep/Wake Research Center to see if I could undertake research within this field. When reflecting on the population group I wanted to focus my research on, I decided that mothers would be an important group to study as they are often underserved and feel the expectation to put their sleep needs last. Further, the leading cause of maternal death in Aotearoa is suicide (Perinatal and Maternal Mortality Review Committee, 2024). Due to the time and scope limitations of the DCLin thesis, I opted to analyse already established datasets from the Moe Kura study and the Wāhi Kōrero platform.

Rationale

Sleep is foundational and critical to a mother's *hauora*. Buysse's (2014) model of 'sleep health' is multi-faceted, incorporating sleep duration, timing, continuity, efficiency, daytime alertness, regularity and satisfaction or perception of the quality of one's sleep. All of these facets are important and are independently associated with health outcomes such as mortality, obesity, and depression (Buysse, 2014). A bidirectional relationship between maternal sleep and mental distress has been well documented in the empirical literature (Lawson et al., 2015). That is, mothers experiencing depression report larger sleep disturbance, and mothers with poorer sleep are more likely to experience depressive symptoms (Bhati & Richards, 2015; Goyal et al., 2007). Importantly, sleep has been identified as a modifiable risk factor for mental distress in the maternal population and provides an opportunity for intervention (Ladyman et al., 2022).

Social determinants of health are the non-medical factors and conditions of daily life that impact health (World Health Organization, 2023). Colloquially, people often refer to the social determinants of health as the “cause of causes,” and they include structural forces such as poverty, access to care, racism, and political systems. These social determinants of health are understood to impact and drive both sleep health and mental distress. In Aotearoa, poorer sleep health outcomes have been observed for Māori mothers compared to non-Māori mothers. Structural inequities drive these outcomes, and we reject the premise that this is an individual problem (Paine & Gander, 2013; Paine & Gander, 2016). Mothers experiencing mental distress are more likely to be in a lower socio-economic position and without a partner compared to those without mental distress (Simhi & Yoselis, 2022). Support is a key social determinant of health that can impact both sleep and mental distress (Kent de Grey et al., 2018; Leahy-Warren et al., 2012). However, less is understood about support in relation to sleep and mental distress in the maternal population in Aotearoa. My doctoral research aimed to better understand the role of support and its impact on maternal sleep health and mental distress in Aotearoa’s unique context.

Methodology

The pragmatic paradigm was chosen to guide my thesis, as it emphasises the real-world applications of research (Kaushik & Walsh, 2019; Morgan, 2007). In addition, this thesis was also guided by a social determinants of health lens, which rejects individual victim-blaming perspectives (Howden-Chapman et al., 2000). My research employed a ‘convergent parallel mixed method design’ where both quantitative and qualitative studies are carried out simultaneously followed by an integration of both methods (Creswell & Clark, 2011).

Qualitative

The Wāhi Kōrero platform is a story sharing webpage where members of the general public anonymously respond to a prompt designed by the research team (Severinsen et al., 2025). For this study, the prompt was “Kōrero I wish I could’ve had with the Well Child nurse”. Kōrero, meaning conversation, and a Well Child nurse is a maternal and child health provider under the Well Child Tamariki Ora programme (such as Plunket and Te Puawaitanga). The Wāhi Kōrero research team is comprised of indigenous and non-indigenous researchers who work alongside one another to make a safe and inclusive online space. This collaboration is rooted in Te Tiriti o Waitangi (The Treaty of Waitangi, our country’s founding agreement). This approach ensures equitable contributions and power-sharing to bring together two distinct worldviews that embody the Māori metaphor ‘he awa whiria’, the braided river (Macfarlane et al., 2024). Ethical approval for Wāhi Kōrero was granted by the University Human Ethics Committee (Application SOB 21/30). Data collection occurred over a period of 9 weeks in 2021. 420 stories were collected, for the purpose of my research, only those stories referencing sleep were included, resulting in 181 sleep-related stories for analysis. Among participants, 61% disclosed their ethnicity: 81% identified as NZ European Pākehā, 18% as Māori, and 3% as Pasifika. Thematic analysis was used to identify themes in the dataset (Clarke & Braun, 2021). Three key themes were identified: 1) maternal instinct as a guide in navigating child sleep practices 2) the need for a shift towards strength-based rather than deficit-focused approaches, and 3) the necessity to move beyond rigid, monocultural service models.

Quantitative

Cross sectional data analysis was carried out on an existing longitudinal data set from the ‘Moe Kura: mother and child sleep and well-being in Aotearoa New Zealand’ study (Moe Kura; (Signal et al., 2022)). We analysed data from the last data wave collection, once mothers were

approximately 3 years postpartum. Ethical approval for E Moe, Māmā (the study's original name) was granted by the NZ Central Health and Disability Committee (HDEC) in October 2009 (CEN/09/09/070). Ethical approval for Moe Kura was granted as an emendation in November 2012 (CEN/09/09/070/AM02). This study was informed by Kaupapa Māori epidemiological research principles, including Māori participation and control, which were prioritised at all stages of the research, supported by a Māori co-Principal Investigator, Māori health advisors, and the involvement of Māori researchers and research assistants. 912 participants (Māori n=294, non-Māori n=618) answered a 90 question survey. For our study, variables that related to sleep health, mental distress, support and other important covariates based on a priori knowledge were selected. A series of cross-sectional binary and multinomial logistic regression models were used to investigate relationships that differing types and amount of support had with sleep health dimensions and mental distress. Mothers who identified needing additional types of support experienced poorer sleep health, whereby needing more concrete support was associated with short sleep duration, emotional support with poorer sleep quality, and advice support with daytime sleepiness and insomnia symptoms. A dose-response relationship was also observed, with mothers who needed additional help across support types having poorer sleep health in all measured dimensions except social jetlag. No significant associations between support and mental distress were observed when sleep was controlled for. Māori mothers experienced higher levels of socioeconomic deprivation, greater social jetlag, more frequent nighttime awakenings for childcare responsibilities, and higher rates of mental distress.

Mixed methods

After the quantitative and qualitative studies were completed, a mixed methods analysis on both data sets was undertaken. The design leverages the complementary strengths of each method,

effectively mitigating the weaknesses of one method with the other. The aim was to integrate the findings that allows for a deeper understanding, comparison and interpretation of the results. In our analysis we sought to understand convergence, divergence and additional coverage. We used a joint display to communicate our findings.

Clinical psychology internship

I completed a 12-month internship at the Massey Psychology Clinic in Wellington. I worked with clients across the lifespan, from diverse ethnic and gender identities. I carried out both assessment and treatment work for a range of presentations such as autism, ADHD, obsessive compulsive disorder, social anxiety, depression, PTSD and personality disorders. As part of my initial health screen for all my clients, I would always ask about sleep health and support in the context of the client's mental health. The following reflections relate to the application of the skills and knowledge I learnt from my doctoral research.

The bidirectional relationship between sleep and mental distress

The vast majority of my clients experienced difficulty sleeping, across different presentations. The advantage of completing my research on sleep health is that I learned about common myths people have about sleep. Such as 'I will always need 8 hours of sleep', or 'sleep hygiene is the most important thing that can help me get a better sleep' and 'one night of bad sleep will ruin my whole day'. Therefore I was able to provide psychoeducation that I learned from my research such as: 'if we can improve our sleep we can improve our mental health', 'the duration of our sleep is only one aspect of our sleep health', 'sleep is personal, one person's bad sleep, might be another person's good sleep, and that is okay'. I would often include a sleep intervention as one of the first things I would speak about with a client as it can be a fast way to

improve their mental health, which then makes other aspects of therapy such as behavioural experiments and cognitive work easier. It was pleasing when clients' sleep health improved, as they felt like they achieved a goal in therapy, and usually their mental distress symptoms lessened.

The importance of social determinants and their application to psychological formulation

My research was guided by a social determinants of health lens, which prompted me to view my findings through a broader lens and reflect on the structural forces that impact the participants in my research and, ergo, my findings. This perspective translated well and became a part of my vital psychological formulation skills. I would consider determinants such as socio-economic position, racism, and access to care as predisposing and perpetuating factors with my clients. For example, when formulating with the Meihana model with a client who identified as Māori, concepts from Ngā Hau e Whā - marginalization, racism, colonization and migration (social determinants of health) enriched my formulation (Pitama et al., 2007). In its application, the intergenerational trauma experienced by my client as a result of colonisation and marginalisation impacted the mental distress my client experienced. Alongside the perpetuating experiences of racism they endured in their workplace and migration, by living in a different part of the country than their whānau. Incorporating social determinants into a psychological formulation, provides a broader perspective to view our clients and their experiences. It also encourages an empathetic approach, shifting from a victim-blaming individual lens to a structural perspective.

Clients reported that hearing their formulation from this perspective was validating. Often, clients carry a lot of unwarranted guilt around how they ended up in therapy, and often feel like it's 'all their fault'. However, when you explain how all these variables beyond their

control contributed to their distress, it can help alleviate their distress and challenge their core beliefs about inadequacy. Ultimately, incorporating social determinants into psychological formulation has reinforced the need for psychologists to hold both individual and structural perspectives simultaneously, ensuring that our formulations, interventions, and advocacy efforts honour the complex realities of the people and communities we serve.

The importance of support

Across my research, I considered professional, emotional, financial, practical/concrete and advice support. One of the important findings from my overall research was that support is not ‘one size fits all’ and that the amount of overall support is paramount. It could be easy for a practitioner to fall into the trap of only asking clients about social support (e.g. “can you tell me about your support network”). Instead, I would consider different sources of support for my client and be practical about how they could help the client. For example, I had a young high school-aged client who recently received an ADHD diagnosis. She came in for the subsequent anxiety she developed in relation to her ADHD symptoms, such as losing confidence in herself as she always forgot due dates of assignments and felt like she was ‘defective’ because of her diagnosis. During our assessment, I made sure to ask about different domains of support. I soon came to realise that she needed additional support from school to help her manage the practicalities of her ADHD symptoms. While engaging with her support network helped provide her with emotional support, it was the practical and advice support she received from a teacher aide that made a large difference to her mental distress. By screening for different types of support in my assessment, we easily were able to make a small change by connecting her to student learning services – which made a big impact to her mental distress and confidence. My research also taught me to view things holistically. Instead of just focusing on a specific

therapeutic modality, I considered the client's overall life and the changes that would improve her mental wellbeing outside the therapy room.

My research findings being affirmed by my clients

During my placement, I had the privilege of working with a few mothers, some who were a few months post-partum and others who had young children. Whenever I met them for the first time as part of introducing myself, I would explain that my research focused on maternal sleep and mental health. However, organically through conversations with clients, I would hear my clients discuss findings that cropped up in my research – such as feeling guilty about lying to well-child providers about co-sleeping, feeling like some professional services were 'one size fits all' and very Western-focused, and the importance of social support and connection. This was satisfying as ultimately when I began my research I wanted it to be very applicable to real life and improve the lives of underserved mothers. This gave me confidence that the findings that we were passing on to providers such as Plunket, make a difference.

Conclusion

Though at times it can feel as if research is disconnected to clinical practice, I often found myself thinking about my thesis and its implications during my internship year. I am proud of the expert knowledge that I have gained regarding sleep and the bi-directional relationship with mental distress. This information has served me well in providing psychoeducation and intervention with clients. I now view support differently and make sure I consider a wide range of support for my clients. Moreover, the social determinants of health perspective that my thesis adopted encouraged me to always view clients holistically, ultimately improving my practice.

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