

School of Occupational Therapy and Social Work

**Physical Activity in Postpartum Women and its Relationship to Postnatal
Depression**

Maryam Saligheh

This thesis is presented for the Degree of
Master of Philosophy
Curtin University

October 2011

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signature: _____

Date: _____

Physical Activity in Postpartum Women and its Relationship to Postnatal Depression

Abstract

Background

For most women in the postpartum period, six to 52 weeks after childbirth, participation in physical activity is limited. New mothers often report inability to exercise, due in part to feeling isolated and exhausted. The literature offers contradictory arguments regarding the influence of exercise on Postnatal Depression (PND). Therefore, this study aimed to: (1) determine the variables associated with physical activity during the postpartum period; (2) investigate the relationship between physical activity and PND; and (3) explore the enablers and barriers to physical activity in a sample of postpartum women.

Method

This multi-method study employed a cross-sectional correlational design in Stage One and a qualitative design in Stage Two. In Stage One 150 postpartum women recruited from the Western Australian metropolitan Child Health Clinics were sent a questionnaire. In Stage Two 14 postpartum women who participated in the survey were also interviewed. Survey data were analysed using SPSS to conduct multiple regression analysis and the interviews were thematically coded.

Results

The study did not demonstrate an association between physical activity participation (PAP) and PND. However, psychosocial factors, parental confidence, partner support and social support were significantly associated with PND. The predictors of the mother's PAP were the age of her baby, her education level, number of children, family income, parental confidence, partner support and lack of time. Lack of information,

lack of confidence, lack of knowledge and poor access to public transport were the barriers to the living domain of PAP. Lack of money was associated with reduced exercise. Results from Stage Two supported the findings from Stage One and illustrated that mothers were more likely to participate in physical activity if they had greater social support, particularly partner support, and if they were confident in their parenting ability.

Conclusion

The study was unable to determine a direct effect of exercise on PND. However, other factors such as partner support do affect mothers at risk of PND and influence their participation in physical activity. Further study is required which firstly employs a longitudinal design and secondly uses a clinically depressed sample to more fully understand the role of PAP in mediating the effects of PND. Specifically tailored exercise programs may help to address barriers to PAP and enable postpartum women to access the physiological and psychological benefits of exercise.

Acknowledgement

First and foremost I offer my sincere gratitude to my supervisor, Prof. Beverly McNamara, who has supported me throughout my thesis. I attribute the level of my MPhil to her encouragement and effort and without her this thesis, too, would not have been completed or written. My Associate Co-supervisor, Dr Rosie Rooney, has offered much advice and insight throughout my work on quantitative components. Dr Robert Kane has provided me with his helpful advice in regards to the data analysis in Stage One. I would like to thank my dearest husband, Erfan, whom without his valuable supports I would not be able to finish this study.

Finally, I would like to thank the nurses in Child Health Clinics whom without their precious assistance I could not be able to conduct this study.

Statement of contribution of others

I, Maryam Saligheh, contributed 70 per cent to the component of the Article One, "Predictors of Postnatal Depression and Physical Activity in a Sample of Australian Postpartum Women".

I as a Co-Author, endorse that this level of contribution by the candidate indicated above is appropriate.

Dr Rosie Rooney _____

Professor Beverley McNamara _____

Dr Robert Kane _____

I, Maryam Saligheh, contributed 80 per cent to the component of the Article Two, "Barriers and enablers to exercise in a sample of postpartum women in Western Australia: A multi-method approach".

Professor Beverley McNamara _____

Dr Rosie Rooney _____

Glossary of Terms

- Postpartum women refers to the participants who were in the period six weeks to 52 weeks after childbirth
- Postnatal Depression (PND) refers to a non-psychotic depressive episode that begins or extends into the postpartum period
- The women recruited for the research could be at the risk of postnatal depression at the time of the study (Stage One), which means they had to have an Edinburgh Postnatal Depression Score [EPDS] of ≥ 10 at the survey phase. The EPDS is a scale commonly used by health professionals to determine the postnatal well-being of mothers. It is recognized that a score of ≥ 10 is an indicator a woman is experiencing depressive symptomatology.
- Physical activity covers any bodily movements produced by skeletal muscles that result in energy expenditure (Caspersen, Powell, & Christianson, 1985).
- Exercise is a specific form of physical activity in which the individual engages for the purpose of improving fitness, physical performance or health (Bouchard, Shepard, Stephens, Sutton, & McPherson, 1990).

Abbreviations and Acronyms

PAP: Physical Activity Participation

PLQ: Postpartum Lifestyle Questionnaire

PND: Postnatal Depression

WA: Western Australia

NICE: National Institute for Clinical Excellence

EPDS: Edinburgh Postnatal Depression Scale

KPAS: Kaiser Physical Activity Survey

KPCS: Karitane Parenting Confidence Scale

DAS-7: Dyadic Adjustment Scale

Table of Contents

1.1 Background to the study	1
1.2 Statement of the problem	3
1.3 Significance	5
1.4 Aim and objectives of the study	6
1.4.1 Stage One	6
1.4.2 Stage Two	8
1.5.2 Stage Two	9
1.6 Structure of Thesis	9
2.1 Introduction	11
2.2 An overview of the postpartum period	11
2.3 Postpartum mental health: Postnatal Depression	12
2.4 Incidence of Postnatal Depression	14
2.5 Predictors of Postnatal Depression	15
2.6 Postpartum physical health: Exercise	16
2.7 Predictors of physical activity in the postpartum period	18
2.8 Understanding the mechanism of exercise	19
2.9 Exercise and Postnatal Depression	21
2.10 Physical activity and depression (mental health)	22
2.11 Interventions for PND	23
2.12 Conclusion	25
3.1 Introduction	26
3.2 Research design and methods	26
3.3 Mixed method approach	27
3.4 Vulnerable and Sensitive Research	31
3.5 Stage One of the research	32
3.5.1 Research questions	32
3.5.2 Participants	32
3.5.3 Measures	33
3.5.4 Sampling Frame	37

3.5.5 Procedures	38
3.5.6 Research design and data analysis.....	39
3.6 Stage Two.....	39
3.7 Ethics.....	40
The relationship between sociodemographic factors, partner support, PND, and physical activity.....	41
4.1 Abstract.....	41
4.2 Introduction	42
4.3 PND and associated factors	42
4.4 Effect of exercise during the postpartum period.....	43
4.5 Role of exercise in women.....	44
4.6 Objectives.....	45
4.7 Methods.....	45
4.7.1 Participants	46
4.7.2 Measures.....	46
4.7.3 Procedure.....	48
4.7.4 Research design and data analysis.....	49
4.8 Phase One: Predictors of Postnatal Depression in a Sample of Australian Postpartum Women.....	49
4.9 Discussion.....	53
4.10 Results (Phase Two): Predictors of Physical Activity in a Sample of Australian Postpartum Women.....	56
Analysis	56
4.11 Discussion.....	59
4.12 Conclusion.....	61
References	62
Barriers and enablers to exercise in a sample of postpartum women in Western Australia: A mixed- methods approach.....	72
5.1 Abstract.....	72
5.2 Introduction	73
5.3 Methods.....	75

5.3.1 Phase One	75
5.3.2 Phase Two	76
5.4 Results Phase one	77
5.5 Results Phase Two.....	79
5.5.1 Birth as a life altering event	79
5.5.2 Postpartum exercise barriers following childbirth	80
5.5.3 Postpartum exercise enablers following childbirth	82
5.6 Discussion.....	84
References	87
6.1 Discussion.....	92
6.2 Available facilities for postpartum women.....	95
6.3 Limitations of the study	95
6.4 Postpartum women's perspective on exercise.....	96
References	99
Appendix A	127
Appendix B	129
Appendix C.....	130
Appendix D.....	132
Appendix E	133
Appendix F	135
Appendix G.....	136
Appendix H.....	137
Appendix I	139

List of Tables

3-1 Types of study designs by four criteria.....	29
4-1 Multiple regression analyses predicting levels of PND from socio-Demographic factors.....	50
4-2 Descriptive Statistics for Levels of Physical Activity in Four Domains.....	51
4-3 Multiple Regression Analysis Predicting PND from Aspects of Social Support Items.....	52
4-4 Multiple Regression Analysis Predicting PND from Parental Confidence and Partner Support.....	53
4-5 Multiple Regression Analysis Predicting Level of Physical Activity from Socio-Demographic Factors.....	57
4-6 Multiple Regression Analysis Predicting Levels of Physical Activity from Parental Confidence and Partner Support.....	58
5-1 Multiple Regression Analysis Predicting Levels of Physical Activity from Potential Barriers to Physical Activity.....	78

CHAPTER ONE

1.1 Background to the study

Although the physical realisation of childbirth is common to women across the world it has a single and different meaning for every mother (Costa, Figueiredo, Pacheco, & Pais, 2003). In the time directly following childbirth, or the postpartum period as it is known, the quality of the mother's life can be compromised unless appropriate supports are provided. The psychological health of the mother is of particular concern as a number of associated factors, like lack of partner support (Appolonio & Fingerhut, 2008) social support (Koh, Miller, Marshall, Brown, & McIntyre, 2008), and having a history of depression (Bliszta et al., 2008) may lead to depressive symptomology in the mother.

Although there are an array of factors which may lead to the existence of postnatal depression, recent studies have begun to focus on two aspects: there are a number of studies that explore the quality of postpartum life together with the existence of postnatal depression (PND); and studies that address and evaluate available interventions designed to help overcome postnatal mood disorder and increase the quality of life following child birth (Dritsa, Gilles, Lowenstein, & Da Costa, 2009). Several different interventions, such as cognitive behavioural therapy, interpersonal psychotherapy and antidepressant use have been examined across different studies (Dennis & Hodnett, 2007). In addition, because the antidepressant effect of exercise has been explored in the general population (Eriksen & Bruusgaard, 2004), new approaches and interventions, such as pram walking, have been considered to improve postpartum physical and mental health (Armstrong & Edwards, 2003; Armstrong & Edwards, 2004).

CHAPTER ONE

Some researchers have suggested exercise as an effective intervention or adjunct for the treatment of postnatal depression more generally (Norman, Sherburn, Osborne, & Galea, 2010; Reed & Ones, 2006). However, it is not clear whether or not mothers in the postpartum period could benefit from exercise as a means of treating or preventing depression as there are a number of new factors which may affect their participation. Although some of these factors may seem obvious, like fatigue associated with recovering from childbirth and caring for the new baby, it cannot be assumed that all women will respond in the same way to these various challenges. There are a small number of studies that have addressed different associated factors for exercising following childbirth.

An American study explored a group of mothers' experience of exercising after childbirth (Adachi-Mejia et al., 2010), whereas two others used a survey approach to examine the issue (Doran & Davis, 2011; Evenson, Aytur, & Borodulin, 2009). These studies all identified a number of barriers to physical activity following childbirth but there was much less attention paid to issues that may help to enable exercise in the postpartum period. Issues such as breastfeeding, child care facilities, and the baby's age must all be taken into consideration when considering both the barriers and enablers to exercise participation in the postpartum period. Moderating barriers to exercise in the postpartum period is an important public health issue. Appropriate and sustainable approaches must be developed to address this issue. Accordingly, research is needed to ensure these approaches are developed within social, geographical and cultural contexts.

CHAPTER ONE

1.2 Statement of the problem

Both quantitative and qualitative studies have pointed out existing barriers to participating in postpartum exercise (King et al., 2000) yet further research is needed to understand the Western Australian context and how exercise in the postpartum period can be enabled. There are also a number of contradictions that exist about the effect of exercise on PND and it would be helpful to try to explore this issue further. The benefits of exercise for women in the postpartum period has been sufficiently supported in the literature, though less is known about whether or not exercise can help to control PND. A more focused research approach is required in order to understand how postpartum exercise programs can be made more sustainable thus, enabling mothers to enjoy a healthier lifestyle.

Women in the postpartum period can benefit both physically and psychologically from exercise. However, a particular concern is how exercise may help to avoid or mediate the effects of PND. Postnatal depression is a common disorder (Gjerdigen & Yawn, 2007). Understanding the mothers' feelings, attitudes and expectations towards a happier and healthier postnatal period is of great importance for the entire family. PND is a serious disorder that might lead to a harmful outcome for the baby and contribute to marital relationship strains (Lee & Chung, 2007).

Factors that impact the experience of PND have been investigated in a range of literature. Examples of associated factors are lack of partner support (Appolonio & Fingerhut, 2008), lack of social support (Koh et al., 2008), lack of confidence (Evenson

CHAPTER ONE

et al., 2009) and the influence of socio-demographic factors(Grussu & Quantraro, 2009; Hamdan & Tamim, 2011; Rubertsson, Waldenstrom, & Wickberg, 2003). However, inconsistencies exist in terms of their effect and correlation(Leigh & Milgrom, 2008). In addition, uncertainty exists about the most appropriate intervention for treating postnatal depression due to the study population, sample size, and measurement tools (Özbaoran, Çoban, & Kucuk, 2011). Despite the improving effect of exercise on mood disorders in the general population (Teychenne, Ball, & Salmon, 2008) it has not been yet well established in regards to PND and contradictions exist in the literature. In other words, there is still good reason to explore this topic, particularly in terms of the experience and needs of women in Western Australia.

Exercise in the postpartum period is important for physical recovery for childbirth as well. Research has shown that exercise is very important to mothers' health due to excess weight in pregnancy (American College of Sports Medicine, 2006). Exercise in the postpartum period helps mothers to lose their pregnancy weight (Larson-Meyer, 2002) while also improving their mental health and psychosocial well-being (Groth & David, 2008). Despite the American College of Obstetricians and Gynaecologists (2002) recommendations which suggest gradual exercise after childbirth, evidence shows that many mothers do not meet the suggested guidelines. The suggested guidelines for adults in Australia is considered to be at least 30 minutes of moderate-intensity physical activity preferably on most days (Department of Health and Aging, 2004). More information is needed about the relationship between maternal well-being in the postpartum period and the attitudes and beliefs of mothers in order to fully understand the common barriers and enablers to exercise. The value of exercise in the postpartum period has been established but there has not been sufficient and rigorous study to provide the evidence needed to establish good quality exercise programs

CHAPTER ONE

tailored according to the mothers' needs. An in-depth understanding of mothers' needs is warranted. The gap in this knowledge should be filled so that more effective interventions can be implemented. Finally, the research field needs to continue to expand and develop preventative and treatment methods, so that mothers can participate in exercise in a non-threatening and secure environment. The goal of exercise programs is to both enhance the mothers' quality of life and help them to achieve success in mothering their children.

1.3 Significance

This study is valuable because it provides new information within the Australian context about physical activity participation in the postpartum period. It provides a comparison of exercise participation according to the mother's status on being at risk of PND in the postpartum period or not, and contributes to a greater understanding of the predictors of physical activity in this cohort. In addition, the exploration of the mothers' experience of exercising or not in the postpartum period enhances understanding of the barriers and potential enablers to exercise. Recommendations from the study can contribute directly to the development of specifically focussed exercise programs for postpartum women and will be of benefit to all women during this period, not just to those experiencing postnatal depression.

Mothers in the postpartum period are vulnerable because of new responsibilities and obstacles to exercise and self-care which may contribute to depression and poor self-image. Information from this study will hopefully help contribute to greater health in the postpartum period through recommendations for appropriate exercise programs.

CHAPTER ONE

1.4 Aim and objectives of the study

A two-stage study design was undertaken using a descriptive cross-sectional cohort design for the Stage One and a qualitative approach in the form of a semi-structured interview with thematic analysis for Stage Two. The objectives of the study are presented below according to the specific phases of this study.

1.4.1 Stage One

Objective one

Describe physical activity participation in a cohort of postpartum women in Western Australia.

Participants were examined on the provided demographic information (age, marital status, level of education, income, and their employment status) and their physical activity level. Mothers were recruited from all across the metropolitan areas.

Objective two

Investigate the factors associated with physical activity participation in postpartum women.

The factors that could affect exercise following the birth of the baby (parent confidence, partner support, and barriers to the exercise) were evaluated. The mentioned variables were measured through a number of standardized questionnaires in the form of a comprehensive survey.

Hypothesis for objective 2:

CHAPTER ONE

- Partner support and parental confidence will predict levels of physical activity in the care-giving, living, occupation, and sport domains.

Objective three

Examine the association for women reporting risk of PND and those without risk on physical activity

PND and Non-PND mothers in regards to their physical activity level in accordance to the physical activity questionnaire (KPAS) were compared to differentiate the physical activity level between the two groups.

Hypothesis for objective 3:

Socio-demographic factors (age of baby, age of mother, annual income, number of children, and level of education) will predict levels of postnatal depression (PND) as measured by the Edinburgh Postnatal Depression Scale (EPDS).

- Higher levels of physical activity in the domains of care-giving, living, occupation, and sport as measured by the Kaiser Physical Activity Survey (KPAS) will predict lower levels of PND.
- Higher levels of social support (as measured by the following items: rely on help, emotional support, talk about problems, feeling free to talk, needing him, rely on for childcare, feel someone there to help, reluctant to ask for help, generally do ask for help, satisfaction with help) will predict lower levels of PND.
- Higher levels of partner support as measured by the Dyadic Adjustment Scale (DAS-7) and parental confidence as measured by the Karitane Parenting Confidence Scale (KPCS) will predict lower levels of PND Socio demographic factors (age of baby, age of mother, annual income, number of children, and

CHAPTER ONE

level of education) will predict level of physical activity in the care-giving, living, occupation, and sport domains.

1.4.2 Stage Two

Objective four

Explore the daily experience of physical activity in postpartum women

Based on the predictors of physical activity and participation of the postpartum cohort of women a semi-structured interview with mothers was used to explore their perception of exercise and its barriers.

Objective five

Investigate the key barriers and enablers to physical activity in the postpartum period.

The mothers' experiences of physical activity in the postpartum period and key variables such as partner support, parent confidence, and general barriers and enablers were investigated in depth.

On the basis of the literature reviewed and the study objectives the following hypotheses were generated. Note the details of the scales used are provided in greater detail in Chapter Three, the methods section of the thesis.

CHAPTER ONE

1.5.2 Stage Two

Hypotheses were not used for the qualitative component of the study. However, the intention was to further explore in depth the mother's experience of physical activity after childbirth. Issues of interest generated from the survey results and from literature about the postpartum period formed the basis for further questioning. Details of barriers and enablers to exercise formed the basis of the interview.

1.6 Structure of Thesis

This thesis is organized into six chapters, two of which have been developed as papers ready for submission to chosen journals.

In this chapter, Chapter One, I have introduced the study, paying some attention to the background, statement of the problem, significance and study objectives. Chapter Two involves the literature review in which I introduce the broad range of literature which has informed the study and which leads to the conceptual framework underlying the study. It is important to note that this research does not fall neatly into a disciplinary area and I have drawn broadly on research conducted in women's health, health psychology, exercise physiology, public health, nursing and midwifery and so forth. Chapter Three provides the methodological perspective, which again is not neatly packaged into one kind of methodology. The study used mixed methods employing both a quantitative and a qualitative approach. The fourth chapter follows consisting of the first article which focuses on stage one of the study exploring the predictors of PND and exercise in the cohort of postpartum women in Western Australia and investigates the difference between those at risk of PND and those not at risk of PND. Chapter Five consists of the second article which employs predominantly qualitative methodology. It captures the mothers' experiences of physical activity focussing on the barriers and

CHAPTER ONE

enablers to exercise in the postpartum period. Finally, Chapter Six discusses the summary of the research and outlines particular recommendations for appropriate and individualised exercise programs for women in the postpartum period.

CHAPTER TWO

2.1 Introduction

In this chapter I review the existing relevant literature that currently exists about the postpartum period and how physical activity and exercise after childbirth affects the mother's general health. In particular, the association between PND and exercise is considered. In addition, the mechanism of exercise has been included in the discussion in order to establish if and how it contributes to the positive physical and mental health of postpartum women.

There are a number of contradictions in the literature around the relationship between exercise and PND. There are some reliable studies which demonstrate what might predict PND, but these are mainly psychosocial and little is known about how exercise can affect PND. My research employed both quantitative and qualitative approaches to help address some of the contradictions in the literature. However, the research also aims to explore how exercise can assist all women in the postpartum period. From this background appropriate exercise programs may be planned.

2.2 An overview of the postpartum period

The term 'postpartum period' refers to the time following childbirth. My study focused on the six to 52 week period after the participants in the study gave birth so I refer to this period as the 'postpartum period', but technically the postpartum period means life after having a baby. Many factors during this time could affect the woman's quality of life and her ability to cope with new responsibilities and motherhood. The joyous experience of motherhood could be altered through

CHAPTER TWO

different psychological changes and could lead to a very stressful life event (Rholes, Simpson, & Friedman, 2006).

The postpartum period could be verified for a mother as a period of loving and nurturing her baby, whereas for another mother it might be an isolating time(Costa et al., 2003). Adopting realistic expectations could help one to get accustomed to motherhood responsibilities and roles. In the postpartum period some mothers believe they should be able to cope with negative emotions and consequently they may not seek the help of a professional when this is warranted; however, the availability of support such as family, friends, and caring professionals are of a great benefit to the mothers' health (Misri, Kostaras, Fox, & Kostaras, 2000).

Childbirth is an altering event for the whole family and the perception of life after having a baby could be affected by many different factors such as the experience of depression or/and lack of partner support (Waldenström, 2004). Different positive or negative experiences of childbirth influence the mothers' health and well-being in the postpartum period (Figueiredo, 2001). In addition, due to the memory of the childbirth event the first six months of the postpartum period needs to focus on supporting a good quality of life for the mother (Waldenström, 2003).

2.3 Postpartum mental health: Postnatal Depression

Postnatal depression is a major public health issue (Department of Health, 2004b; Lumley & Austin, 2001). It refers to an episode that causes mood disturbance and it could begin in, or extend into, the postpartum period. The onset of PND has been debated with suggestions that it occurs at different stages of the postpartum period. Some suggest it commences within the fourth week of the postpartum period (American Psychiatric Press, 2000). It has been suggested that for those women who might experience it in later postpartum the definition of PND and the

CHAPTER TWO

onset needs to be expanded to the whole of the first year postpartum (Goodman, 2003). In addition, sometimes the condition might extend to more than a year following childbirth (Goodman, 2003) and has a critical effect on the infant's health (Hoffbrand, Howard, & Crawley 2001; O'Hara, 2009; Righetti- Velteme, Conne-Perreard, Bousquet, & Mazano, 2002). It is argued that the experience of PND is more problematic in women's lives than any other type of depression as exceptional demands are placed on the women at a time when they need to care for their babies and families (Holden, 1994). Furthermore, PND may cause strain in marital relationships (Halberich & Karkun, 2006).

While the rate of depression differs in pregnancy and postpartum, studies have suggested the rate is higher in the postpartum period in contrast to pregnancy (Dietz et al., 2007). The symptoms that show the onset of PND are different among the mothers and may include such symptoms as tearfulness, fatigue, loss of interest in life, guilt, insecurity, irritability, fear of harming the baby and reluctance to breastfeed (DA Costa, Drista, Rippen, Lowenstein, & Khalife, 2006; Hatton et al., 2005). The National Health and Medical Research Council (2000) have classified PND risk factors into four categories. The four categories are confirmed risk factors, probable risk factors, possible risk factors, and possible protective factors. To overcome the classified risk factors different interventions have been introduced, for example, medication, counselling, psychotherapy, group approaches, and support strategies. Approaches to treating PND vary across studies (MacArthur et al., 2002), but social support has been the main focus of much of the research for years(MacArthur et al., 2002; Wickberg & Hwang, 2001). Pharmacological approaches are not favoured by mothers due to the possible impact on breastfeeding.

Acceptance of exercise as a useful adjunct treatment option for PND has grown recently (Daley, MacArthur, & Winter, 2007). Exercise intervention has been introduced in recent years and a few studies have suggested the precise effect of it.

CHAPTER TWO

The UK National Institute for Clinical Excellence (2004) recommended that patients need to be advised about the exercise benefits upon their request for treatment options. However, due to presence of exercise barriers in the postpartum period, facilitating an appropriate exercise program is not straight forward. Due to the availability of results from the different interventions further investigation is required to determine if interventions are warranted and which are most appropriate (Bhugra et al., 2000; Bick, 2003; Emond et al., 2002).

2.4 Incidence of Postnatal Depression

The incidence of postnatal depression varies widely throughout the world depending on the measuring instrument and the sample size, study design and characteristics of the study (O' Hara & Swain, 1996). Understanding the accurate rate of postnatal depression is a major health issue. Correct calculations are needed in order to plan appropriate mental health services. Existing figures of PND prevalence rate need to be considered cautiously due to diverse socio-economic factors, cultural factors and ethnic backgrounds (Halberich & Karkun, 2006). A number of studies around the world have considered PND as a Western phenomenon (Munck-Olsen, Laursen, Pedersen, Mors, & Mortensen, 2006; Warner, Appleby, Whitton, & Faragher, 1996). Studies in Europe, Chile and Australia do not show any substantial difference in the prevalence of PND; it has been suggested that ten to 15 per cent of Western mothers are affected by PND (O' Hara & Swain, 1996).

Other statistics present the rate of PND as about 13.5 per cent in China (Ghubash & Abou-Saleh, 1997), 15.8 per cent in Arab women and 16 per cent in Zimbabwean women (Nhiwatiwa, Patel, & Acuda, 1998). This increases in Japanese women at 17 per cent (Yoshida, Yamashita, Ueda, & Tashiro, 2001) and in India and Pakistan the rate escalate even further and is respectively 23 per cent (Patel, Rodrigues, &

CHAPTER TWO

Desouza, 2002) and 28 per cent (Rahman, Iqbal, & Harrington, 2003). South Africa rather alarmingly is reported at the rate of 34.7 per cent (Cooper et al., 1999). Evidence indicates the rate of PND is doubled in developing countries which could be as a result of environmental factors, external stressors and lifestyle habits. The rate of PND varies widely and as noted this may be because of the way that data is collected and recorded (Lobato, Moraes, Dias, & Reichenheim, 2011); an example of this diversity is evident in a study from Brazil that estimates the rate of PND to be from 12 per cent to 37 per cent (Faisal-Cury, Tedesco, Menezes, & Zugaib, 2004; Hasselmann, Wemeck, & Silva, 2008; Moraes et al., 2006; Ruschi et al., 2007).

2.5 Predictors of Postnatal Depression

A number of research studies have evaluated different risk factors for PND. Indeed, the majority of the literature surrounding PND has focussed on the associated factors that could cause postpartum mood disturbance (Robertson, Grace, Wallington, & Stewart, 2004; Sobotkova & Stembera, 2003). Studies showed that demographic, psychosocial, and socioeconomic factors are of great importance in considering the causes of PND (Halberich & Karkun, 2006). This study has reviewed a wide range of evidence around postpartum depression in countries such as Singapore, Malta, Malaysia, Austria, and Denmark; in addition, the results of this review discuss the prevalence of PND which is considered to be more prevalent in countries such as Brazil, Guyana, Costa Rica, Italy, Chile, South Africa, Taiwan and Korea. For example, a lower perception of social support was found to be a predictor of PND in different studies (Leung, 2002; Richards, 2000). In 2002 (Chan, Levy, Chung, & Dominic Lee, 2002) investigated social support in 35 women and suggested that women who experience less support from family and partners are at risk of PND. This has been documented further by Robertson and colleagues (2004) who demonstrated that lack of social support is one of the strongest risk factors for PND.

CHAPTER TWO

Similarly, partner support was found to be one of the major contributors to postpartum mental health (Ghubash & Eapen, 2009).

A meta-analysis has presented the effects of socioeconomic and demographic factors on PND and suggested these factors have the highest association with PND (Beck, 2001). The purpose of this meta analysis was to update the 1980s studies around postpartum depression. This was later supported by an Arab study that found these variables had the strongest effect on PND (Hamdan, Hawamdeh, & Hussein, 2008). However, contradictions exist and not every research study has agreed upon the impact of socioeconomic and demographic factors (Özbaaran et al., 2011). For example, factors such as the level of education (Araya, Lewis, Rojas, & Fritsch, 2003; Artazcoz, Borrell, Benach, Cortes, & Rohlfs, 2004; Grussu & Quantraro, 2009; Robertson, Jones, Haque, Holder, & Craddock, 2005; Singh-Manoux, Clarke, & Marmot, 2002), employment status (Ghubash & Eapen, 2009; Hamdan & Tamim, 2011), and mothers' age (Cooper et al., 1999; Rubertsson et al., 2003) have been documented to be predictors of depression following childbirth; whereas Leigh & Milgrom (2008) do not support any of these findings. To add further factors to the mix postpartum life responsibilities and the mothers' degree of confidence and self-esteem have been suggested as having an impact on the mothers' mental health following childbirth (Leigh & Milgrom, 2008; Ghubash & Eapen, 2009). Given the variability of studies it is important to consider the associated factors that predict PND in a local and comparative context; further exploration is warranted to draw more consistent results.

2.6 Postpartum physical health: Exercise

Evidence suggests there are benefits of regular physical activity and exercise during the postnatal period for both mothers (McCrory, 2001) and their offspring as well (Carey & Quinn, 2001; McCrory, 2001). Exercise is a proven method for weight loss

CHAPTER TWO

and for maintaining cardiovascular fitness (Department of Health, 2006) and has many other associated health benefits (Sampselle, Seng, Yeo, Killion, & Oakley, 1999). However, despite the available evidence not many women are sufficiently active both in pregnancy and childbirth (Albright, Maddock, & Nigg, 2006; Borodulin, Evenson, Wen, Herring, & Benson, 2008) and lower levels of well-being are experienced by inactive mothers (Sampselle et al., 1999). Other studies document the risk factors associated with the reduction in the level of activity during pregnancy and after childbirth (Albright et al., 2006; Symons Downs & Hausenblas, 2004). Maternal body weight and postpartum excess weight have been shown to influence the mothers' mental health and psychological well-being (Doran & Davis, 2011; LaCoursiere, Baksh, Bloebaum, & Vamer, 2006).

Although mothers are advised to be active and to exercise, some women in the postnatal period refuse due to breastfeeding responsibilities (Currie, 2004), caring for the baby, and postnatal exhaustion (Carey & Quinn, 2001; McCrory, 2001). Bearing this in mind, the reality of exercising might be even harder for those with PND (Daley et al., 2007).

A view of the postpartum period shows recovery from childbirth is not always simple and the experience of discomfort is very common in every day functions (Kanotra et al., 2007). Therefore, clarifying the possible side-effects of exercise on mother's and baby's health is essential in planning future exercise interventions (Devine, Bove, & Olson, 2000). As the benefits of exercise, such as positive feeling elevated mood state have been suggested (Reed & Ones, 2006), the barriers and enablers to exercise in the postpartum period need to be explored further understand the manner in which women may access suitable exercise programs.

CHAPTER TWO

2.7 Predictors of physical activity in the postpartum period

Decline in the level of physical activity during pregnancy through to the postpartum period is inevitable according to the evidence, although the rationale behind this theory is unclear (Clarke et al., 2004). The determinants of physical activity in the postpartum period should therefore be identified (Pereira et al., 2007). Different factors determine exercise participation in postpartum period such as individual abilities, environmental and interpersonal factors (King et al., 2000). Life following pregnancy and child birth could lead to different changes in physical activity patterns; factors such as child care responsibilities and other environmental factors could cause exercise participation to be altered (Albright et al., 2006; Stahl, Rutten, & Nutbeam, 2001). In addition, mothers' participation and attitudes toward exercise fluctuates according to the influence of the surrounding environment such as the availability of a social network(Stretcher & Rosenstock, 1997).

Other factors that have been associated with exercise participation in the postpartum period including the mothers' self-esteem and level of confidence (Koh et al., 2008). A study by Vernon and colleagues (2010) showed mothers with a lower level of competence in caregiving spent more time in lighter physical activities rather than vigorous types of exercise. Other factors that affect exercise participation are demographic factors such as level of education; a study by Evenson and colleagues (2009) indicated mothers with a lower level of education tend to exercise less. In addition, factors such as lack of time (Smith et al., 2005; Downs & Ulbrecht 2006), lack of motivation (Doran & Davis, 2011), and lack of an appropriate exercise program (Evenson, K et al., 2009) are considered as exercise barriers. However, some studies have considered a few factors as physical activity enablers following birth such as partner support (Blum et al, 2004), social support (Albright et al., 2006) and motivation to feel better(Downs & Hausenblas, 2004).

CHAPTER TWO

Although, partner support has been measured mostly in smaller studies (Kantora et al, 2007; Downs & Ulbrecht, 2006); the effect of social support has been reported both in small and large samples and its positive effect on exercise participation is suggested in mothers (Smith et al., 2005). In addition, availability of support for caregiving during the postpartum period and practical support are both important factors that will influence the mothers' participation. Despite the presented evidence about the associated factors which will predict exercise in the postpartum period such as partner support, social support, and the influence of demographic factors, ambiguity exists and further clarification is required about exercise participation (Devine et al., 2000).

2.8 Understanding the mechanism of exercise

Physical activity is known to have positive effects on individuals' lifestyles and contributes to a healthier life (Wolin, Glynn, Colditz, Lee, & Kawachi, 2007). However, people may not overtly recognise their rationale for exercising, and the reality may be the basic joyfulness of participation (Ruby, Dunn, Perrino, Gillis, & Viel, 2011). Several biological, psychosocial and psychological theories have been proposed to explain the positive effects of exercise on a person's mental health (Daley et al., 2007). However, there is still a mystery that remains about the mechanism by which physical activity and exercise change the quality of life (Gillison, Skevington, Sato, Standage, & Evangelidou, 2009). The mechanism by which exercise could affect individuals' health may vary, it may be implemented for psychological improvement or to better physiological performance (Taylor et al., 2004).

The possible biological mechanism may be linked to an increase in the level of endorphins. This was first reported over 20 years ago showing that endorphin is

CHAPTER TWO

secreted from pituitary glands in the brain (Hadley & Haskell-Luevano, 1999). In addition, the vascular endothelial growth factor which forms in the blood is known to rise at the time of exercising (Farrell et al., 1982) and this results in a positive mood. The release of other hormones such as dopamine and noradrenaline may be considered as an underlying cause in elevating mood with exercise (Meeusen & De Merleir, 1995). Further Broocks and colleagues (2003) considered the hypothesis behind the improvement in depression and anxiety through exercising to be physiological which is known as the ‘Serotonin secret’.

By contrast the psychological hypotheses proposed to explain the influence of exercise on quality of life relates to the improved degree of self-esteem and confidence outcomes associated with exercising (Oldervoll, Kaasa, Hjermstad, Lund, & Loge, 2004). The possible decrease in the level of depression has been explained by the effect of exercise on weight loss and muscle tone which may be linked to motivation for exercise (Currie & Develin, 2002). Although, the degree of support for this theory is very limited, it is one of the most prevalent theories for the psychological effect of exercise. Also, one study suggests that the feeling of self-achievement could lead to decrease of depression (Craft, 2005).

Azjen and Fishbein (2005) suggested the theory of planned behaviour and concluded that the individual’s attitude toward enjoying the exercise might lead to behavioural intention to exercise which in turn guides the person to participate in exercise. This model has been evaluated in postpartum women (Hales, Evenson, Wen, & Wilcox, 2010), and will be discussed in later parts of the thesis. Various types of theories exist, such as the one which considers exercise as a stress reliever demonstrating that exercise distracts the individual from stressful stimuli and challenging days (Salmon, 2001). Another theory is the idea of evaluating exercise as the key to psychological improvement which results in higher self-efficacy which then leads to more participation Netz et al., (2005). Yet another theory discusses the effect of exercise on the sleeping cycle (Tanaka & Shirakawa, 2004). Due to its

CHAPTER TWO

antidepressant effect exercise improves sleep and results in a better mood (Ernst, Olson, Pinel, Lam, & Christie, 2006). Exercise as an approach for managing emotions has also been suggested (Schechtman & Ory, 2001). Experiencing positive emotions from exercising may result in more exercise participation (Dunton & Vaughan, 2008).

2.9 Exercise and Postnatal Depression

Exercise has been modified as an adjunct to treating depression in the general population (Stein, 2005) and has been suggested as improving postpartum depression (Craig & Howard, 2009; Daley, 2008). A study in United Kingdom in the general population concluded that exercise has important mental health benefits for depression (Department of Health, 2004a). It is widely established that exercise has an antidepressant effect but systematic reviews and further study are required to fully investigate this for postnatal women. As is evident from the short overview below, there have been few studies in this area.

The effect of exercise on PND has been investigated to some extent in the literature (Daley et al., 2007). However, there is a lack of well-designed prospective studies (Humpel, Owen, & Leslie, 2002; Sallis, Kraft, & Linton, 2002); thus further investigation is warranted as the postpartum period is one of the most critical times in a woman's life (Gunderson & Abrams, 2000). In Australia, two randomized control trials supported the role of exercise as a moderator for PND (Daley, Kate, & MacArthur, 2009). In addition evidence from a pram walking intervention supports the fact that improved fitness levels could result in reduced depression (Armstrong & Edwards, 2003). A randomized control trial showed that a combination of exercise and face to face health care education will result in mothers' well-being and reduce the risk of PND (Norman et al., 2010). In addition, a mixture of social

CHAPTER TWO

support and an exercise program may be a good approach to assist mothers with PND (Battle & Zolnick, 2005). Overall, women have found exercise to be an effective weapon in terms of postnatal well-being (Lox & Treasure, 2000).

2.10 Physical activity and depression (mental health)

Considering the lack of information about the effect of exercise on PND, it is worthwhile reviewing the literature briefly to see what research reveals about the effect of exercise on depression more generally. Depressive symptoms are mostly associated with less physical activity participation (Peveler, Carson, & Rodin, 2002). Thus, both the physiological and the psychological effects of exercise have to be considered (Department of Health, 2004a). The association between exercise participation and depression has been considered in the general population and evidence shows that exercise interventions are beneficial for depression and anxiety (Stathopoulou, Powers, Berry, Smits, & Otto, 2006).

Studies have established the valuable effect of aerobic exercise on depression in a general population (Biddle, Fox, & Boutcher, 2000) and a study in Finland (Hassmen, Koivula, & Uutela, 2000) suggests the effect of two exercise sessions on reducing depression, anger, and stress. Likewise a study in Germany (Schmitz, Kruse, & Kugler, 2004) in a sample of 7,124 participants evaluated the quality of life associated with physical activity participation. Results indicated a higher level of physical activity significantly increases the quality of life among individuals with depression and anxiety. Similarly, results of a study in United States (Goodwin, 2003) show the negative association between physical activity and major depression. In clinical samples the results have an even more significant effect and show that symptoms of depression are reduced by exercise interventions and are more effective in comparison to psychotherapy (Lawlor & Hopker, 2001).

CHAPTER TWO

Notwithstanding these positive indications, the effect of exercise on depression has not been pursued systematically as an intervention solely and mostly has been combined with other types of interventions, or most of the trials have been of poor quality with inadequate follow-up (Daley, 2008). It is also important to note that some research has concluded that exercise has short term effects (Sjosten & Kivela, 2006).

2.11 Interventions for PND

Different interventions have been used in PND but these can be mainly classified as pharmacological and non-pharmacological. Some researchers indicate that there are potential side effects of antidepressants on breastfeeding and the infants' health (Dennis & Chung Lee, 2006) though others have considered them as a safe option for treatment (Hoffbrand, Howard, & Crawley, 2001). The non-pharmacological approach involves the treatment of high risk women with interventions; such as, cognitive behavioural therapy and interpersonal psychotherapy (Dennis & Hodnett, 2007). Recently, exercise has been suggested as an adjunct for treating postnatal depression as its antidepressant effect is highly regarded and some symptoms of depression such as fatigue and reduced cognitive function may persist for those who take medications (Eriksen & Bruusgaard, 2004). Interestingly, exercise as an intervention has been shown in different meta-analyses to be as effective as psychotherapy and pharmacological interventions (Craft & Landers, 1998); similarly its effect has been considered equal to cognitive therapy in another meta-analysis (Lawlor & Hopker, 2001). In addition, randomised trials have concluded its noticeable effect in comparison with other treatment options (Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005). A home based intervention supported the previous findings and suggested many patients found the effect of exercise similar to antidepressants (Blumenthal et al., 2007). Exercise has been suggested as

CHAPTER TWO

having minimal side effects and does not need external factors such as availability of a physical therapist and it is considered to be a cost effective option (Daley, 2002).

Exercise has been suggested as a strategy to improve mothers' psychological well-being (Currie & Develin, 2002); however, as discussed earlier the mechanism by which this occurs is still unclear (Ernst et al., 2006). Despite the benefits of exercise intervention, there is still need for further investigation as there is no published meta-analysis of the effect of exercise on PND (Daley, 2008) and studies that used RCTs to determine the effect of group pram walking on PND (Armstrong & Edwards, 2003; Armstrong & Edwards, 2004) were with small sample sizes. Nevertheless, they have reported considerable reduction in depression this study is done in Australia. Despite the lack of sophisticated studies due to limited access to clinical populations or the sample size of studies, mothers have showed compliance to exercise (Daley et al, 2007) and many observational studies support the effect of exercise as an adjunct for the treatment of depression (Currie & Develin, 2002; Wilkinson, Philips, & Jackson, 2003).

Different types of interventions have been considered to moderate the impact of mental health issues and much of the research focus has been around reviews, meta-analysis, and critical analysis. However, there are some key issues that have not been considered previously in the literature (Craike, Coleman, & MacMahon, 2010; Haase, Steptoe, Sallis, & Wardle, 2004) and these need to be considered in order to evaluate exercise interventions. It is important to consider the quality of the program and its structure; for example, exercise intensity, duration, frequency, types of exercise, and the study population. In addition, it has been suggested by Legrand and Heuze (2007) that the effect of exercise may depend on its dose and the required level for treatment of depression may be different to the one for general fitness. Despite the limited evidence in the area of exercise and PND (Demissie, Siega-Riz, & Evenson, 2011), the National Institute for Health and Clinical

CHAPTER TWO

Excellence (2007) have recommended that exercise is effective in managing PND for women with mild or moderate depression during the postnatal period.

Overall, more trials are needed for postpartum women and comparisons cannot be made from studies involving the general population (Daley, 2008).

2.12 Conclusion

As noted above there is still a lot to learn about exercise in the postpartum period and the effect that exercise may have on PND and postpartum wellbeing. It may not be surprising that there is contradictory evidence about the effect of exercise on PND. It is very difficult to access clinical populations and more difficult again to introduce and sustain exercise interventions for RCTs. In addition any measurement of exercise in the pre or postnatal period is difficult as women's physical activity is different from what they would normally do due to the physical changes in their bodies. Although my study is modest, I attempted to address some of the limitations in the literature and to examine the issue in the local context of Perth, Western Australia. By exploring mothers' views about postpartum physical and mental health and identifying their opinions and feelings about the existing barriers they face in exercising regularly in the postpartum period this research attempted to shed some light on how exercise can improve postpartum life. To address my aims I adopted a mixed method approach which is discussed in the following chapter.

CHAPTER THREE

3.1 Introduction

This chapter covers how I designed this study in order to address the objectives. I chose a mixed methods design in order to understand the factors associated with physical activity participation after child birth for both women with and without PND, and also to more fully comprehend how women can be encouraged and supported to exercise following the birth of their babies. The study consisted of two stages: Stage One utilised a postpartum lifestyle questionnaire (PLQ) which reviewed the predictors of exercise in postpartum women within six weeks to 52 weeks and how those predictors affected the mothers' mood; Stage Two utilised interviews with women to explore the barriers and enablers to exercise during the postpartum period. The study aimed to assist the researcher and others to recommend appropriate exercise programs for this population. This chapter describes the research design, hypotheses and population sample (including sample size calculation). The first section which covers the theory of mixed method design is followed by a detailed description of the two research stages including information about the participants, the procedures and instruments used in collecting the data, the data analysis, and the ethical considerations associated with the study.

3.2 Research design and methods

Quantitative research employs the scientific method which allows the researcher to generalise the findings of the research to a broader population. On other hand, qualitative research considers reality to be subjective and the approach is considered valuable as it provides an analytical process that allows the researcher

CHAPTER THREE

to integrate an individual's comments into meaningful findings (McClement & Woodgate, 1998). Each qualitative and quantitative research process is used to address different kinds of research questions. While both demands acceptable validity and reliability, the underlying assumptions are different (Strang, 2000). In addition, qualitative research seeks to clarify the participants' experience, whereas quantitative research seeks generalizable conclusions (Penrod & Morrison, 2004).

I considered that a combination of quantitative and qualitative approaches was appropriate for my research. It aimed to explore the reality of postpartum life within the context of physical activity through standardised tools and the mothers' accounts of their experiences. This 'reality' included the available social support they were able to draw upon, their self-confidence, whether or not they exercised and how much and what kinds of barriers to exercise they encountered. Importantly, I also wanted to know how my findings could lead to an appropriate exercise program/s and increase the mothers' physical activity. I could only find this information through questioning the mothers and I chose to do this in different ways, both through questionnaires and interviews. Combining different methodological approaches which draw on different traditions is sometimes called mixed methods.

3.3 Mixed method approach

Creswell (2003) defines mixed methods as a form of data collection or data analysis that uses both qualitative and quantitative approaches in a single study, often allowing the data to be gathered sequentially. Using mixed method can capitalise on the strengths of each approach and offset their different weaknesses. It could also provide more comprehensive answers to research questions thus going beyond the limitations of a single approach. The term 'mixed methods' connotes the diverse nature of methods rather than the use of different informant sources with the same

CHAPTER THREE

methodological concept (for example, the quantitative survey in Stage One and in the semi-structured interview in Stage Two rather than a combination of interviews and focus groups in one study). In addition the approach requires that both quantitative and qualitative methodologies be used within the context of one research study rather than the use of methods in multiple, separate studies concerning the same research problem (Patton, 2002). Employing two methods in one study maximises further support to ensure the results are valid and not a methodological artefact (Patton, 2002).

Overall, addressing mixed-methods in one single study requires the initial analysis to take place primarily within an appropriate strategy (Morse, 2003). Four criteria has been used by Creswell (2003) to determine the type of mixed design methods used for the study: (a) the implementation of data collection; (b) the priority given to quantitative or qualitative research; (c) the stage in the research at which integration of quantitative and qualitative research occurs and (d) the theoretical perspective of the research study.

An overview of the types of designs suggested by Tashakkori and Teddlie(2003) is provided in the table on the page 28 .

CHAPTER THREE

Table 3.1

Types of study designs by four criteria

Design	Implementation	Priority	Integration stage	Theoretical Perspective
Sequential Explanatory	quan→ qual	usually quan; can be qual or equal	Interpretation phase	Possibly present
Sequential Explanatory	quan→ qual	usually qual; can be quan or qual	Interpretation phase	Possibly present
Sequential Transformative	Either quan→ qual or qual→ quan	quan, qual, or equal	Interpretation phase	Definitely present (e.g. conceptual framework, advocacy, empowerment)
Concurrent Triangulation	Concurrent collection of quan or qual	Preferably equal; can be quan or qual	Interpretation phase or analysis phase	Possibly present
Concurrent Nested	Concurrent collection of quan or qual	quan or qual	Analysis phase	Possibly present
Concurrent Transformative	Concurrent collection of quan or qual	Concurrent collection of qual & quan data	Usually analysis phase; can be during interpretative phase	Definitely present (e.g. conceptual framework, advocacy, empowerment)

Note. Quan= Quantitative; Qual= Qualitative; → followed by. From "Handbook of Mixed Methods in Social & Behavioural Research," by Tashakkori and Teddlie, 2003, p.224, Copyright by Sage Publications, Inc.

CHAPTER THREE

As the table illustrates there are many ways in which different research methods can be combined in social research. I consider my research design to be sequential explanatory, with the quantitative preceding the qualitative component. The quantitative component of the research was given priority and the two components of the research began to be integrated during the interpretation phase. The research is not informed heavily by a theoretical perspective but each qualitative and quantitative component draws upon background regarding the role of exercise and other physical activity participation in influencing mood.

Pragmatism has been considered to the most suitable paradigm in mixed method research (Tashakkori & Teddlie, 2003). However, it does need to be noted that not all researchers agree upon the compatibility of quantitative and qualitative research. I tend to agree with the pragmatic approach adopted by Tashakkori and Teddlie (2003):

- Pragmatist researchers conceive the research question to be a key element rather than the paradigm that underlies the method or the method they use;
- The specific decision regarding the use of mixed methods, qualitative methods or quantitative methods depends on the research question and the stage of the research cycle;
- Pragmatism avoids the use of philosophical concepts;
- Pragmatism presents a very practical and applied research philosophy.

I believe pragmatism advocates consideration of divergent view-points and this suits my study as the participants came from a number of different backgrounds with some at more risk of PND than others. The flexible design of the mixed methods approach allowed me to manage the research in such a way as to achieve the goal and purpose of my research. For instance, following the first stage of my research I made several changes to the initial research design due to recruitment

CHAPTER THREE

issues. The qualitative component of the research allowed me to add to the findings in such a way that it enriched the data.

Applying a mixed method strategy has also allowed me, through participants' interviews, to more fully understand women's expectation and demands from their postpartum life and physical activity.

3.4 Vulnerable and Sensitive Research

One of the concerns I had in conducting the research was that women, particularly those at risk of PND, may consider the subject matter to be sensitive. Women in the postpartum period may be subject to mood swings, lack of confidence and can feel overwhelmed by their circumstances. Researchers often undertake research on sensitive topics and with vulnerable populations or groups(De Laine, 2000) and due consideration needs to be made when conducting this kind of research. Sensitive topics have been called 'back regions' (De Laine, 2000) which refer to an individual's private space where personal activities may occur. Understanding the possible sensitivities around private space and respecting participants' privacy and the intimacies they may divulge is necessary if the research is to be both ethical and trustworthy. I was fortunate that I did not encounter any problem; although I needed to be aware and prepared should problem arise.

CHAPTER THREE

3.5 Stage One of the research

3.5.1 Research questions

- Do socio-demographic variables have an impact on physical activity participation in six weeks to twelve months postpartum women in Western Australia metropolitan areas?
- Do key variables such as having partner support, facing barriers or level of confidence cause any difference in physical activity participation following child birth?
- Does any difference exist between women reported to be at risk of PND and those not at a risk of PND in respect to their physical activity level?
- Is there any difference between key variables such as having a partner, facing barriers or level of confidence in mothers who are reported to be at risk of PND and those who are not?
- Does the result of interviews (Stage Two) support the findings from Stage One?

3.5.2 Participants

A sample of (N=150) women within six weeks to 52 weeks postpartum were involved in the study.

To be eligible for the study, participants had to meet the following criteria:

CHAPTER THREE

- mothers within the timeframe of six weeks to 52 weeks postpartum who live in the Perth metropolitan region of Western Australia;
- mothers who do not use a wheel chair or have a physical/medical problem that prevents undertaking moderate to vigorous physical activity;
- mothers who are able to read or respond in English;
- mothers who have a baby without disabilities or premature baby with <35 weeks gestation.

3.5.3 Measures

The Postpartum life style questionnaire (PLQ) is a 14-page tool used to collect physical activity participation, parenting confidence, social support, perceived barriers to exercising, existence of postnatal depression, partner support, and personal demographic data including mothers' age, baby's age, number of children, ethnic background, marital status, level of education, household income, employment position and status, access to park, post code and type of accommodation. The questionnaire is attached at Appendix I.

The front cover of PLQ was designed with the statement of "your postpartum life style" to make a good connection between participants and research goals. The questionnaire included the following scales:

Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky, 1987): The EPDS is a widely used instrument for the screening of PND; it is a self-report scale consisting of 10-items and each item is scored from 0-3 on a four point scale. The simple design of the EPDS allows women to undertake the test without any administrator (Cox & Holden, 2003; Cox et al., 1987). The questionnaire asks about mothers' feeling in the past 7 days. Questions 1, 2, and 4 are scored 0, 1, 2, or 3 with top box scored as 0 and the bottom box scored as 3. Questions 3, 5-10 are reversed scored with the bottom box scored 0 and top box scored 3. The maximum score is 30 and 10 or

CHAPTER THREE

greater shows the possibility of depression; the Cronbach's alpha is 0.88 in the validation sample.

Kaiser Physical Activity Survey, (Sternfeld, Ainsworth, & Quesenberry, 1999): The KPAS is self-administered; divided into five domains being household/caregiving, active living habits, participation in sport and exercise, and occupational activities. In total, the survey contains 75-items that takes twenty minutes to fill-in. A few modification has been made to the original survey; such as using the 'since having your baby' instead of 'past year' in two domains, active living habits and participation in sport and exercise. The four sections are used to classify physical activity status. The first section (household/caregiving) contains 11 items which asks questions about the caring for children, disabled child, and household chores. The responses are categorical, ranging from 1 for 'none' to 4 for '20' hours or more per week reflecting the total amount spent in household/caregiving activities. The second section, occupational activities, has 8 questions both categorical and short answers asks about the type of occupation, the specific tasks and duties, and how is the nature of the occupation, and how often does the person may sit, stand, walk, lift, or sweat from performing the duties.

There are some specified codes for the occupation section according to the Department of Labour Occupational Codes. The intensity code is from 1=low to 3=medium and 5=high depend to the physical demands of the occupation will be assigned.

Section three contains 4-items which ask about physical activities such as walking, cycling, and watching TV. The score for this section is calculated as the average of 5-level categorical responses.

For the sports/exercise section, 15-items are asked; respondents answer the questions about the type of exercise they do, and to identify the frequency of three exercises and duration for the three most frequent sports/exercise activities

CHAPTER THREE

performed in the past year. The specific activities are coded by the intensity and multiplied by hours and months.

The reliability of the KPAS is ranged between 0.79- 0.91(Ainsworth, Sternfeld, Richardson, & Jackson, 2000).

Karitane Parenting confidence Scale(Črnčec, Barnett, & Matthey, 2008): The KPCS measurement tool assesses parenting confidence, perceived parental self-efficacy and skills in relation to the infant care. It is developed in Australia and is valid for 0-12 months old babies. It is a self-administered tool

It targets parenting stress, depression and satisfaction following the birth of the baby and has a demonstrated expected correlation with self-efficacy, child development, and support (Črnčecet al, 2008). . The questionnaire consist of 15-items asking about parents' confident in caring for their infants; each item on KPCS scored 0, 1, 2, or 3 with scores summed to produce a total score; and the rate is 0-45 and the cut-off is 39. The highest score which shows higher level of self-efficacy is 40 or more and classifies the person to be in no-clinical range. Score 31-35 demonstrate on moderate clinical range, followed by 36-39 which is for mild clinical range; the lowest level of self-efficacy is the score 31 or lower. The reliability of the scale is well proven and Cronbach's alpha is 0.81 with total variance of 49.3% (Črnčecet al, 2008).

Dyadic Adjustment Scale (Spanier, 1976):DAS-7 exists in two different versions, short and long versions; the 7-item is the shortened form of 32-item and it is suggested that it could be of more value for surveys, interventions, and clinical screening (Schumm et al., 1985; Schumm et al., 1986; Sharpley & Cross, 1982).It measures the marital adjustment, the degree of satisfaction, the level of happiness and cooperation in their life. In this study the DAS-7 was used as it takes less time for mothers to fill it in; in addition, it has 6 questions based on the Liker Scale from 0 for complete disagreement or dissatisfaction to 7 for being agreed or satisfied. The

CHAPTER THREE

DAS-7 has 7-items, six questions are rated on a six point Likert scale, the end points are either ‘always agree’ and ‘always disagree’ or ‘all the time’ and ‘never’. The last question is rated on seven point scale from the endpoints of ‘extremely unhappy’ and ‘perfectly happy’. The validity of DAS-7 is well proved (Hunsley, Best, Lefebvre, & Diana, 2001). and the internal consistency is 0.91 (Hunsley, Best, Lefebvre, & Diana, 2001).

Social Support Interview, (O' Hara, 1995): the survey was designed to make it as simple as possible for the person; however to give detail of scoring I included the appendix (J) an original copy of the questionnaire. The SSI is a self-report measure of social support. It contains three sections: The first section has 4-items and is designed to obtain information whether she has a spouse or a partner and also to identify the source of support available from confidant, parent, and spouse. Section two contains 9-items with three sub-scales to each question. The rating for each identified source of support is 0-5. In fact, 0 for no person being available; and from 1 to 5 it ranks from never to always. In this section questions are asked about emotional, instrumental support, and mutual sharing of responsibilities and tasks. In addition, they are asked on to what extent the person feel free to talk about anything. It asks about the degree of anticipation to rely on others (partner/spouse, parents, and confidants, or how confident they are to deal with childcare.

Individual social scores are specified to each source of support. The scores for each of the three sources of support are derived by adding across the nine questions for each source to give a total score for each source. 0-45 is the score range for each component and the three score separately can be added together for the final score which ranging between 0-135. The highest score represent the highest level of social support. Section three contains four questions and covers the overall network of support. The range is from 1-5 which is never to always and ask the topics such as turning to someone in times of need and whether in terms of instrumental and emotional support do they turn to the available sources. The other question will ask

CHAPTER THREE

about the degree of satisfaction with the overall support and whether if they feel hesitant to use the available source of support. Calculating the scores across the four questions shows the score for the overall satisfaction with available support. The total is 20 and represents the highest overall support received.

The SSI is the most contemporary reliable measure addressing the purpose of this research (O' Hara, 1995). Test-retest reliability was adequate, and 3 subscales demonstrated adequate internal consistency with alphas ranging from 0.77 to 0.85 (O' Hara, 1995).

Barrier questionnaire: The barrier questionnaire was designed to identify existing obstacles to physical exercise from the mother's point of view. A multiple answered questionnaire based on the Likert scale, it is self-administered tool which contains 21 questions in regards to the common barriers to exercise in postpartum and scores are based from 0 for not any problem, 1 minor problem, and 2 for major problem.

Demographic questionnaire: This component of the survey included questions about the demographic characteristics of the mother, including mothers' age, baby's age, number of children, ethnic background, marital status, education level, household income, employment position and status, access to park, post code and type of accommodation. The questions are represented in form of multiple answered and is simple to fill in by the mothers.

3.5.4 Sampling Frame

According to official figures, there were 32,139 births in Western Australia in 2008 (an 8.5% increase over 2007) (Australian Bureau of Statistics, 2008). If we assume that at least 70% of these are in the metro area, then we anticipate that there would have been at least 22,000 births in the Perth metro area.

CHAPTER THREE

To examine the individual predictors of physical activity in the entire cohort, will require a sample size of 150 participants for a medium effect size. However, for subgroup analysis (the PND and non-PND groups) approximately 10 -15% of the sample is expected to report PND. Assuming a power of 80% and taking $\alpha=0.05$ (probability of a type I error), if we anticipate a medium difference between the PND and non-PND groups (effect size=0.5), then we would need a total sample size of 150 to demonstrate this.

3.5.5 Procedures

The research received approval from the two governing bodies (Curtin University of Technology, and Department of Health Child and Adolescent Health Service) and the data collection commenced in March 2010 and finished in July 2010. A total number of 600 questionnaires were distributed in metropolitan areas of Western Australia (Perth); 100 of the surveys were distributed among clinics on the Eastern Region after a regional meeting between clinics managers and 500 were allocated to the clinics in the Western region of Perth.

The Postpartum Lifestyle Questionnaire (PLQ) was distributed in a form of package that contained Participant's information sheet, reply paid envelope for participants; in addition, nurses were provided by an instruction package that included checklist, advertisement sheet and reply paid envelope for the accurate procedure of distribution to mothers within the six weeks to 52 weeks postpartum period through child health clinics. Specifically, mothers were chosen if they gave birth to a baby in the last 12 months. They were recruited to the study by the metropolitan child health clinics. Upon the mother's agreement to participate in the study they received the PLQ package. .

Information distributed to the participants and child health clinics is attached at Appendix A, B, E and F.

CHAPTER THREE

3.5.6 Research design and data analysis

A cross-sectional correlation design was used. SPSS 17 was used to analyse data: frequencies and discrimination of means and standard deviations (SD); and multiple regression analysis was used to determine the aspects of psychosocial and socio-demographic factors that were the best predictors of PND and physical activity.

3.6 Stage Two

Following data analysis of the survey a list of interview questions were designed based on the results as well as popular themes around motherhood, life after birth, motivation to exercise, and how mothers' exercise participation was either constrained or enabled following child birth. The interview guide is attached at Appendix G. Fourteen postpartum women who completed the survey and indicated an interest in continuing the study were invited to participate in an interview. The aim of the study was explained when they were initially contacted by telephone. All women were interviewed in their homes as this was more convenient due to child care responsibilities and time restrictions. All interviews were tape recorded and transcribed. Added more information to stage 2 (Chapter 5). The researcher read through the transcripts and repeatedly coded them which lead to the final themes. The interviews lasted for 30 to 45 minutes. The transcripts were analysed for thematic content. This approach identifies themes determined through general postpartum issues as well as particular issues related to barriers and enablers to exercise participation. Themes consisted of significant sentences and phrases that contributed to a particular concept. Themes emerged around the experience of

CHAPTER THREE

birth and motherhood and how these life changing experiences contributed to the women's health and their ability participate in physical activity.

3.7 Ethics

Permission to conduct this study was obtained from Curtin University Human Research Ethics Committee (HR 152/2009, 1/12/2009-1/12/2010), and the Department of Health Child and Adolescents Health Service and Evaluation Coordinating Committee (20/01/2010).

Confidentiality was emphasized early in the study. Results of the testing were confidential, and they were not identified by names, but interviewees were given a code. No harm or risk factors were identified as a result of participating in this study. Participants were informed of their right to discontinue participation at any time. Data was stored in a locked cabinet, away from the intervention setting, and would be stored for the minimum period of 5 years.

CHAPTER FOUR

The relationship between sociodemographic factors, partner support, PND, and physical activity

4.1 Abstract

Background: postnatal depression (PND) is defined as a psychological mood disorder that occurs in a mother within six weeks of her giving birth. It refers to an episode that causes mood disturbance and it could begin in, or extend into, the postpartum period. It is thought to have a high impact upon the mother's health as well as the family's functioning and the child's development. Psychosocial factors, socioeconomic factors, leisure and physical activity may all contribute to postpartum mood and ability to cope with responsibilities. The aim of this study was to investigate the factors associated with physical activity participation and PND in postpartum women.

Methods: The study used a cross-sectional correlational design. A sample of 150 postpartum women were sent a package of six standardised questionnaires.

Results: Psycho-social factors, parental confidence, partner support, and social support predicted PND and the mothers' physical activity. There was no association between physical activity participation and PND. The factors that predicted PND were the mother's age, the baby's age, having someone to rely on for childcare, level of partner support, level of parental confidence, and being willing to ask for help; the predictors of the mother's physical activity participation were baby's age, mother's education level, family income, the number of children, parental confidence, partner support, lack of time, lack of information, lack of confidence, lack of knowledge and poor access to public transport.

Conclusion: Several factors were associated with PND and participation in physical activity, but there was no association between PND and physical activity.

CHAPTER FOUR

4.2 Introduction

Research shows that depression is one of the leading mental health disorders throughout the world (Murray & Lopez, 1996; Üstün, Ayuso-Mateos, Chatterji, Mathers, & Murray, 2004) and will be the second most common cause of disability in Australia by 2020 (Mathers, Vos, Stevenson, & Begg, 2000). Results from a meta-analysis(Robertson et al., 2004) showed that approximately 13 per cent of childbearing women around the world suffer from this condition (Gale & Harlow, 2003; Grussu & Quantraro, 2009). An Australian national depression research initiative recorded the rate of PND as 16 per cent for the first birth experience in Australia (Beyondblue, 2009). Furthermore, in Australia, it is estimated that 25,000 Australian women are affected by PND regardless of the number of births and this is considered a major health issue (Maloney, 1998). PND can be considered as a distressing event for childbearing women and could affect their mothering role and function (Boyce, 2003; Brockington, 2004; Gaynes et al., 2005; Hatton et al., 2005). Overall, the postpartum period may be associated with higher levels of anxiety, stress, and depression which may threaten the women's ability to mother her child. Recognizing PND may be difficult as many mothers tend not to disclose their feelings or recognize the changes in their feelings (Cox, 1989).

4.3 PND and associated factors

Some studies involving the investigation of PND have been limited due to small sample sizes (Blum, Beaudoin, & caton-Lemos, 2004; Özbaaran et al., 2011). However, other studies have approached the subject through examining the

CHAPTER FOUR

psychosocial context, for example by evaluating partner support or social support during the postpartum period (Seimyr, Edhborg, Lundh, & Sjogren, 2004; Zoltanick, Johnson, Miller, Pearlstein, & Howard, 2001). A number of studies have suggested a good quality relationship regardless of the source of support is likely to affect postpartum health (Beck, 1996; O' Hara & Swain, 1996). Similarly, lack of partner support has been found to be a strong predictor of PND (Milgrom et al., 2008).

Some researchers have argued that low income is a predictor of PND (Hamdan et al., 2008; Patel et al., 2002), whereas other studies have not involved reports of any association between income and PND (Özbaaarán et al., 2011). Inconsistency was found with respect to the other demographic factors and it has been suggested that level of education (Araya et al., 2003; Artazcoz et al., 2004; Grussu & Quantraro, 2009; Robertson et al., 2005; Singh-Manoux et al., 2002), employment status (Ghubash & Eapen, 2009; Hamdan & Tamim, 2011) and mothers' age (Cooper et al., 1999; Rubertsson et al., 2003) are associated with PND; however, others do not support these findings (Leigh & Milgrom, 2008). Furthermore, parent self-esteem and self-confidence and ability to cope with childhood responsibilities are closely thought to place mothers at risk of PND (Ghubash & Eapen, 2009; Leigh & Milgrom, 2008; Vernon, Young-Hyman, & Looney, 2010). Inconsistencies in the literature prevent a clear understanding of the factors associated with PND. Further research is therefore required.

4.4 Effect of exercise during the postpartum period

Researchers have concerns regarding postpartum health, weight retention, breastfeeding and exercise but available guidelines do not provide sufficient instruction and support for women following birth (Mottola, 2002). The literature is well documented in terms of aerobic fitness (Department of Health Website, 2006)and the outcomes of exercise on general population (Stein, 2005)and

CHAPTER FOUR

pregnant women (Symons Downs & Hausenblas, 2004), but little attention has been paid to the postpartum lifestyle; issues have been covered around weight retention (LaCoursiere et al., 2006) and milk supply (Currie, 2004), but nothing has been done in regards to the postpartum recovery and care.

One study on postpartum women within 4-38 weeks of childbirth revealed exercise facilitated the mother's recovery (DA Costa et al., 2009). According to research by McIntosh (1993) factors such as lack of support, lack of time, and frequent feeling of isolation could contribute to the mental health and recovery in the postpartum period. Difficulties with motherhood such as inability to breastfeed have been reported from other studies (Cooke, 1996; Mc Veigh, 1997) and would greatly minimize the effect of exercise. Inconsistent results have been reported in this area; however, overall, the association between physical activity and postpartum general health (Sampselle et al., 1999) and postnatal mood disorder (Bowen & Muhajarine, 2006) is unknown.

4.5 Role of exercise in women

Despite the small number of studies on PND and exercise, it has been suggested (Cramer, Nieman, & Lee, 1991) that in the general population exercise is associated with decreases in levels of depression, anxiety and stress (Blumenthal et al., 2007; Blumenthal & Lephuong, 2009; Nabkasorn et al., 2006) and enhances general well-being (Cramer et al., 1991). A lack of methodological rigour is evident in the earlier stages of designing exercise interventions for the management of depression. With the exception of one study (Armstrong & Edwards, 2004) the focus has been on exercise in the general population (DA Costa et al., 2009). Armstrong and Edwards evaluated an exercise intervention versus social support approach on a sample of Australian postpartum women; despite its randomized control design, the sample size was small (Armstrong & Edwards, 2004). It appears there are more approaches

CHAPTER FOUR

on treating depression in older adults or in ones with chronic injury than there are for treating postpartum women. However, the effect of exercise as a non-pharmacological intervention for enhancing recovery of postpartum depression has been evaluated recently and the exercise has been offered as to be therapeutic option for mothers and their family (Daley et al., 2007).

Thus, inconsistency exists in literature on exercise and depression; for instance some studies expect mood improvement through the enhancement of physical fitness, whereas others concluded being physically fit would not guarantee the alleviation of depression. In addition, there is no established theory to explain why exercise would be effective for PND (DA Costa et al., 2009). The aim of this study is to investigate the factors associated with physical activity participation in postpartum women. Specific objectives are as follows:

4.6 Objectives

- 1) To describe physical activity participation in a cohort of postpartum women in Western Australia
- 2) To investigate the factors associated with physical activity participation in postpartum women.
- 3) To examine the association for women reporting PND and those without on physical activity.

4.7 Methods

A cross-sectional correlation design was used.

CHAPTER FOUR

4.7.1 Participants

A sample of 150 postpartum women were involved in the study. To be eligible for the study participants had to meet the following criteria:

Mothers had to be within six to 52 weeks postpartum; live in the Perth metropolitan region of Western Australia; not use a wheel chair or have a physical/medical problem that prevents undertaking moderate to vigorous physical activity; be able to read or respond in English; and not have a baby with disabilities or a premature baby of less than 35 weeks gestation.

4.7.2 Measures

The Postpartum Lifestyle Questionnaire (PLQ) is a 14-page instrument designed to collect details on physical activity participation, parenting confidence, social support, barriers of exercising, screening of postnatal depression, partner support, and personal demographics including age, ethnicity, education, income, type of accommodation, and occupation. The statement “your postpartum lifestyle” appeared on the front cover of the PLQ in order to make a good connection between participants and research goals. The PLQ is made up of the following scales and surveys:

Edinburgh Postnatal Depression Scale, EPDS; (Cox et al., 1987). The EPDS is a widely used self-report measure of PND. It consists of 10-items; each item is scored on a four point scale from 0-3. The Cronbach's alpha was 0.88 (Cox et al., 1987)..

CHAPTER FOUR

Kaiser Physical Activity Survey, (Sternfeld et al., 1999)KPAS is a self-report measure and is divided into four domains: household/caregiving (caring for a child or/and a disabled person, house chores, such as washing, cleaning, and gardening); occupational activities (types of job, and the intensity of work); active living habits (walking, watching TV, bike riding); and participation in sport and exercise (favourite sport, the frequency of the exercise, and the exercise intensity). The KPAS contains seventy five items and it takes twenty minutes to complete. The reliability of the KPAS ranges between 0.79- 0.91(Sternfeld et al., 1999).

Karitane Parenting Confidence Scale,(KPCS) (Črnčec et al., 2008). The KPCS is a self-report measure, consists of 15-items; designed to assess parenting confidence, perceived parental self-efficacy and skills in relation to infant care. It was developed in Australia and is valid for 0-12 months old babies (Črnčecet al, 2008). It targets parenting stress, depression and satisfaction following the birth of the baby and has demonstrated expected correlation with self-efficacy, child development, and support (Črnčecet al, 2008). A Cronbach's alpha of 0.81 has been reported for the measure (Črnčecet al, 2008).

Dyadic Adjustment Scale, (DAS-7) (Spanier, 1976). The DAS-7 exists in two different versions, a seven item short form and a 32 item long form. It has been suggested that the DAS-7 is better for surveys, interventions, and clinical screening (Schumm et al., 1985; Schumm et al., 1986; Sharpley & Cross, 1982). This study used the DAS-7 because it takes less time for mothers to fill it in. Six of the DAS-7 items are rated on a 5-point Likert scale from 0 for complete disagreement or dissatisfaction to 7 for being agreed or satisfied. The internal consistency of the DAS-7 is well established and the Cronbach's alpha is 0.91 (Hunsley et al., 2001). It measures marital adjustment, level of satisfaction, and level of happiness and cooperation.

CHAPTER FOUR

Social Support Interview, (O' Hara, 1995). The SSI is a self-report measure of social support. It contains three sections: The first section has four items and is designed to obtain information whether the respondent has a spouse or partner and also to identify the source of support available (confidant, parent, and spouse). Section two contains nine items with three sub-scales to each question. Section three contains four questions and covers the overall network of support. The range is from one to five which is never to always and asks the topics such as turning to someone in times of need and whether in terms of instrumental and emotional support do they turn to the available sources. The other question asks about the degree of satisfaction with the overall support and whether if they feel hesitant to use the available source of support. Calculating the scores across the four questions shows the score for the overall support satisfaction with available support. The total is 20 and represents the highest overall support received. . Test-retest reliability was adequate, and three subscales demonstrated adequate internal consistency with alphas ranging from 0.77 to 0.85 (O' Hara, 1995).

Demographic questionnaire, included questions about the demographic characteristics of the mother, including her level of education, marital relationship, number of children, and socioeconomic status.

4.7.3 Procedure

The research received approval from the two governing bodies (Curtin University of Technology, and Department of Health Child and Adolescent Health Service) and the data collection commenced in March 2010 and finished in July 2010. Six hundred questionnaires were distributed in the metropolitan areas of Perth (Western Australia), 100 of the surveys were distributed among the child health

CHAPTER FOUR

clinics in the Eastern region of Perth after a meeting with clinic managers, and 500 were allocated to the clinics in the Western region Perth. There was a greater support in the Western region. The Eastern region was only be able to accommodate 100 surveys.

The Postpartum Lifestyle Questionnaire (PLQ) was distributed in a form of a package that contained the participant's information sheet and a reply paid envelope for the participants. In addition, nurses were provided with an instruction package that included a checklist, advertisement sheet and another reply paid envelope so they could return details of the number of questionnaires distributed to mothers in the six to 52 weeks postpartum period during the study period. Postpartum women recruited to the study by the metropolitan child health clinics provided consent and were then given the PLQ package. .

4.7.4 Research design and data analysis

SPSS 17 was used to analyse the data. Descriptive statistics were reported, and inferential statistics in the form of multiple regressions were conducted: Phase One of the data analysis was the examination of the factors that might be associated with PND in postpartum women; Phase Two of the data analysis analysed the factors that might be associated with the participation of these women in physical activities.

4.8 Phase One: Predictors of Postnatal Depression in a Sample of Australian Postpartum Women

Mothers were between 18 to 43 years old and were six to 52 weeks postpartum. They were from a variety of ethnic backgrounds, but most were Australian (60%) or British (30%). The mothers were all married and about 35 per cent had

CHAPTER FOUR

postgraduate qualifications and 25 percent had done an undergraduate degree while 40 per cent of mothers had completed a college, vocational or secondary school qualification. In terms of employment, 53 per cent had been in a non-paid position; however 47 per cent had been in a full-time position which was followed by 27 per cent and 26 per cent respectively part-time and casual positions. The highest annual family income of \$75,000 to \$119,000 of households was followed by incomes of less than \$120,000.

Hypothesis 1

Socio-demographic factors (age of baby, age of mother, annual income, number of children, and level of education) will predict levels of postnatal depression (PND as measured by the EPDS).

The results of a multiple regression analyses predicting levels of PND from socio-demographic factors are reported in Table 1.

Table 4-1

Multiple Regression Analysis Predicting PND from Socio-demographic Factors (N = 142)

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Postnatal depression <i>R</i> ² = .122, <i>p</i> =.003	Age of mother.	-.201	.074	-.242	-.219	.007**
	Age of baby.	.071	.029	.200	.198	.015*
	Annual income.	.404	.255	.132	.127	.115
	Level of education.	.029	.213	.011-	.011	.893
	Number of children.	-.066	.497	.012	-.011	.894

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

CHAPTER FOUR

The mother's age and the baby's age were the only significant predictors of PND. The older the mothers, the lower their levels of PND; and the younger their babies the lower their levels of PND.

Hypothesis 2

Higher levels of physical activity in the domains of care-giving, living, occupation, and sport (as measured by the KPAS) will predict lower levels of PND.

There were no significant correlations between levels of physical activity and postnatal depression (PND as measured by the EPDS).

The EPDS cut-off of 10 was used to partition the sample into an 'at risk for PND' group ($n = 18$) and a 'not at risk for PND' group ($n = 132$). There were no significant point-biserial correlations between levels of physical activity and group membership ('at risk', 'not at risk'). Once again the hypothesis that levels of physical activity would predict levels of PND received no support.

Table 4-2

Descriptive Statistics for Levels of Physical Activity in Four Domains (N = 150)

	Minimum	Maximum	Mean	Std. Deviation
KPAS Caregiving	1.78	4.11	3.0319	.47549
KPAS Living	1.25	4.25	2.8933	.50196
KPAS Occupation	1.63	3.75	2.7602	.43812
KPAS Sport	1.00	5.00	3.0689	1.32283

Low levels of physical activity were reported by this sample of postpartum women (Table 2).

CHAPTER FOUR

Hypothesis 3

Higher levels of social support (as measured by the following items: Rely on help, Emotional support, Talk about problems, Feeling free to talk, Needing him, Rely on for childcare, Feel someone there to help, Reluctant to ask for help, Generally do ask for help, Satisfaction with help) will predict lower levels of PND.

A third multiple regression analysis was conducted to determine the aspects of social support that were the best predictors of PND; the results are reported in Table 3.

Table 4-3

Multiple Regression Analysis Predicting PND from Aspects of Social Support Items (N = 150)

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Postnatal depression	Rely on help.	.592	.504	.115	.084	.242
$R^2 = .293, p < .001$	Emotional support.	-.282	.575	-.046	-.035	.625
	Talk about problems.	-.812	.508	-.137	-.114	.112
	Feeling free to talk.	-.644	.564	-.102	-.081	.255
	Needling him.	-.568	.607	-.091	-.067	.352
	Rely on for childcare.	-.557	.281	-.164	-.142	.049*
	Feel someone there to help.	-.143	.482	-.027	-.021	.767
	Reluctant to ask for help.	.951	.318	.267	.213	.003**
	Generally do ask for help.	-.173	.482	-.034	-.026	.720
	Satisfaction with help.	-.560	.443	-.110	-.090	.209

* $p < .05$, ** $p < .01$

Two aspects of social support emerged as significant predictors of PND. The more the mothers could rely on their partners for childcare, the less depressed they felt; and the less reluctant mothers were to ask for help, the less depressed they felt.

CHAPTER FOUR

Hypothesis 4

Higher levels of partner support (as measured by the DAS-7) and parental confidence (as measured by the KPCS) will predict lower levels of PND.

A fourth multiple regression analysis was conducted comparing parental confidence and partner support as predictors of PND. The results are reported in Table 4.

Table 4-4

Multiple Regression Analysis Predicting PND from Parental Confidence and Partner Support (N = 150)

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Postnatal depression <i>R</i> ² = .244, <i>p</i> <.001	Parental confidence	-.409	.079	-.372	-.370	.000***
	Partner support	-.241	.058	-.298	-.297	.000***

****p*< .001

Each of the two measures predicts unique variance in PND. Specifically, less parental confidence and less partner support predict higher levels of PND.

4.9 Discussion

The findings suggest that the mother's age, and the baby's age are predictors of PND; in fact the older the mothers, the lower their levels of PND which could be as a result of being a mature person. Older mothers may be able to cope with the emotions associated with motherhood more so than younger women. The younger the mothers' babies the lower the level of PND which could be due to the accumulated burden of parenting responsibility possibly leading gradually to PND.

CHAPTER FOUR

These findings are consistence with other studies (O' Hara & Swain, 1996; Rubertsson et al., 2003; Vernon et al., 2010).

The study could not establish any association between PND and the level of education which is also noted by Grussu (2009) and Özbasarın et al. (Özbaoaran et al., 2011) who demonstrated there is no association between PND and the mother's education level. However, education in other studies was found to be a predictor of PND (Araya et al., 2003; Artazcoz et al., 2004; Grussu & Quantraro, 2009; Robertson et al., 2005). Mothers who had a higher level of education were more at risk of postpartum depression in two relatively recent studies (Ersek, 2009; Vernon et al., 2010).

There was no association between PND and physical activity participation in our study which supports findings by Poudevigne and O'Connor (2005) who did not find any association between physical activity and depressive symptoms in pregnant women. However, Urizar et al. (2005) suggested that mothers who suffer from anxiety and stress disorders during a one to ten week exercise intervention participate less in exercise in contrast to those who scored less. The effect of moderate exercise was examined on women diagnosed with PND and it showed great improvement in their response (National Institute for Health and Clinical Excellence, 2006). In addition, several studies have assessed the therapeutic effect of exercise on PND (Boury, Larkin, & Krummel, 2004; Craig & Howard, 2009; Daley, 2008; Daley et al., 2007) and the mother's mood (Daley, 2008; Galper, Trivedi, & Barlow, 2006; Swamy & Østbye, 2008). These findings are in contrast to our findings; thus, it would be important to identify the factors that maintain physical activity at low levels for these women.

As exercise has been nominated as an everyday challenge following marriage and childbirth (Albright et al., 2006; Brown & Trost, 2003) it has been revealed that

CHAPTER FOUR

lower exercise engagement increases the risk of PND (Vernon et al., 2010). Exercise interventions have been explored in various studies on women; for instance, the effect of cardio workout on mothers within six to 20 weeks postpartum revealed improvement in mood in the control group whereas the intervention group showed less depression and anxiety by the completion of the study (Koltyn & Schultes, 1997).

The role of social support in predicting PND was established in this study and this finding is consistent with those who demonstrate PND as a reason of poor quality interaction with others (Honey, Bennett, & Morgan, 2003; Milgrom et al., 2008). The presence of social support as a contributor to managing PND has been identified in different studies (Beck, 2001; Robertson et al., 2004). In addition, it has been claimed that lack of social support and an active network could increase the risk of PND (O'Hara, 1997). In fact, social support has been identified in different contexts by researchers who suggested that it has buffering effects; thus an under developed network would result in a higher level of depression and emotional conflict (Robertson et al., 2004).

Parental confidence and partner support was found to predict PND in the current study. Less parental confidence and lesspartner support both result in higher levels of PND. This could be due to feelings of isolation and lack of self-efficacy following childbirth. Other studies have shown partner support to be a strong predictor of PND (Özbaoran et al., 2011). There are, however, some results that are inconsistent with the study findings (Kendall-Tackett, 1993) . In general, the quality of the marital relationship is found to be an indicator of experiencing depression following the birth of baby (Beck, 1996; O' Hara & Swain, 1996). In regards to parent confidence and vulnerability to PND studies have documented that being capable of understanding the baby and the ability to cope and manage motherhood responsibilities will protect mothers from the risk of having PND (Ghubash & Eapen,

CHAPTER FOUR

2009; Leigh & Milgrom, 2008). On the other hand, lack of confidence has been shown to increase the risk of PND following childbirth (Vernon et al., 2010); these results support the study findings.

Contrary to the hypotheses, exercise was not significantly associated with the level of PND in the present study. This result might reflect a restricted range of scores on the KPAS resulting from the low levels of physical activity reported by this sample (Table 2). The finding supports the study by Demissie et al.,(2011) who could not establish any correlation between recreational activities and depressive symptoms in postpartum women.

The Phase One results demonstrated that there was no association between being at risk of PND and exercise participation. However, as the effects of exercise on mood have been confirmed frequently in the general population and given that exercise is good for physical and psychological general health, a second stage of the study was conducted. Stage Two of the study was designed to examine the predictors of physical activity in order to identify potential facilitators of exercise in postpartum women.

4.10 Results (Phase Two): Predictors of Physical Activity in a Sample of Australian Postpartum Women

Analysis

Phase Two examines potential predictors of exercise participation in postpartum women.

CHAPTER FOUR

Hypothesis 1

Socio-demographic factors (age of baby, age of mother, annual income, number of children, and level of education) will predict level of physical activity in the care-giving, living, occupation, and sport domains.

The results of a multiple regression analysis predicting levels of physical activity in the care-giving, living, occupation, and sport domains from socio-demographic factors are reported in Table 5.

Table 4-5

Multiple Regression Analysis Predicting Level of Physical Activity from Socio-Demographic Factors (N = 142)

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Care-giving $R^2 = .165, p < .001$	Age of baby	.011	.003	.255	.253	.002**
	Age of mother	-.008	.009	-.082	-.074	.347
	Income	-.034	.030	-.092	-.089	.261
	Number of children	.181	.059	.260	.241	.003**
	Level of education	-.053	.025	-.169	-.164	.038*
Living $R^2 = .084, p = .034$	Age of baby	.009	.004	.195	.193	.020*
	Age of mother	.005	.010	.045	.041	.620
	Income	-.086	.034	-.216	-.208	.012*
	Number of children	.006	.067	.008	.007	.932
Occupation $R^2 = .190, p < .001$	Age of baby	.004	.003	.092	.091	.242
	Age of mother	-.017	.008	-.183	-.165	.034*
	Income	-.004	.028	-.012	-.012	.878
	Number of children	.287	.055	.438	.404	.000***
	Level of education	-.017	.023	-.058	-.056	.471
Sport $R^2 = .049, p = .232$	Age of baby	.001	.010	.012	.011	.892
	Age of mother	.047	.026	.166	.151	.074
	Income	-.120	.091	-.115	-.111	.188
	Number of children	-.256	.177	-.131	-.121	.151
	Level of education	-.012	.076	-.014	-.014	.871

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

The results can be summarised as follows: Mothers with older babies were more

CHAPTER FOUR

active in the care-giving and living domains; younger mothers were more active in the occupation domain; mothers with lower incomes were more active in the living domain; mothers with more children were more active in the care-giving and occupation domains; less highly educated mothers were more active in the care-giving domain. None of the socio-demographic factors predicted levels of sporting activity.

Hypothesis 2

Partner support and parental confidence will predict levels of physical activity in the care-giving, living, occupation, and sport domains.

Table 4-6

Multiple Regression Analysis Predicting Levels of Physical Activity from Parental Confidence and Partner Support (N = 150)

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Care-giving <i>R</i> ² = .088, p=.001	Parental confidence	.034	.011	.244	.243	.002**
	Partner support	-.019	.008	-.189	-.188	.018*
Living <i>R</i> ² = .007, p=.579	Parental confidence	.000	.012	-.006	-.006	.954
	Partner support	-.009	.009	-.085	-.085	.301
Occupation <i>R</i> ² = .051, p=.021	Parental confidence	.012	.010	.092	.092	.255
	Partner support	-.020	.007	-.214	-.213	.009**
Sport <i>R</i> ² = .051, p<.021	Parental confidence	.023	.031	.060	.060	.457
	Partner support	.060	.023	.213	.213	.009**

***p< .001

Each of the two measures predicts unique variance in at least one of physical activity domains. Specifically, higher levels of partner support predicts lower levels of physical activity in the care-giving and occupation domains, but higher levels of physical activity in the sporting domain. Higher levels of parental confidence predicts higher levels of physical activity in the care-giving and occupation domains.

CHAPTER FOUR

4.11 Discussion

The baby's age, mothers' age, annual income, level of education, and number of children were all significantly associated with levels of physical activity in the current study. Mothers with older babies were more active in care-giving (child care, family care, and households) and living domains (watching TV, walking, bike riding). The reason for this could be that having older children enables mothers to engage more within the context of family life and household chores. In addition they can allocate more time to personal entertainment such as walking, riding or watching TV once their baby is less reliant on their constant presence for feeding.

Mothers who were younger were more active in occupation domains (being a full-time mother at home or being employed at a workplace). This might be as a result of being young and more energetic or it may be that younger mothers are more definite about remaining in the workplace. Older mothers may have other children and added childcare responsibilities.

Mothers with lower incomes had done more activity in the area of walking, riding or watching television as the cost of such activities is low; having more children causes mothers to be more active with family care, child care, and there is more activity in the area of 'occupation' domains. Those with lower levels of education devoted more time to caregiving, which might be due to their inability to find well-paid employment which would give them an incentive to work outside of the home. Similarly, other studies support this idea and have revealed level of income (Eyler et al., 2002), and the children's age can affect physical activity participation in the postpartum period (Sampselle et al., 1999). Despite the current evidence of an association between income and physical activity participation, controversy exists

CHAPTER FOUR

and some research has indicated that there is no association between income (Bild et al., 1993; Ransdell & Wells, 1998) and education level (Young, Miller, Wilder, Yanek, & Becker, 1998) with physical activity participation.

Parental confidence and partner support have been found to predict PND and similarly they are both predictors of physical activity participation; mothers with a higher level of confidence in parenting are more active in caregiving. One study evaluated physical activity through KPAS and results demonstrated more participation in occupational activities is the outcome of feeling less confident and incapable of coping with maternal roles (Blum et al, 2004), which contradicts the study findings. The current study could not establish any association between parental confidence and levels of activity in either the occupational domain, active living domain or the sport domain. It should be noted that the Blum et al. study only had 91 participants which is a smaller sample size to the current study which had 150 women in the sample.

Findings from other studies have shown that partner support makes it easier for mothers to engage in physical activity after child birth (Albright et al., 2006; Blum et al., 2004; Kanotra et al., 2007; Mottola & Campbell, 2003; Symons Downs & Ulbrecht, 2006) and this supports the findings of this study.

There were some limitations for the current study such as the size of the sample, a lack of clinically depressed mothers in the sample and the duration of the study. Increasing the size of the sample thus ensuring greater power may help to establish stronger correlations between some of the finding reported and may help to put to rest some of the disagreement between different studies. In addition the inclusion of greater numbers of clinically depressed mothers in the study, while this is methodologically challenging, would strengthen the findings and perhaps add support for the hypothesis that exercise can help to mediate the effects of PND.

CHAPTER FOUR

4.12 Conclusion

The study findings suggest that there is no association between physical activity participation and postnatal depression following childbirth; however, psychosocial factors such as partner support, social support and parental confidence were shown to be associated with physical activity participation and PND. It appears that exercise has a positive influence on the health of mothers, but further research is needed in order to establish a relationship between exercise and postpartum mood. The exercise enablers need to be investigated during pregnancy and the prenatal period to facilitate postnatal exercise and encourage more participation in postnatal exercise classes as women are mostly inactive during this time due to adapting to their new role and responsibilities. In addition, qualitative approaches are required to further address new mothers' specific needs for structured exercise programs to address their individual needs and maintain their participation.

References

- Albright, C., Maddock, J., & Nigg, C. (2006). Physical Activity Before Pregnancy and Following Childbirth in a Multiethnic Sample of Healthy Women in Hawaii'. *Women and Health*, 42(3), 95-110. Retrieved from Retrieved from www.tandfonline.com. doi:10.1300/J013v42n03_06
- Araya, R., Lewis, G., Rojas, G., & Fritsch, R. (2003). Education and income: which is more important for mental health? . *Journal of Epidemiology and Community Health*, 57, 501-505. Retrieved from
<http://www.jstor.org/dbgw.lis.curtin.edu.au/journals/01417681.html>
- Armstrong, K., & Edwards, H. (2004). The effectiveness of a pram walking exercise programme in reducing depressive symptomatology for postnatal women. *International Journal of Nursing Practice*, 10, 177-194. Retrieved from
<http://web.ebscohost.com/dbgw.lis.curtin.edu.au/ehost/detail?sid=1b4262f0-5a0a-46ec-91379ba028493ab0%40sessionmgr4&vid=1&hid=14&bdata=JnNpdGU9ZWhvc3QtbGI2ZQ%3d%3d#db=rzh&jid=81A>
- Artazcoz, L., Borrell, C., Benach, J., Cortes, I., & Rohlf, I. (2004). Women, family demands and health: the importance of employment status and socioeconomic position. *Social Science and Medicine*, 59(2), 263-274.
doi:doi:10.1016/j.socscimed.2003.10.029
- Beck, C. T. (1996). A Meta-Analysis of Predictors of Postpartum Depression. *Nursing Research*, 45(5), 297. Retrieved from
<http://ovidsp.tx.ovid.com/dbgw.lis.curtin.edu.au/>
- Beck, C. T. (2001). Predictors of Postpartum Depression. An update. *Nursing Research*, 50(5), 275. Retrieved from Retrieved from www.OvidSP.com
- Beyondblue. (2009). Retrieved from www.beyondblue.org.au

- Bild, D., Jacobs, D. R., Sidney, S., Haskell, W., Anderssen, N., & Oberman, A. (1993). Physical activity among young black and white women. *Annals of Epidemiology*, 3, 636-644. Retrieved from www.ScienceDirect.com
- Blum, J., Beaudoin, C., & caton-Lemos, L. (2004). Physical Activity Patterns and Maternal Well-Being in Postpartum Women. *Maternal and Child Health Journal*, 8(3), 163-169. doi:10.1023/B:MACI.0000037649.24025.2c
- Blumenthal, J. A., Babyak, M. A., Doraiswamy, P. M., Watkins, L., Hoffman, B. M., & Barbour, K. A. (2007). Exercise and pharmacotherapy in the treatment of major depressive disorder. *Psychosomatic Medicine*, 69, 587-596. doi:10.1097/PSY.0b013e318148c19a
- Blumenthal, J. A., & Lephuong, O. (2009). A commentary on exercise and depression and the verdict is. *Mental Health and Physical Activity* 2, 97-99. doi:10.1016/j.mhpa.2009.08.001
- Boury, J., Larkin, K., & Krummel, D. (2004). Factors related to postpartum depressive symptoms in low-income women. *Women and Health*, 39, 19-34. doi:10.1300/J013v39n03_02
- Bowen, A., & Muhajarine, N. (2006). Antenatal depression. *The Canadian Nurse*, 102(9), 27-30. Retrieved from <http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/search/advanced?sid=f43925c8-8943-4bf0-a965-8c264425cb73%40sessionmgr13&vid=3&hid=111>
- Boyce, P. (2003). Risk factors for postnatal depression: a review and risk factors in Australian population. *Archives of Women's Mental Health*, 6(Supplement 2), S43-S50. doi:10.1007/s00737-003-0005-9
- Brockington, I. (2004). Diagnosis and management of postpartum disorder: A review. *World Psychiatry*, 3(2), 89-95. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- Brown, W., & Trost, S. (2003). Life transitions and changing physical activity patterns in young women. *American Journal of Preventive Medicine*, 25, 140-143. doi:10.1016/S0749-3797(03)00119-3
- Cooke, M. (1996). *Mother's experience of infant feeding*. Melbourne.

- Cooper, P. J., Tomlinson, M., Schwartz, L., Woolgar, M., Murray, L., & Moltenao, C. (1999). Postpartum Depression and the Mother-Infant Relationship in a South-African Peri-Urban Settlement. *British Journal of Psychiatry*, 175(6), 554-558. doi:10.1192/bjp.175.6.554
- Cox, J., Holden, J., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh postnatal depression scale. *British Journal of Psychiatry*, 150, 782-786. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- Cox, J. L. (1989). Can postnatal depression be prevented. *Midwife Health Visitor and Community Nurse*, 25(8), 326-329.
- Craig, M., & Howard, L. (2009). Postnatal depression. from Clinical Evidence (Online) <http://clinicalevidence.bmj.com/ceweb/conditions/pac/1407/1407.jsp>
- Cramer, S. R., Nieman, D. C., & Lee, J. W. (1991). The effect of moderate exercise training on psychological well-being and mood state in women. *Journal of Psychosomatic Research*, 35, 437-449. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- Črnčec, R., Barnett, B., & Matthey, S. (2008). Karitane Parenting Confidence Scale: Manual (Under Review). *Journal of Nursing Measurements*. doi:10.1002/nur.20271
- Currie, U. (2004). Motherhood, stress and the exercise experience: freedom or constraint? *Leisure Studies*, 23(3), 225-242. doi:10.1080/0261436042000251987
- DA Costa, D., Lowenstein, I. A., M, Ionescu-Ittu, R., Dritsa, M., Rippen, N. C., P, & Khalife, S. (2009). A randomized clinical trial of exercise to alleviate postpartum depressed mood. *Journal of Psychosomatic Obstetrics and Gynecology*, 30(3), 191-200. doi:10.1080/01674820903212136
- Daley, A. (2008). Exercise and depression: A review of reviews. *Journal of Clinical Psychology in Medical Settings*, 15, 140-147. doi:10.1007/s10880-008-9105-z
- Daley, A., MacArthur, C., & Winter, H. (2007). The role of exercise as a treatment of postnatal depression: A review of the literature. *Journal of Midwifery and Women's Health*, 52, 56-62. doi:10.1016/j.jmwh.2006.08.017
- Department of Health. (2006). *At least five a week: Evidence on the impact of physical activity and its relationship to health*. Retrieved from

[http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAn](http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/Publications-)
[dGuidance/Publications-](#)

[PolicyAndGuidanceArticle/fs/en?CONTENTID4080994&chk1Ft1Of](#)

Demissie, Z., Siega-Riz, A., & Evenson, K. (2011). Associates between physical activity and postpartum depressive symptoms *Journal of Women's Health, 20*(7). doi:10.1007/s00737-010-0193-z

Ersek, JL. Huber, L.R (2009). Physical Activity Prior to and During Pregnancy and Risk of Postpartum Depressive Symptoms. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 38*, 556-566. doi:10.1111/j.1552-6909.2009.01050.x

Eyler, A., Matson-Koffman, D., Vest, J., Evenson, K., Sanderson, B., & Thompson, J. (2002). Environmental, policy, and cultural factors related to physical activity in a diverse sample of women: The women's Cardiovascular Health Network Project-Summary and discussion. *Women and Health, 36*, 123-134.

doi:10.1300/J013v36n02_01

Gale, S., & Harlow, B. (2003). Postpartum mood disorders: a review of clinical and epidemiological factors. *Journal of Psychosomatic Obstetrics and Gynecology, 24*, 257-266. Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/login?COPT=REJPTYzNjMmSU5UP>
[TAmVkJVSPTI=&clientId=22212](#)

Galper, D., Trivedi, M., & Barlow, C. (2006). Inverse association between physical activity and mental health in men and women. *Medicine and Science in Sport and Exercise, 38*, 173-178. doi:10.1249/01.mss.0000180883.32116.28

Gaynes, B. N., Gavin, N., Meltzer-Brody, S., Swinson, T., Gartlehner, G., Brody, S., et al. (2005). Perinatal depression: prevalence, screening accuracy and outcomes. *Agency for Health Research and Quality 119*, 1-99. Retrieved from

<http://www.ahrq.gov/clinic/epcsums/peridepsum.pdf>

Ghubash, R., & Eapen, V. (2009). Postpartum mental illness: perspectives from an Arabian Gulf population. *Psychological Reports, 105*, 127-136.

doi:10.2466/pr0.105.1.127-136

- Grussu, P., & Quantraro, R. (2009). Prevalence and risk factors for ahigh level of postnatal depression symptomatology in Italian women: A smaple drawn from antenatal classes. *European Psychiatry*, 24, 327-333. Retrieved from www.sciencedirect.com
- Hamdan, A., Hawamdeh, S., & Hussein, A. (2008). The prevalence and correlates of depressive symptoms among Arab women in a primary healthcare setting. *International Journal of Psychiatry in Medicine*, 38(4), 453-467. Retrieved from <http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJPTYzNjMmSU5UPTAmVkJVSPTI=&clientId=22212&cfc=1>
- Hamdan, A., & Tamim, H. (2011). Psychosocial risk and protective factors for postpartum depression in the United Arab Emirates. *Archives of Women's Mental Health* 14, 125-133. doi:10.1007/s00737-010-0189-8
- Hatton, D., Harrison-Hohner, J., Coste, S., Dorato, V., Curet, L., & McCarron, D. (2005). Symptoms of postpartum depression and breastfeeding. *Journal of Human Lactation*, 21, 444-449. doi:10.1177/0890334405280947
- Honey, K., Bennett, P., & Morgan, M. (2003). Predicting postantal depression. *Journal of Affective Disorders*, 76, 201-210. doi:10.1016/S0165-0327(02)00085-X
- Hunsley, J., Best, M., Lefebvre, M., & Diana, V. (2001). The seven-item short form of the Dyadic Adjustment Scale: further evidence of construct validity. *The American Journal of Family Therapy*, 29(4), 325-335. Retrieved from <http://dx.doi.org/10.1080/01926180126501>. doi:10.1080/01926180126501
- Kanotra, S., Angelo, D., Phrase, T., Morrow, B., Barfield, W., & Lansky, A. (2007). Challenges faced by new mothers in the early postpartum period: An analysis of comment data from the 2000 Pregnancy Risk Assessment Monitoring System(PRAMS) survey. *Maternal and Child Health Journal*, 11, 549-558. doi:10.1007/s10995-007-0206-3
- Kendall-Tackett, K. A. (1993). *Postpartum depression: a comprehensive approach for nurses*. NewburyPark, California: Sage Publications.

- Koltyn, K., & Schultes, S. (1997). Psychological effects of an aerobic exercise session and a rest session following pregnancy. *Journal of Medicine and Physical Fitness*, 37, 287-291. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- LaCoursiere, Y., Baksh, L., Bloebaum, L., & Vamer, M. (2006). Maternal body mass index and self-reported postpartum depressive symptoms. *Maternal and Child Health Journal*, 10, 385-390. doi:10.1007/s10995-006-0075-1
- Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BioMed central psychiatry*, 8(24), 1-11. doi:10.1186/1471-244X-8-24
- Maloney, D. (1998). Postnatal depression: a study of mothers in the metropolitan area of Perth, Western Australia. *Australian College of Midwives*, 11(2), 18-23. doi:10.1016/S1031-170X(98)80030-5
- Mathers, C., Vos, E., Stevenson, C., & Begg, J. (2000). The Australian burden of disease study: Measuring the loss of health from disease, injuries and risk factors. *Medical Journal of Australia*, 172, 592-596. Retrieved from http://www.mja.com.au.dbgw.lis.curtin.edu.au/public/issues/172_12_190600/mathers/mathers.html
- Mc Veigh, C. A. (1997). Functional Status after childbirth in an Australian sample. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 27(4), 402-409. doi:10.1111/j.1552-6909.1998.tb02664.x
- McIntosh, J. (1993). Postpartum Depression: Women's help seeking behaviour and perception of cause. *Journal of Advanced Nursing*, 18, 178-184. doi:10.1046/j.1365-2648.1993.18020178.x
- Milgrom, J. G., A, Bliszta, J., Hayes, B., Barnett, B., Brooks, J., Erickson, J., et al. (2008). Antenatal risk factors for postnatal depression: a large prospective study. *Journal of Affective Disorders*, 108, 147-157. doi:10.1016/j.jad.2007.10.014
- Mottola, M. F. (2002). Exercise in the postpartum period: Practical Applications. *Current Sport Medicine Reports*, 1, 362-368. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Mottola, M., & Campbell, M. (2003). Activity patterns during pregnancy. *Canadian Journal of Applied Physiology* 28, 642-653. Retrieved from

<http://www.ncbi.nlm.nih.gov/guide/>

Murray, C., & Lopez, A. (1996). *A comprehensive assessment of mortality and disability from disease, injuries, and risk factors in 1990 and projected to 2020* Cambridge: Harvard University Press.

Nabkasorn, C., Miyai, N., Sootmongkol, A., Junprasert, S., Yamamoto, H., Arita, M., et al. (2006). Effects of physical exercise on depression, neuroendocrine stress hormones and physiological fitness in adolescent females with depressive symptoms *The European Journal of Public Health*, 16(2), 179-184.
doi:10.1093/eurpub/cki159

National Institute for Health and Clinical Excellence. (2006). *Antenatal and postnatal mental health. Clinical management and service guidance*. London.

O'Hara, M. W. (1995). *Postpartum depression: causes and consequences*. New York.
O'Hara, M. W., & Swain, A. M. (1996). Rates and risk of postpartum depression- a meta analysis. *International Review of Psychiatry*, 8, 37-54. Retrieved from Retrieve from <http://informahealthcare.com>. doi:095p0261/96/010037-18 0

O'Hara, M. (1997). *The nature of postpartum depressive disorders*. New York: Guilford.

Özbaoaran, F., Çoban, A., & Kucuk, M. (2011). Prevalence and risk factors concerning postpartum depression among women within early postnatal periods in Turkey. *Archives of Gynecology and Obstetrics*, 283, 483-490. doi:10.1007/s00404-010-1402-8

Patel, V., Rodrigues, M., & Desouza, N. (2002). Gender, Poverty, and Postnatal depression in GOA, India. *The American Journal of Psychiatry*, 159(1), 43-47.

Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>

Poudevigne, M., & O'Connor, P. (2005). Physical activity, mood and self-esteem during pregnancy. *Medicine and Science in Sport and Exercise*, 37, 1374-1380.

doi:10.1249/01.mss.0000174907.27818.f

Ransdell, L. B., & Wells, C., L. (1998). Physical activity in urban white, African-American, and Mexican-American women. *Medicine and Science in Sport and Exercise*, 30(11), 1068-1615. Retrieved from

<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>

Robertson, E., Grace, S., Wallington, T., & Stewart, D. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry* 26, 289-295. doi:10.1016/j.genhosppsych.2004.02.006

Robertson, E., Jones, I., Haque, S., Holder, R., & Craddock, N. (2005). Risk of puerperal and non-puerperal recurrence of illness following bipolar affective puerperal (postpartum) psychosis. *British Journal of Psychiatry*, 186, 258-259. doi:10.1192/bjp.186.3.258

Rubertsson, C., Waldenstrom, U., & Wickberg, B. (2003). Depressive mood in early pregnancy: prevalence and women at risk in a national Swedish sample. *Journal of Reproductive and Infant Psychology*, 21(2), 113-123.

doi:10.1080/0264683031000124073

Sampselle, C. M., Seng, J., Yeo, S., Killion, C., & Oakley, D. (1999). Physical activity and postpartum well-being. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 28, 41-49. doi:10.1111/j.1552-6909.1999.tb01963.x.

Schumm, W., Anderson, S., Benegas, J., McCutchen, M., Griffin, C., Morris, J., et al. (1985). Criterion-related validity of the Kansas Marital Satisfaction Scale. *Psychological Reports*, 56, 719-722. Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed>

Schumm, W., Paff-Bergen, L., Hatch, R., Obiorah, F., Copeland, J., Meens, L., et al. (1986). Concurrent and discriminant validity of the Kansas Marital Satisfaction Scale *Journal of Marriage and The Family*, 48, 381-387. doi:10.2307/352405

Seimyr, L., Edhborg, M., Lundh, W., & Sjogren, B. (2004). In the shadow of maternal depressed mood: experiences of parenthood during the first year after childbirth. *Journal of Psychosomatic Obstetrics and Gynecology*, 25, 23-34. Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJPTYzNjMmSU5UPTAmVkJVSPti=&clientId=22212&cfc=1>

Sharpley, C., & Cross, D. (1982). A psychometric evaluation of the Spainer Dyadic Adjustment Scale. *Journal of Marriage and Family, 44*, 739-741. Retrieved from <http://www.jstor.org/stable/351594>.

Singh-Manoux, A., Clarke, P., & Marmot, M. (2002). Multiple measurers of socioeconomic position and psychosocial health: proximal and distal measurers.

International Journal of Epidemiology, 31(6), 1192-1199. doi:10.1093/ije/31.6.1192

Spainer, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family, 38*(1), 15-28. doi:10.2307/350547

Stein, M. (2005). Sweating away the blues. Can exercise treat depression? *American Journal of Preventive Medicine, 28*, 1. doi:10.1016/j.amepre.2004.09.024

Sternfeld, B., Ainsworth, B. E., & Quesenberry, J. (1999). Physical activity patterns in a diverse population of women *Journal of Preventive Medicine, 28*, 313-323. doi:10.1006/pmed.1998.0470

Swamy, G., & Østbye, T. (2008). Association of Preterm Birth With Long-term Survival, Reproduction, and Next-Generation Preterm Birth. *The Journal of American Medical Association, 299*(12), 1429-1436. doi:10.1001/jama.299.12.1429

Symons Downs, D., & Hausenblas, H. (2004). Women's exercise beliefs and behaviours during their pregnancy and postpartum. *Journal of Midwifery and Women's Health, 49*, 138-144. doi:10.1016/S1526-9523(03)00495-1

Symons Downs, D., & Ulbrecht, J. (2006). Gestational diabetes and exercise beliefs: an elicitation study. *Diabetes Care, 29*(2), 236-240.

doi:10.2337/diacare.29.02.06.dc05-1262

Thornton, P., Kieffer, E., & Salabarria-Pena, Y. (2006). Weight, diet, and physical activity related beliefs and practices among pregnant and postpartum Latino women: the role of social support. *Maternal and Child Health Journal, 10*, 95-104. doi:10.1007/s10995-005-0025-3

- Urizar, G., Hurtz, S., Ahn, D., King, A., Albright, C., & Atienza, A. (2005). Influence of maternal stress on successful participation in a physical activity intervention: The IMPACT Project. *Women and Health*, 42, 63-82. doi:10.1300/J013v42n04_04
- Üstün, T., Ayuso-Mateos, J., Chatterji, S., Mathers, C., & Murray, C. (2004). Global burden of depressive disorders in the year 2000. *British Journal of Psychiatry*, 184, 386-392. doi:10.1192/bjp.184.5.386
- Vernon, M., Young-Hyman, D., & Looney, S. (2010). Maternal stress, physical activity, and body mass index during mothers' first year postpartum. *Women and Health*, 50(6), 544-562. Retrieved from
<http://dx.doi.org/10.1080/03630242.2010.516692>.
doi:10.1080/03630242.2010.516692
- Young, D., Miller, K., Wilder, L., Yanek, L., & Becker, D. (1998). Physical activity patterns of urban African Americans *Journal of Community Health*, 23(2), 99-112.
doi:10.1023/A:1018757307041
- Zoltanick, C., Johnson, S., Miller, I., Pearlstein, T., & Howard, M. (2001). Postpartum depression in women receiving public assistance: pilot study of an interpersonal therapy oriented group intervention. *American Journal of Psychiatry*, 158, 638-640. Retrieved from
http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJ_TPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1

CHAPTER FIVE

Barriers and enablers to exercise in a sample of postpartum women in Western Australia: A mixed- methods approach

5.1 Abstract

Background: For most women in the postpartum period, six to 52 weeks after childbirth, physical activity is very limited. New mothers often report feeling isolated and exhausted and unable to exercise. Some exercise programs, like group pram walking, have been trialled but more information is needed to fully understand the specific barriers and enablers to exercise during the postpartum period.

Methods: This study used a mixed-method approach. Postpartum women recruited from child health clinics were sent a package of standardized questionnaires to investigate the barriers that affected their exercise participation. In addition, 14 postpartum women who participated in the survey were contacted for an interview in order to further discuss exercise barriers and enablers.

Results: For the 150 women who responded to the survey lack of confidence and lack of time had the greatest impact on participation in sport and exercise. When daily physical activity participation, apart from sport and exercise, was assessed lack of information, lack of confidence, lack of knowledge and poor access to public transport were statistically significant. Furthermore, lack of money lead to participation in paid occupation thus reducing the opportunity to exercise. Lack of money also restricted the mothers' opportunities to use paid care giving facilities. The qualitative data supported the survey results in regards to barriers and illustrated that mothers may be able to participate more in exercise if they had greater social support, particularly partner support. The participants suggested that

CHAPTER FIVE

environmental factors like increased knowledge about where and how to appropriate exercise programs can be accessed, either in the home or outside, could potentially enable increased exercise. Lack of good quality programs was mentioned by all of participants as a barrier to exercising. Many women did not know about them or where to access them in their area. Of those who had this information, most did not enroll in classes due to lack of time, the high cost of classes and the inconvenient locations. Having partner support was described as ‘the most reliable source of support’ by the mothers and they believed the presence of their partners was vital to enable them to exercise.

Conclusion: New mothers require substantial social support and specifically tailored exercise programs to enable them to access the physiological and psychological benefits of exercise. Further study is warranted to develop and trial appropriate exercise programs.

5.2 Introduction

Despite the proven health benefits of physical activity and its association with regular exercise(Bull, Bauman, Bellew, & Brown, 2004), many adults do not exercise to the standard level in developed and industrialized countries(Bauman, Huxley, & James, 2001; Centre for disease control and prevention, 2005; Craig, Marshall, & Sjostrom, 2003; Haase et al., 2004; Hillsdon, Cavil, Nanchahal, Diamont, & White, 2000; Macera, Ham, & Yore, 2005). Women tend to participate less in sporting or vigorous activities than men (Ainsworth, Haskell, & Leon, 1993). However, they have scored similarly in surveys of participation if household chores and care giving are included as ‘physical’ activities (Eyler et al., 1998). Evidence shows that in 2004 a quarter of women in the United States reported they did not participate in physical activities. Similarly over 13 per cent of Australian women do not participate in physical activities (Bauman et al., 2001; Centre for disease control and

CHAPTER FIVE

prevention, 2005). Studies show that most women, especially those in lower socio-economic groups and those who have lower educational attainment, are not physically active according to the Australian national standards (Australian Institute of Health and Welfare, 2006).

The physical activity participation trend is similar for women in the postpartum period. Van Rajji and colleagues (1990) found that postpartum women spent three per cent of their days on shopping, walking, or sporting activities with the remaining time devoted to household chores and care-giving. Findings show that new mothers, irrespective of physical recovery after birth, need to adapt to their new identity and responsibilities, both of which can be considered barriers to physical activity (Moran, Holt, & Martin, 1997). Barriers to physical activity have a great impact on exercise participation outcomes in postpartum women (Symons Downs & Hausenblas, 2004). Identification of barriers to exercise in the postpartum period varies across different studies. However, overall the barriers can be divided into environmental and personal factors.

Those that are considered environmental are outside of the control of the individual such as neighbourhood safety, or road standards. Other environmental influences include access to recreational facilities, neighbourhood safety, and exercise facilities at home(Booth, Gordon, Carlson, & Hamilton, 2000; King et al., 2000). Personal barriers include lack of energy or fatigue, time constraints, low income, lack of motivation and social support. Common barriers reported in studies were 'lack of childcare support', and the 'number of children' requiring care. Women have identified these barriers as 'facing limitations in physical abilities', 'no energy', 'no one to exercise with' and 'feeling so tired of feeding and care giving' (Adachi-Mejia et al., 2010; Currie, 2004; McCrory, 2001).Kieffer and colleagues (2002) have also proposed other barriers to exercise participation such as family attitudes and social isolation.

CHAPTER FIVE

Although positive health outcomes are associated with exercising in the postpartum period (Brown & Lumley, 2000), further information is required to fully understand the particular cultural, social and local contexts in which new mothers participate in physical activity (Albright et al., 2006; Cramp, 2009; Symons Downs & Hausenblas, 2004; Treuth, Butte, & Puyau, 2005). Studies are required to understand both the barriers and enablers to exercise participation in the postpartum period.

5.3 Methods

This study employed a mixed study design and was conducted in two phases. Phase one was a postpartum life style and physical activity survey that used a self-administered questionnaire. Phase two was a qualitative study that used interviews with a subset of women who had completed the survey. The study had institutional human ethics approval.

5.3.1 Phase One

The questionnaire was distributed through child health clinics in the Perth, Western Australia, metropolitan area to 600 women who were between six to 52 weeks post childbirth. The questionnaire included demographic information as well as the Kaiser Physical Activity Survey (KPAS) (Sternfeld et al., 1999) and a range of questions designed to assess barriers to exercise. The KPAS is divided into four domains: household/caregiving (caring for a child or/and a disabled person, house chores, such as washing, cleaning, and gardening); occupational activities (types of job, and the intensity of work); active living habits (walking, watching TV, bike riding); and participation in sport and exercise (favourite sport, the frequency of the exercise, and the exercise intensity). The KPAS contains seventy five items and it takes twenty minutes to complete. The reliability of the KPAS is ranged between

CHAPTER FIVE

0.79 and 0.91 (Ainsworth, Sternfeld, Richardson, & Jackson, 2000). Barriers to exercise were assessed through 21 multi-choice questions. These questions used a likert scale (scores 0 not any problem, 1 minor problem and 2 major problem). A multiple regression analysis was conducted to identify the factors that create barriers to physical activity.

5.3.2 Phase Two

Following data analysis of the survey a list of interview questions were designed based on the survey results, as well as popular themes around motherhood, life after birth, motivation to exercise, and how mothers' exercise participation was either constrained or enabled following childbirth. Fourteen postpartum women who completed the survey and indicated an interest in continuing in the study were invited to participate in an interview. The aim of the study was explained when they were initially contacted by telephone. All women were interviewed in their homes as this was more convenient due to child care responsibilities and time restrictions. All interviews were taped recorded and transcribed.

The interviews lasted for between 30 and 45 minutes. They were transcribed and the initial coding was generated. Through an immersion in the data the researcher became familiar with the text and line by line analysis was conducted to summarise the overall final themes. Finally, themes were refined and sub-themes were identified.

The analysis identified themes determined around general postpartum life as well as specific issues related to barriers and enablers to exercise participation. Themes consisted of significant sentences and phrases that contributed to a particular concept. Themes emerged around the experience of birth and motherhood and how these life changing experiences contributed to the women's health and their ability to participate in physical activity.

CHAPTER FIVE

5.4 Results Phase one

The women who responded to the survey were aged 18 to 43 years and were all in the postpartum period six to 52 weeks following birth. They were from diverse ethnic backgrounds though most were born in Australia with 30 per cent of the respondents being British. All respondents were married. Approximately 35 per cent had postgraduate qualifications, 25 per cent had an undergraduate degree and 40 per cent had completed a college, vocational or secondary school qualification.

In terms of employment status before giving birth, 53 per cent had been in non-paid positions; of those in paid positions 47 per cent had been full-time, 27 per cent had been in part-time positions and 26 per cent in casual positions. For annual family income 27 per cent of respondents reported incomes of greater than \$120,000; 41 per cent reported \$75,000 to \$119,999; 22 per cent reported \$45,000 to \$74,999; 5 per cent reported \$15,000 to \$44,999; and 14 per cent reported \$5000 to \$14,999.

The results are shown in Table 1 and can be summarised as the following. Mothers who lacked confidence were less physically active in the living and sporting domains; mothers who lacked information about how to get involved in exercise were more physically active in the living domain; mothers who lacked knowledge were less physically active in the living domain; mothers who lacked money were more physically active in the care-giving and occupation domains; mothers who lacked public transport were less active in the living domain; mothers who lacked time were less physically active in the sporting domain. Lack of social activities did not predict activity levels in any of the domains.

CHAPTER FIVE

Table 5-1

Multiple Regression Analysis Predicting Levels of Physical Activity from Potential Barriers to exercise

DV	Predictors	B	Standard Error	Beta	Part Correlation (sr)	p-value
Care-giving	Lack of Confidence	-.064	.066	-.082	-.079	.331
	Lack of Information	.057	.113	.052	.041	.616
	Lack of Knowledge	.028	.125	.026	.018	.823
	Lack of Money	.142	.061	.200	.190	.021*
	Lack of Public Transport	-.161	.094	-.146	-.140	.088
	Lack of Social Activities	-.018	.079	-.023	-.018	.831
	Lack of Time	.031	.052	.052	.049	.551
<i>R</i> ² = .064, p=.221						
Living	Lack of Confidence	-.200	.067	-.237	-.230	.003**
	Lack of Information	.260	.115	.222	.175	.025*
	Lack of Knowledge	-.325	.126	-.287	-.198	.011*
	Lack of Money	.107	.062	.140	.133	.086
	Lack of Public Transport	-.313	.095	-.263	-.252	.001**
	Lack of Social Activities	.032	.080	.038	.031	.690
	Lack of Time	.009	.053	.013	.013	.870
<i>R</i> ² = .164, p=.001						
Occupation	Lack of Confidence	-.084	.061	-.115	-.111	.169
	Lack of Information	.073	.104	.072	.057	.483
	Lack of Knowledge	.020	.115	.020	.014	.863
	Lack of Money	.149	.056	.226	.215	.009**
	Lack of Public Transport	-.031	.087	-.030	-.029	.717
	Lack of Social Activities	-.105	.073	-.145	-.116	.153
	Lack of Time	.065	.048	.117	.109	.176
<i>R</i> ² = .086, p=.075						
Sport	Lack of Confidence	-.601	.176	-.271	-.262	.001**
	Lack of Information	-.166	.300	-.054	-.042	.581
	Lack of Knowledge	-.097	.332	-.033	-.023	.770
	Lack of Money	.003	.162	.001	.001	.986
	Lack of Public Transport	-.376	.250	-.120	-.115	.135
	Lack of Social Activities	.005	.210	.002	.002	.983
	Lack of Time	-.343	.138	-.204	-.191	.014*
<i>R</i> ² = .169, p<.001						

CHAPTER FIVE

5.5 Results Phase Two

5.5.1 Birth as a life altering event

When interviewed all of the women spoke about how hard it was to adjust to a new life after giving birth. Some expressed a sense of social isolation as they were ‘doing things by themselves’ and a few spoke of feeling ‘frustrated’ and ‘bored’ and struggled with the monotony of their new life. All spoke of feeling exhausted and some felt an upheaval in emotions ranging from sadness to extreme happiness which many participants explained as ‘hormonal imbalances’. The postpartum mood swings were generally viewed as short term. Many women believed that the difficulties they experienced would be short lived and they would return to their normal life before too long. Adjusting to their new lives also included reflecting upon and coming to terms with the event of childbirth. Some women acknowledged that despite all of their preparation the birth was still unpredictable and for some uncontrollable. A few women struggled with a sense of disappointment, and felt that their expectations around childbirth were not met.

The women spoke about changing expectations and how they were no longer thinking only of themselves. One of the women stated that ‘the highest priority is the baby’ (Participant (P) 13) and another reported she needed to ‘feel in charge and in control of my baby’ (P8). However, not all women spoke this way and a number felt they deserved to have the opportunity to be involved in activities they enjoyed. One mother said: ‘It can’t be just about the baby’ (P5). For another mother keeping up her exercise routine was her main priority after having her baby (P4). The process of recovery from childbirth and adjustment of a new life was highly reliant upon the support of partners and family. For example, one woman said ‘with

CHAPTER FIVE

the help of my family I would expect to back to normal life soon' (P1). Overall, the women in the study were very dependent on their network of friends as well as their families. They saw their friends as a crucial element of their postpartum life.

5.5.2 Postpartum exercise barriers following childbirth

As found in another study (King et al., 2000), the barriers to participating in exercise in the postpartum period can be divided into personal and environmental barriers, though both are interconnected. Of the personal barriers lack of time was cited as one of the most common barriers. Very few women in the study made exercise a priority with the three highest priorities noted by the mothers as looking after the baby and other children, taking care of husbands/partners and finally housework. With exercise made a low priority it is not surprising that the women also found a lack of motivation to exercise, which was possibly also aggravated by the social isolation experienced by a number of women. One mother said, 'you need the motivation and that maybe if you were going with someone else you'd make more of an effort to go' (P12). Almost every mother stated that having support or 'an extra hand' would be really useful in order to start exercising and to stay motivated to exercise. However, this was quite a challenge for many of the women, with one woman saying she felt she always had 'a child attached to me' (P11). Another woman complained 'it's really hard to go out anywhere and find anyone to exercise with' (P7). Women who tended to avoid exercise classes were less confident in participating in physical activity or spoke about having a poor body image.

A number of environmental barriers, mainly related to access issues that would affect the ability to exercise, were mentioned by the participants. Identifying achievable goals and setting a standard achievable program are the key elements in enabling women to exercise (Armstrong & Edwards, 2003). Lack of good quality programs was mentioned by all of participants as a barrier to exercising. Some

CHAPTER FIVE

women expressed concern about the lack of a specific postnatal program which targeted pelvic floor dysfunction. A number of the women had participated in postnatal swimming classes but these were only for a set period of time and once they stopped the women tended to stop exercising altogether. Mothers mostly agreed that they needed 'the right exercise program' in order to achieve maximum health after childbirth.

Right stuff, exercises that are simple and that you can do it by yourself at home, exercises that would help with the pelvic floor because that is really important because I didn't realize how important it was until I had this baby because, you're so, well for me because I was so tender I couldn't feel that part of my body (P6).

Despite the available classes through the community centers and recreation centers, many women did not know about them or where to access them in their area. Of those who had this information, most did not enroll in classes due to lack of time, the high cost of classes and the inconvenient locations. 'Being on a low income' or 'expensive memberships' were reasons mentioned by mothers for not using the classes and activities. Many mothers believed that there was insufficient information and support made available through the community centres for postnatal classes.

The only way I found out about it is through the health clinic and that was the exercises at B and if you didn't, if your clinic nurse didn't tell you about it or you didn't see the pamphlet you wouldn't know. So maybe something that you

CHAPTER FIVE

actually do need when you register...may be the government needs to tell women (P9).

5.5.3 Postpartum exercise enablers following childbirth

Having partner support was described as 'the most reliable source of support' by the mothers and they believed the presence of their partners was vital to enable them to exercise. Some mothers relied on their partner to the extent that they assigned exact times when they could expect to receive the needed support, for example one mother said 'I like to have the support on the weekend or late afternoon'(P13). Sometimes mothers exercised with their partners, for instance one mother said, 'I would rather go out pram walking with my husband instead of a mothers' group' (P2). Another mother used the term 'planned walking' indicating the importance of scheduling exercise into her family routine (P4). In addition, some mothers said that having a physically active partner helped them to participate more in exercise as the partner encouraged them and understood the importance of their own exercise regimen. It is important to note that sometimes partners could not always help even if they were supportive and the mothers noted how breastfeeding was a time consuming task only they could undertake, or the baby would 'not take the bottle from someone else' or would 'not stay with anyone else'. Social networks like mothers' groups and postnatal classes were considered highly important for many of the mothers, both to share their experience and to create opportunities to be physically active. The role of the mothers' group that many of the women attended was primarily to provide postpartum education and communication. A number of the women said they felt 'fantastic' after participating in various groups and community workshops and most women said it was important to meet others in a 'similar situation'. One mother commented that 'exercise is stress reliever, and makes you feel energetic' (P5). Another stated she

CHAPTER FIVE

had a ‘positive feeling’ after exercise (P3) and yet another said ‘feeling mentally better’ (P9) is what encouraged her to exercise. Although most of the mothers belonged to a local network of other new mothers, a number chose not to join the groups due to ‘age restrictions’, ‘having more in common with a person not a group’, ‘being too busy’ or because they chose to rely on their own network of friends.

Clearly the mothers tended to get involved in postnatal classes mostly through the hospital where they gave birth and for a specific period of time. The motivating factors to attend these classes included having free access to the classes, their baby’s participation with them in the class or having someone to look after their babies while they were exercising. I have been to the hospital where Sam was born, they have a mother’s group there which is really good and we went to that when Sam was really little ‘cause that was really helpful, lots and lots of mums with lots of different ideas and we also went to the hospital postnatal swimming classes that are mostly for mums but the bubs do a little bit of singing and splashing in the water when they’re really little so that was really, really good too and now Sam’s enrolled in swimming lessons so he does all those as well. (P10)

Some mothers believed they had learned more about the variety of exercises available. The ‘exercise modification’, ‘how it targeted health’, and learning about ‘muscles, strength and endurance’ were mentioned as the best reasons to attend exercise classes.

CHAPTER FIVE

5.6 Discussion

This study illustrated, particularly through the qualitative findings, that mothers were aware of the general benefits of exercise but often felt overwhelmed by their responsibilities and generally made exercise a low priority. It appears that Western Australian postpartum women face similar challenges to motherhood and barriers to exercise participation to postpartum women elsewhere (Evenson et al., 2009). The new mothers in the study considered childbirth and parenting as the biggest responsibility they would ever face (Nielsen et al., 2006; Paskiewicz, 2001), but this responsibility consumed their time and thoughts. Both pregnancy and postpartum life decreased their activity level generally(Smith, Cheung, Bauman, Zehle, & Mclean, 2005; Symons Downs & Hausenblas, 2004).

The obstacles to postpartum exercise were many and it may not seem surprising that the participants in the study considered lack of time, energy and social isolation as the major barriers to exercise. While these findings have been confirmed in other studies (Adachi-Mejia et al., 2010; Blum et al., 2004; Kanotra et al., 2007; Symons Downs & Hausenblas, 2004; Symons Downs & Ulbrecht, 2006), the findings reported here have been illustrated through both qualitative and quantitative data. Indeed one of the strengths of the study is the use of both methodologies to triangulate the findings. Other studies of postpartum women and exercise have used surveys or interviews alone.

The study confirmed the positive effect of social support in enabling exercise (Booth et al., 2000; Symons Downs & Hausenblas, 2004). The participants relied heavily

CHAPTER FIVE

upon their partners, but also their friends who they valued greatly. Despite this a number of mothers did report difficulty in finding someone to exercise with. Social networks of any kind can be a great support for postpartum women (Martin Ginis, Burke, & Gauvin, 2007). However, when exercise was left for mothers in the study to organise they did not prioritise it, perhaps indicating the importance of alleviating them of the responsibility. The participants also lacked knowledge about the availability of appropriately structured programs. Not only were they exhausted from their new responsibilities of parenting, it appeared that time and energy were also required to pursue information about where and how they could exercise, if indeed these resources were available locally.

Findings suggest that the more confident the mothers were in their ability to be a good parent the more likely they were to participate in exercise. A similar study (Koh et al., 2008) demonstrated that mothers with a higher level of self-efficacy were more active. A number of mothers who participated in the qualitative study worried about not having someone to look after their baby and this impacted greatly upon their ability to become involved in exercise programs. Childcare has been cited as a barrier to exercise in another recent study (Gramp & Bray, 2010). There may be good argument to develop broad based classes for postpartum women which include components of exercise, self-efficacy and parenting skills.

A range of strategies are needed to support postpartum women to exercise as there is no ‘one size fits all’ approach. Generic exercise programs may not be a solution as this study demonstrated that mothers have different needs, priorities and goals. While some mothers would exercise in groups given the appropriate supports, others were not interested in group participation and requested individualized exercise programs. No matter what exercise program is chosen, it must be both

CHAPTER FIVE

achievable and accessible. Mothers need information about childcare support, the availability of postpartum classes and, if appropriate, how they can tailor a home-based program to their own needs.

This study, like others, had limitations. The participants self-selected for both the quantitative and qualitative stages of the study. In the quantitative stage of the study the sample size was relatively small, although the response rate of 25 per cent was reasonable for a postal survey. A bigger sample size and/or a population with a clinical condition such as postnatal mood disorder would extend the study further and provide greater confidence in the results. In the qualitative component of the study the 14 women were very articulate, all had partners and had attained a relatively high standard of education when compared to the broader population, therefore this study only captures the views of a particular demographic.

The current findings demonstrate that further investigation through practical intervention is warranted. More research needs to be done to explore the postpartum lifestyle and how targeted exercise interventions affect the health and well-being of postpartum women. The results indicate that targeting exercise programs to the specific needs of mothers, whether they wish to exercise alone or with others, is likely to help mothers to feel more confident about participating in exercise. Physical activity will lead to better physical and mental health in mothers and may contribute to healthier parenting.

References

- Adachi-Mejia, A., Keith, M., Drake, B., MacKenzie, T., Titus-Ernstoff, L., Longacre, M., et al. (2010). Perceived Intrinsic Barriers to Physical Activity Among Rural Mothers. *Journal of Women's Health, 19*(12). doi:10.1089=jwh.2009.1879
- Ainsworth, B., Haskell, W., & Leon, A. (1993). Compendium of physical activities: Classification of energy costs of human physical activities. *Medicine and Science in Sport and Exercise, 25*, 71-80. Retrieved from
<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Ainsworth, B., Sternfeld, B., Richardson, M., & Jackson, K. (2000). Evaluation of the Kaiser Physical Activity survey in Women. *Medicine and Science in Sport and Exercise, 32*, 1327-1338. Retrieved from
<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Albright, C., Maddock, J., & Nigg, C. (2006). Physical Activity Before Pregnancy and Following Childbirth in a Multiethnic Sample of Healthy Women in Hawaii'. *Women and Health, 42*(3), 95-110. Retrieved from www.tandfonline.com. doi:10.1300/J013v42n03_06
- Armstrong, K., & Edwards, H. (2003). The effects of exercise and social support on mothers reporting depressive symptoms: A pilot randomized controlled trial. *International Journal of Mental Health Nursing, 12*, 130-138. Retrieved from
http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/detail?sid=76cdf864-1b9d-4f96-927e_eb676d428f4e%40sessionmgr104&vid=1&hid=113&bdata=JnNpdGU9ZWhvc3QtbGI2ZQ%3d%3d#db=rzh&jid=KLH
- Australian Institute of Health and Welfare. (2006). *Australia's Health*. Canberra, Australia.
- Bauman, A. A.-F., M, Huxley, R., & James, W. (2001). *Trends in Population Levels of Reported Physical Activity in Australia, 1997, 1999 and 2000*. Canberra, Australia.

- Blum, J., Beaudoin, C., & caton-Lemos, L. (2004). Physical Activity Patterns and Maternal Well-Being in Postpartum Women. *Maternal and Child Health Journal*, 8(3), 163-169. doi:10.1023/B:MACI.0000037649.24025.2c
- Booth, F., Gordon, S., Carlson, C., & Hamilton, M. (2000). Waging war on modern chronic disease:: Primary prevention through exercise biology. *Scandinavian Journal of Medicine and Science in Sport*, 10(5), 308-309. doi:10.1111/j.1600-0838.2000.100509
- Brown, S., & Lumley, J. (2000). Physical health problems after childbirth and maternal depression at six to seven months postpartum. *British Journal of Obstetrics and Gynecology*, 107(10), 1194-1201. doi:10.1111/j.1471-0528.2000.tb11607.x
- Bull, F., Bauman, A., Bellew, B., & Brown, W. (2004). *Getting Australia Active II: An Update of Evidence on Physical Activity and Health*. . Melbourne, Australia.
- Centre for disease control and prevention. (2005). *Trends in leisure-time physical inactivity by age, sex and race/ethnicity*. United States- 1991-1994.
- Craig, C., Marshall, A., & Sjostrom, M. (2003). International Physical Activity Questionnaire: 12- country reliability and validity. *Medicine and Science in Sport and Exercise*, 35(8), 1381-1395. doi:10.1249/01.MSS.0000078924.61453.FB
- Cramp, A. B., S. (2009). A prospective examination of exercise and barrier to self-efficacy to engage in leisure-time physical activity during pregnancy. *Annals of Behavioral Medicine*, 37(3), 325-334. doi:10.1007/s12160-009-9102-y
- Currie, U. (2004). Motherhood, stress and the exercise experience: freedom or constraint? *Leisure Studies*, 23(3), 225-242. doi:10.1080/0261436042000251987
- Evenson, K., Aytur, S., & Borodulin, K. (2009). Physical activity beliefs, barriers, and enablers among postpartum women. *Journal of Women's Health*, 18, 1925-1934. doi:10.1089=jwh.2008.1309

- Eyler, A., Baker, E., Cromer, L., King, A., Brownson, R., & Donatelle, R. (1998). Physical activity and minority women: A qualitative study. *Health Education and Behaviour*, 25, 640-652. doi:10.1177/109019819802500510
- Gramp, G., & Bray, S. (2010). Postnatal Women's Feeling State Responses to Exercise With and Without Baby. *Maternal and Child Health Journal*, 14, 343-349. doi:10.1007/s10995-009-0462-5
- Haase, A., Steptoe, A., Sallis, J., & Wardle, J. (2004). Leisure-time physical activity in university students from 23 countries: associations with health beliefs, risk awareness and national economic development. *Preventive Medicine*, 39, 182-190. Retrieved from Retrieved from www.Sciedirect.com
- Hillsdon, M., Cavil, N., Nanchahal, K., Diamont, A., & White, I. (2000). National level promotion of physical activity: results from England's ACTIVE for LIVE campaign. *Journal of Epidemiology and Community Health*, 55, 755-761. doi:10.1136/jech.55.10.755
- Kanotra, S., Angelo, D., Phrase, T., Morrow, B., Barfield, W., & Lansky, A. (2007). Challenges faced by new mothers in the early postpartum period: An analysis of comment data from the 2000 Pregnancy Risk Assessment Monitoring System(PRAMS) survey. *Maternal and Child Health Journal*, 11, 549-558. doi:10.1007/s10995-007-0206-3
- Kieffer, E., Willis, S., Arellano, N., & Guzman, R. (2002). Perspectives of pregnant and postpartum Latino women on diabetes, physical activity, and health. *Health Education and Behaviour*, 29(5), 542-556. doi:10.1177/109019802237023
- King, A., Castro, C., Wilcox, S., Eyler, A., Sallis, J., & Brownson, R. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S middle-aged women. *Health Psychology*, 19, 354-356. doi:10.1037//0278-6133.19.4.354
- Koh, D., Miller, Y., Marshall, A., Brown, W., & McIntyre, D. (2008). Health enhancing physical activity behaviour and related factors in postpartum women with recent gestational diabete mellitus. *Journal of Science and Medicine in Sport*, 13, 42-45. doi:10.1016/j.jsams.2008.10.003

- Macera, C., Ham, S., & Yore, M. (2005). Prevalence of physical activity in the United States: Behavioural Risk Factor Surveillance System. *Preventive Chronic Disease, 2*, 1-10. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- Martin Ginis, K., Burke, S., & Gauvin, L. (2007). Exercising with others exacerbates the negative effects of mirrored environments on sedentary women's feeling state. *Psychology and Health, 22*, 945-962.
doi:10.1080/14768320601070571
- McCrory, M. (2001). Does dieting during lactation put infant growth at risk? *Nutrition Reviews, 59*, 18-21. Retrieved from
<http://web.ebscohost.com.dbgw.lis.curtin.edu.au>
- Moran, C., Holt, V., & Martin, D. (1997). What do women want to know after childbirth? *Birth, 24*, 27-34. doi:10.1111/j.1523-536X.1997.00027.pp.x
- Nielsen, T., Wraae, K., Brixen, K., Hermann, A., Andersen, M., & Hagen, G. (2006). Prevalence of overweight, obesity, and physical inactivity in 20- to 29-year-old, Danish men. Relation to socioeconomic status: the Odense Androgen Study. *International Journal of Obesity, 30*, 805-815.
doi:10.1038/sj.ijo.0803197
- Paskiewicz, L. (2001). Pregnant adolescents and their mothers: A shared experience of teen mothering. *The American journal of Maternal Child Nursing, 26(1)*, 33-38. Retrieved from <http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Smith, B. J., Cheung, N. W., Bauman, A. E., Zehle, K., & Mclean, M. (2005). Postpartum physical activity and related psychosocial factors among women with recent gestational diabetes mellitus *Diabetes Care, 28(11)*, 2650-2654.
Retrieved from
<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJPTYzNjMmSU5UPTAmVkJVSPtI=&clientId=22212&cfc=1>
- Sternfeld, B., Ainsworth, B. E., & Quesenberry, J. (1999). Physical activity patterns in a diverse population of women *Journal of Preventive Medicine, 28*, 313-323.
doi:10.1006/pmed.1998.0470

- Symons Downs, D., & Hausenblas, H. (2004). Women's exercise beliefs and behaviours during their pregnancy and postpartum. *Journal of Midwifery and Women's Health*, 49, 138-144. doi:10.1016/S1526-9523(03)00495-1
- Symons Downs, D., & Ulbrecht, J. (2006). Gestational diabetes and exercise beliefs: an elicitation study. *Diabetes Care*, 29(2), 236-240. doi:10.2337/diacare.29.02.06.dc05-1262
- Treuth, M., Butte, N., & Puyau, M. (2005). Pregnancy-related changes in physical activity, fitness, and strength. *Medicine and Science in Sport and Exercise*, 37(5), 832-837. doi:10.1249/01.MSS.0000161749.38453.02
- Van Raaij, J., Schonk, C., Vermaat-Miedema, S., Peek, M., & Hautvast, J. (1990). Energy cost of physical activity throughout pregnancy and the first year postpartum in Dutch women with sedentary lifestyles. *American Journal of Clinical Nutrition*, 52, 234-239. Retrieved from

<http://www.ajcn.org.dbgw.lis.curtin.edu.au>

CHAPTER SIX

6.1 Discussion

This study found that for the sample of Western Australian women surveyed there was no association between physical activity and PND. However, the effect of psychosocial and socioeconomic factors on physical activity and PND was of interest and can provide insight into the postpartum experience of women as they face the daily struggles of parenting and maintaining their own health.

Stage One of the research showed that factors such as having social support, partner support and self-confidence lead to more physical activity participation. Mothers with higher levels of partner support and confidence could be at less risk of becoming depressed.

Stage Two of the research, however, depicts a broader view of physical activity and exercise in the postpartum period from six to 52 weeks and the results are based on mothers' actual needs and expectations. The results of the interviews revealed that mothers can be classified into two different groups according to existing environmental concerns: those who were satisfied with the available level of support through their family, friends, or/and partners; and those who had concerns about their lack of support. For those needing far more support, exercising became far too difficult and a strong barrier to change.

The study is significant and valuable as it targeted women after childbirth who are considered mostly 'inactive' due to their responsibilities and personal restrictions. However, it is important to acknowledge that the women who participated in the study saw themselves as having to be physically active to a certain degree because being a mother required them to care for their baby. This required lifting, feeding, washing, physically comforting the baby and so forth. They were aware of the value

CHAPTER SIX

of exercise beyond the daily physical activity noted. They knew that it was important to incorporate specific exercise routines into their postpartum life, but they were also very aware of the obstacles that could lead to less physical activity.

The obstacles to exercise may be personal such as lack of time and support, or lack of appropriate knowledge about the available services through their communities. It is often difficult to change the personal circumstances but the environmental factors can be identified and addressed. Why was it that the mothers did not know about available exercise programs? Was this the result of insufficient community program announcements, or lack of coordinators to educate the mothers about the availability of programs? Or perhaps there are insufficient programs that are acceptable to mothers and targeted to their particular needs. Government programs, in particular need to be more structured and should be tailored according to the population demand, in this case to women in the postpartum period. For example, further promotion is required for the postpartum classes which should be structured through every city council to increase the response rate from mothers. Correct marketing and education about the resources available is essential as most of the classes are free of membership charges thus everyone can afford to participate.

In contrast to those who identified barriers, some mothers explained their level of satisfaction with existing exercise programs in terms of meeting other mothers within the same area or suburb. These mothers were pleased about the postnatal exercise classes that accommodated mothers and enabled them to participate with their babies in specific classes. The classes served several purposes with mothers reporting not just the benefits of exercise but also the opportunity to learn from other mothers and instructors. However, when the classes stopped the mothers did not know where to access similar sorts of classes. A more planned long term approach is required for mothers to maintain the sufficient level of activity during

CHAPTER SIX

the postpartum period and beyond. The study identified the gap between the six to 12 month period after childbirth which could be a time where mothers can become isolated, lack motivation and become subject to mood swings.

The results of Stage Two of the study provide sources of information which can inform appropriate exercise programs for mothers according to their individual needs and capacities after pregnancy. Some mothers in the study suggested that they would like to have an individualised program to enable them to participate in routine exercises by themselves. These mothers felt they lacked time to attend the public classes and others were not interested in group activities.

Through the interviews, mothers discussed their dream exercise program tailored to what they want and need in the postpartum period. Those who felt lack of confidence or lack of good support wanted the exercise program to be backed-up with guidance on how to find support if they do not have any available and how to increase their level of confidence. Thus, a well-designed and educational program could be considered as particularly helpful for mothers. While pram walking approaches to exercise in the postpartum period have been trialled (Armstrong & Edwards, 2004), they are not the only approach required. A ‘one size fits all’ approach is insufficient. Group pram walking may be ideal for some women but not for all.

The postpartum specific program has to contain relevant exercises according to the changing needs of the new mothers’ bodies and has to target the muscles and areas that have lost strength during pregnancy or at the time of labour. The mothers in the study understood the requirements and although some had learned basic exercises expressed a desire for a readily accessible and easy to follow program designed to improve the structure and function of pelvic floor muscles, or the ones that deal with core strength.

CHAPTER SIX

6.2 Available facilities for postpartum women

According to the Department of Health in WA (Department of Health WA, 2011) , there are many different services available for women in the postpartum period. A Community Midwifery program (Community Midwifery Westren Australia, 2010) offers a variety of services during pregnancy and the postnatal period; for example, breastfeeding concerns like lactation, and ‘Mums and Bubs’ which aims to reduce isolation among mothers by regular meetings for them the first Wednesday of each month in two different suburbs in Perth. The ‘Mother Nurture’ groups are another area that provides support for early parenting (Community Midwifery Westren Australia, 2010). In addition, there are several workshops on offer which include preparation for childbirth. The other available resources are educational and can be accessed through the centre library in North Fremantle which increase parents' level of knowledge (Community Midwifery Westren Australia, 2010). However, the lack of exercise workshops and support is of significant importance and requires further consideration.([Department of Health WA, 2011](#)) Overall, exercise has been suggested by the WA Department of Health as an alternative approach for the emotional health of parents but there are currently insufficient resources in both the public and private sectors([Department of Health WA, 2011](#)). If a health promotional approach to exercise in the postpartum period is to be adopted it requires government support.

6.3 Limitations of the study

The limitations of the current study were firstly, time constraint in the recruitment process. Greater numbers in Stage One of the study would have strengthened the results. However, a study that recruited mothers in pregnancy and following their

CHAPTER SIX

life through to the postpartum period would have been ideal to clearly understand the possible antenatal factors that may associate with exercise and PND, or the possible relation between prenatal and postnatal factors. In addition, lack of time precluded the inclusion of a trial of an appropriately designed and targeted exercise program based on the mothers' opinions and needs. Such an approach was outside of the scope of a Masters study, but if adopted in future could lead to some interesting results. Accessing a sample of clinically depressed women to enrich the findings was again beyond the scope of the study. However, it would have enriched the study and made the testing of hypotheses in Stage One within closer reach.

Because of the sampling strategy (ie, through child health clinics), the final sample would not include those women who did not attend child health clinics. It would also capture more women in the early postpartum stages because of the inevitable dropping off of women taking their babies to clinics as the babies get older i.e. there would be an over-representation of mothers with younger babies.

6.4 Postpartum women's perspective on exercise

According to the results of Stage Two of the study, women can be classified into four different groups in terms of their need for exercise programs as described below:

- Women wishing individualised exercise programs; this approach is suitable for the mothers who want to have their exercise session privately, most importantly, in the convenience of their own homes. However, these women cannot do this alone and require an appropriate guidelines and a clearly articulated self-management program. This kind of program enables the person to manage their session by themselves and it attempts to enhance the ability of person to successfully self-manage the day-to-day challenges of their condition with the

CHAPTER SIX

support of other professionals if required (Barlow, Sturt, & Hearnshaw, 2002). The goal of self-management is that people have the confidence to deal with the situation themselves (Adams, Greiner, & Corrigan, 2004).

- Mothers wishing to take part in group classes - this is ideal for those who are interested in socialising with others. However, the area of concern for this option is the access to available and appropriate classes through the community. These classes need to be run by appropriately qualified staff at a reasonable cost otherwise they may be of little use to mothers and outside of their financial reach. Clearly, appropriate resources are needed to subsidise the costs of the classes. The third approach could be for the women who are at risk of PND - this group demands specific guidelines as this population are vulnerable and require not just exercise classes but appropriate counselling and support. Psychological approaches have to be combined with exercise programs to increase the effect of exercise as an alternative treatment option. In addition, the classes have to be planned by an expert and someone who is trained in working with women living with depression. Finally, educational courses are required to enhance womens' knowledge in general population; those who are pregnant or in the postpartum period. A health promotional approach is required to alert women to the association between exercise and mental health as well as physical health.

6.5 Future research

Mothers in the postpartum period need advice about how to perform exercise correctly and regularly, as well as being practically and psychologically supported to participate in exercise programs. Supervised programs would be effective for group classes; however, due to the high cost of these programs a better approach may be to incorporate self-management techniques into the exercise program. Instituting and trialling a self-management approach to postpartum exercise could constitute a

CHAPTER SIX

future research project. In addition, a longitudinal study may be an option to provide an in-depth understanding of mothers' needs in terms of exercise during the postnatal period.

A study which employs a follow-up approach through pregnancy and the postpartum period may result in findings which assist the experts in clarifying how best to support women in the postpartum period to achieve maximum health, particularly those at risk of PND.

Appropriate guidelines are required in order to deliver a suitable exercise program for mothers and expert advice is essential for such strategies. The specified exercise programs have to be tailored and delivered through professionals such as exercise physiologists and exercise psychologists, or those who are familiar with postpartum period and the specific physical and psychological needs of women following childbirth. Furthermore, guidelines need to be specified for every region due to environmental, social and cultural diversity. In other words a useful physical activity program for women in Western Australia may not be the best one for postpartum women in the Eastern region of Australia or in other parts of the world. Nevertheless, although the specific context is required in any program, there are findings from this study that may be applicable elsewhere.

References

- Adachi-Mejia, A., Keith, M., Drake, B., MacKenzie, T., Titus-Ernstoff, L., Longacre, M., et al. (2010). Perceived Intrinsic Barriers to Physical Activity Among Rural Mothers. *Journal of Women's Health, 19*(12). doi:10.1089=jwh.2009.1879
- Adams, K., Greiner, A., & Corrigan, J. (2004). *Report of a summit*. Washington, DC.
- Ainsworth, B., Haskell, W., & Leon, A. (1993). Compendium of physical activities: Classification of energy costs of human physical activities. *Medicine and Science in Sport and Exercise, 25*, 71-80. Retrieved from
<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Ainsworth, B., Sternfeld, B., Richardson, M., & Jackson, K. (2000). Evaluation of the Kaiser Physical Activity survey in Women. *Medicine and Science in Sport and Exercise, 32*, 1327-1338. Retrieved from
<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Albright, C., Maddock, J., & Nigg, C. (2006). Physical Activity Before Pregnancy and Following Childbirth in a Multiethnic Sample of Healthy Women in Hawaii!. *Women and Health, 42*(3), 95-110. Retrieved from www.tandfonline.com doi:10.1300/J013v42n03_06
- American College of Obstetricians and Gynecologists. (2002). Exercise during pregnancy and the postpartum period. *Obstetrics and Gynecology, 99*(1), 171-173. doi:10.1016/S0029-7844(01)01749-5.
- American College of Sports Medicine. (2006). Impact of physical activity during pregnancy and postpartum on chronic disease risk *Medicine and Science in Sport and Exercise, 38*(5), 989-1006.
doi:10.1249/01.mss.0000218147.51025.8a
- American Psychiatric Press. (2000). *Diagnostic and statistical manual of mental disorders- text revision*. Washington DC.
- Appolonio, K., & Fingerhut, R. (2008). Postpartum depression in a military sample. *Military Medicine, 173*, 1085-1091.

- Araya, R., Lewis, G., Rojas, G., & Fritsch, R. (2003). Education and income: which is more important for mental health? . *Journal of Epidemiology and Community Health*, 57, 501-505. Retrieved from
<http://www.jstor.org.dbgw.lis.curtin.edu.au/journals/01417681.html>
- Armstrong, K., & Edwards, H. (2003). The effects of exercise and social support on mothers reporting depressive symptoms: A pilot randomized controlled trial. *International Journal of Mental Health Nursing*, 12, 130-138. Retrieved from
<http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/detail?sid=76cdf864-1b9d-4f96-927e-eb676d428f4e%40sessionmgr104&vid=1&hid=113&bdata=JnNpdGU9ZWhvc3QtbGI2ZQ%3d%3d#db=rzh&jid=KLH>
- Armstrong, K., & Edwards, H. (2004). The effectiveness of a pram walking exercise programme in reducing depressive symptomatology for postnatal women. *International Journal of Nursing Practice*, 10, 177-194. Retrieved from
<http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/detail?sid=1b4262f0-5a0a-46ec-9137-9ba028493ab0%40sessionmgr4&vid=1&hid=14&bdata=JnNpdGU9ZWhvc3QtbGI2ZQ%3d%3d#db=rzh&jid=81A>
- Artazcoz, L., Borrell, C., Benach, J., Cortes, I., & Rohlf, I. (2004). Women, family demands and health: the importance of employment status and socioeconomic position. *Social Science and Medicine*, 59(2), 263-274.
doi:doi:10.1016/j.socscimed.2003.10.029
- Australian Institute of Health and Welfare. (2006). *Australia's Health*. Canberra, Australia.
- Azjen, I., & Fishbein, M. (2005). The influence of attitudes on behaviour. In D. J. Albarracin, BTZanna, MP (Ed.), *The handbook of Attitudes*. Mahwah, New Jersey: Erlbaum.

- Barlow, J., Sturt, J., & Hearnshaw, H. (2002). Self-management interventions for people with chronic conditions in primary care: examples from arthritis, asthma and diabetes. *Health Education Journal*, 61(4), 365-378.
- Battle, C., & Zolnick, C. (2005). Prevention of postpartum depression. *Psychiatric Annals*, 35, 590-598. Retrieved from
http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJT_PTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1
- Bauman, A. A.-F., M, Huxley, R., & James, W. (2001). *Trends in Population Levels of Reported Physical Activity in Australia, 1997, 1999 and 2000*. Canberra, Australia.
- Beck, C. T. (1996). A Meta-Analysis of Predictors of Postpartum Depression. *Nursing Research*, 45(5), 297. Retrieved from
<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au/>
- Beck, C. T. (2001). Predictors of Postpartum Depression. An update. *Nursing Research*, 50(5), 275. Retrieved from Retrieved from www.OvidSP.com
- Beyondblue. (2009). Retrieved from www.beyondblue.org.au
- Bhugra, T., Wheatley, S., Taub, N., Culverwell, A., Friedman, T., Kirwan, P., et al. (2000). Pragmatic randomised trial of antenatal intervention to prevent postnatal depression by reducing psychological risk factors. *Psychological Medicine*, 30(6), 1273-1281. Retrieved from<http://journals.cambridge.org>
- Bick, D. (2003). Strategies to reduce postnatal psychological morbidity: the role of midwifery services. *Disease Management and Health Outcomes*, 11(1), 11-20. Retrieved from<http://web.ebscohost.com>
- Biddle, J., Fox, K., & Boutcher, H. (2000). *Physical Activity and Psychological Well-Being*. London, Routledge.
- Bild, D., Jacobs, D. R., Sidney, S., Haskell, W., Anderssen, N., & Oberman, A. (1993). Physical activity among young black and white women. *Annals of Epidemiology*, 3, 636-644. Retrieved from www.ScienceDirect.com

- Bliszta, J., Tang, M., Meyer, D., Milgrom, J., Ericksen, J., & Buist, A. (2008). Single motherhood versus poor partner relationship: outcomes for antenatal mental health. *Australian and New Zealand Journal of Psychiatry*, 42(1), 56-65. doi:10.1111/j.1753-6405.2008.00274.x
- Blum, J., Beaudoin, C., & caton-Lemos, L. (2004). Physical Activity Patterns and Maternal Well-Being in Postpartum Women. *Maternal and Child Health Journal*, 8(3), 163-169. doi:10.1023/B:MACI.0000037649.24025.2c
- Blumenthal, J., Babyak, M., Doraiswamy, P., Watkins, L., Hoffman, B., & Barbour, K. A. (2007). Exercise and pharmacotherapy in the treatment of major depressive disorder. *Psychosomatic Medicine*, 69, 587-596. doi:10.1097/PSY.0b013e318148c19a
- Blumenthal, J., & Lephuong, O. (2009). A commentary on exercise and depression and the verdict is. *Mental Health and Physical Activity* 2, 97-99. doi:10.1016/j.mhpaa.2009.08.001
- Booth, F., Gordon, S., Carlson, C., & Hamilton, M. (2000). Waging war on modern chronic disease:: Primary prevention through exercise biology. *Scandinavian Journal of medicine and Science in Sport*, 10(5), 308-309. doi:10.1111/j.1600-0838.2000.100509
- Borodulin, K., Evenson, K., Wen, F., Herring, A., & Benson, A. (2008). Physical activity patterns during pregnancy. *Medicine and Science in Sport and Exercise*, 40(11), 1901-1908. doi:10.1249/MSS.0b013e31817f1957
- Bouchard, C., Shepard, R., Stephens, T., Sutton, J., & McPherson, B. (1990). *Exercise, fitness and health*. Champaign, IL: Human Kinetics
- Boury, J., Larkin, K., & Krummel, D. (2004). Factors related to postpartum depressive symptoms in low-income women. *Women and Health*, 39, 19-34. doi:10.1300/J013v39n03_02
- Bowen, A., & Muhajarine, N. (2006). Antenatal depression. *The Canadian Nurse*, 102(9), 27-30. Retrieved from

<http://web.ebscohost.com/dbgw.lis.curtin.edu.au/ehost/search/advanced?sid=f43925c8-8943-4bf0-a965-8c264425cb73%40sessionmgr13&vid=3&hid=111>

Boyce, P. (2003). Risk factors for postnatal depression: a review and risk factors in Australian population. *Archives of Women's Mental Health*, 6(Supplement 2), S43-S50. doi:10.1007/s00737-003-0005-9

Brockington, I. (2004). Diagnosis and management of postpartum disorder: A review. *World Psychiatry*, 3(2), 89-95. Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed>

Broocks, A., Meyer, T., Optiz, M., Bartmann, U., Hillmer Vogel, U., & George, A. (2003). 5-HT1A responsivity in patients with panic disorder before and after treatment with aerobic exercise ,clomipramine or placebo. *European Neuropsychopharmacology*, 13(Supplement 3), 153-164.

doi:10.1016/S0924-977X(02)00177-3

Brown, S., & Lumley, J. (2000). Physical health problems after childbirth and maternal depression at six to seven months postpartum. *British Journal of Obstetrics and Gynecology*, 107(10), 1194-1201. doi:10.1111/j.1471-0528.2000.tb11607.x

Brown, W., & Trost, S. (2003). Life transitions and changing physical activity patterns in young women. *American Journal of Preventive Medicine*, 25, 140-143. doi:10.1016/S0749-3797(03)00119-3

Bull, F., Bauman, A., Bellew, B., & Brown, W. (2004). *Getting Australia Active II: An Update of Evidence on Physical Activity and Health*. . Melbourne, Australia.

Carey, G., & Quinn, T. (2001). Exercise and Lactation: Are they compatible? *Canadian Journal of Applied Physiology*, 26, 55-74.

Retrieved from <http://www.ncbi.nlm.nih.gov/guide/>

Caspersen, C. J., Powell, K., & Christianson, G. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health related research. *Public Health Reports*, 100(2), 126-131.

Retrieved from <http://www.jstor.org/stable/20056429>

Centre for disease control and prevention. (2005). *Trends in leisure-time physical inactivity by age, sex and race/ethnicity*. United States- 1991-1994.

Chan, S., Levy, V., Chung, T., & Dominic Lee, F. (2002). A qualitative study of the experiences of a group of Hong Kong Chinese women diagnosed with postnatal depression. *Journal of Advanced Nursing*, 39(6), 571-579.

doi:10.1046/j.1365-2648.2002.02326.x

Community Midwifery Westren Australia. (2010). *Postnatal Support*. Retrieved from <http://cmwa.oolybooly.biz/index.html>

Cooke, M. (1996). *Mother's experience of infant feeding*. Melbourne.

Cooper, P. J., Tomlinson, M., Schwartz, L., Woolgar, M., Murray, L., & Moltenao, C. (1999). Postpartum Depression and the Mother-Infant Relationship in a South-African Peri- Urban Settlement. *British Journal of Psychiatry*, 175(6), 554-558.

doi:10.1192/bjp.175.6.554

Costa, R., Figueiredo, B., Pacheco, A., & Pais, A. (2003). Tipo de parto: Expectativas,experiências, dor e satisfação. [Type of delivery: Expectations, experiences, pain and satisfaction]. *Revista Portuguesa de Obstetrícia*, 26(6), 265-306.

Retrieved from <http://hdl.handle.net/1822/4232>

Cox, J. (1989). Can postnatal depression be prevented. *Midwife Health Visitor and Community Nurse*, 25(8), 326-329.

Cox, J., & Holden, J. (2003). *Perinatal mental health: a guid to the Edinburgh Postnatal Depression Scale (EPDS)*. Gaskell: Royal College of Psychiatrists.

Cox, J., Holden, J., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh postnatal depression scale. *British Journal of Psychiatry*, 150, 782-786.

Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Craft, L. (2005). Exercise and clinical depression: examining two psychological mechanism *Psychology of Sport and Exercise*, 6(2), 151-171.

doi:10.1016/j.psychsport.2003.11.003

Craft, L., & Landers, D. (1998). The effects of exercise on clinical depression and depression resulting from mental illness: A meta-analysis. *Journal of Sport and Exercise Psychology*, 20(1), 339-357.

Retrieved from <http://journals.humankinetics.com/JSEP>

Craig, C., Marshall, A., & Sjostrom, M. (2003). International Physical Activity Questionnaire: 12- country reliability and validity. *Medicine and Science in Sport and Exercise*, 35(8), 1381-1395.

doi:10.1249/01.MSS.0000078924.61453.FB

Craig, M., & Howard, L. (2009). Postnatal depression. from Clinical Evidence (Online) <http://clincalevidence.bmjjournals.org/ceweb/conditions/pac/1407/1407.jsp>

Craike, M., Coleman, D., & MacMahon, C. (2010). Direct and buffering effects of physical activity on stress-related depression in mothers of infants. *Journal of Sport and Exercise Psychology*, 32, 23-38. Retrieved from Retrieved from <http://journals.humankinetics.com/JSEP>

Cramer, S. R., Nieman, D. C., & Lee, J. W. (1991). The effect of moderate exercise training on psychological well-being and mood state in women. *Journal of Psychosomatic Research*, 35, 437-449.

Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Cramp, A. B., S. (2009). A prospective examination of exercise and barrier to self-efficacy to engage in leisure-time physical activity during pregnancy. *Annals of Behavioral Medicine*, 37(3), 325-334. doi:10.1007/s12160-009-9102-y

Creswell, J. W. (2003). *Research design: Qualitative and quantitative approaches* Calif: Sage Publications.

Črnčec, R., Barnett, B., & Matthey, S. (2008). Karitane Parenting Confidence Scale: Manual (Under Review). *Journal of Nursing Measurements*.

doi:10.1002/nur.20271

Currie, J. (2004). Motherhood, stress and the exercise experience: freedom or constraint? *Leisure Studies*, 23(3), 225-242.

doi:10.1080/0261436042000251987

- Currie, J., & Develin, E. (2002). Stroll your way to well-being: A survey of the perceived benefits, barriers, community support and stigma associated with pram walking groups designed for new mothers, Sydney. *Health Care Women International*, 23, 882-893. doi:10.1080/07399330290112380
- DA Costa, D., Drista, M., Rippen, N., Lowensteyn, I., & Khalife, S. (2006). Health-related quality of life in postpartum depressed women. *Archives of Women's Mental Health* 9, 95-102. doi:10.1007/s00737-005-0108-6
- DA Costa, D., Lowensteyn, I. A., M, Ionescu-Ittu, R., Dritsa, M., Rippen, N. C., P, & Khalife, S. (2009). A randomized clinical trial of exercise to alleviate postpartum depressed mood. *Journal of Psychosomatic Obstetrics and Gynecology*, 30(3), 191-200. doi:10.1080/01674820903212136
- Daley, A. (2002). Exercise therapy and mental health in clinical populations: Is exercise therapy a worthwhile intervention? *Advances in Psychiatry Treatment*, 8, 262-270. doi:10.1192/apt.8.4.262
- Daley, A. (2008). Exercise and depression: A review of reviews. *Journal of Clinical Psychology in Medical Settings*, 15, 140-147. doi:10.1007/s10880-008-9105-z
- Daley, A., Kate, J., & MacArthur, C. (2009). The effectiveness of exercise in the management of post-natal depression: systematic review and meta-analysis. *Family Practice*, 26, 154-162. doi:10.1093/fampra/cmn101
- Daley, A., MacArthur, C., & Winter, H. (2007). The role of exercise as a treatment of postnatal depression: A review of the literature. *Journal of Midwifery and Women 's Health*, 52, 56-62. doi:10.1016/j.jmwh.2006.08.017
- De Laine, M. (2000). *Fieldwork, participation and practice: ethics and dilemmas in qualitative research*. California: Sage Publications.
- Demissie, Z., Siega-Riz, A., & Evenson, K. (2011). Associates between physical activity and postpartum depressive symptoms *Journa of Women's Health*, 20(7). doi:10.1007/s00737-010-0193-z

- Dennis, C., & Chung Lee, L. (2006). Postpartum depression help-seeking barriers and maternal treatment preferences: A qualitative systematic review. *Birth*, 33(4), 323-331. Retrieved from <http://web.ebscohost.com>
- Dennis, C., & Hodnett, E. (2007). Psychosocial and psychological interventions for treating postpartum depression: Review. *Cochrane Database of Systematic Reviews*(4). Retrieved from Retrieved from <http://www2.cochrane.org/>
- Department of Health. (2004a). *At least five a week: Evidence on the impact of physical activity and its relationship to health* Retrieved from www.dh.gov.uk/en/publicationsandstatistics/publications/publicationspolicyandguidance/dh_4080994
- Department of Health. (2004b). *Confidential enquiry into maternal and child health: why mothers die 2000–2002. London.* Retrieved from <http://www.cemach.org.uk/getdoc/28695c42-0a1e-4fd6-8601-abd01ad6c162/Saving-Mothers-Lives-Report-2000-2002.aspx> (accessed 2 Nov 2007)
- Department of Health. (2006). *At least five a week: Evidence on the impact of physical activity and its relationship to health.* Retrieved from http://www.dh.gov.uk/PublicationsAndStatistics/Publications/PublicationsPolicyAndGuidance/Publications-PolicyAndGuidanceArticle/fs/en?CONTENT_ID=4080994&chk=1Ft1Of
- Department of Health and Aging. (2004). *Get out and get active: Australia's physical activity recommendations for 12-18 years old.* Retrieved from [Http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/php-physical-activity-kids-pdf-cnt.htm/\\$FILE/youth_phys.pdf](Http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/php-physical-activity-kids-pdf-cnt.htm/$FILE/youth_phys.pdf).
- Department of Health WA. (2011). *Women and Newborn Health Service.* Retrieved from http://www.kemh.health.wa.gov.au/health/emotional_health/treatment_options.htm

Devine, C., Bove, C., & Olson, C. (2000). Continuity and change in women's weight orientations and lifestyle practices through pregnancy and the postpartum period: The influence of life course trajectories and transitional events. *Social Science and Medicine*, 50, 567-582.

doi:10.1016/S0277-9536(99)00314-7

Dietz, P., Williams, S., Callaghan, W., Bachman, D., Whitlock, E., & Hornbrook, M. (2007). Clinically identified maternal depression before, during, and after pregnancies ending in live births. *American Journal of Psychiatry*, 164, 1515-1520. Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>

Doran, F., & Davis, K. (2011). Factors that influence physical activity for pregnant and postpartum women and implications for primary care. *Australian Journal of Primary Health*, 17, 79-85. Retrieved from Retrieved from <http://search.informit.com.au>

Dritsa, M., Gilles, D., Lowenstein, I., & Da Costa, D. (2009). Effects of home-based exercise on fatigue in postpartum depressed women: Who is more likely to benefit and why. *Journal of Psychosomatic Research* 67, 159-163.

doi:10.1016/j.jpsychores.2009.01.010

Dunn, A. L., Trivedi, M. H., Kampert, J. B., Clark, C. G., & Chambliss, H. O. (2005). Exercise treatment for depression: Efficacy and Dose response. *American Journal of preventive Medicine*, 28, 1-8. doi:10.1016/j.amepre.2004.09.003

Dunton, G., & Vaughan, E. (2008). Anticipated affective consequences of physical activity adoption and maintenance. *Health Psychology*, 27, 703-710. doi:10.1037/0278-6133.27.6.703

Emond, A., Pollock, J., Deave, T., Bonnell, S., Peters, T., & Harvey, I. (2002). An evaluation of the First Parent Health Visitor Scheme. *Archives of Disease in Childhood*, 86(3), 150-170. doi:10.1136/adc.86.3.150

- Eriksen, W., & Bruusgaard, D. (2004). Do physical leisure time activities prevent fatigue? A 15-month prospective study of nurses' aids. *British Journal of Sports Medicine*, 38, 331-336. doi:10.1136/bjsm.2002.004390
- Ernst, C., Olson, A. K., Pinel, J. P. J., Lam, R. W., & Christie, B. R. (2006). Antidepressant effects of exercise: Evidence for an adult-neurogenesis hypothesis? *Journal of Psychiatry and Neuroscience*, 31, 84-92. Retrieved from <http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>
- Ersek, J. B. H., L.R (2009). Physical Activity Prior to and During Pregnancy and Risk of Postpartum Depressive Symptoms. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 38, 556-566. doi:10.1111/j.1552-6909.2009.01050.x
- Evenson, K., Aytur, S., & Borodulin, K. (2009). Physical activity beliefs, barriers, and enablers among postpartum women. *Journal of Women's Health*, 18, 1925-1934. doi:10.1089=jwh.2008.1309
- Eyler, A., Baker, E., Cromer, L., King, A., Brownson, R., & Donatelle, R. (1998). Physical activity and minority women: A qualitative study. *Health Education and Behaviour*, 25, 640-652. doi:10.1177/109019819802500510
- Eyler, A., Matson-Koffman, D., Vest, J., Evenson, K., Sanderson, B., & Thompson, J. (2002). Environmental, policy, and cultural factors related to physical activity in a diverse sample of women: The women's Cardiovascular Health Network Project-Summary and discussion. *Women and Health*, 36, 123-134. doi:10.1300/J013v36n02_01
- Faisal-Cury, A., Tedesco, J. K., S, Menezes, P., & Zugaib, M. (2004). Postpartum depression: in relation to life events and patterns of coping. *Archives of Women's Mental Health*, 7(2), 123-131. doi:10.1007/s00737-003-0038-0
- Figueiredo, B. (2001). *Māes e bebe's [Mothers and infants]*. Lisboa, Portugal: Fundac,āo Calouste Gulbenkian e Fundac,āo para a Ciēncia e a Tecnologia.

Gale, S., & Harlow, B. (2003). Postpartum mood disorders: a review of clinical and epidemiological factors. *Journal of Psychosomatic Obstetrics and Gynecology*, 24, 257-266.

Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/login?COPT=REJTPTYzNjMmSU5UPTAmVkJVSPTI=&clientId=22212>

Galper, D., Trivedi, M., & Barlow, C. (2006). Inverse association between physical activity and mental health in men and women. *Medicine and Science in Sport and Exercise*, 38, 173-178. doi:10.1249/01.mss.0000180883.32116.28

Gaynes, B. N., Gavin, N., Meltzer-Brody, S., Swinson, T., Gartlehner, G., Brody, S., et al. (2005). Perinatal depression: prevalence, screening accuracy and outcomes. *Agency for Health Research and Quality* 119, 1-99. Retrieved from <http://www.ahrq.gov/clinic/epcsums/peridepsum.pdf>

Ghubash, R., & Abou-Saleh, M. (1997). Postpartum psychiatric illness in Arab culture: prevalence and psychosocial correlates. *British Journal of Psychiatry*, 171, 66-68. doi:10.1192/bjp.171.1.65

Ghubash, R., & Eapen, V. (2009). Postpartum mental illness: perspectives from an Arabian Gulf population. *Psychological Reports*, 105, 127-136. doi:10.2466/pr0.105.1.127-136

Gillison, F., Skevington, S., Sato, A., Standage, M., & Evangelidou, S. (2009). The effects of exercise interventions on quality of life in clinical and healthy populations; a meta-analysis. *Social Science and Medicine*, 68, 1700-1710. doi:10.1016/j.socscimed.2009.02.028

Gjerdingen, D., & Yawn, B. (2007). Postpartum depression screening: importance, methods, barriers and recommendations for practice. *Journal of American Board of Family Medicine* 20, 280-288. doi:10.3122/jabfm.2007.03.060171

Goodman, S. (2003). *Genesis and epigenesis of psychopathology in children with depressed mothers: toward an integrative biopsychosocial perspective*. New York: Cambridge University.

- Goodwin, R. D. (2003). Association between physical activity and mental disorders among adults in the United States. *Preventive Medicine*, 36, 698-703. Retrieved from Retrieved from www.Sciedirect.com
- Gramp, G., & Bray, S. (2010). Postnatal Women's Feeling State Responses to Exercise With and Without Baby. *Maternal and Child Health Journal*, 14, 343-349. doi:10.1007/s10995-009-0462-5
- Groth, S., & David, T. (2008). New mothers' views of weight and exercise. *The American journal of maternal/child nursing*, 33(6), 364-370. doi:10.1097/01.NMC.0000341257.26169.30
- Grussu, P., & Quantraro, R. (2009). Prevalence and risk factors for ahigh level of postnatal depression symptomatology in Italian women: A smaple drawn from ante-natal classes. *European Psychiatry*, 24, 327-333. Retrieved from www.sciedirect.com
- Gunderson, E., & Abrams, B. (2000). Epidemiology of gestational weight gain and body weight changes after pregnancy. *Journal of Epidemiologic Review*, 22, 261-274. Retrieved from <http://www.ncbi.nlm.nih.gov/guide/>
- Haase, A., Steptoe, A., Sallis, J., & Wardle, J. (2004). Leisure-time physical activity in university students from 23 countries: associations with health beliefs, risk awarness and national economic development. *Preventive Medicine*, 39, 182-190. Retrieved from Retrieved from www.Sciedirect.com
- Hadley, M., & Haskell-Luevano, C. (1999). The proopiomelanocortin system. *Annals of the New York Academy of sciences*, 885, 1-21. doi:10.1111/j.1749-6632.1999.tb08662.x
- Halberich, U., & Karkun, S. (2006). Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. *Journal of Affective Disorders*, 91, 97-111. doi:10.1016/j.jad.2005.12.051
- Hales, D., Evenson, K., Wen, F., & Wilcox, S. (2010). Postpartum physical activity: Measuring theory of planned behaviour constructs. *American Journal of Health Behaviour*, 34(4), 387-401.

Retrieved from <http://www.ncbi.nlm.nih.gov/guide/>

Hamdan, A., Hawamdeh, S., & Hussein, A. (2008). The prevalence and correlates of depressive symptoms among Arab women in a primary healthcare setting.

International Journal of Psychiatry in Medicine, 38(4), 453-467. Retrieved from
<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJT&PTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>

Hamdan, A., & Tamim, H. (2011). Psychosocial risk and protective factors for postpartum depression in the United Arab Emirates. *Archives of Women's Mental Health* 14, 125-133. doi:10.1007/s00737-010-0189-8

Hasselmann, M., Wemeck, G., & Silva, C. (2008). Symptoms of postpartum depression and early interruption of exclusive breastfeeding in the first 2 months of life. *Cadernos de Saúde Pública* 24, S341-S352. Retrieved from
<http://www.ncbi.nlm.nih.gov/guide/>

Hassmen, P., Koivula, N., & Uutela, A. (2000). Physical exercise and psychological well-being: A population study in Finland. *Preventive Medicine*, 30, 17-25. doi:10.1006/pmed.1999.0597

Hatton, D., Harrison-Hohner, J., Coste, S., Dorato, V., Curet, L., & McCarron, D. (2005). Symptoms of postpartum depression and breastfeeding. *Journal of Human Lactation*, 21, 444-449. doi:10.1177/0890334405280947

Hillsdon, M., Cavil, N., Nanchahal, K., Diamont, A., & White, I. (2000). National level promotion of physical activity: results from England's ACTIVE for LIVE campaign. *Journal of Epidemiology and Community Health*, 55, 755-761. doi:10.1136/jech.55.10.755

Hoffbrand, S., Howard, L., & Crawley, H. (2001). Antidepressant drug treatment for postnatal depression. from Cochrane Database of Systematic Reviews

Hoffbrand, S., Howrad, L., & Crawley , H. (2001). Antidepressant drug treatment for postnatal depression. *Nursing Times*, 97(45), 35. Retrieved from Retrieved from Cochrane Database of Systematic Reviews

<http://www2.cochrane.org/reviews/>

- Holden, J. (1994). *Can non-psychotic depression be prevented?* . London: Gaskell.
- Honey, K., Bennett, P., & Morgan, M. (2003). Predicting postnatal depression. *Journal of Affective Disorders*, 76, 201-210.
doi:10.1016/S0165-0327(02)00085-X
- Humpel, N., Owen, N., & Leslie, E. (2002). Environmental factors associated with adults participation in physical activity. *American Journal of Preventive Medicine*, 22, 188-199. Retrieved from www.ScienceDirect.com
- Hunsley, J., Best, M., Lefebvre, M., & Diana, V. (2001). The seven-item short form of the Dyadic Adjustment Scale: further evidence of construct validity. *The American Journal of Family Therapy*, 29(4), 325-335. Retrieved from <http://dx.doi.org/10.1080/01926180126501>. doi:10.1080/01926180126501
- Kanotra, S., Angelo, D., Phrase, T., Morrow, B., Barfield, W., & Lansky, A. (2007). Challenges faced by new mothers in the early postpartum period: An analysis of comment data from the 2000 Pregnancy Risk Assessment Monitoring System(PRAMS) survey. *Maternal and Child Health Journal*, 11, 549-558.
doi:10.1007/s10995-007-0206-3
- Kendall-Tackett, K. A. (1993). *Postpartum depression: a comprehensive approach for nurses*. NewburyPark, California: Sage Publications.
- Kieffer, E., Willis, S., Arellano, N., & Guzman, R. (2002). Perspectives of pregnant and postpartum Latino women on diabetes, physical activity, and health. *Health Education and Behaviour*, 29(5), 542-556. doi:10.1177/109019802237023
- King, A., Castro, C., Wilcox, S., Eyler, A., Sallis, J., & Brownson, R. (2000). Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S middle-aged women. *Health Psychology*, 19, 354-356.
doi:10.1037//0278-6133.19.4.354
- Koh, D., Miller, Y., Marshall, A., Brown, W., & McIntyre, D. (2008). Health enhancing physical activity behaviour and related factors in postpartum women with recent gestational diabete mellitus. *Journal of Science and Medicine in Sport*, 13, 42-45. doi:10.1016/j.jsams.2008.10.003

- Koltyn, K., & Schultes, S. (1997). Psychological effects of an aerobic exercise session and a rest session following pregnancy. *Journal of Medicine and Physical Fitness*, 37, 287-291. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>
- LaCoursiere, Y., Baksh, L., Bloebaum, L., & Vamer, M. (2006). Maternal body mass index and self-reported postpartum depressive symptoms. *Maternal and Child Health Journal*, 10, 385-390. doi:10.1007/s10995-006-0075-1
- Larson-Meyer, D. (2002). Effect of postpartum exercise on mothers and their offspring: A review of the literature. *Obesity Research*, 10, 841-853. doi:10.1038/oby.2002.114
- Lawlor, D., & Hopker, S. (2001). The effectiveness of exercise as an intervention in the management of depression: Systematic review and meta-regression analysis of randomized controlled trials. *British Medical Journal*, 322, 1-8. doi:10.1136/bmj.322.7289.763
- Lee, D., & Chung, T. (2007). Postnatal Depression: An update. *Best Practice and Research Clinical Obstetrics & Gynaecology*, 21(2), 183-191. doi:10.1016/j.bpobgyn.2006.10.003
- Lee, D., Yip, A., Chiu, H., Leung, T., & Chung, T. (2001). A psychiatric epidemiological study of postpartum Chinese women. *American Journal of Psychiatry*, 158, 220-226. Retrieved from <http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJT&PTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>
- Legrand, F., & Heuze, J. (2007). Antidepressant effects associated with different exercise conditions in participants with depression: a pilot study. *Journal of Sport and Exercise Psychology*, 29, 348-364. Retrieved from <http://journals.human kinetics.com/jsep>
- Leigh, B., & Milgrom, J. (2008). Risk factors for antenatal depression, postnatal depression and parenting stress. *BioMed central psychiatry*, 8(24), 1-11. doi:10.1186/1471-244X-8-24

Leung, S. (2002). *Postpartum depression: perceived social support and stress among Hong Kong Chinese women*. 62. Retrieved from
<http://hdl.handle.net/10397/2873> (10B)

Lobato, G., Moraes, C., Dias, S., & Reichenheim, M. (2011). Postpartum depression according to time frames and sub-groups: a survey in primary health care settings in Rio de Janeiro, Brazil. *Archives of Women's Mental Health*, 14, 187-193. doi:10.1007/s00737-011-0206-6

Lox, C. L., & Treasure, D. C. (2000). Changes in feeling states following aquatic exercise during pregnancy. *Journal of Applied Social Psychology*, 30, 518-527. doi:10.1111/j.1559-1816.2000.tb02494.x

Lumley, J., & Austin, M.-P. (2001). What interventions may reduce postpartum depression. *Current Opinion in Obstetrics and Gynecology*, 13, 605-611. doi:<http://dx.doi.org/10.1097/00001703-200112000-00009>

MacArthur, C., Winter, H., Bick, D. E., Knowles, H., Lilford, R., & Lancashire, R. J. (2002). Effects of redesigned community postnatal care on women's health 4 months after birth: A Cluster Randomized Controlled Trial. *Lancet*, 9304, 378-385. Retrieved from Retrieved from <http://web.ebscohost.com>

Macera, C., Ham, S., & Yore, M. (2005). Prevalence of physical activity in the United States: Behavioural Risk Factor Surveillance System. *Preventive Chronic Disease*, 2, 1-10. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Maloney, D. (1998). Postnatal depression: a study of mothers in the metropolitan area of Perth, Western Australia. *Australian College of Midwives*, 11(2), 18-23. doi:10.1016/S1031-170X(98)80030-5

Martin Ginis, K., Burke, S., & Gauvin, L. (2007). Exercising with others exacerbates the negative effects of mirrored environments on sedentary women's feeling state. *Psychology and Health*, 22, 945-962. doi:10.1080/14768320601070571

Mathers, C., Vos, E., Stevenson, C., & Begg, J. (2000). The Australian burden of disease study: Measuring the loss of health from disease, injuries and risk factors.

Medical Journal of Australia, 172, 592-596. Retrieved from http://www.mja.com.au.dbgw.lis.curtin.edu.au/public/issues/172_12_190600/mathers/mathers.html

Mc Veigh, C. A. (1997). Functional Status after childbirth in an Australian sample. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 27(4), 402-409. doi:10.1111/j.1552-6909.1998.tb02664.x

McClement, S. E., & Woodgate, R. L. (1998). Research with families in palliative care: conceptual and methodological challenges. *European Journal of Cancer Care*, 7, 247-254. doi:10.1046/j.1365-2354.1998.00108.x

McCrory, M. (2001). Does dieting during lactation put infant growth at risk? *Nutrition Reviews*, 59, 18-21.

Retrieved from <http://web.ebscohost.com.dbgw.lis.curtin.edu.au>

McIntosh, J. (1993). Postpartum Depression: Women's help seeking behaviour and perception of cause. *Journal of Advanced Nursing*, 18, 178-184. doi:10.1046/j.1365-2648.1993.18020178.x

Meeusen, R., & De Merleir, K. (1995). Exercise and brain neurotransmission. *Sports Medicine* 20, 160-188.

Retrieved from Retrieved from <http://ovidsp.tx.ovid.com>

Milgrom, J. G., A, Bliszta, J., Hayes, B., Barnett, B., Brooks, J., Erickson, J., et al. (2008). Antenatal risk factors for postnatal depression: a large prospective study. *Journal of Affective Disorders*, 108, 147-157.

doi:10.1016/j.jad.2007.10.014

Misri, S., Kostaras, X., Fox, D., & Kostaras, D. (2000). The impact of partner support in the treatment of postpartum depression. *Canadian Journal of Psychiatry- Revue Canadienne De Psychiatrie* 45(6), 554-558. Retrieved from retrieved from Canadian Psychiatry Association

<http://publications.cpa-apc.org/browse/documents/3>

Moraes, I., Pinheiro, R., Silva, R., Horta, B., Sousa, P., & Faria, A. (2006). Prevalence of postpartum depression and associated factors. *Revista de Saúde Pública* 40, 65-70. doi:<http://dx.doi.org/10.1590/S0034-89102006000100011>

Moran, C., Holt, V., & Martin, D. (1997). What do women want to know after childbirth? *Birth*, 24, 27-34. doi:10.1111/j.1523-536X.1997.00027.pp.x

Morse, J. M. (2003). *Principles of mixed methods and multimethod research design*. California: Sage Publication.

Mottola, M. (2002). Exercise in the postpartum period: Practical Applications. *Current Sport Medicine Reports*, 1, 362-368.

Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Mottola, M., & Campbell, M. (2003). Activity patterns during pregnancy. *Canadian Journal of Applied Physiology* 28, 642-653.

Retrieved from <http://www.ncbi.nlm.nih.gov/guide/>

Munck-Olsen, T., Laursen, T., Pedersen, C., Mors, O., & Mortensen, P. (2006). New parents and mental disorders: a population based register study. *The Journal of American Medical Association*, 296, 2582-2589.

doi:10.1001/jama.296.21.2582

Murray, C., & Lopez, A. (1996). *A comprehensive assessment of mortality and disability from disease, injuries, and risk factors in 1990 and projected to 2020* Cambridge: Harvard University Press.

Nabkasorn, C., Miyai, N., Sootmongkol, A., Junprasert, S., Yamamoto, H., Arita, M., et al. (2006). Effects of physical exercise on depression, neuroendocrine stress hormones and physiological fitness in adolescent females with depressive symptoms *The European Journal of Public Health*, 16(2), 179-184. doi:10.1093/eurpub/cki159

National Health and Medical Research Council. (2000). Postnatal depression: A systematic review of published scientific literature to 1999. from National Health and Medical Research Council,

National Institute for Clinical Excellence. (2004). *Depression: Management of depression in primary and secondary care*. London.

National Institute for Clinical Excellence. (2007). *Antenatal and Postnatal mental health*. London.

National Institute for Health and Clinical Excellence. (2006). *Antenatal and postnatal mental health.Clinical management and service guidance*. London.

Netz, Y., Wu, M., Becker, B., & Tenenbaum, G. (2005). Physical activity and psychosocial well-being in advanced age: a meta-analysis of intervention studies *Psychology of Aging, 20*(2), 272-284.

Retrieved from <http://www.ncbi.nlm.nih.gov/guide/>

Nhiwatiwa, S., Patel, V., & Acuda, W. (1998). Predicting postnatal mental disorder with a screening questionnaire: a prospective cohort study from Zimbabwe. *Journal of Epidemiology and Community Health, 52*, 262-266.

doi:10.2307/25568665

Nielsen, T., Wraae, K., Brixen, K., Hermann, A., Andersen, M., & Hagen, G. (2006). Prevalence of overweight, obesity, and physical inactivity in 20- to 29-year-old, Danish men. Relation to socioeconomic status: the Odense Androgen Study. *International Journal of Obesity, 30*, 805-815.

doi:10.1038/sj.ijo.0803197

Norman, E., Sherburn, M., Osborne, R., & Galea, M. (2010). An Exercise and Education Program Improves Well-Being of New Mothers: A Randomized Controlled Trial. *Physical Therapy, 90*, 348-355. doi:10.2522/ptj.20090139

O'Hara, M. (1995). *Postpartum depression: causes and consequences*. New York.

O'Hara, M., & Swain, A. (1996). Rates and risk of postpartum depression- a meta analysis. *International Review of Psychiatry, 8*, 37-54. Retrieve from <http://informahealthcare.com>. doi:095pO261/96/010037-18 0

O'Hara, M. (1997). *The nature of postpartum depressive disorders*. New York: Guilford.

O'Hara, M. (2009). Postpartum depression: what we know. *Journal of Clinical Psychology, 65*(12), 1258-1269. doi:10.1002/jclp.20644

- Oldervoll, L., Kaasa, S., Hjermstad, M., Lund, J., & Loge, J. (2004). Physical exercise results in the improved subjective well-being of a few or is effective rehabilitation for all cancer patients? *European Journal of Cancer*, 40(7), 951-962. doi:10.1016/j.ejca.2003.12.005
- Özbaoraran, F., Çoban, A., & Kucuk, M. (2011). Prevalence and risk factors concerning postpartum depression among women within early postnatal periods in Turkey. *Archives of Gynecology and Obstetrics*, 283, 483-490. doi:10.1007/s00404-010-1402-8
- Paskiewicz, L. (2001). Pregnant adolescents and their mothers: A shared experience of teen mothering. *The American journal of Maternal Child Nursing*, 26(1), 33-38. Retrieved from <http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>
- Patel, V., Rodrigues, M., & Desouza, N. (2002). Gender, Poverty, and Postnatal depression in GOA, India. *The American Journal of Psychiatry*, 159(1), 43-47. Retrieved from
<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>
- Patton, M. Q. (2002). *Qualitative research and evaluation methods* (Vol. 3rd edition). California: Sage publications.
- Penrod, J. D., & Morrison, S. R. (2004). Challenges for palliative care research. *Journal of Palliative Medicine*, 7(3), 398-402.
doi:10.1089/1096621041349392
- Peveler, R., Carson, A., & Rodin, G. (2002). ABC of psychological medicine: depression in medical patients. *British Medical Journal*, 325, 149-152.
- Poudevigne, M., & O'Connor, P. (2005). Physical activity, mood and self-esteem during pregnancy. *Medicine and Science in Sport and Exercise*, 37, 1374-1380.
doi:10.1249/01.mss.0000174907.27818.f
- Rahman, A., Iqbal, Z., & Harrington, R. (2003). Life events, social supprt and depression in childbirth: Prospective from a rural community in developing world. *Psychological Medicine*, 33, 1161-1167.

doi:10.1017/S0033291703008286

Ransdell, L. B., & Wells, C., L. (1998). Physical activity in urban white, African-American, and Mexican-American women. *Medicine and Science in Sport and Exercise*, 30(11), 1068-1615. Retrieved from

<http://ovidsp.tx.ovid.com.dbgw.lis.curtin.edu.au>

Reed, J., & Ones, D. (2006). The effect of acute aerobic exercise on positive activated affect: A meta-analysis. *Psychology of Sport and Exercise*, 7, 477-514. doi:10.1016/j.psychsport.2005.11.003.

Rholes, W., Simpson, J., & Friedman, M. (2006). Avoidant attachment and the experience of parenting *Personality and Social Psychology Bulletin*, 32, 275-285. doi:10.1177/0146167205280910

Richards, M. (2000). Commentary: assessing women's well-being and social and emotional needs in pregnancy and the postpartum field. *Birth: Issues in Perinatal Care*, 27(2), 102-103. Retrieved from

<http://www.ncbi.nlm.nih.gov/pubmed>

Righetti-Velteme, M., Conne-Perreard, Bousquet, A., & Mazano, J. (2002). Postpartum depression and mother infant relationship at 3 months old. *Journal of Affective Disorder*, 70, 291-306.

doi:10.1016/S0165-0327(01)00367-6

Robertson, E., Grace, S., Wallington, T., & Stewart, D. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry* 26, 289-295. doi:10.1016/j.genhosppsych.2004.02.006

Robertson, E., Jones, I., Haque, S., Holder, R., & Craddock, N. (2005). Risk of puerperal and non-puerperal recurrence of illness following bipolar affective puerperal (postpartum) psychosis. *British Journal of Psychiatry*, 186, 258-259. doi:10.1192/bjp.186.3.258

Rubertsson, C., Waldenstrom, U., & Wickberg, B. (2003). Depressive mood in early pregnancy: prevalence and women at risk in a national Swedish sample. *Journal of Reproductive and Infant Psychology*, 21(2), 113-123.

doi:10.1080/0264683031000124073

Ruby, M., Dunn, E., Perrino, A., Gillis, R., & Viel, S. (2011). The invisible benefits of exercise. *Health Psychology, 30*(1), 67-74. doi:10.1037/a0021859

Ruschi, G., Sun, S., Mattar, R., ChambôFilho, A., Zandonade, E., & Lima, V. (2007). Postpartum depression epidemiology in Brazilian sample *Rev Psiquiatr Rio Gd Sul, 29*, 274-280.

doi:<http://dx.doi.org/10.1590/S0101-81082007000300006>

Sallis, J. F., Kraft, K., & Linton, L. (2002). How the environment shapes physical activity: A transdisciplinary research agenda. *American Journal of Preventive Medicine, 22*(208)

Salmon, P. (2001). effects of physical exercise on anxiety, depression, and sevsitity to stress: A unifying theory *Clinical Psychology Review, 21*(1), 33-61. doi:10.1016/S0272-7358(99)00032-X

Sampselle, C. M., Seng, J., Yeo, S., Killion, C., & Oakley, D. (1999). Physical activity and postpartum well-being. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 28*, 41-49. doi:10.1111/j.1552-6909.1999.tb01963.x.

Schechtman, K., & Ory, M. (2001). The effects of exercise on the quality of life of frail older adults: a preplanned meta-analysis of the FICSIT trials. *Annals of behavioural Medicine, 23*(3), 186-197. doi:10.1207/S15324796ABM2303_6

Schmitz, N., Kruse, J., & Kugler, J. (2004). The association between physical exercises and health-related quality of life in subjects with mental disorders: Results from a cross sectional survey. *Preventive Medicine, 39*(6), 1200-1207.

Schumm, W., Anderson, S., Benegas, J., McCutchen, M., Griffin, C., Morris, J., et al. (1985). Criterion-related validity of the Kansas Marital Satisfaction Scale. *Psychological Reports, 56*, 719-722.

Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Schumm, W., Paff-Bergen, L., Hatch, R., Obiorah, F., Copeland, J., Meens, L., et al. (1986). Concurrent and discriminant validity of the Kansas Marital Satisfaction Scale *Journal of Marriage and The Family, 48*, 381-387.

doi:10.2307/352405

Seimyr, L., Edhborg, M., Lundh, W., & Sjogren, B. (2004). In the shadow of maternal depressed mood: experiences of parenthood during the first year after childbirth. *Journal of Psychosomatic Obstetrics and Gynecology*, 25, 23-34. Retrieved from

[http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJT
PTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1](http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1)

Sharpley, C., & Cross, D. (1982). A psychometric evaluation of the Spainer Dyadic Adjustment Scale. *Journal of Marriage and Family*, 44, 739-741. Retrieved from <http://www.jstor.org/stable/351594>

Singh-Manoux, A., Clarke, P., & Marmot, M. (2002). Multiple measurers of socioeconomic position and psychosocial health: proximal and distal measurers. *International Journal of Epidemiology*, 31(6), 1192-1199. doi:10.1093/ije/31.6.1192

Sjosten, N., & Kivela, S. (2006). The effects of physical exercises on depressive symptoms among the aged: Asystematic review *International Journal of Geriatric Psychiatry*, 21, 410-418. doi:10.1002/gps.1494

Smith, B. J., Cheung, N. W., Bauman, A. E., Zehle, K., & Mclean, M. (2005). Postpartum physical activity and related psychosocial factors among women with recent gestational diabetes mellitus *Diabetes Care*, 28(11), 2650-2654. Retrieved from [http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJT
PTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1](http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1)

Sobotkova, D., & Stembera, Z. (2003). Psychological aspects in perinatal medicine 1980-2000: III. The postnatal period. *Ceska Gynekologie*, 68(6), 385-389. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Spainer, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*, 38(1), 15-28. doi:10.2307/350547

Stahl, T., Rutten, A., & Nutbeam, D. (2001). The importance of the social environment for physically active lifestyle- results from an international study. *Social Science and Medicine*, 52, 1-10.

doi:10.1016/S0277-9536(00)00116-7

Stathopoulou, G., Powers, M., Berry, A., Smits, A., & Otto, M. (2006). Exercise interventions for mental health: A quantitative and qualitative review. *Clinical Psychology: Science and Practice*, 13(2), 179-193.

doi:10.1111/j.1468-2850.2006.00021.x

Stein, M. (2005). Sweating away the blues. Can exercise treat depression? *American Journal of Preventive Medicine*, 28, 1. doi:10.1016/j.amepre.2004.09.024

Sternfeld, B., Ainsworth, B. E., & Quesenberry, J. (1999). Physical activity patterns in a diverse population of women *Journal of Preventive Medicine*, 28, 313-323.
doi:10.1006/pmed.1998.0470

Strang, P. (2000). Qualitative research methods in palliative medicine and palliative oncology- an introduction. *Acta Oncologica*, 39(8), 911-917.

doi:10.1080/02841860050215873

Stretcher, V., & Rosenstock, I. (1997). *Health behavior and health education*. San Francisco.

Swamy, G., & Østbye, T. (2008). Association of Preterm Birth With Long-term Survival, Reproduction, and Next-Generation Preterm Birth. *The Journal of American Medical Association*, 299(12), 1429-1436.

doi:10.1001/jama.299.12.1429

Symons Downs, D., & Hausenblas, H. (2004). Women's exercise beliefs and behaviours during their pregnancy and postpartum. *Journal of Midwifery and Women's Health*, 49, 138-144. doi:10.1016/S1526-9523(03)00495-1

Symons Downs, D., & Ulbrecht, J. (2006). Gestational diabetes and exercise beliefs: an elicitation study. *Diabetes Care*, 29(2), 236-240.

doi:10.2337/diacare.29.02.06.dc05-1262

- Tanaka, H., & Shirakawa, S. (2004). Sleep health, lifestyle, and mental health in the Japanese elderly: ensuring sleep to promote a healthy brain and mind *Journal of Psychosomatic Research*, 56(5), 465-477.
doi:10.1016/j.jpsychores.2004.03.002
- Tashakkori, A., & Teddie, C. (2003). *Handbook of Mixed Methods in Social & Behavioural Research* (Vol. 224). California: Sage Publications.
- Taylor, A., Cable, N., Faulkner, G., Hillsdon, M., Narici, M., & Van der Bij, A. (2004). Physical activity and older adults: a review of health benefits and the effectiveness of interventions. *Journal of Sports Sciences*, 22(8), 703-725.
doi:10.1080/02640410410001712421
- Teychenne, M., Ball, K., & Salmon, J. (2008). Physical activity and likelihood of depression in adults: A review. *Preventive Medicine*, 46, 397-411.
doi:10.1016/j.ypmed.2008.01.009
- Thornton, P., Kieffer, E., & Salabarria-Pena, Y. (2006). Weight, diet, and physical activity related beliefs and practices among pregnant and postpartum Latino women: the role of social support. *Maternal and Child Health Journal*, 10, 95-104.
doi:10.1007/s10995-005-0025-3
- Treuth, M., Butte, N., & Puyau, M. (2005). Pregnancy-related changes in physical activity, fitness, and strength. *Medicine and Science in Sport and Exercise*, 37(5), 832-837. doi:10.1249/01.MSS.0000161749.38453.02
- Urizar, G., Hurtz, S., Ahn, D., King, A., Albright, C., & Atienza, A. (2005). Influence of maternal stress on successful participation in a physical activity intervention: The IMPACT Project. *Women and Health*, 42, 63-82.
doi:10.1300/J013v42n04_04
- Üstün, T., Ayuso-Mateos, J., Chatterji, S., Mathers, C., & Murray, C. (2004). Global burden of depressive disorders in the year 2000. *British Journal of Psychiatry*, 184, 386-392. doi:10.1192/bjp.184.5.386
- Van raaij, J., Schonk, C., Vermaat-Miedema, S., Peek, M., & Hautvast, J. (1990). Energy cost of physical activity throughout pregnancy and the first year postpartum in

- Dutch women with sedentary lifestyles. *American Journal of Clinical Nutrition*, 52, 234-239. Retrieved from
<http://www.ajcn.org.dbgw.lis.curtin.edu.au>
- Vernon, M., Young-Hyman, D., & Looney, S. (2010). Maternal stress, physical activity, and body mass index during mothers' first year postpartum. *Women and Health*, 50(6), 544-562. Retrieved from
<http://dx.doi.org/10.1080/03630242.2010.516692>.
doi:10.1080/03630242.2010.516692
- Waldenström, U. (2003). Women's memory of childbirth at two months and one year after the birth. *Birth*, 4, 248-254. Retrieved from
<http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/search/advanced?sid=ec5a79af-b3c2-42dd-a3c4-22decb52fe96%40sessionmgr104&vid=1&hid=125>
- Waldenström, U. (2004). Why do some women change their opinion about childbirth over time? *Birth*, 31(2), 102-107. Retrieved from
<http://web.ebscohost.com.dbgw.lis.curtin.edu.au/ehost/search/advanced?sid=ec5a79af-b3c2-42dd-a3c4-22decb52fe96%40sessionmgr104&vid=1&hid=125>
- Warner, R., Appleby, L., Whitton, A., & Faragher, B. (1996). Demographic and obstetric risk factors for postnatal psychiatric morbidity. *British Journal of Psychiatry*, 168, 607-611. doi:10.1192/bjp.168.5.607
- Wickberg, B., & Hwang, C. (2001). Do not minimize signs of postpartum depression! Early intervention essential to prevent negative consequences for the child. *Lakartidningen*, 98(13), 1534-1538. Retrieved from
<http://www.ncbi.nlm.nih.gov/entrez/utils/elink.fcgi?cmd=prlinks&dbfrom=pubmed&retmode=ref&id=11330150>
- Wilkinson, J., Philips, S., & Jackson, J. (2003). "Mad for fitness": an exercise group to combat a high incidence of postnatal depression. *Journal of Family Health Care*, 13, 44-48. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed>

Wolin, K., Glynn, R., Colditz, G., Lee, I., & Kawachi, I. (2007). Long-term physical activity patterns and health-related quality of life in U.S. women. *American Journal of Preventive Medicine*, 32(6), 490-499.

doi:10.1016/j.amepre.2007.02.014

Yoshida, K., Yamashita, H., Ueda, M., & Tashiro, N. (2001). Postnatal depression in Japanese mothers and the reconsideration of 'Satogaeri bunberi'. *Pediatrics International*, 43, 189-193. doi:10.1046/j.1442-200x.2001.01370.x

Young, D., Miller, K., Wilder, L., Yanek, L., & Becker, D. (1998). Physical activity patterns of urban African Americans *Journal of Community Health*, 23(2), 99-112. doi:10.1023/A:1018757307041

Zoltanick, C., Johnson, S., Miller, I., Pearlstein, T., & Howard, M. (2001). Postpartum depression in women receiving public assistance: pilot study of an interpersonal therapy oriented group intervention. *American Journal of Psychiatry*, 158, 638-640. Retrieved from

<http://proquest.umi.com.dbgw.lis.curtin.edu.au/pqdweb?RQT=302&COPT=REJTPTYzNjMmSU5UPTAmVkVSPTI=&clientId=22212&cfc=1>

Appendix A

Participant Information Sheet-Stage One

Physical activity and postpartum lifestyle

Purpose of the Research

My name is Maryam Saligheh. I am currently completing a piece of research for my Master of Philosophy in the School of Occupational Therapy and Social Work at Curtin University of Technology.

What is the research about?

I am interested in finding out about physical activity participation in mothers after delivering a baby, so we can better understand about the general levels of participation, as well as barriers and enablers to exercise participation in mothers after having a baby.

Who can participate in the study?

Any mother who has delivered a baby within the last 12 months, and whose baby was not born earlier than 34 weeks

What information will I be asked to provide?

You will be given a survey to complete that asks mainly about physical activity participation, but also includes some other lifestyle, parenting and health related questions. This survey will take about 25 minutes to complete, and is made up of previously researched questionnaires.

What will happen to the information I am asked to provide?

Your involvement in the research is entirely voluntarily. Complete confidentiality will be ensured. In any publications, including the thesis, or presentations that arise from this

research, no names or personal details will be identified, as information will be grouped for reporting. According to university policy the information you provide will be kept in a locked cabinet for five years, before it is destroyed, and only accessible to the researchers.

What are the risks or benefits to me?

There are no anticipated risks, but neither will you benefit directly at this time. However, your participation will contribute to the development of a specific exercise program to help mothers who struggle with exercise or postnatal depression after delivering a baby.

Completing the questionnaires and sending them back to the researcher means that you have given your permission for your information to be used in the research

Enclosed you will find the questionnaire and a reply paid envelope and please return the survey by placing it in a reply pre-paid envelope and post it to the researcher within 14 days

Who do I contact if I have any question or want further information?

You are welcome to contact any of the investigators of this research project:

Mrs. Maryam Saligheh on (08) 92661789, 0413066311 or Email:

Maryam.saligheh@postgrad.curtin.edu.au

Professor Beverley McNamara on (08)92667982 or Email:bev.mcnamara@curtin.edu.au

Thank you for your time and assistance.

This study has been approved by the Curtin University Human Research Ethics Committee (Approval number HR152/2009). The committee is comprised of members of public, academics, lawyers, doctors and pastoral carers. Its main role is to protect participants. If needed, verification can be obtained, or complaints made either by writing to the Curtin University Human Research Ethics Committee. C/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth 6845 or by telephoning (08) 92662784 or by emailing hrec@curtin.edu.au

Appendix B

Advertisement Sheet

An invitation to participate in an important study

Physical activity and postpartum life style

Have you delivered a baby in the last 12 months?

Are you willing to assist us to find out more about physical activity and exercise participation since having your baby?

Then we would welcome your participation in this study

Please ask child health nurse for a copy of questionnaire

Need more information

Who to contact?

You are welcome to contact either of the principal investigators of this research project:

Mrs. Maryam Saligheh on (08) 92661789, 0413066311 or Email:

Maryam.saligheh@postgrad.curtin.edu.au

OR

Professor Beverley McNamara on (08)92667982 or Email: bev.mcnamara@curtin.edu.au

Appendix C

Participant's Information Sheet- Stage two

Developing an exercise program for postpartum women

Purpose of the Research

My name is Maryam Saligheh. I am currently completing a piece of research for my Master of Philosophy in the School of Occupational Therapy and Social Work at Curtin University of Technology.

What is the research about?

I am interested in finding out the effect of some personal and environmental factors that are associated with new mothers' participation in an exercise program after delivering a baby. I hope that it will help us to understand your experience and develop an exercise program that will be helpful to new mothers.

Who can participate in the study?

Any mother who has delivered a baby within the last 12 months, whose baby was not born earlier than 34 weeks

What information will I be asked to provide?

You will be asked to take part in an interview; the interview will consist of 12 questions in regards to your feelings, physical activity, any available support, and barriers to physical activity for you as a mum. It is expected that this interview will take one hour to complete and it could be in the comfort of your own home. You are not obliged to participate in the study and you may withdraw from the study at any time.

What will happen to the information I am asked to provide?

Your involvement in the research is entirely voluntarily. Complete confidentiality will be ensured. In any publications, including the thesis, or presentations that arise from this research, no names or personal details will be identified, as information will be grouped for reporting. According to, university policy; the information will be kept in a locked cabinet for five years, before it destroyed.

The information from this study will be used to develop a manual for a physical activity program for new mothers.

What are the risks or benefits to me?

There are no anticipated risks; in this study. You may benefit from the opportunity to discuss your own physical activity needs and goals.

Who do I contact if I have any question or want further information?

You are welcome to contact either of the principal investigators of this research project:

Mrs. Maryam Saligheh on (08) 92661789 or Email: Maryam.saligheh@postgrad.curtin.edu.au

OR

Professor Beverley McNamara on (08)92667982 or Email: bev.mcnamara@curtin.edu.au

Thank you for your time and assistance.

This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification can be obtained, or complaints made either by writing to the Curtin University Human Research Ethics Committee, C/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth 6845 or by telephoning (08) 92662784

Appendix D

Consent Form

Developing an exercise program for postpartum women

Consent Form- Stage Two

I, (print full name) _____

Have read the participants information sheet (Stage Two) explaining the research project “Physical Activity in Postpartum Women and its Relationship to Postnatal Depression” being conducted by Maryam Saligheh. I have been given the opportunity to ask questions about this study. I feel well informed and agree to participate in the study as outlined to me.

I understand that participation is voluntary and I may withdraw at any time with-out prejudice to myself. I understand that my details will be kept confidential. All publications resulting from this study will not use identifying information, and names will be changed to protect my identity.

Contact phone: _____

Signature: _____

Date: _____

Thank you

Please return this form using the reply paid envelope provided

Appendix E

Survey Checklist

Thank you for your time

This checklist has been designed to help the research team and you to maintain the quality of research

Each package should consist of participant's information sheet, the questionnaire, and a prepaid envelope.

You have been asked to help us to distribute this to mothers who would be happy to complete our questionnaire about physical activity and postpartum lifestyle. We have specific criteria for the mothers who will be given the questionnaire.

They should:

- live in the Perth metropolitan area
- be between six weeks and 12 months postpartum
- be able to read or respond in English

They should not:

- use a wheelchair or have a physical or medical condition that would prevent them from undertaking moderate to vigorous physical activity
- have a baby with disabilities or a premature baby of less than 35 weeks gestation

You will be giving out the questionnaires to mothers as they attend the clinic. Please follow the check list to help us to keep a record of distribution.

Your name -----

Child health clinic location -----

Number of questionnaires you have been given to distribute-----

Date you received the questionnaires-----

Once you have distributed all of the questionnaires please return this sheet in the reply paid envelope.

You are welcome to contact either of the principal investigators for any further information

Mrs. Maryam Saligheh on (08) 92661789, 0413066311 or Email:
Maryam.saligheh@postgrad.curtin.edu.au

OR

Professor Beverley McNamara on (08)92667982 or Email: bev.mcnamara@curtin.edu.au

Appendix F

Survey Instruction

This page is designed to provide you with appropriate information regarding the check list which you have received with the package.

Please read this instruction and follow up the attached check list to help the progress of this research and management of your own time.

The provided check list consists of short answer questions which allow you to organize each step of distribution better. These questions will help us to provide you with further number of surveys if any required and keeping a good record of research. There are five easy steps to follow the check list

Please write:

1. The number of survey which you have received
2. The clinic location (suburb)
3. Understanding the criteria of samples (Mums)
4. Providing us with the best way of contacting you
5. To help us with the start and final date of distribution

Please respond to the questions of the check list and email the electronic copy to one of the investigators of this research

M.S Maryam Saligheh Maryam.saligheh@postgrad.curtin.edu.au

or

Professor Beverley McNamara bev.mcnamara@curtin.edu.au

Appendix G

Interview Guide

Curtin University, School of Occupational Therapy and Social Work

Physical Activity in Postpartum Women and its Relationship to Postnatal Depression

Interview Guide

- 1- How have you been feeling since the birth of your baby?
- 2- What are the priorities for a woman after child birth?
- 3- Would you consider yourself as someone who is doing moderate to vigorous activity?
- 4- What sort of activity do you do? On a daily basis/ on a weekly basis?
- 5- What sort of exercise do you enjoy?
- 6- Have you been able to do this exercise recently?
- 7- If no – why? If yes- why?
- 8- What do you think generally are the barriers to women exercising after child birth?
- 9- What do you think makes a woman start exercising after child birth?
- 10- What kinds of support do you think you need in order to exercise?
- 11- What do you think your partner needs to do to help you?
- 12- How do you think exercise could help you?

Collect demographic details have been provided in the questionnaire.

The Edinburgh Postnatal Depression Scale will be re-conducted (this was part of the original questionnaire).

Appendix H

Ethics Approval 1

memorandum	
To	A/Prof Anne Passmore, Occupational Therapy
From	A/Professor Stephan Millett, Chair, Human Research Ethics Committee
Subject	Protocol Approval HR 152/2009
Date	9 December 2009
Copy	Maryam Saligheh, Occupational Therapy Graduate Studies Officer, Faculty of Health Sciences



Office of Research and Development

Human Research Ethics Committee

TELEPHONE 9266 2784

FACSIMILE 9266 3793

EMAIL hrec@curtin.edu.au

Thank you for your application submitted to the Human Research Ethics Committee (HREC) for the project titled "*Self-Management of Physical Activity in Postpartum Women*". Your application has been reviewed by the HREC and is approved.

- You have ethics clearance to undertake the research as stated in your proposal.
- The approval number for your project is **HR 152/2009**. Please quote this number in any future correspondence.
- Approval of this project is for a period of twelve months **01-12-2009** to **01-12-2010**. To renew this approval a completed Form B (attached) must be submitted before the expiry date **01-12-2010**.
- If you are a Higher Degree by Research student, data collection must not begin before your Application for Candidacy is approved by your Faculty Graduate Studies Committee.
- The following standard statement **must be** included in the information sheet to participants:

This study has been approved by the Curtin University Human Research Ethics Committee (Approval Number HR 152/2009). The Committee is comprised of members of the public, academics, lawyers, doctors and pastoral carers. Its main role is to protect participants. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784 or by emailing hrec@curtin.edu.au.

Applicants should note the following:

It is the policy of the HREC to conduct random audits on a percentage of approved projects. These audits may be conducted at any time after the project starts. In cases where the HREC considers that there may be a risk of adverse events, or where participants may be especially vulnerable, the HREC may request the chief investigator to provide an outcomes report, including information on follow-up of participants.

The attached **FORM B** should be completed and returned to the Secretary, HREC, C/- Office of Research & Development:

When the project has finished, or

- If at any time during the twelve months changes/amendments occur, or
- If a serious or unexpected adverse event occurs, or
- 14 days prior to the expiry date if renewal is required.
- An application for renewal may be made with a Form B three years running, after which a new application form (Form A), providing comprehensive details, must be submitted.

Regards,

A handwritten signature in black ink, appearing to read "Stephan Millett".

A/Professor Stephan Millett
Chair Human Research Ethics Committee

Ethics Approval 2



Government of Western Australia
Department of Health
Child and Adolescent Health Service

Maryam Saligheh
Occupational Therapy Graduate Studies Officer
Faculty of Health Sciences
Curtin University of Technology

20/01/2010

Dear Maryam

Re: Self management of physical activity in postpartum women (phase 1)

The Child and Adolescent Community Health (CACH) Research and Evaluation Co-ordinating Committee (RECC) has approved the project re: Self management of physical activity in postpartum women (phase 1).

Please contact me on 92248066 if you have any questions.

Yours sincerely

A handwritten signature in black ink, appearing to read "Isabel Redfern".

Isabel Redfern
Chair
Research and Evaluation Co-ordinating Committee
Child and Adolescent Community Health
Child and Adolescent Health Service

20/01/2010

Appendix I

Physical Activity and Postpartum Life Style Questionnaire

Section one

This section is asking about the amount of physical activity undertaken since you had your last baby. Please tick the box that is closest to your situation.

Household and child care activities

1. Caring for a child or children under 2 years of age

- | | |
|--------------------------------------------|----------------------------------------------------------------|
| <input type="checkbox"/> 1 none | <input type="checkbox"/> 3 \geq 1 hour but < 20 hours a week |
| <input type="checkbox"/> 2 < 1 hour a week | <input type="checkbox"/> 4 \geq 20 hours a week |

2. Caring for a child or children between 2 and 5 years of age

- | | |
|--------------------------------------------|----------------------------------------------------------------|
| <input type="checkbox"/> 1 none | <input type="checkbox"/> 3 \geq 1 hour but < 20 hours a week |
| <input type="checkbox"/> 2 < 1 hour a week | <input type="checkbox"/> 4 \geq 20 hours a week |

3. Caring for a disabled child or elderly person

- | | |
|--------------------------------------------|----------------------------------------------------------------|
| <input type="checkbox"/> 1 none | <input type="checkbox"/> 3 \geq 1 hour but < 20 hours a week |
| <input type="checkbox"/> 2 < 1 hour a week | <input type="checkbox"/> 4 \geq 20 hours a week |

4. Preparing meals or cleaning up from meals on weekdays

- | | |
|---------------------------------|-------------------------------------------------------------------------------|
| <input type="checkbox"/> 1 none | <input type="checkbox"/> 2 \geq $\frac{1}{2}$ hour a day but < 1 hour a day |
| or < $\frac{1}{2}$ hour | <input type="checkbox"/> 3 \geq 1 hour but < $1\frac{1}{2}$ hours a day |
| | <input type="checkbox"/> 4 \geq $1\frac{1}{2}$ hours but < 2 hours |
| | <input type="checkbox"/> 5 \geq 2 hours a day |

5. Preparing meals or cleaning up from meals on weekends?

- | | |
|------------------------------------|-----|
| <input type="checkbox"/> 1 none or | day |
| < $\frac{1}{2}$ hour a | |

- | | |
|--------------------------------------------------------------|------------------------------------------------------------|
| <input type="checkbox"/> 2 ≥ ½ hour a day but < 1 hour a day | <input type="checkbox"/> 3 ≥ 1 hour but < 1 ½ hours a day |
| | <input type="checkbox"/> 4 ≥ 1 ½ hours but < 2 hours a day |
| | <input type="checkbox"/> 5 ≥ 2 hours a day |

6. Doing major cleaning, such as shampooing carpets, washing floors, walls or windows

- | | |
|------------------------------------------------------------|----------------------------------------------|
| <input type="checkbox"/> 1 Never or less than once a month | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 Once a week |

- | | |
|-----------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 2 Once a month | <input type="checkbox"/> 5 More than once a week |
|-----------------------------------------|--------------------------------------------------|

7. Doing routine cleaning such as dusting, laundry, vacuuming or changing linen

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 Never or less than once a month | <input type="checkbox"/> 2 Once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 Once a week |
| | <input type="checkbox"/> 5 More than once a week |

8. Going grocery shopping and pushing a shopping cart?

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 Never or less than once a month | <input type="checkbox"/> 2 Once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 Once a week |
| | <input type="checkbox"/> 5 More than once a week |

9. Doing gardening or yard work, such as mowing the lawn or raking leaves

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 Never or less than once a month | <input type="checkbox"/> 2 Once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 Once a week |
| | <input type="checkbox"/> 5 More than once a week |

10. Doing heavy outdoor work, such as heavy gardening

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 Never or less than once a month | <input type="checkbox"/> 2 Once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 Once a week |
| | <input type="checkbox"/> 5 More than once a week |

11. Doing major home decorations or repairs, such as plumbing, tiling, painting or building

- | |
|-----------------------------------------------|
| <input type="checkbox"/> 1 Never or less than |
|-----------------------------------------------|

- | | |
|-----------------------------------------|--------------------------------------------------|
| once a month | <input type="checkbox"/> 3 2-3 times a month |
| <input type="checkbox"/> 2 Once a month | <input type="checkbox"/> 4 Once a week |
| | <input type="checkbox"/> 5 More than once a week |

Occupational activities

12. What is your occupation? (If more than one job, describe your occupation for the job with the most hours worked per week currently, e.g. childcare, home duties, paid employment).

13. What are your most important specific tasks or duties, other than emotional care?
(For example, childcare, keeping account books, laundry)

1. _____
2. _____
3. _____

14. In comparison with other women your age, do you think your work is physically---

1 much lighter 2 lighter 3 the same as 4 heavier 5 much heavier

15. After work, are you physically tired-----

1 never 2 seldom 3 sometimes 4 often 5 always

16. When you are working at your current occupation how often do you do each of the following:

- | | | | | | |
|------------------------------------------------|----------------------------------|-----------------------------------|--------------------------------------|----------------------------------|-----------------------------------|
| <input type="checkbox"/> 1 sit | <input type="checkbox"/> 1 Never | <input type="checkbox"/> 2 Seldom | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 4 Often | <input type="checkbox"/> 5 Always |
| <input type="checkbox"/> 2 stand | <input type="checkbox"/> 1 Never | <input type="checkbox"/> 2 Seldom | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 4 Often | <input type="checkbox"/> 5 Always |
| <input type="checkbox"/> 3 walk | <input type="checkbox"/> 1 Never | <input type="checkbox"/> 2 Seldom | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 4 Often | <input type="checkbox"/> 5 Always |
| <input type="checkbox"/> 4 lift heavy loads | <input type="checkbox"/> 1 Never | <input type="checkbox"/> 2 Seldom | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 4 Often | <input type="checkbox"/> 5 Always |
| <input type="checkbox"/> 5 sweat from exertion | <input type="checkbox"/> 1 Never | <input type="checkbox"/> 2 Seldom | <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 4 Often | <input type="checkbox"/> 5 Always |

Active Living Habits

17. How many minutes a day do you usually walk and / or bicycle to and from work, school or errands since having your baby?

1 <5 or 2 ≥5 but <15 or 3 ≥15 but <30 or 4 ≥30 but <45 or

5 >45

18. Did you watch television?

- | | |
|------------------------------------------|-----------------------------------------------------------------|
| <input type="checkbox"/> 1 <1hour a week | <input type="checkbox"/> 2 ≥ 1 hour a week but <1 hour a day or |
| | <input type="checkbox"/> 3 ≥1 hour a day but < 2 hours a day or |
| | <input type="checkbox"/> 4 ≥ 2hours a day but <4 hours a day or |
| | <input type="checkbox"/> 5 ≥ 4 hours a day |

19. Did you walk (for at least 15 minutes at a time)?

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 never or less than once a month | <input type="checkbox"/> 2 once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 once a week |
| | <input type="checkbox"/> 5 more than once a week |

20. Did you bike (for at least 15 minutes at a time)?

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 never or less than once a month | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 once a week |
| | <input type="checkbox"/> 5 more than once a week |
| <input type="checkbox"/> 2 once a month | |

Participation in sport and exercise since having your baby

21. In comparison with other women of your own age, do you think your recreational physical activity is----

- 1 much less 2 less 3 same as 4 more 5 much more

22. Did you play sports or exercise?

- | | |
|------------------------------------------------------------|--------------------------------------------------|
| <input type="checkbox"/> 1 never or less than once a month | <input type="checkbox"/> 2 once a month |
| | <input type="checkbox"/> 3 2-3 times a month |
| | <input type="checkbox"/> 4 once a week |
| | <input type="checkbox"/> 5 more than once a week |

23. Did you sweat from exertion during sports or exercise?

- 1 never or less 2 once a month
 than once a 3 2-3 times a month
 month 4 once a week
 5 more than once a week

24. Did you participate in any of these activities or in any other similar activities not included in the list? 1 Yes 2 No

25. Please tick the activity or activities that you have participated in since having your baby or specify the activity if it is not on the list.

- | | | | |
|--------------------------------------------|----------------------------------------------|-------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Netball | <input type="checkbox"/> 2 Volleyball | <input type="checkbox"/> 3 Swimming | <input type="checkbox"/> 4 Water polo |
| <input type="checkbox"/> 5 Track and Field | <input type="checkbox"/> 6 Cycling | <input type="checkbox"/> 7 Golf | <input type="checkbox"/> 8 Jogging |
| <input type="checkbox"/> 9 Running | <input type="checkbox"/> 10 Weight Training | <input type="checkbox"/> 11 Tennis | <input type="checkbox"/> 12 Pram walking |
| <input type="checkbox"/> 13 Pilates | <input type="checkbox"/> 14 Cardiac exercise | <input type="checkbox"/> 15 Walking | <input type="checkbox"/> 16 Basketball |
| <input type="checkbox"/> 17 Gym circuit | <input type="checkbox"/> 18 Yoga | | |

Other please specify-----

26. Which sport or exercise did you do most frequently? (specify one only)

27. How many months since having your baby did you this activity?

- 1 <1 or 2 1-3 or 3 4-6 or 4 7-9 or 5 >9 Months

28. How many hours a week did you usually do this activity?

- 1 <1 or 2 ≥1 but <2 or 3 ≥2 but <3 or 4 ≥3 but <4 or 5 ≥4

29. Did you do any other exercise or play any other sport since having your baby?

- 1 Yes 2 No

If yes, please continue answering with following questions

30. What was the second most frequent sport or exercise you did? (specify one only)

31. How many months since having your baby did you do this activity?

- 1 <1 or 2 >1-3 or 3 4-6 or 4 7-9 or 5 >9

32. How many hours a week did you usually do this activity?

- 1 <1 or 2 ≥1 but <2 or 3 ≥2 but <3 or 4 ≥3 but <4 or 5 ≥4

Section two

This section asks about your experience of being a mum since you had your last baby. Please tick the box that is closest to your situation.

Here is an example already completed:

e.g. I am confident about holding my baby

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

This would mean “I feel confident about holding my baby some of the time”.

Please complete the other questions in the same way¹.

1. I am confident about feeding my baby

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

2. I can settle my baby

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

¹Development of an instrument to assess perceived self-efficacy in the parents of infants
Rudi Crncec, Bryanne Barnett, Stephen Matthey, *Research in Nursing and Health* (2008), 31,
442-453

3. I am confident about helping my baby to establish a good sleep routine

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

4. I know what to do when my baby cries

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

5. I understand what my baby is trying to tell me

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

6. I can soothe my baby when he/she is distressed

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

7. I am confident about playing with my baby

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

8. If my baby has a common cold or slight fever, I am confident about handling it

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

9. I feel sure that my partner will be there when I need support

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

10. I am confident that my baby is doing well

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

11. I can make decisions about the care of my baby

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

12. Being a mother is very stressful for me

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

13. I feel I am doing a good job as a mother

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

14. Other people think I am doing a good job as a mother

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

15. I feel sure that people will be there for me when I need support

- 1 No, hardly ever
- 2 No, not very often
- 3 Yes, some of the time
- 4 Yes, most of the time

Section three

This section is about support available from a confidante, parents and partner.

Please tick the box that best describes the support that you receive.

1. Is there any one in particular you confide in or talk to about yourself or your problems?

- 1 Yes 2 No Identify the name/ initials of that person here-----

2. Which of your parents are you most able to confide in and talk to about yourself and your problems?

- 1 Mother 2 Father

3. Can you rely on this **person (See Q1)** for help in doing things when you may need it, such as assisting on the job, helping with household tasks, providing personal or family care (for example, baby-sitting), or even lending money?

- a. confidante b. parent c. partner d. sibling

- 1 No 4 Usually
- 2 Rarely 5 Always
- 3 Sometimes 6 Don't know
- 7 No person

4. Can you turn to this person for emotional support when you need it?

- a. confidante b. parent c. partner d. sibling

- 1 No 4 Usually 7 No person
- 2 Rarely 5 Always
- 3 Sometimes 6 Don't know

5. Can this person rely on you for help in doing things when he/she may need it, such as assisting on the job, helping with household tasks, providing personal or family care (for example, baby-sitting) or even lending money?

a. confidante b. parent c. partner d. sibling

1 No 4 Usually 7 No person

2 Rarely 5 Always

3 Sometimes 6 Don't know

6. Can this person turn to you for emotional support when he/she may need it?

a. confidante b. parent c. partner d. sibling

1 No 4 Usually 7 No person

2 Rarely 5 Always

3 Sometimes 6 Don't know

7. In general, since you had your baby, has your association with this person made your life easier (or more enjoyable) or more difficult (or more burdensome)?

a. confidante b. parent c. partner d. sibling

1 No 4 Usually 7 No person

2 Rarely 5 Always

3 Sometimes 6 Don't know

8. When you have problems or troubles, do you talk them over with this person?

a. confidante b. parent c. partner d. sibling

1 Always 4 Rarely

2 Usually 5 Never

3 Sometimes 6 No person

9. Do you feel free to talk about anything you wish with this person?

a. confidante b. parent c. partner d. sibling

1 Very free 4 Not very free

2 Somewhat free 5 Not at all free

3 Moderately free 6 No person

10. Does this person tell you about his / her problems?

a. confidante b. parent c. partner d. sibling

- 1 Always 4 Rarely
 2 Usually 5 Never
 3 Sometimes 6 No person

11. Is this person there when you need him / her?

a. confidante b. parent c. partner d. sibling

- 1 Always 3 Sometimes
 2 Usually 4 Rarely
 5 Never
 6 No person

12. Do you anticipate being able to rely on this person for help with childcare?

a. confidante b. parent c. partner d. sibling

- 1 All of 3 About half the time
the time 4 Occasionally
 2 Frequently 5 Never
 6 No person

13. In general, do you feel there is someone you can turn to in times of need?

- 1 Always 4 Rarely
 2 Usually 5 Never
 3 Sometimes

14. Are you ever hesitant (or reluctant) to ask for help from family and / or friends when you may need it?

- 1 Always 4 Rarely
 2 Usually 5 Never
 3 Sometimes

15. Generally speaking, when you may need help in doing something, or advice, information, support, etc, do you turn to the people available to you?

- | | |
|--------------------------------------|-------------------------------------------|
| <input type="checkbox"/> 1 Always | <input type="checkbox"/> 4 Rarely |
| <input type="checkbox"/> 2 Usually | <input type="checkbox"/> 5 Never |
| <input type="checkbox"/> 3 Sometimes | <input type="checkbox"/> 6 Not applicable |

16. In general, how satisfied are you with the help / support provided by the people available to you?

- | | |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <input type="checkbox"/> 1 Very satisfied | <input type="checkbox"/> 2 Somewhat satisfied |
| <input type="checkbox"/> 3 Neither satisfied or dissatisfied | <input type="checkbox"/> 4 Somewhat dissatisfied |
| <input type="checkbox"/> 5 Very dissatisfied | <input type="checkbox"/> 6 Not applicable, has no one available or does not use them |

Section four

This section is asking about the barriers that you may have faced in engaging in physical activity and exercise since having your baby. Please tick the box which describes your condition best.

1. Lack of self-confidence

- | | | |
|------------------------------------------|------------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Not a problem | <input type="checkbox"/> 2 Minor problem | <input type="checkbox"/> 3 Major problem |
|------------------------------------------|------------------------------------------|------------------------------------------|

2. Lack of information

- | | | |
|------------------------------------------|------------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Not a problem | <input type="checkbox"/> 2 Minor problem | <input type="checkbox"/> 3 Major problem |
|------------------------------------------|------------------------------------------|------------------------------------------|

3. Lack of knowledge about how to get involved

- | | | |
|------------------------------------------|------------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Not a problem | <input type="checkbox"/> 2 Minor problem | <input type="checkbox"/> 3 Major problem |
|------------------------------------------|------------------------------------------|------------------------------------------|

4. Lack of interesting social options/ activities/ venues

- | | | |
|------------------------------------------|------------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Not a problem | <input type="checkbox"/> 2 Minor problem | <input type="checkbox"/> 3 Major problem |
|------------------------------------------|------------------------------------------|------------------------------------------|

5. Child care responsibilities

- | | | |
|------------------------------------------|------------------------------------------|------------------------------------------|
| <input type="checkbox"/> 1 Not a problem | <input type="checkbox"/> 2 Minor problem | <input type="checkbox"/> 3 Major problem |
|------------------------------------------|------------------------------------------|------------------------------------------|

6. Other caring responsibilities (e.g., elderly, persons with a disability, ill, etc.)

1 Not a problem 2 Minor problem 3 Major problem

7. Personal disability or physical or mental health issues

1 Not a problem 2 Minor problem 3 Major problem

8. Lack of money

1 Not a problem 2 Minor problem 3 Major problem

9. Lack of time

1 Not a problem 2 Minor problem 3 Major problem

10. Lack of sufficient private/public transport

1 Not a problem 2 Minor problem 3 Major problem

11. No one to go with

1 Not a problem 2 Minor problem 3 Major problem

12. Partner support

1 Not a problem 2 Minor problem 3 Major problem

13. Poor access to the public/private facilities for exercise

1 Not a problem 2 Minor problem 3 Major problem

14. Not very good at managing my time

1 Not a problem 2 Minor problem 3 Major problem

15. No nearby parks/gardens

1 Not a problem 2 Minor problem 3 Major problem

16. Neighbourhood safety

1 Not a problem 2 Minor problem 3 Major problem

17. Pregnancy weight gain

1 Not a problem 2 Minor problem 3 Major problem

18. Not interested in participating in physical activity

1 Not a problem 2 Minor problem 3 Major problem

19. Has your level of physical activity been changed since having your baby?

1 Yes 2 No

20. How would you describe the level of your physical activity since having your baby?

1 extremely inactive 2 sedentary 3 moderately active

4 vigorously active

21. Other barriers (Please describe)

Section five

As you have recently had a baby we would like to know how you are feeling and what are your experiences of the postpartum period. Please tick the box that comes closest to how you felt in the past 7 days, not just how you feel today.

Here is an example, already completed.

I have felt happy:

- 1 Yes, all the time
 2 Yes, most of the time
 3 No, not very often
 4 No, not at all

This would mean: "I have felt happy most of the time" during the past week.

1. I have been able to laugh and see the funny side of things

- 1 As much as I always could 2 Not quite so much now
 3 Definitely not so much now 4 Not at all

2. I have looked forward with enjoyment to things

- 1 As much as I ever had 2 Rather less than I used to
 3 Definitely less than I used to 4 Hardly at all

3. I have blamed myself unnecessarily when things went wrong

- 1 Yes, most of the time 2 Yes, some of the time
 3 Not very often 4 No, never

4. I have been anxious or worried for no good reason

- 1 No, not at all 2 Hardly ever
 3 Yes, sometimes 4 Yes, very often

5. I have felt scared or panicky for no very good reason

- 1 Yes, quite a lot 2 Yes, sometimes
 3 No, not much 4 No, not at all

6. Things have been getting on top of me

- 1 Yes, most of the time I haven't been able to cope at all
 2 Yes, sometimes I haven't been coping as well as usual
 3 No, most of the time I have coped quite well
 4 No, I have been coping as well as ever

7. I have been so unhappy that I have had difficulty sleeping

- 1 Yes, most of the time 2 Yes, sometimes
 3 Not very often 4 No, not at all

8. I have felt sad or miserable

- 1 Yes, most of the time 2 Yes, quite often
 3 Not, very often 4 No, not at all

9. I have been so unhappy that I have been crying

- 1 Yes, most of the time 2 Yes, quite often
 3 Only occasionally 4 No, never

10. The thought of harming myself has occurred to me

- 1 Yes, quite often 2 Sometimes
 3 Hardly ever 4 Never

Section Six

This section is about you. Please answer the questions and tick the box that best describes you.

Your age: **Baby's age:** **Ethnic/cultural background:**

Number of children including baby:

1. What is your marital status?

- 1 Married 2 Single 3 De facto
 4 Divorced 5 Separated 6 Widowed

2. What is the highest level of education you have completed?

- 1 Postgraduate 2 Undergraduate 3 College
 4 Vocational/ technical school 5 Secondary school
 6 Primary School

3. Are you currently in paid-employment?

- 1 Yes 2 No (If Yes please answer question 4)

4. What is your current employment position?

- 1 Full-time 2 Part-time 3 Casual

5. Which income bracket best describes your household?

- 1 >\$120,000 2 \$75,000 to \$119,000 3 \$45,000 to \$74,000
 4 \$15,000 to \$44,999 5 \$10,000 to \$14,999
 6 \$5,000 to less than \$9,999 7 \$1 to less than \$5,000
 8 Don't know

6. What is your postcode? (Please write in the space provided)

7. Do you have access to a local park?

- 1 Yes 2 No

8. Which type of accommodation below best describes your current place of living?

- 1 Studio 2 Unit 3 Flat/ Apartment 4 House