Introduction chapter & conclusion (discussion+conclusion) chapter excerpted from a public health thesis:

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Chapter 1: Introduction

1.1 The obesity crisis

Obesity is a growing public health challenge that together with overweight, affects more than one-third of the world's population.[1, 2] According to the World Health Organization, the worldwide prevalence of obesity nearly tripled between 1975 and 2016.[2] In 2016, 39% of adults aged 18 years and over (39% men and 40% women) were living with overweight and 13% (11% men and 15% women) with obesity globally.[2] The health consequences of overweight and obesity include increased risk of cardiovascular diseases, diabetes, musculoskeletal disorders, mainly osteoarthritis, and some cancers including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon cancers. Obesity also has psychological health implications including depression, impaired body image, low self-esteem, eating disorders, stress, and poor quality of life.[3, 4] Obesity can adversely impact fertility in both men and women through hormonal disturbances, menstrual dysfunction, anovulation, and infertility.[5] In addition to the health burden of obesity, it constitutes a significant economic burden through increased healthcare costs, reduced productivity, increased disability, and reduced length of disability-free healthy living across the life cycle.[6, 7]

1.2 Obesity in women of reproductive age

Women of reproductive age are particularly prone to obesity due to pregnancy-related weight gain and other factors such as the decline in physical activity associated with having children.[8] Excessive gestational weight gain (weight gain above the Institute of Medicine recommendations during pregnancy) and postpartum weight retention (retaining weight after birth) are significant contributors to parity-related weight gain.[8, 9] Average weight retention by one year after childbirth is 0.5 – 3 kg, which is highly variable with more than 20% of women retaining >4 kg.[10] It is estimated that 20% of all women irrespective of pre-pregnancy BMI

move to a higher BMI category by 18 months postpartum.[10] Maternal obesity has an adverse effect on maternal and child health.[11] Maternal obesity is associated with an increased risk of preeclampsia, gestational hypertension, gestational diabetes mellitus, caesarean section, stillbirth, pre-term birth, congenital anomalies, perinatal death, increased birth weight, and large-for-gestational-age babies.[12] Obesity in pregnancy can also lead to increased risk of cardiovascular diseases and diabetes in the long-term for both mother and child, and future obesity for the child.[13] Given that treating established obesity is intensive, costly, and unsustainable at the population level, it is imperative that efforts to address obesity focus on prevention.[11, 14]

A healthy lifestyle is necessary for optimal maternal health and the prevention of obesity.[8, 15] Diet and physical activity are modifiable lifestyle behaviours that are disturbingly suboptimal in the general population and specifically in women of reproductive age.[15-18] Women at this life-stage face considerable barriers to maintaining a healthy lifestyle. The demands of care for children may lead women to place their health and self-care as of secondary importance to their children's wellbeing.[19, 20] Competing demands on their time make it difficult to engage in health-promoting activities.[21] Healthy lifestyle behaviours must be

adopted and sustained in the long term to produce the desired benefits. Therefore, strategies such as integrating interventions into routine care and ensuring interventions are flexible are required to mitigate barriers to engaging in health-promoting activities.

1.3 Postpartum lifestyle interventions

The effectiveness of lifestyle interventions for weight management in postpartum women has been well researched.[9, 22-24] It should be noted that the quality of evidence is mixed and impeded by factors including a lack of statistical power, poor engagement, and high attrition.[10, 25] Interventions that include a combination of diet and physical activity components have

demonstrated efficacy for postpartum weight loss and improvement of body composition with a mean difference in body weight of -2.33 kg (95% confidence interval (CI), -3.10 to -1.56)[24] reported and sustained at one-year postpartum.[26] Diet-only interventions were also reported to be efficacious while physical activity-only interventions were inefficacious for postpartum weight loss.[27-29] Intervention characteristics reported to be associated with effectiveness of postpartum lifestyle interventions included delivery by health professionals,[30, 31] digital health delivery,[32-34] provision of social support,[35, 36] embedding interventions into existing services,[37, 38] and including more behaviour change techniques (BCTs) especially BCTs that support self- regulation.[39, 40] Previous successful interventions have used a range of delivery modes (face- to-face and virtual modes), settings (facility- and home-based), and formats (one-on-one or group-based).[21, 22, 25, 30, 38] However, the evidence on the efficacy of lifestyle interventions has not been effectively translated into changes in practice and policies to deliver sustainable public health impact.[11]

1.4 Implementation challenges of postpartum lifestyle interventions

Postpartum women are a hard-to-reach population because of the shift in their priority from self-care to the wellbeing of their children. The barriers to healthy lifestyle behaviours faced by postpartum women contribute to poor engagement and high attrition rates of up to 42%.[25] This is concerning, considering that the impact of postpartum lifestyle interventions at the population level is determined by both the program reach (penetration) and engagement (participation).[24, 37, 41, 42] Attempts have been made to address these barriers through modification of the delivery modes and embedding interventions within routine health services.[21, 38] For example, a diabetes prevention program for postpartum women with gestational diabetes in pregnancy successfully increased participants' engagement by 44% by modifying the delivery mode from face-to-face to telephone delivery.[21] However, pragmatic trials and real-world examples of integrating interventions into routine care services are

lacking.[24] Therefore, implementation research to guide the adaptation and use of evidence- based interventions in targeted settings and integration into existing services should be prioritised.[10, 43] This is vital to improving reach and engagement with lifestyle interventions and their translation to population-level impact levels.

1.5 Theoretical framework

Changing behaviour requires an understanding of the factors that influence behaviour and the context in which they occur. The use of theory in the development of behaviour change interventions is necessary to ensure that factors that cause health problems and the methods to achieve change are adequately described.[44] The use of multiple theories in the development of behaviour change interventions is integral to their effectiveness.[45] This thesis is underpinned by the Theoretical Domains Framework (TDF) and the Capability, Opportunity, Motivation, and Behaviour (COM-B) model.[46-48] The TDF is an integrative framework developed from the synthesis of 33 psychological and organisational theories.[46, 47] The TDF provides a theoretical lens through which to view cognitive, affective, social, and environmental influences on behaviour to effectively target processes for change and to provide a guide towards implementing

evidence-based practice.[46] The TDF is clustered into 14 domains that are an expansion of the three core components capability, opportunity, and motivation that make up the COM-B model to obtain a more differentiated understanding of underlying behavioural causes (Figure 1.1).[48] The COM-B model proposes that behaviour results from the interaction between a person's physical and psychological capabilities (C), to utilise social and environmental opportunities (O), via motivators (M) that are reflective or automatic.[48] Both TDF and COM-B form the hub of the Behaviour Change Wheel, a method for characterising and designing behaviour change interventions.[48]

4

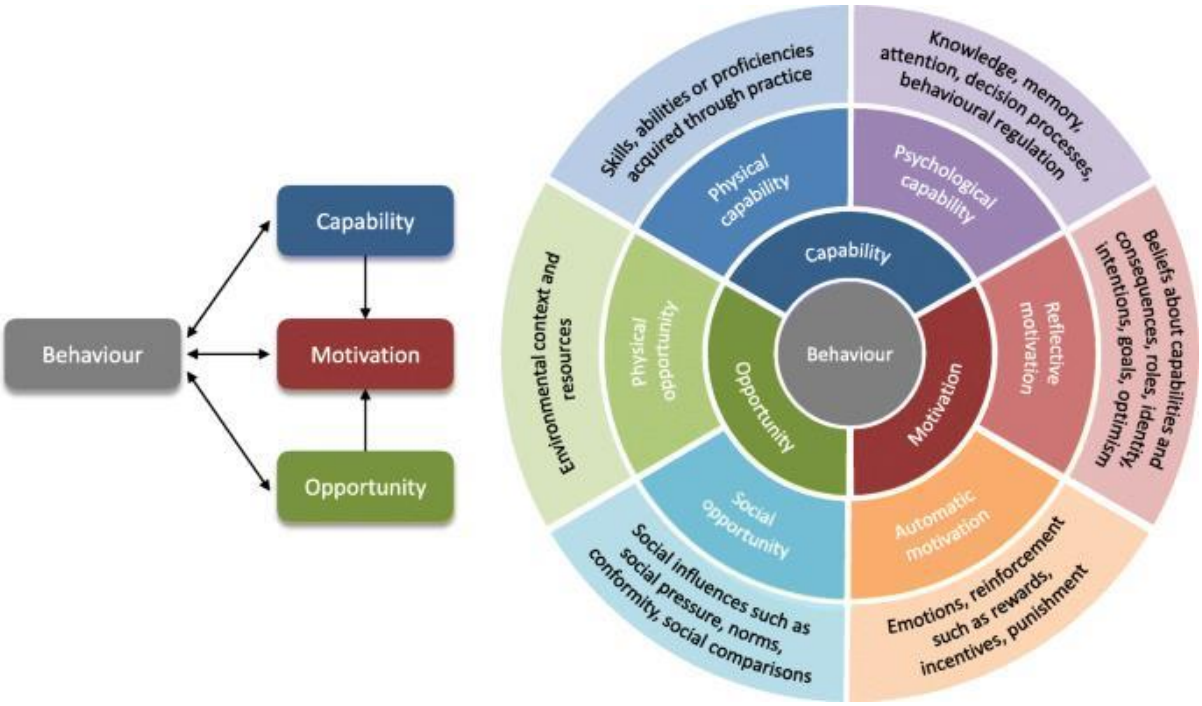

Figure 1.1 The Capability Opportunity Motivation Behaviour Model linked with the Theoretical Domains Framework[49]

1.6 Intervention Mapping

Intervention mapping is a planning framework that provides a systematic process and detailed protocol for effective, step-by-step decision-making for the development, implementation, and evaluation of interventions.[50] It is based on using theory and evidence as foundations for taking an ecological approach to understanding and intervening at multiple levels such as individual, interpersonal, community, and organizational. It is grounded in community participation to ensure that the needs and contextual factors of the target population are captured in the intervention development process.[44, 50] Intervention mapping has been extensively used to develop health promotion interventions and implementation strategies in community and clinical settings.[50] It consists of six iterative steps that define the process from problem identification to problem solving with the product of each step serving as a guide for the subsequent step (Figure 1.2).[44, 50] In Step 1 a planning group is established to provide input and expertise throughout the process and a needs assessment is conducted to create a logic model

5

of the problem. This involves a detailed description of the health problem, the context, the population, setting and community for the intervention. In Step 2, the expected program outcomes (what is intended to change as a result of the program) are specified. Change objectives (specific goals to be achieved as a result of the program) are created by cross- tabulating performance objectives (explicit behaviours needed to achieve the program outcomes) for each outcome with determinants of behaviour based on theoretical and empirical evidence. The logic model of change is developed to depict the proposed mechanisms of change.

Step 3 involves the selection of theory- and evidence-based change methods and practical applications to deliver change methods. In Step 4 the scope, sequence, components, materials, and protocols are created and refined. In Step 5, the program implementation plan is developed and the evaluation plan is developed in Step 6. Steps 4 – 6 are outside the scope of this thesis.

Figure 1.2. Intervention Mapping Steps (Bartholomew Eldredge et al., 2016).

1.7 Conceptual framework

To guide the potential translation of the research findings into practice, this research also incorporated processes that align with the Knowledge to Action framework,[51] a conceptual framework for the translation of knowledge into sustainable evidence-based interventions.[52] The Knowledge to Action framework was informed by 31 planned action theories about the process of change.[51, 52] It comprises two iterative components, knowledge creation and action cycle (application). Knowledge creation includes the generation of primary studies, synthesis

of research, and knowledge products and tools (e.g., practice guidelines). The action cycle is the process in which the knowledge is implemented into practice.

As part of formative work to support the translation of evidence into practice, this thesis includes two steps of the knowledge creation component, knowledge synthesis (chapters two and three) and knowledge generation (chapters four to seven). Knowledge generation included empirical (using quantitative and qualitative research methodologies to generate new knowledge in chapters four to seven), contextual (understanding the principles and relationships that underlie postpartum lifestyle behaviours in chapters six and seven), and experiential (knowledge gained by capturing the experiences of postpartum women in chapters six and seven) knowledge.

This thesis also included some steps of the action cycle. It identified postpartum weight retention as the problem and explored the research and knowledge relevant to this problem (chapters two and three). Through the involvement of stakeholders (postpartum women) at the planning level (chapter seven) and tailoring to their needs (chapters six and seven), it adapted knowledge to the context of postpartum women. This thesis applied the knowledge generated for the development of program components with key stakeholders (mothers in a community mothers' group) through a co-design process (chapter seven).

1.8 Thesis rationale

Despite the evidence on the efficacy of postpartum lifestyle interventions for reducing postpartum weight retention and improving health outcomes for women, this has not been translated into practice in real-world settings to allow delivery of sustainable health impact on a large scale.[24, 26, 28, 53] To ensure the effectiveness of health promotion interventions, there is a need to incorporate both theoretical and empirical evidence and engage key stakeholders and community members in the planning process.[45] Previous studies have highlighted the

importance of stakeholder involvement in intervention development to ensure its acceptability and cultural appropriateness.[54-56] For example, children were involved throughout the development process of an obesity prevention intervention for children.[55] Similarly, women have been involved as key community members in the development of a cervical cancer screening intervention.[57] Postpartum women are key stakeholders in the development and implementation of lifestyle interventions to reduce postpartum weight retention and should be active members of the intervention planning process. A review of literature on postpartum women with previous gestational diabetes suggests that there is a disconnect between the perceptions of women and the target of current physical activity interventions.[58] In addition, postpartum lifestyle interventions are not adequately engaged with due to specific barriers such as time constraints and lack of support for childcare faced by postpartum women.[19, 59] The input of postpartum women is therefore essential for the development of culturally-appropriate and context-specific programs that meet their needs and ensures optimal engagement to produce impact at the population level.[60, 61] Also, interventions may need to be tailored differently depending on individual characteristics such as the number of children, postpartum age, or socio-demographic characteristics. Implementation research to mitigate barriers to uptake and engagement with lifestyle interventions among postpartum women is needed. This thesis, therefore, focused on understanding the barriers to healthy lifestyle behaviours and the individual characteristics of postpartum women for tailoring interventions. It sought to understand the gaps in the successful implementation of postpartum lifestyle interventions, and address these gaps to improve reach and achieve population level impact of postpartum lifestyle interventions. This thesis further demonstrated an example of how to implement the knowledge generated and evidence synthesised for the creation of a model of care or service in a community mothers' group.

The studies in this thesis employed a wide definition of postpartum women and included women up to five years after childbirth. This allowed the capturing of challenges to healthy lifestyle behaviours faced by mothers within the early years of child development and before the start of school.

1.9 Thesis aims and outline

The overall aim of this thesis was to understand and describe the specific barriers and enablers to adopting healthy lifestyle behaviours in the postpartum period and to co-design a lifestyle intervention program using theoretical and empirical evidence to improve lifestyle behaviours and reduce postpartum weight retention. This research addresses crucial gaps in the implementation of postpartum lifestyle programs for reducing postpartum weight retention. The gaps addressed include the involvement of postpartum women as key stakeholders in the intervention development process and the integration of programs into existing services for optimal reach and engagement. It addressed an important public health issue of maternal obesity by using theoretical and empirical evidence to develop program components that can be integrated into routine services for mothers thereby creating a pathway for sustainable delivery of lifestyle programs for postpartum women. This will lead to increased uptake and engagement with postpartum lifestyle programs and result in a population-level reduction in maternal obesity.

The thesis is comprised of a series of published peer-reviewed studies and studies that have been submitted for peer review. As part of the needs assessment for the intervention mapping methodology, chapter two includes a systematic review of literature on the barriers and facilitators to engaging in lifestyle modification in postpartum women from the perspective of women and healthcare providers was conducted (published in *Obesity Reviews*).[62] Chapter

10

three includes a narrative review of the implementation challenges of postpartum lifestyle interventions (published in the *Journal of Clinical Medicine*).[63]

Empirical evidence from epidemiological analysis of data from the Australian Longitudinal Study on Women's Health (ALSWH) to provide insight into the patterns of change in women's lifestyle behaviours (diet, physical activity, and sitting time) by parity was included in chapter four (published in *International Journal of Epidemiology*).[64] Chapter five explored the levels of physical activity in women with infants, toddlers, and pre-schoolers and the sociodemographic and behavioural factors associated with this (published in *Public Health*). These epidemiological studies provide insight into the lifestyle behaviours that should be targeted in postpartum lifestyle interventions and the specific postpartum demographic groups that require intervention tailoring (personalisation of lifestyle advice). Selecting the individual characteristics on which to tailor interventions is the initial step in designing tailored postpartum lifestyle interventions.[65]

Chapter six describes a multi-methods study that included a survey and qualitative interviews of postpartum women to understand their preferences for a lifestyle intervention program based on the Template for Intervention Description and Replication (TIDieR) checklist (published in *Nutrients*). Chapter seven (submitted to Qualitative Health Research) describes the process of engaging mothers of young children in a community mothers' group to co-design intervention components through focus group discussions and a series of two co-design workshops.

1.10 Research questions

The following research questions were addressed by the individual studies that make up this thesis:

Research question 1: What are the barriers and facilitators to a healthy lifestyle in postpartum

women (birth to 2 years) from the perspective of women and their healthcare providers? 11

(Chapter 2: Barriers and facilitators to a healthy lifestyle in postpartum women: A systematic review of qualitative and quantitative studies in postpartum women and healthcare providers) *Research question 2:* What are the challenges to the implementation of postpartum lifestyle interventions in real-world settings?

(Chapter 3: Reducing postpartum weight retention: A review of the implementation challenges of postpartum lifestyle interventions)

Research question 3: How do having children and the number of children influence weight and lifestyle behaviours (energy intake, diet quality, physical activity, and sitting time) of women? (Chapter 4: Assessing patterns of change in lifestyle behaviours by parity: a longitudinal cohort study)

Research question 4: Do levels of physical activity and sitting time differ by the age of the youngest child (infants, toddlers, and pre-schoolers) and what sociodemographic and behavioural factors are associated with these? (Chapter 5: Levels of physical activity and sitting time in women with infants, toddlers, and pre-schoolers: A population-based cross-sectional study)

Research question 5: What are the preferred intervention characteristics of postpartum women (birth to 5 years) for the delivery of lifestyle interventions? (Chapter 6: Postpartum women's preferences for lifestyle intervention after childbirth: A multi-methods study using the TIDieR checklist)

Research question 6: What are the processes of co-designing theory- and evidence-based intervention components to reduce postpartum weight retention and improve the health and wellbeing of postpartum women (birth to 5 years)? (Chapter 7: Co-designing a community lifestyle intervention program to reduce postpartum weight retention)

1.11 Chapter references

1. NCD Risk Factor Collaboration. Trends in adult body-mass index in 200 countries from 1975 to 2014: a pooled analysis of 1698 population-based measurement studies with 19·2 million participants. *Lancet.* 2016;387(10026):1377-96;10.1016/s0140-6736(16)30054-x.

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Chapter 8: Discussion

8.1 General discussion

The overall aim of this thesis was to understand and describe the specific barriers and enablers to adopting healthy lifestyle behaviours in the postpartum period and to co-design a lifestyle intervention program using theoretical and empirical evidence to improve lifestyle behaviours and reduce postpartum weight retention. The preceding chapters describe in detail the formative research and processes of generating new knowledge on how to improve intervention uptake and engagement in postpartum women and the application of this knowledge for the development of intervention components using a participatory design methodology. This research incorporated evidence from systematic literature reviews, empirical research, behaviour change theories, and consumer perspectives, and utilised a participatory approach to develop the components of an intervention program that can be embedded within existing services for postpartum women.

Postpartum women are hard to reach because of competing demands on their time and the lack of prioritization of personal health.[1] Considering that maternal lifestyle behaviours are closely linked to that of the child, programs that improve the health and wellbeing of mothers have the potential to impact that of the child.[2, 3] While there is a large body of literature on postpartum lifestyle interventions for reducing postpartum weight retention, a need was identified for strategies to improve the reach and engagement of postpartum women for population-level impact.[4-6] Recent reviews highlighted the need for postpartum lifestyle intervention research to focus on sustainability, feasibility, and strategies to improve adherence to ensure effective implementation and sustainable impact.[7, 8] This thesis included key steps for the translation

of knowledge into sustainable evidence-based interventions aligning with the Knowledge to Action framework.[9] This thesis demonstrated how empirical knowledge (using qualitative and

quantitative methodologies), contextual knowledge (understanding the principles and relationships that underlie postpartum lifestyle behaviours), and experiential knowledge (knowledge gained through the experience of postpartum women) were generated to inform the development of intervention components.[9] The knowledge generated in this thesis informs the understanding of barriers that need to be addressed when implementing health promotion activities in postpartum women. This thesis demonstrated through participatory co-design involving stakeholder engagement and adaptation to the local context, how the knowledge generated informed the potential implementation of postpartum lifestyle intervention in the real-world settings of mothers' group.

8.2 Summary of findings

The formative research provided evidence that informed the development of the intervention components. The systematic review highlighted the barriers and facilitators to engaging in healthy lifestyle behaviours in postpartum women at the individual level. Some barriers identified were a lack of knowledge regarding the benefits of healthy lifestyle behaviours, stress, time constraints, lack of social support, low self-worth, and the perception that great effort is required for making healthy meals and exercising (chapter two). Some facilitators identified were having social support from family and other social networks, identifying the benefits of exercise, the ability to plan and schedule, and enjoying the activity. To ensure the effectiveness of postpartum lifestyle interventions in real-world settings, the barriers to engagement such as fatigue, low self-worth, and childcare needs must be adequately addressed and the facilitators such as scheduling and enjoyment of the activity must be harnessed.[10] The comprehensive literature review identified gaps in the implementation of postpartum lifestyle interventions at a program level, particularly poor reach and engagement and the need to enlist the participation of postpartum women in the development of the programs (chapter three).[5, 11]

The findings of the epidemiological studies in this thesis support the identification of women at high risk of unhealthy lifestyle behaviours based on their sociodemographic characteristics (chapters four and five). The findings offer insight into how lifestyle behaviours may change with the number and age of children in the household and the sociodemographic and behavioural factors that contribute to this, providing evidence on which lifestyle behaviour should be targeted at different postpartum life stages. These findings are important for public health policy and messaging and offer a valuable contribution to the growing body of knowledge on the changes in lifestyle behaviours associated with having children. Specifically, the epidemiological findings can inform the targeting of interventions to specific groups of women or tailoring (personalisation of lifestyle advice) according to individual characteristics. For example, based on the findings, energy intake and physical activity should be targeted for improvement in parous women, and for multiparous women, diet quality in addition to these.[12] Also, women within the first postpartum year should be targeted for improvement in physical activity compared to women with pre-schoolers who had higher physical activity levels. However, it is important to note that the women included in the epidemiological studies are predominantly educated and of medium to high household income. Similarly, there is a need for consideration of the type of physical activity (which could not be explored from the available data in this study) in making recommendations to postpartum women. In particular, literature suggests that walking is maintained in many postpartum women while other types of leisure-time physical activity may decline.[13-15]

Identification of the preferences of postpartum women for a lifestyle intervention program provided evidence to support integrating interventions into routine services that women were already engaged with (chapter six). It also highlighted women's preference for flexible, practical, and low-intensity programs, and taking contextual factors into account e.g., interventions may be tailored differently for working mothers and stay-at-home mothers. The

involvement of health professionals as a credible source of information and enlisting the support of women's social networks were considered valuable inclusions. In agreement with these findings, a previous review highlighted the importance of integrating interventions into existing systems for the prevention of diabetes after pregnancy in postpartum women who had gestational diabetes.[16] Similarly, a diabetes prevention intervention trial for postpartum women with previous gestational diabetes increased program acceptability and engagement through a flexible delivery mode.[17] These findings guide the development of postpartum lifestyle interventions that are acceptable to women and amenable for scale-up.

To facilitate the co-design process, partnership with a mothers' group that supports mothers of preschoolers was sought and established.[18, 19] The use of a participatory design methodology combined with the intervention mapping approach facilitated the grounding of the program components in theory and evidence (chapter seven).[20] Intervention mapping allowed the descriptive reporting of the program components and the behaviour change techniques used which has previously been reported as needed to advance research in peer-supported interventions.[21] The use of a participatory co-design approach facilitated the identification of contextual factors relevant to the mothers' group with whom the intervention was co-designed. Literature suggests that enlisting the support of community organizations can expand the reach and effectiveness of health promotion activities.[22] Co-designing the intervention program components with postpartum women as key stakeholders in the whole process ensures that their needs and preferences are captured. It also empowers and builds mothers' capacity to self- manage their health, and empowers the mothers' group to support the health of its members. A systematic review provided evidence to support the effectiveness of community participation in empowering community members and improve health outcomes.[23] The integration of the program components into the activities of a mothers' group addressed the barrier of poor engagement due to time constraints and childcare needs. The need for social support was

addressed through the structuring of the intervention program as a peer-led program and including peer-mentorship as a component of the intervention.[1, 24] The program offers a potentially low-resource strategy and reduces the resources and time burden on healthcare providers for program implementation.

Previous studies have reported that the key determinants of successful peer supported interventions include involving the program end users in the development process, aligning interventions to their needs, partnering with existing community and health services, codesigning training materials with peer supporters and allowing them to exercise autonomy in the tailoring and delivery of the intervention.[25, 26] This research addressed these key determinants in the initial intervention development process. For future research to progress this work, the next steps will involve the co-development of the program and training materials with mothers, the development of the implementation and evaluation plans, and pilot testing. This research employed a strength-based approach by exploring the resources of a mothers' group that was already providing support to postpartum women to strengthen their capacity to improve the health and wellbeing of its members.

8.3 Implications

This PhD research addressed key implementation gaps at the program level, identified core intervention components for targeting individual postpartum women, provided evidence to support targeted public health messaging at the population level, and demonstrated the application of these theoretical and evidence-based findings through participatory co-design with a community mothers' group. These advances postpartum lifestyle research to achieve impact at a population level and empowerment at an individual level. The learnings from this research can be translated to similar settings or adapted for other community group settings such as playgroups or traditional health care settings such as maternal and child health services.

The program components deliver a holistic approach to maternal health and wellbeing which caters not only to the physical health, but also to the social, emotional, and mental health needs of mothers with young children. It focused on enabling mothers and building intrinsic motivation to improve lifestyle behaviours through inspiring leadership that values motherhood and validates the successes of individual postpartum mothers. It is expected that these results will guide improvements in the models of care for postpartum women. These findings are important for practice and policy to urgently address the maternal obesity crisis through low- resource programs that have the potential to increase reach and engagement through integration with existing services. To advance postpartum lifestyle research, there is a need to look beyond the traditional models of care that rely heavily on health professionals and investigate the effectiveness of peer-led interventions to support lifestyle management in postpartum women.[25] This approach is likely to lead to interventions that are relevant in real-world settings with greater potential for uptake and sustainability. Digital health interventions including electronic and telehealth interventions are potentially effective and feasible pathways for postpartum lifestyle intervention delivery.[27, 28]

8.4 Limitations and recommendations

There was limited capacity both in terms of time and resources to undergo the full intervention development processes.[29] Therefore, this thesis did not include the testing, implementation, and evaluation of the intervention components developed. This would likely have taken up to three years to complete instead of the six months of this PhD dedicated to it and required further funding. These limitations have also been expressed by other researchers and apply to intervention development in real-world settings.[30, 31] Therefore, this research offers a pragmatic approach to intervention development with a specific example for integrating postpartum lifestyle intervention programs into existing services such as mothers' groups. Although the

voices of the program end-users (mothers with young children and the community mothers' 142

group) were captured in the development of the intervention components, partners and other family members as part of the interpersonal level of the socio-ecological model were not included.[20] Partners have a particularly strong influence on women's lifestyle choices and including their perspective as key stakeholders may be crucial for lasting behaviour change, especially in high-risk women who have experienced gestational diabetes or preeclampsia.[7] Having a whole family approach to interventions has been reported as an effective strategy to consolidate partner support for lasting behaviour change and could complement programs that target and empower mothers.[7, 32, 33]

8.5 Future research directions

The implementation of postpartum lifestyle intervention programs relies heavily on health professionals for their delivery and is often intensive and expensive. Health professionals have limited capacity to provide ongoing lifestyle support to postpartum women because of the limited time and resources to take on this role.[34] This has led to the lack of continuity of care for postpartum women after delivery with care being less regular and usually focused on breastfeeding and care of the newborn rather than on maternal health.[35-37] The recent COVID- 19 pandemic has put further strain on the healthcare system in many countries including Australia, reducing access to health services.[38] There is, therefore, a need to seek alternative pathways for the ongoing provision of lifestyle counselling and support for postpartum women to combat maternal obesity. A recent systematic review and meta-analysis reported the effectiveness of peer interventions in reducing waist circumference.[25] This is important considering that waist circumference is positively correlated with visceral obesity which plays a significant role in the development of chronic diseases.[39] Therefore, training mothers as peer coaches to provide mutual support to one other is a potentially effective pathway that will reduce the burden of maternal obesity prevention on the healthcare system.

This PhD thesis has highlighted the importance of the need for further research into training mothers to deliver postpartum lifestyle interventions. Many mothers are part of a community support group during the

early years of their child's development. Leveraging these groups to provide ongoing lifestyle support to mothers has the potential to expand the reach of the programs and increase acceptability. Due to the extensive formative research undergone during this PhD, it was not possible to include the development of program materials, pilot testing, implementation, and evaluation of the program within its duration. Further research is needed for the development of program materials, and testing, implementing and evaluating the program. However, the program components developed have the potential to serve as a prototype that can be adapted for implementation in mothers' groups or similar settings such as playgroups and other social groups for mothers with young children.

8.6 Conclusions

The postpartum period is a time when women experience unique barriers to adopting and maintaining healthy lifestyle behaviours. These barriers hinder the successful implementation of postpartum lifestyle interventions. This thesis employed evidence synthesis and new knowledge generation including epidemiological, qualitative, and survey studies to develop strategies to improve the implementation of postpartum lifestyle interventions. The learnings from this research were applied to a mothers' group (an existing service), as one proposed setting for engaging with postpartum women. This provided a low-resource and potentially effective strategy that addresses the support needs of postpartum women and reduces the burden of obesity on health professionals' time and the healthcare system in terms of the cost of treating obesity. This thesis addressed important gaps in postpartum lifestyle research, making a novel contribution to the emerging body of knowledge in postpartum lifestyle research. The systematic and consumer participatory methodology led to the creation of

program components that is potentially feasible to implement and although yet to be tested, 144

include all the attributes of an effective program. The findings provide evidence to support continued research into the effectiveness of peer-led postpartum lifestyle interventions integrated into community settings to address maternal obesity. It is hoped that this thesis will stimulate further research into the training of mothers as peer-coaches to deliver postpartum lifestyle intervention programs.