

**Provider and participant views and experiences of the ESTEEM dietary intervention
for pregnant women with metabolic risk factors: a qualitative study**

Edith Adela Anne Hamilton

Master of Education (Management) OU

Bachelor of Science (Health Studies) QUB

Post-Graduate Diploma in Health Service Leadership (Darzi Fellow) (Leeds)

A thesis submitted in partial fulfilment of the degree of Doctor of Philosophy

Barts and the London School of Medicine and Dentistry

Queen Mary University of London

Barts Research Centre for Women's Health

Barts and the London School of Medicine and Dentistry

Queen Mary University of London

September 2019

Statement of originality

Declaration

I, Edith Adela Anne Hamilton, confirm that the research included within this thesis is my own work or that where it has been carried out in collaboration with, or supported by others, that this is duly acknowledged below and my contribution indicated. Previously published material is also acknowledged below.

I attest that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge break any UK law, infringe any third party's copyright or other Intellectual Property Right, or contain any confidential material.

I accept that the College has the right to use plagiarism detection software to check the electronic version of the thesis.

I confirm that this thesis has not been previously submitted for the award of a degree by this or any other University. I authorise that the thesis I present for examination for the PhD degree shall, if a degree is awarded, be deposited in the library of Queen Mary University London and the electronic institutional repository and that, subject to the conditions set out below, it may be made available for public reference, inter-library loan and copying.



Signature:

Date: 09/09/2019

Dedication

To all women and mothers,

To my friends and family,

To my two supervisors, Prof. S Thangaratinam and Prof. A Harden, for all their support and guidance

To Deanna, with heartfelt thanks for your kindness throughout

To my dear friend Gillian Waterworth, nee McIlwaine, nurse, paediatric nurse, neonatal nurse and health visitor. Gillian devoted her life to caring for women, children and people. Her own pregnancy was complicated by diabetes, preeclampsia, anaemia and haemorrhage.

Gillian died on the 14th August 2019

The Barts Health Trustees Research prize 2015 was awarded for this work

Abstract

Background

ESTEEM (Effect of Simple, Targeted diEt in prEgnant women with Metabolic risk factors on pregnancy outcomes), was a randomised controlled trial of a dietary intervention based on the Mediterranean diet. Intervention programmes like this are recognised in the literature as complex to evaluate and engagement and adherence are problematic. There is a need for dietary interventions in pregnancy which are simple and effective.

The aim

The aim of this study was to explore the views and experiences of the ESTEEM dietary intervention in a pregnant cohort with metabolic risk factors.

Methods

Qualitative methods using interviews with women, partners (separately) and focus groups with health care professionals were carried out. Data were analysed using thematic analysis.

The findings

Women were able to plan and adapt their food and use the ESTEEM diet to their own and their family's advantage. Conversely, some of the information provided during the ESTEEM intervention made women more aware of their metabolic risk factors and more anxious. Women found solutions to their individual concerns during the ESTEEM intervention, by sharing information and ideas, and by supporting each other.

Partners perceived the dietary intervention as having benefits for themselves, the mother as well as their children. Men appeared to hold mothers to be mainly responsible for feeding the children and ensuring that what they ate was healthy.

Health care professionals considered that developing and maintaining good relationships with women, and skilful and flexible approaches to enable dietary change were needed. They also emphasised the need to include family and friends, and in particular, children in interventions.

Conclusions

In order to effect dietary change, the material context in which people live must be taken into consideration. Diet and lifestyle interventions will become truly effective if they are co-designed with women and families and health care is co-produced with people.

Declaration.....	2
Dedication.....	3
Abstract.....	4
Contents.....	5
List of Tables.....	8
List of Figures.....	8
List of appendices.....	8

CONTENTS

Chapter One: Introduction to the thesis, review of relevant literature, methodology and context

1.1 The burden of the problem	9
1.1.1 Metabolic risk factors in pregnancy.....	10
1.1.2 Diet and lifestyle.....	10
1.1.3 Gestational weight gain.....	11
1.1.4 Hyperlipidaemia and hypertensive disorders.....	12
1.1.5 Complications of metabolic risk factors upon pregnancy and birth.....	12
1.2 Diet and lifestyle interventions	13
1.2.1. Nutrition in pregnancy.....	13
1.2.2 Existing research on diet and lifestyle interventions in pregnancy.....	14
1.2.1 Challenges in existing research on diet and lifestyle interventions.....	16
1.2.2 Constraints to women’s engagement with dietary interventions.....	17
1.2.3 Women’s attitudes, beliefs and circumstances.....	19
1.2.4 Attitudes of partners.....	20
1.2.5 Attitudes of health care professionals and policy-makers.....	20
1.2.6 Other factors affecting diet and lifestyle interventions.....	23
1.3 Methodology and background context for the research presented in this thesis.....	24
1.3.1 Recap on rationale for the thesis.....	24
1.3.2 The role of qualitative research in trials.....	24
1.3.3 My position as researcher.....	25
1.3.4 Framing the research questions - Aims and objectives.....	27
1.3.5 Research paradigm.....	27
1.3.6 Development of my research questions.....	30
1.3.7 The ESTEEM dietary intervention.....	32
1.3.8 Theory of change underpinning the ESTEEM dietary intervention.....	36
1.3.9 Summary of chapter and overview of whole thesis.....	37

1.3.10 Research questions.....	38
--------------------------------	----

Chapter Two: Theories and models related to learning, health and behaviour.....39

2.1 Introduction.....	39
2.2 Theories of adult learning	39
2.3 Health theories and social cognitive theory.....	42
2.4 Beliefs about health.....	43
2.5 Theories of health and Locus of control.....	44
2.6 Social ecological theories.....	45
2.7 Health behaviour.....	45
2.8 Concepts underpinning care for women.....	48
2.9 Women in society, women’s role and food.....	48
2.10 Discussion.....	50

Chapter Three: A Systematic review of interventions on diet and lifestyle.....53

3.1 Introduction.....	54
3.2 Literature search.....	55
3.2.1 Study selection and quality assessment.....	55
3.2.2 Data extraction and analysis.....	55
3.2.3 Results	56
3.2.3.1 Characteristics of the included studies and interventions.....	56
3.2.3.2 Quality assessment.....	57
3.2.3.3 Acceptability of diet and lifestyle intervention.....	57
3.2.3.4 Intention to adhere to diet and lifestyle intervention.....	57
3.2.3.5 Change in behaviour on diet and lifestyle intervention	58
3.2.3.6 Knowledge and attitudes on diet and lifestyle intervention.....	58
3.2.3.7 Factors influencing participation in study on diet and lifestyle.....	58
3.3 Discussion.....	59
3.4 Conclusions.....	62

Chapter Four: Research design and methods.....63

4.1 Introduction and overview.....	63
4.2 Research design.....	63
4.3 Research methods.....	67
4.4 Data collection	69

4.5 Data analysis.....	76
4.6 Ethics.....	83
4.6 Chapter summary.....	86
Chapter Five: Women’s views and experiences of the ESTEEM intervention.....	87
5.1 Summary of the characteristics of women interviewed	87
5.2 Themes.....	89
5.2 Summary and conclusions.....	106
Chapter Six: Partners’ views and experiences of the ESTEEM intervention.....	107
6.1 Summary of the characteristics of the men interviewed.....	107
6.2 Themes.....	108
6.3 Summary and conclusions.....	121
Chapter Seven: Health care professionals views of the ESTEEM intervention.....	123
7.1 Summary of the characteristics of participants in the focus groups.....	123
7.2 Themes.....	125
7.3 Summary and conclusions.....	136
Chapter Eight: Discussion and conclusions.....	138
8.1 Principal findings.....	138
8.2 Discussion and critique of the theories and assumptions written in to the design.....	142
8.3 Position of the findings within the evidence base.....	152
8.4 Summary of the implications for theory.....	156
8.5 Implications for practice.....	158
8.6 Strengths of the study	163
8.7 Limitations of the study.....	165
8.8 Implications for future research.....	167
8.9 Implications for policy.....	168
8.10 Conclusion.....	153

List of tables

1. Overview of thesis.....	27
2. The timeline of the ESTEEM intervention and contacts/activities with women.....	34
3. Research questions and issues covered by each chapter in thesis.....	37
4. Trial characteristics.....	56
5. The women’s interview schedule - Questions and prompts.....	70
6. The partner interview schedule - Questions and prompts.....	72
7. The focus group interview schedule - Questions and prompts.....	74
8. Demographic characteristics of women participants.....	87
9. The number (%) attendance at ESTEEM sessions for trial / qualitative study.....	89
10. Demographic characteristics of partner participants.....	107
11. Demographic characteristics of focus group participants.....	124
12. Emergent themes and suggestions for future ESTEEM and intervention delivery.....	161

List of figures

1. The six assumptions which enable the development and application of adult learning.....	41
2. Flowchart of how the parts of the study were conducted.....	68
3. Thematic map of findings from interviews with women.....	90
4. Thematic map of findings from interviews with partners.....	109
5. Thematic map of findings from focus group participants.....	125
6. Analysis of the potential of a dietary intervention using a social-ecological mode.....	158

List of appendices

1. Summary of factors identified in literature review.....	182
2. Example of ESTEEM Materials.....	185
3. Logic model underpinning the ESTEEM intervention.....	185
4. Table of the characteristics of the women and details included in the study.....	187
5. Systematic review of randomised controlled trials.....	196
6. Flow diagram describing the process of the study selection.....	207
7. Acceptability of the various components reported.....	208
8. Quality assessment of randomised trials on diet and lifestyle.....	208
9. Trials reporting of: (a) Intention (b) Change of behaviour (c) Knowledge.....	209
10. Factors influencing participation reported in randomised trials.....	210
11. Example of development of coding and analysis of data.....	211
12. Proposed logic model.....	216

Chapter One: Introduction to the thesis, review of relevant literature, methodology and context

This chapter introduces the thesis by defining the nature of the problem to be addressed and introducing the main concepts that are used within the thesis. I review previous theoretical and empirical literature in order to provide the rationale for the empirical research presented which focuses on dietary interventions for pregnant women with metabolic risk factors. The areas of literature I reviewed were in keeping with the main domains I was interested in which included metabolic risk factors in pregnancy, diet and lifestyle, dietary interventions in pregnancy, drawing on perspectives from clinical medicine, midwifery, public health and the social sciences. As the primary focus of my thesis is on how women, their partners and professionals view and experiences dietary interventions, I summarise existing research which shares this focus. The empirical research I present in this thesis includes a systematic review of studies that assessed the extent to which women's views and experiences, and those of their wider family are used to inform and assess dietary interventions in pregnancy. This review is presented in full in chapter 3 but I draw on relevant points from this review in this chapter as necessary. The next chapter comprises the theoretical models I employed. In the final section of this chapter I outline the methodological approach I have used in this thesis and describe the specific context in which the empirical work was carried out.

1.1 The burden of the problem

1.1.1 Metabolic risk factors in pregnancy

The prevalence of obesity (body mass index (BMI) $>30\text{kg/m}^2$) is escalating globally and this represents a significant risk factor for diabetes (a carbohydrate intolerance, a period of prolonged high blood sugar) and other metabolic disorders. ^{1,2} It is estimated that in developed countries over 60% of women of reproductive age are overweight and consequently gestational diabetes now affects up to 18% of all pregnancies worldwide. ^{1,2}

As well as pre-pregnancy obesity and hyperglycaemia, other metabolic risk factors include elevated triglycerides, low high-density lipoprotein-cholesterol and raised blood pressure. ³ These adverse factors in pregnancy predispose women and babies to preterm birth, small or

large for gestational age baby, preeclampsia, gestational diabetes, fetal loss and neonatal asphyxia.³

Women with excessive weight gain have a corresponding increase in the above obstetric complications and controlling weight gain may reduce the risk of adverse pregnancy outcomes.⁴ Research on diet and lifestyle interventions has tried to evaluate the usefulness of various approaches to maternal weight gain in pregnancy and improve perinatal outcomes.⁵ Some studies had significant problems with adherence to the intervention.⁵ Outside pregnancy, the most successful weight loss and weight control interventions have used regular dietary counselling and weekly contact with participants.⁶ A reduction in obesity has the potential to make a significant contribution to maternal health.⁴

1.1.2 Diet and lifestyle

There has been an increase in the intake of high-fat, energy-dense foods and a decrease in physical activity caused by the present sedentary nature of numerous kinds of work, changing modes of transport and the rise in urbanisation.⁷ These changes in diet and exercise are frequently the result of environmental and societal factors. The absence of helpful policy from the health, agriculture, transport, planning, environmental, food processing and education sectors have led to environmental and societal changes. These in turn have led to the present imbalance between calorific intake and calorific requirement which causes obesity.⁷

Lifestyle modification programmes have demonstrated success in achieving the WHO goal of a 10% weight loss amongst obese and overweight adults (with co-morbid complaints). Lifestyle modification, is conceived of three major components which are diet, physical activity and behaviour therapy.⁶ In order to achieve success, interventions are required to facilitate the monitoring of food consumption, weight and physical activity.^{6,7} These three phenomena are crucial for both short and long-term weight maintenance.

Although some weight loss improves health substantially, even a modest weight loss which results in weight regain is beneficial to lasting health.^{6,8} Many weight-reduction diets exist and obese adults are able to follow a wide range of diets with various macronutrient components to lose weight. Nonetheless, it is the calorific control, and not the macronutrient content which determines weight loss.⁶

More research is needed to examine the best diet and ideal macronutrients for improving certain conditions such as impaired glucose tolerance or cardio-vascular disease. ⁶ As dietary maintenance is of particular importance, the person's personal preference must be explored. ⁹ A diet needs to be sustained for several months to achieve a weight loss of 5 to 10% of baseline weight. This amount of weight loss has the greatest gain in terms of health outcomes. ^{6,9}

1.1.3 Gestational weight gain

The amount of weight a woman may gain during pregnancy can vary significantly. ⁹ Currently, there are no evidence-based UK guidelines on recommended weight-gain during pregnancy. ⁹ The Institute of Medicine (IOM) gestational weight gain (GWG) guidance is recognised internationally. ¹⁰ The IOM guidance recommends a total weight gain of 6.8 – 11.3 kg (15-25 lbs) for overweight women (BMI 25-29.9). GWG below this does not appear to have a negative impact on intrauterine growth nor on neonatal outcomes ¹¹. They conclude that overweight pregnant women who gain less than the recommended weight gain but have an appropriately growing fetus do not need to be encouraged to increase their weight gain to conform to the present guidance as this will not improve maternal health or fetal outcomes. ^{11,12}

For obese women the IOM defines obesity during pregnancy as a pre-pregnancy BMI of ≥ 30 kg/m² and given the limited data available per class, does not subdivide between class one (BMI 30-34.9) class two (BMI 35-39.9) and class three (BMI 40 and over). ¹¹ The IOM then recommends a gestational weight gain of 5-9.1kg (11-20 lbs) for obese women. ¹¹

The maintenance of GWG within these recommended limits is associated with improved outcomes for mother and baby. ^{10,12,13} However, researchers estimate that between one to two thirds of women in developed countries exceed the recommended limit. ^{11,14,15} Furthermore, women who are overweight or obese before becoming pregnant have a threefold greater risk of exceeding GWG recommended limits. ¹⁶

The authors of the IOM report ¹⁷ say they attempt to balance the risks of having large for gestational age babies, small for gestational age babies, premature births and post-partum weight retention. They do not recommend lower targets of weight gain for women with higher degrees of obesity citing a paucity of evidence of both short and long-term maternal and fetal/neonatal outcomes. ¹⁸ The risk of having a small for gestational age baby competes with

possible benefits such as lowered caesarean section rates, risks of having large for gestational age delivery and post-partum weight retention for severely obese women with limited weight gain during pregnancy.¹⁸

Several large studies published following the IOM report advocate more restrictive weight control.^{17,18} A systematic review demonstrated that over-weight and obese women who gain less weight than that which is recommended by the IOM have no greater risk of bearing a low birth-weight baby. Other researchers express that the IOM guidance is too restricting for severely obese women and could be linked to higher rates of premature birth, small for gestational age babies or perinatal mortality.¹⁸

The evidence above seems to show that the associations between maternal obesity, degree of obesity, gestational weight gain and maternal and neonatal outcomes are not easy to decipher.¹⁵ The IOM recommend that individualised care and clinical judgement are necessary to manage the overweight and obese women who are gaining or desire to gain less weight than that recommended, only of course, in the case of an appropriately growing fetus.¹⁵

1.1.4 Hyperlipidaemia and hypertensive disorders

The metabolic risk factors of pregnancy are a group of metabolic abnormalities which are associated with glucose resistance and manifest themselves as relative hyperglycaemia, hyperlipidaemia and coagulation disorders.¹⁹

The normal physiological response to pregnancy is a transient move to a metabolic syndrome whereby a certain degree of insulin resistance, definite hyperlipidaemia and an increase in coagulation factors is required.¹⁹ The upregulation of the inflammatory cascade and an increased white cell count are also recognised as additional risk factors to cardio-vascular disease. Markers of inflammation, for example C-reactive protein, interleukin-6 or raised white cell count have been found to independently predict cardio-vascular disease and diabetes.¹⁹

1.1.5 Complications of metabolic risk factors upon pregnancy and birth

Pregnant women with metabolic risk factors are at greater risk of pre-eclampsia and the associated hyperlipidaemia increases the risk of cardiovascular disease and hypertension. Additionally, chronic hypertension contributes to a higher risk of preeclampsia.

Women who have metabolic risk factors of pregnancy are at greater risk of preeclampsia, gestational diabetes, placental abruption and caesarean section. The baby is more subject to intra-uterine growth restriction, intensive care unit admission and prematurity. Caesarean section and prematurity also carry additional risks to mother and baby. Also, adverse pregnancy outcomes indicate increased risk of metabolic and cardio-vascular disease later in life for both mother and child.²⁰

1.2 Diet and lifestyle interventions in pregnancy

1.2.1 Nutrition in pregnancy

Nutrition has the potential to improve maternal and child health and to improve population health across the life-cycle. The “Life course perspective”²¹ states that environmental, biological, social, physical, and behavioural factors together with life experiences over the life-cycle influence the health of present and future generations.²¹ From preconception to adult life, nutrition can benefit or may damage population health, shaping health courses over generations.^{21,22}

The complex relationships between the lifecycle, the nutrients required at the various stages of life, and also peoples’ access to food, need to be better understood. Domestic, national and international approaches must collaborate in order to ensure that diet is an integral part of population health programmes.^{20,22} Strategies to balance energy consumption with proper exercise are needed. How these strategies may be supported to sustain the periods of significant human growth and development add to the need to consider the life course perspective.²⁰

Periods of important growth and development such as pregnancy, infancy and adolescence are important as nutrition is fundamental to shaping the health course.²⁰ Good nutrition is essential for the health of mother and child, influencing the encoding of offspring for healthy growth and development as well as the protection of bodily tissues and structures.

Nutrition impacts on critical life periods. Fetal origins theory suggests that malnutrition during pregnancy and early life causes enduring modifications of the structure and function of organs.^{21,23} This then renders the person more susceptible to chronic ailments in later life.^{21,23}

A connection has been found between maternal intake of oily fish or oils containing omega-3 fatty acids in pregnancy and motor activity, visual development, cognitive improvement and the maturity of sleep patterns in infants.^{24,25} Omega-3 fatty acids are important organisational

constituents of the cell membrane, the central nervous system and retinal cell membrane construction.²⁶ Improved embryo morphology has been demonstrated when these are taken during the peri-conception period.²⁵

Contrasting with the above, undesirable effects on the fetus have been noted, caused by maternal obesity and other associated metabolic conditions. Maternal metabolic conditions may affect intra-uterine neuro-development caused by elevated blood glucose levels which then lead to chronic hyper-insulinaemia. This is followed by a surge of events and subsequent fetal hypoxia and iron deficiency negatively impact upon intra-uterine neuro-development.

Importantly, gestational diabetes, being defined as the onset of new glucose intolerance during pregnancy, manifests itself when pancreatic β -cells are no longer able to compensate for the increased insulin-resistance occurring during pregnancy.²⁰ Gestational diabetes is strongly correlated to poor pregnancy outcomes and with consequent long-term unfavourable outcomes in the offspring. This occurs due to the epigenetic alterations of the fetal genome.

Both maternal malnutrition and poor placental function reduce the nutrients available to the fetus and may result in secondary alterations in metabolism and of gene expression.²³ Although beneficial to the fetus at this time, these alterations can contribute to ill health during the life course.²³

A full understanding of this has not yet been grasped, but experts are looking at how epigenetic modifications of the fetal genome can be averted by therapy given during the antenatal period. It is known that treatment of severe hyperglycaemia in pregnancy improves pregnancy outcomes, but this is in the short-term. The long-term effects of treatment and the level of maternal glycaemia at which treatment is best directed is still not known.²⁰

1.2.2 Existing research on diet and lifestyle interventions in pregnancy

Diet and lifestyle interventions in pregnancy have the potential to control maternal gestational weight gain and enhance obstetric outcomes.⁴ A large meta-analysis of 44 randomised controlled trials which included 7278 women found that amongst the interventions trialled those based on diet had maximum effect.^{4,27}

Trials and meta-analyses of interventions to encourage healthy gestational weight gain (GWG) are multiplying and increasing in scope.^{10,15} One Cochrane meta-analysis of interventions to improve GWG reveals that those trials testing interventions involving diet, exercise or both, reduce the likelihood of excess GWG by 20%.²⁸ Researchers discussed weaknesses in previous

studies and argued that these are related to implementation and acceptability issues.^{29,30} Additionally, the high costs of some intensive interventions and approaches which require regular group or individual support and facilitation which may not always suit women suggest that interventions are less likely to be implemented or taken up.³¹

Pregnant women sometimes have poor knowledge about obesity and weight gain.³² They are not aware of the consequences of weight gain nor the various strategies which can be used to manage this. Women are generally more aware of long-term health risks than those related to obesity and pregnancy (such as heart attack). Some women are unaware of the difficulties of post-natal weight loss.³³

In addition to women's pre-existing knowledge, preferences and awareness, there are numerous design and logistical factors which could potentially affect uptake and adherence to interventions.³⁴ For example the format of interventions (e.g. group sessions vs one-to-one sessions), the type of intervention components (e.g. advice, provision of resources, skill development social support), who is involved in delivering the intervention (e.g. dietician, midwife, peer) or the length and frequency of interventions (e.g. continuous or one-off input) may all affect the acceptability of interventions, adherence and ultimately effectiveness.^{33,35} We do not yet have sufficient evidence to identify which are the 'active' or 'essential' ingredients of an intervention, although current evidence has highlighted the importance of, for example, social support, the use of motivational techniques and flexibility.³⁶

Diet and lifestyle interventions also appear to require a sustained approach with for example weekly contact, continuous feedback, and goal-setting. Research has also suggested that it is important to work with women's wider family and social network if successful change is to be achieved.^{32,36}

A gap in the literature on dietary interventions appears to be around what we can learn from women's own views and experiences of dietary interventions. Women's experience of food and health is widely diverse and knowledge of this can be used to design ways to encourage healthy eating. As I found in the systematic review I undertook (chapter 3), only 24 out of the 110 trials identified reported on women's views. There is currently therefore limited evidence about how women view and experience dietary interventions in pregnancy. For example, acceptability of the intervention from the woman's point of view was only reported on in 23 of

the 110 trials identified in the systematic review and when it was reported details of data collection and analysis were largely missing.

I also found in this review that the main emphasis of the interventions tested within trials appears to centre on the woman with little mention of her home situation or her social network. For example, only four out of the 24 trials which reported women's views, had any information on the level of family support. Similarly, life outside the home does not seem to be considered in these investigations. The use of theoretical models to underpin dietary interventions also differs widely in the trials. We know from previous research that psychological constructs such as attitudes and beliefs are related to behaviour change, however, the thoughts, beliefs and motivations of women are rarely explored in reports on the findings of trials of dietary interventions in pregnancy (Appendix 1).

1.2.3 Challenges in existing research on diet and lifestyle interventions in pregnancy

A further challenge for trials of dietary interventions in pregnancy is that participation is low^{4,32,37} and varies between 20%⁵ and 40%.³⁸ The reasons given by women for non-participation are reported as being disinterest, concern about overemphasis on diet in pregnancy and anxiety regarding body image.³⁸ Beliefs about the importance of high food intake for healthy fetal development are entrenched in many women's psyche, additionally women do not feel they have any control over gestational weight gain,³⁹ moreover, advice to restrict weight gain can cause distress.⁴⁰

It could be claimed that diet and lifestyle interventions in pregnancy, similar to weight-loss programmes in the general population, have approached maternal obesity as an essentially nutritional and medical problem.⁴¹⁻⁴³ Regardless of the increased body of knowledge, prevention and intervention programmes continue to have limited success.⁴²

A broader societal approach may be required to tackle obesity and engender change at a personal, family, community and population level. At present it would seem that available interventions for addressing metabolic risk factors in pregnancy do not consider that pregnancy and excess weight gain are strongly embodied^{42,44} and are lived experiences which occur within and are shaped by women's families and their community.⁴¹

The role of gender, class and ethnicity in shaping embodiment “are ignored in health promotion practices and policies” (P.1).⁴⁵ Despite these challenges, pregnant women are receptive to lifestyle advice and value health-promotion activities, although, women’s diet, physical activity and weight gain remain far from the recommended standards.³⁴ Diet, physical activity and weight gain during pregnancy can significantly influence both women and their babies’ immediate and long-term health.^{46,47}

1.2.4 Constraints to women’s engagement with dietary interventions

I reviewed the qualitative literature within the wider body of literature on dietary interventions in pregnancy. A substantial body of literature has been carried out on obese pregnant women’s experiences of diet. I also steered my focus towards pregnant women with other risk factors as women in the ESTEEM intervention had a range of metabolic risk factors of which being obese was one. I also reviewed other relevant studies which were conducted outside of pregnancy. These were of interest to me as I was examining factors that may influence women’s engagement with diet, in general.

A range of factors have been identified in the literature that influence the extent to which women feel supported or may be less able to engage with a dietary intervention. A summary of these are presented in Appendix 1. These constraining factors may comprise of the contrast between the expected and the actual experience of women, factors which influence the delivery of the intervention, communication with members of staff and conveyance of information, amongst others.

One Nordic randomised controlled trial (RCT) explored overweight and obese middle-aged women’s experiences of the processes involved in their dietary changes during a dietary intervention which took place over a two-year period.⁴⁸ Using grounded theory principles, the core category found was “Engagement phases in the process of a diet intervention”, which was underpinned by four themes. These referred to “honeymoon phase”, “everyday life phase”, “it’s up to you phase” and “the crossroads phase”. Researchers reported that the initial stages of the intervention were more positive as participants described their perceived weight loss and their extensive support. The next stages were portrayed as demonstrating the largest obstacles to dietary change for women. The home environment was determined as being a fundamental influence, which could impact on maintenance of the dietary changes women had made, or cause them to lapse to their previous eating habits.⁴⁸

In a study of a lifestyle intervention carried out in Sweden, eleven obese women with BMI $\geq 30\text{kg/m}^2$ were interviewed at the end of pregnancy.⁴⁹ A phenomenological analysis was used to elicit women's experiences of participating in their lifestyle intervention to discover what impact it had on women's health and lifestyle. The findings showed that implementing new eating habits required support for women. In the main this came from midwives, partners, family and friends. It also came from other women in similar situations, also by participation in the dietary intervention itself. The support had to be non-disapproving and have a balanced viewpoint on women's weight. During the intervention women learnt about controlling weight-gain. At the outset, not all women were convinced that it would be possible to control their gestational weight gain, although they were motivated to try. Women experienced that their lifestyle changes could be less onerous than at first imagined, and also small changes could yield unanticipated, positive results. To be able to continue their lifestyle changes more long-term, women must notice some kind of results, for example, better weight control.⁴⁹

A programme evaluation of an intervention that aimed to support women to control their weight during pregnancy found that women with a BMI of $\geq 35\text{kg/m}^2$ were twice as likely to participate in this as women with a BMI of $\leq 35\text{kg/m}^2$.⁵⁰ Findings from a focus group made up from midwives working in the antenatal clinic revealed that three key themes impacting on recruitment to the intervention, included 'finding the words', 'acknowledging challenges' and 'midwives' knowledge'. It was acknowledged that staff were unprepared to talk to pregnant women about weight control.⁵⁰

A community-based study of 20 semi-structured interviews using thematic analysis assessed the acceptability of an intervention delivered to obese pregnant women and up to 2 years following delivery.⁵¹ High levels of acceptability were described which included convenience and comfort of home visits, supportive contacts of dietitians and regular weight observations.⁵¹ Women requested more frequent support and greater practical assistance such as more recipes. This study concluded that early intervention was promising regarding its potential to reduce maternal obesity and lower childhood obesity.⁵¹

Women revealed that they wanted to support each other and found that sharing with women in the same situation was facilitative towards their engagement with their dietary intervention, also it was more likely for them to maintain their food changes long-term.^{49,52}

Although a number of dietary interventions are proposed to foster healthy eating and physical activity in pregnancy, with greater insights into the barriers and facilitators of these they could be more effective.⁵³

1.2.5 Women's attitudes, beliefs and circumstances

Pregnancy is an opportune moment for women to engage in behaviour change interventions. It is a unique time when women have particular motivation to implement health related behaviour change.⁵⁴ It is also time when women have frequent interactions with numerous health professionals which occasion many opportunities for health improvement. However, many women believe that pregnancy is a time when they allow themselves to eat following their cravings and think that they eat to “fuel” the baby and pregnancy and “eat for two”.⁴⁰

Some overweight and obese women tend to be unconcerned about weight gain during pregnancy⁵⁵ which may require an approach based on knowledge and insights into these women's individual intentions and beliefs. Regarding this, whilst most overweight or obese pregnant women know they have a weight problem, only one quarter of them are able to state their BMI accurately.⁵³ Researchers confirm that most women underestimate their weight.^{11,35,53,56} In addition, it is reported that pre-pregnancy obesity rather than excessive gestational weight gain is the major cause for pregnancy and birth complications.

Risk is the likelihood that a particular event will happen. The dilemma facing maternity health care practitioners today is how to discuss risk with pregnant women.⁵⁷ Both health care professionals and women should understand the various ways risk can be communicated. In general, risk may be expressed in terms of absolute risk, relative risk and attributable risk. Understanding women's perception of their risk can provide explanations for their health-related behaviours. It is therefore useful to determine women's perception of their own risk and how they comprehend this, when assessing pregnant women.⁵⁷

Typically, behaviour change during pregnancy is driven by the woman's personal circumstances. Some women are very motivated during pregnancy to engage in change, whilst others are unwilling to modify their diet in a healthy way.⁵³ This may indicate that a more tailored approach may be needed which includes taking more account of women's own situations and concerns.

1.2.6 Attitudes of partners

In one qualitative study on obese pregnant women's efforts to eat a healthy diet in pregnancy, partners were depicted as being either supportive, or unsupportive.⁵⁸ At present there is little detail provided in literature regarding partners' views of dietary interventions and on how they may support women during these. One study of women and partners' experiences of pregnancy with a BMI > 40kg/m².⁴¹ does exist, although evidence shows that health behaviours shared between partners is a greater contributor to increased weight gain than other factors such as parents and childhood.⁴¹ Evidence of views of partners about diet, weight and lifestyle is scarce. Such information would add to our understanding of diet, health, and pregnancy and this could be used to improve the provision of future diet and lifestyle interventions.

One qualitative phenomenological study showed that partners and family may provide support for women during dietary interventions, however, they can also cause obstacles by encouraging women to "eat for two".⁴⁰ Other research shows that if women are to sustain a dietary intervention and lifestyle change they must be able to distinguish some sort of tangible result such as improvement in health status, or, weight loss.⁴⁹ This would also be useful to remember, when devising dietary interventions.

1.2.7 Attitudes of health care professionals and policy-makers

One study researched the area of midwives' views on the implementation of guidelines for obese pregnant women.⁵⁹ The midwives believed that they had the necessary experience, theoretical and practical understanding in order to discuss physical activity with obese pregnant women. However, midwives reported that they perceived they did not have the ability nor the proficiency to carry out the behaviour.⁵⁹ This became a barrier to midwives not having appropriate discussions with women.

Another finding from a study looking at maternal obesity support services pointed out that midwives may underestimate the social stigma of obesity for the pregnant woman. As well as encouraging healthy lifestyle choices, they should be aware of the psycho-social impact of obesity and be able to offer supportive care.⁶⁰ The researchers went on to say that midwives might inadvertently make assumptions about women's response to their size and underestimate

the pressure upon them.⁶⁰ This could limit their ability to respond appropriately to the psychosocial implications of obesity for women.

The findings from one qualitative study using a phenomenological method to describe obese women's experience of a diet and lifestyle intervention in Sweden showed that midwifery support was needed to establish new lifestyle habits.⁴⁹ Encouragement from partners, friends and relatives together with that of obese pregnant women in similar circumstances was required. Women expressed that they found midwifery support was knowledgeable and unprejudiced, and that participating in the intervention accommodated their dietary changes.⁴⁹ The particular aspects valued by women were aqua-natal classes and group discussion with the dietitian. Sharing their stories and experiences enabled women to reflect on their own progress, develop affinities with others as well as having sense of worth and belonging.⁴⁹

In a Dutch qualitative study examining health education by midwives, women thought that midwives were responsible for creating a good relationship even though the notion of good relationship could vary for each one.⁶¹ A relationship of trust with their midwife was referred to on several occasions and this bond with midwives was seen as essential to allow health behaviour change.⁶¹ In the same study, some women were not satisfied with the relationship they had with their midwife and felt that they had not had support or, did not know what to expect from the relationship.⁶¹ Building a good relationship was viewed by women as a critical midwifery task, in order to achieve health education.^{61,62}

One other Dutch study revealed that nutrition education provided verbally by midwives was inclined to be general. On the other hand women were able to grasp the importance of health education and health messages if these were pointed out to them.⁶¹ Other studies show that some women wanted more information on diet and exercise in pregnancy than what they received.⁶³ A large systematic review of the quantitative and qualitative literature from 2002-2014 focused on healthy pregnant women in developed countries. This showed that women were not receiving adequate nutrition education in pregnancy from their health care providers.⁶⁴ Health care providers viewed nutrition advice as important but, lack of time, resources and education made it difficult for them to accomplish this.⁶⁵

Similarly, a survey about antenatal information and support provided by obstetricians showed that a significant number never discussed physical activity with pregnant women.³⁶ As well as this, sedentary women frequently received mixed messages from friends, family and doctors.⁶⁶ A randomised trial assessing the benefits and risks of aerobic exercise during pregnancy,

used a fitness programme in line with the American College of Obstetricians and Gynaecologists (ACOG) guidelines. The evidence was seen as strong enough to suggest that obstetricians should provide more specific and more substantial information about exercise in pregnancy.⁶⁶

In another vein, “cautious” advice regarding physical activity, together with excessive dietary education which emphasises what to avoid, may suggest a view that pregnancy is a high-risk state where any risk is to be avoided irrespective of the woman or her values.⁶⁷ Risk needs to be communicated to women in a more personalised manner to enable women to better understand their health needs.⁶⁷

From a policy perspective, the concept of population health is pertinent. Some see this as a new term that highlights the influential role of social and economic effects in combination with biological and environmental factors, that shape the health of entire populations whilst others interpret population health primarily as a goal, that of achieving measurable improvements in the health of a defined population. The concept of co-producing health can be seen as a way of enacting or ensuring that the wider social purpose of population health is accomplished, whilst paying attention to individual needs of women and families.⁶⁸

Co-producing health is about empowering people to make choices and decisions alongside professionals, regarding their physical, psychological, sociological, spiritual or educational well-being. It is about wanting to make a difference to people’s lives⁶⁸ in ways that are meaningful to people. Spencer, Dineen and Phillips say that “co-production is an approach to public services which involves citizens, communities, and the professionals who support them, pooling their expertise to deliver more effective and sustainable outcomes and an improved experience for all involved” (P.7).⁶⁹

Experts from the field of co-producing health widely acknowledge that providing choices is important but we need to go further than just providing choices to creating services that communities are actually involved in designing. Other priorities rather than choice come first to some people.¹⁵ Choice in fact must be dealt with on a one to one basis, and trying to put people into boxes is unhelpful. People should be asked what it is they want and this necessitates both genuine discussion and active listening.¹⁵ The basic premise of co-producing health is listening. This precept is expressed by Mol as embracing a “logic of care, rather than a logic of choice”.⁷⁰

Identifying effective diet and lifestyle approaches and strategies that benefit not only pregnant women but the population as a whole will enable health practitioners and researchers to operate more effectively, and achieve more health benefits with the available resources.

1.2.8 Other factors affecting diet and lifestyle interventions

Although economic factors such as availability of food and money affect diet, the diets of all peoples are determined by the culture of their own particular group and by ecological factors such as the types of food regionally and seasonally available to them.⁷¹ Selection of food may be conscious but our choice is influenced in a variety of ways by the culture in which we have been reared.

Beliefs about food are often part of a broader culture and beliefs system which attempts to order the universe as the society sees it.⁷¹ In the main, these beliefs concern qualities assumed to be inherent to food, which is then able to alter the physiological response of the consumer. The most common food beliefs are those that attribute heating and cooling properties to food.⁷¹ Culture is the sum of a people's approach to life, their objects of daily use, material technology, and the manner or style in which they employ them.^{72,73} Much of it is learned so early in life that it becomes unconscious, and it persists because it has purposes that adapt to those involved in it. Culture may then be a factor affecting the uptake and the acceptability of dietary and lifestyle interventions for people.

Food and eating therefore, are more than processes by which the body may obtain nourishment. Food is an elaborate performance of gender, social class and identity.⁷⁴ By promoting weight loss and insisting on unsuitable diets the stumbling block is that this "fails to integrate people's lived experience..." (P. 315).⁷⁵ To fit these sometimes imperceptible perhaps subtle, yet sensitive areas, dietary interventions should be suitable, to have a degree of success. Also, any consideration of food and bodies in the context of families must not ignore the meaning surrounding these, for participants.

Interventions to change diet-related behaviour have enormous potential to alter current patterns of metabolic disease in pregnancy and beyond. Behaviour plays an important role in people's health. In addition, evidence shows that different patterns of behaviour are deeply embedded in people's social and material circumstances, and their cultural context.⁴⁴

1.3 Methodology and background context for the research presented in this thesis

1.3.1 Recap on rationale for the thesis

Women with risk factors who become pregnant have acquired experience upon which they have constructed their perceptions of health and diet. Their understanding of diet and food will influence the way they manage their dietary intake in pregnancy. Evidence from trials is stated as being limited and inconsistent, even heterogenous.^{76,77} as their inclusion criteria vary, timing and approaches differ, outcome measures are dissimilar and experimental groups are small. The situation is further complicated by the fact that women of normal weight and who are underweight prior to pregnancy may become overweight during pregnancy. Pre-pregnancy obesity rather than excessive weight gain is the major cause for perinatal morbidity. It is said that pregnancy is an ideal time for change in health behaviour, but the reasons given above show the complexities which may lie behind adopting specific dietary, behaviour-change techniques.

Previous dietary interventions have carried out specific interventions on pregnant women. What is less clear is how women experience an intervention. The views and experiences of pregnant women on diet and lifestyle interventions needs more identification. Little evidence exists to justify how to develop and carryout out a diet and lifestyle intervention for pregnant women with metabolic risk factors. Clinical acceptability is not the question as our interest lies in finding out what may be more acceptable and feasible for women. My research aims to find out how the ESTEEM dietary intervention is viewed and experienced by women, their partners and the healthcare professionals involved. As my primary research takes place within a trial, I briefly discuss the role of qualitative research in trials in section 1.3.2 below.

1.3.2 The role of qualitative research in trials

Using qualitative research alongside trials has improved the intervention and trial conduct at the pre-trial phase. It has also been effective in explaining trial findings and shed light on issues in relation to the application of research in the real world.^{78,79} One review reported that five aspects of trials were addressed by the use of qualitative research.⁷⁸ These included trialling the intervention, the design and conduct of the trial, the outcomes and processes measured during the trial, the outcomes of the trial, and the health problem being investigated. As well as this, it is known that qualitative research used at the feasibility stage of a trial can solve

problems by ironing these out, early on. Another advantage is that health care professionals can understand the usefulness of trial findings in different contexts.⁷⁹

The value of qualitative research lies beyond the specific trial by informing future practice, developing and evaluating complex interventions.⁷⁹ Other benefits include provision of insights into patient experience and by and large, improve the provision of health care.⁷⁸

The use of qualitative research with trials, although growing, has been limited and there are several reasons for this. These reasons include a lack of understanding of qualitative research by quantitative researchers and qualitative research not being valued within some disciplines.⁷⁸

Qualitative research can identify issues with trial conduct that may not be viewed as important. Some tension may occur between the trial design team needs and what the qualitative researcher views as important. Openness is needed to ensure communication between all parties involved.⁷⁸ The trial team may need to understand the feasibility of the intervention and the qualitative researcher may be more interested in the mechanisms which are more likely to make the intervention work.⁷⁸⁻⁸⁰

My interest lay in finding out how the ESTEEM intervention worked by describing the context, the components of the intervention and the mechanisms employed. Qualitative methods will elicit the views of women, partners and health care professionals and a logic model will illustrate how the intervention activities affecting women and their partners may produce their outcomes. This will assist in the development of future interventions.

1.3.3 My position as researcher

Before looking at the specific context for the primary empirical research presented in this thesis, it would be apt to address my own position as researcher. The inconsistency and the lack of appropriate dietary advice, and in addition, the particular challenges this presents during at risk pregnancy heightened my awareness of this issue. The fact that food, a topic which I love, seemed to be a challenge, even a major problem for women and health care providers alike, made me want to understand more. Initially, when I tried to understand how women engaged or did not, with proposed dietary changes, I recognised that their attitudes and needs varied greatly. I also saw that provider expectations and attitudes differed widely.

I needed to see how and why women were not able to change their food and more importantly, why they said they were changing, yet, this did not seem to be reflected in their health

circumstances. I saw also that the pregnancy experience of women at risk differed significantly from those who were not at risk. I wished then, to know how best to approach dietary change in at risk women.

As a midwife working in the NHS (National Health Service), I understood how very easy it was to become acclimatised to a biomedical model and the adoption of a utilitarian approach, which was focused on the care of ‘at risk’ women. Discussions regarding women and their care did not always fully involve them or their families.

However, when I worked with women and their families individually, my appreciation of their triumphs and difficulties was heightened. I noted their frustration and difficulty to commit to, and, sustain dietary change. It saddened me to see the guilt and fear which was engendered by them not being able to make alterations to their diet. I observed their dread, as they feared damaging their baby. And despite our best efforts to provide women-centred care, we were often unsuccessful in delivering these values.

My colleagues also acknowledged the importance of dietary change in pregnancy for at risk women, but barriers remained. There was an apparent powerlessness to respond to the women’s needs and to involve her and her family, in her care. The barriers to participant and provider engagement with dietary change for at risk pregnant women, acknowledged in the literature, were tangible in the clinical setting. As time passed, I became more certain that we would be able to find ways to facilitate change. This could be done by examining women’s, partners’, and providers’ views of a dietary intervention in an antenatal care setting.

As mentioned above, guidelines exist for practitioners working in maternity settings and a variety of resources are available to advise about weight in pregnancy, diet and health. But, very few of these resources focus on the women’s needs. As women-centred and family-centred models are a core attribute of midwifery and maternity care, I was curious to know how such an approach may be related to the experience of pregnant women (with metabolic risk factors) and their partners on a dietary intervention.

An understanding of the dietary experiences of women and partners on the intervention would provide a novel as well as a useful lens to look at the fit between women/family-centred intervention approaches. By juxta-posing the experiences of the providers we would also have a means to examine multi-factorial components and be able to consider these in relation to each-other. This would provide a means to support other health care professionals, as with knowledge of the facilitators and barriers, we would be able to promote more women/family-

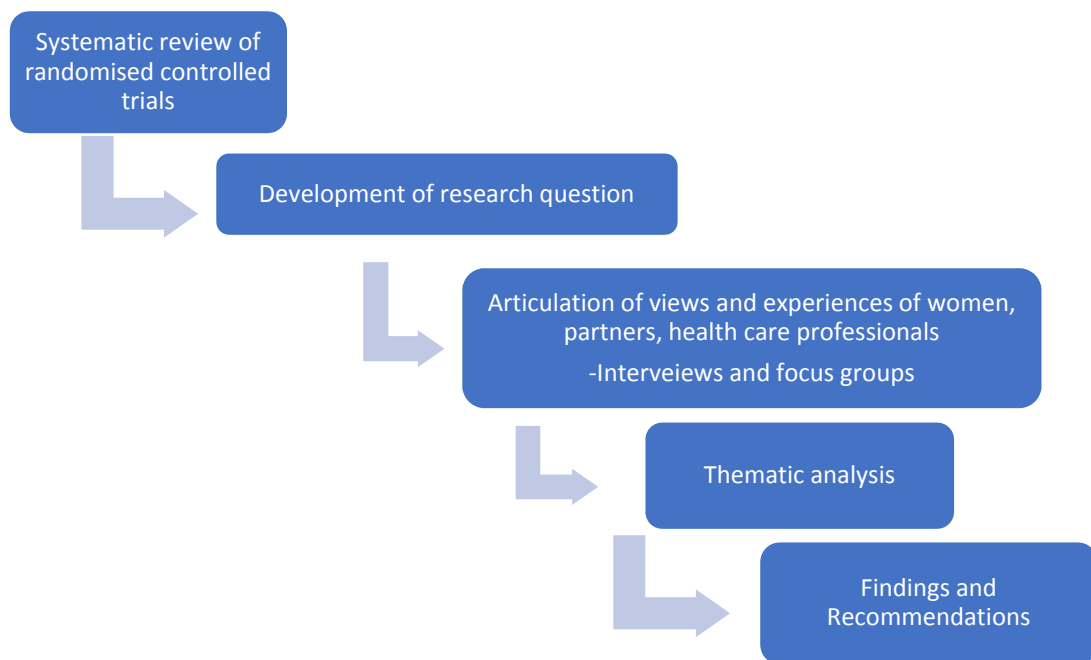
centred care in the development of dietary interventions in pregnancy for the future. These ideas are what prompted and informed the following study.

1.3.4 Framing the research questions - Aims and objectives

The aim of this study was to explore the views and experiences of the ESTEEM dietary intervention in a pregnant cohort with metabolic risk factors, using a qualitative approach. The views and experiences of women, their partners and the healthcare professionals were examined to find out how these impacted upon engagement with the intervention and examined barriers and facilitators to this. This was as far as I know, the first study to examine women, partners and health care professionals' views of a diet and lifestyle intervention in pregnancy.

I organised my study using the following qualitative approach: development of research question, interviews and focus groups, thematic analysis and interpretation, recommendations.

Table 1 Overview of thesis



1.3.5 Research paradigm

I have approached this study through a constructionist interpretative paradigm. This approach was used as I wanted to view the research I was doing as a co-production between myself and the people I was researching. I was aware that some of my “own assumptions must inform what questions” were asked by myself, and how. I knew that I was not “an inanimate writing pad or machine that records the interviewee’s responses uncontaminated by human interaction” (P. 152).⁸¹

A social constructionist approach to illness could be said to be an amalgam of different intellectual strands.⁸² However, social constructionists would disagree with a strictly positivist conception of illness as being the mere embodiment of disease. They would say that illness rather: “is shaped by social interactions, shared cultural traditions, shifting frameworks of knowledge and relations of power” (P.69).⁸³

Constructionism is closely associated with interpretivism. Interpretivism often addresses essential features of shared meaning and understanding. Constructionists would go further, and are concerned with knowledge as produced and interpreted.⁸¹ In the context of my study, I hold that individuals construct their own knowledge within their socio-cultural context, which is influenced by their prior knowledge and understanding. I base my thinking on the principle that maternal obesity, preeclampsia and hyperlipidaemia are socially constructed disease classifications. By saying this I am not calling into question their reality as medical conditions. This would have potentially damaging consequences for both the woman and her baby. As a midwife, and with most social constructionists, I acknowledge that illness and disease exist as biological realities.⁸⁴

Some would argue that maternal obesity, preeclampsia and hyperlipidaemia are objects which rather than being determined, are constructed in the context of particular social and political conjunctures. This highlights the fact that these diseases are established and defined in discourse. They are therefore understood and interpreted by means of social activity and should then, be examined using social and cultural enquiry.⁸⁵

The use of a social constructionist approach can help us explain the social and cultural backdrop of disease and illness. Some medical conditions have particular symbolic associations and social and cultural meanings attributed to them. These may have consequences for those diagnosed with these conditions and also healthcare provision and the related health policy.

Drawing on Lupton,⁸⁴ and a constructionist framework, it is possible to observe how medical conditions may become stigmatised and how this stigma impacts on those with the condition.⁸⁶ One study looked at common metaphors and beliefs about the causes of obesity and demonstrated how this had affected support for public policy.⁸⁷ The researchers indicated how the frequently used metaphor of obesity as gluttonous could have served to block policy or, encourage more punitive individual responses from some people. This confirms that there is nothing inherent about a condition that makes it stigmatising. It is rather society's reaction to this, or the type of people who possess it, which result in a condition being stigmatised.

A social constructionist outlook sees all types of knowledge, whether they are experiential or based on rational science, as being valid.⁸⁸ It is interested in accounts by lay people. Social constructionism draws on phenomenological underpinnings to understand the experience of illness as socially constructed.⁸² People have particular understandings of what it means to have a medical condition and may enact it, or endow it, with particular meaning.⁸²

My reason for adopting a constructionist approach is because it can be said to take subjective experience seriously. As a midwife, I see the woman's view and perspective as real and I consider how medical conditions are managed in different social settings. Besides, focusing on the meaning of care and treatments in the context of everyday life may offer a different perspective to the clinical issue of non-engagement and non-compliance to interventions. Compliance as a concept itself can be problematised from a constructionist perspective, and also from a midwifery one. It may suggest a paternalistic and controlling relationship between the healthcare professional and the woman.⁸⁹

Social constructionist inquiry should not be viewed as a means of finding the truth. It is an option, and presents another form or account of events which may be utilised alongside, juxtaposed or against other views for match, contrast or association. It should be judged for its propensity for insight rather than its credibility. As researchers, we must be aware of our dynamic role in producing empirical evidence and creating social knowledge. In this way, by recognising the social and cultural makings of medicine, disease and healthcare, we may indeed see them change and improve to better suit women and their families.⁸⁵ In particular, this may be more likely to enable dietary change.

In contrast to traditional phenomenological methods, constructionist descriptions are located within the existing knowledge of an issue so that research findings may be constructed on the basis of relevant linkages to other work in the field.⁹⁰ The use of existing knowledge as a framework for orienting the study served to provide a rationale for the anticipated study boundaries and also articulated the theoretical assumptions, biases and pre-conceptions that drove the development of my research design forward.⁹⁰ This allowed me to use the existing body of research concerning explanations, issues and influences related to dietary interventions in pregnancy to serve as a foundation that assisted in shaping the direction of this work. This together with my examination of education and health behaviour theories in chapter 2 I had a solid basis upon which I could build.

And finally, as well as providing an insight into the experiences of pregnant women on a dietary intervention, this also allowed me to consider how these experiences could be described within a constructionist approach. This new knowledge then had the potential to inform the development of service frameworks that support pregnant women, enhance dietary habits and improve the provision of maternity health care.⁹¹

1.3.6 Development of my research questions

The aim of this study was to explore the views and experiences of the ESTEEM dietary intervention (described in section 1.3.7 below) in a pregnant cohort with metabolic risk factors. So, I developed questions which directed me to understand the salient, influencing factors upon these. I wanted to explore the concept of engagement with the ESTEEM dietary intervention in at risk women. Engagement with an intervention is affected by provider and client characteristics.⁹² Although some research has looked at ways to improve participant understanding of interventions and promote participant involvement and decision-making, these areas remain lacking.⁹² Further exploration is required to look at the association between knowledge of the trial or intervention, anxiety about care and health needs, and also the willingness to engage in research.

It is important to understand women's perceptions of their eating preferences prior to pregnancy (What are women's perceptions of their eating patterns and preferences prior to pregnancy?) and also what their eating habits are like and how these were influenced and how

these were acquired. Lifestyle, close family and acquaintances (What and who influences women's decision-making in the management of their eating plan, during pregnancy?) will also impact on how often and what routine and behaviours the women and her family may have. Previous diets or eating fads or plans may also have a bearing on what and how often a woman may eat (How do women construct and make sense of the dietary intervention, its benefits for themselves, their baby and their family?). Previous pregnancies will also influence how the woman adapts her eating during pregnancy (How do women view their experience of pregnancy and childbirth and the management of their diet?), therefore my initial research questions were developed from these notions.

Working research questions:

- What are women's perceptions of their eating patterns and preferences prior to pregnancy?
- What do women perceive to be their areas of concern for themselves, their baby and their family in terms of diet?
- How do women construct and make sense of the dietary intervention, its benefits for themselves, their baby and their family?
- How do women perceive maternal responsibility in the context of having risk factors in pregnancy (obesity, raised lipids, high blood pressure)?
- What and who influences women's decision-making in the management of their eating plan, during pregnancy?
- How do women view their experience of pregnancy and childbirth and the management of their diet?

As I progressed, it became apparent that the questions I had formulated were too wide-ranging for a single PhD study and that repetition existed within these. I therefore refocused on the questions set out below and it was clear that these were indeed in keeping with my research stance, my approach and my need to explore how dietary interventions were viewed and

experienced by women, families and health care professionals. They allowed me to examine how participants experienced the ways in which the intervention was put into operation.

The research questions:

1. What do we know from randomised controlled trials included in a systematic review of diet and lifestyle interventions for pregnant women about women's (and their partners wider families) views and experiences of these types of interventions?
2. How do pregnant women with metabolic risk factors experience a dietary intervention and what are the factors that influence their engagement with the intervention?
3. How do partners of pregnant women with metabolic risk factors view and experience a dietary intervention to improve pregnancy outcomes and how do these support women's participation?
4. How do health care professionals view and experience a dietary intervention for pregnant women with metabolic risk factors and what implications do these suggest for the design and delivery of such dietary interventions?

1.3.7 The ESTEEM dietary intervention

As noted in section 1 of this chapter, obesity and hyperlipidaemia increase perinatal complications such as preeclampsia. Preeclampsia is a condition in pregnancy characterised by high blood pressure and increased protein in the urine. It is one of the main contributors to maternal death and is also one of the leading causes of premature birth accounting for two thirds of neonatal deaths. A Mediterranean diet has been shown to improve cardiovascular outcomes in a non-pregnant population.^{4,93} Obesity, hyperlipidaemia and hypertension are all independent risk factors for preeclampsia. Interventions which modify metabolic risk factors and reduce cardio-vascular incidents will also have the potential to lower the risk of preeclampsia.

ESTEEM (Effect of Simple, Targeted diEt in prEgnant women with Metabolic risk factors on pregnancy outcomes), was a randomised controlled trial of a dietary intervention based on the Mediterranean diet. The trial took place at The Women and Children's Clinical Academic Group (CAG) at an inner-London Trust which has the largest number of deliveries in Europe (around 17,000 per annum). The Trust serves populations with high levels of socio-economic, cultural and ethnic diversity.

The hypothesis underpinning the ESTEEM intervention is that pregnant women with metabolic risk factors would benefit from a Mediterranean (lipid-modifying) diet which is simple, accessible and acceptable. All women were assessed at booking for metabolic risk factors which included obesity, raised triglycerides and high blood pressure. Women with at least one of the above risk factors were randomised to one of two groups – the ESTEEM dietary intervention, or, routine antenatal dietary advice.

Screening took place after women had their booking history and first ultrasonic-scan, which was at the woman's twelfth week of pregnancy. Some midwives and midwife-ultrasonographers assisted in screening. They approached women and provided some information to see if women were interested in participating in the ESTEEM study. They then informed the research midwives who would further inform women about the study and talk through the written information they gave them. Some midwives were able to recruit women during the booking visit. Eligible women were approached by the research midwife. As most partners attend the first antenatal visit with women, the couple was informed about ESTEEM study and they also received written information.

Data on how recruitment and retention worked in the trial – the context of the study sample

Initially, the recruitment period for the trial was for 14 months, however, this was extended for a further 4 months due to the large sample size which was required, being carried out between September 2014 and end of February 2016.⁹⁴ The number of recruitment centres was also increased from 3 to 5 (4 in London, 1 in Birmingham). These were opened in a step wise approach in order to be able to test and troubleshoot issues related to recruitment, before advancing further.⁹⁴ This allowed judicious allocation of trial resources and the factoring in of the length of the intervention and the follow up periods of all participants.⁹⁴

The results of the trial showed that 7,950 women were screened, of these 3,421 were recruited, 1,252 randomised, to the intervention ($n = 627$) and to the control group ($n = 625$). Of the 625 women allocated to the ESTEEM dietary intervention group 34 were excluded (24 recruited in error, 7 patient request, 3 for invalid consent).⁹⁵ The intervention baseline data was available for 593 and 40 of these were lost to follow up leaving a total of 553 followed up and included in the analysis.⁹⁵ A third of women randomised to the trial were in their first pregnancy (330/1205). Two thirds of the women were African or Asian.⁹⁵

Social and cultural context and cultural adaptation to ESTEEM dietary intervention

The ESTEEM dietary intervention recommended that women follow a Mediterranean style diet, included group educational sessions and one to one advice to support women to change their diets and undertake physical activity, and provided women with nuts and olive oil, recipes and factsheets. The key components of the diet included high intake of fruit and vegetables, non-refined grains, legumes, moderate to high consumption of fish, small to moderate intake of poultry and dairy products such as yoghurt and cheese, low consumption of red meat and processed meat and avoidance of sugary drinks, fast food, and food rich in animal fat. In particular, ESTEEM advocated high intake of nuts (including walnuts, hazelnuts, and almonds) and high intake of extra virgin olive oil as the main source of fat.

Following randomisation, women in the intervention arm were invited to attend the ESTEEM antenatal clinic to start the intervention by 18 weeks gestation (Table 2). All participants were interviewed by the ESTEEM study dietician or a trained researcher to assess their baseline diet and deliver the dietary intervention on a one-to-one basis. The dietician used a 24 hours food recall followed by focused questions to estimate the participant's basal dietary intake and identify elements for change towards a Mediterranean diet. Once identified, the participants were encouraged to set and record personalised goals following the SMART model (specific, measurable, achievable, relevant and time-specific) to implement the highlighted dietary changes. These goals were recorded in the participant's case record and were used to track progress in subsequent visits.

The trial dietitian and trained researchers delivered the intervention by conducting face-to-face meetings. One personalised session was carried out at around 18 weeks of pregnancy with two further sessions around week 20 and 28 of pregnancy, using presentations. The intervention was made culturally sensitive by providing cooking advice and the use of a recipe book (Appendix 2). Elements of the Mediterranean diet were incorporated into the local cuisine⁹⁵ which was largely Asian. Recipes were co-designed with community teams (food-academy.co.uk). Women's partners were invited to participate in the sessions.

Table 2 The timeline of the ESTEEM intervention and contacts/activities with women

Timeline	Intervention activity
By week 18 of pregnancy	<ul style="list-style-type: none">• Commence intervention by week 18• Assessment of baseline diet and delivery of intervention on a one-to-one with dietitian or trained health care professional• Goals noted in participant's case record and used to track their progress• Provision of olive oil, walnuts, hazelnuts and almonds, recipes, factsheets on benefits of consumption of these foodstuffs• Food assessment questionnaire, physical activity questionnaire, quality of life questionnaire completed
Weeks 20 and 28 of the pregnancy	<ul style="list-style-type: none">• Small groups sessions where possible, with partner• Presentations providing basic dietary education, good food habits, shopping advice, reading food labels, Mediterranean style diet and general pregnancy health advice• Sharing of dietary experiences, exploring obstacles, solution-finding.
Weeks 24 and 32 of pregnancy	<ul style="list-style-type: none">• Two follow-up calls to check on woman's well-being and adherence to diet

The dietitian provided basic education on the benefits of a Mediterranean style diet on pregnancy and the drawbacks of poor adherence to the intervention. Starting at this session and throughout the pregnancy, women were provided with extra virgin olive oil and sachets of nuts (such as walnuts, hazelnuts, and almonds) and were instructed to consume 0.5 litre/week of extra virgin olive oil for the whole family and 30 g of mixed nuts individually. The dietitian also provided culturally modified cooking recipes to help the women include the components of Mediterranean lifestyle into their diet such as nuts and fish. Factsheets on the benefits of consuming these nutrients in pregnancy were provided.

Participants were asked to complete the following questionnaires by the 18th week of pregnancy: a short dietary questionnaire specifically designed to assess the intake of Mediterranean food groups, a questionnaire to assess participant's physical activity and a questionnaire to assess quality of life.

Participants were then invited to two further intervention sessions at 20th and 28th week of pregnancy. These sessions were delivered in a group setting including where possible, women's partners. The trial dietitian delivered bespoke presentations providing basic dietary education, good food habits, healthy shopping advice, reading food labels, beneficial dietary elements in the Mediterranean style diet and general pregnancy health advice. Women were encouraged to share their experience of their dietary changes, explore obstacles to adopting the intervention and find potential solutions to these. Two follow-up phone calls were made to participants in the intervention group at 24th and 32nd week of pregnancy to check on their wellbeing and assess their adherence. The control group was provided the standard antenatal dietary advice. This included advice on healthy diet and physical activity in women with normal weight, overweight and obesity.

1.3.8 Theory of change underpinning the ESTEEM dietary intervention

Complex intervention programmes such as the ESTEEM dietary intervention are recognised in the literature as difficult to evaluate. It is recommended that to make sense of this complexity the assumptions or theory of change on which the intervention is based need to be made explicit. However, these are often not articulated.⁹⁶ I constructed a logic model for the ESTEEM intervention in order to clarify its causal assumptions. I wanted to make explicit how the intervention was expected to work (Appendix 3).

Logic models are increasingly being used to demonstrate how the mechanisms which occur during an intervention are expected to happen.⁹⁷ It is a visual representation of the planning and resources, the activities carried out, and the intended outputs and outcomes, of an intervention. A schematic diagram may demonstrate the relationships between the various parts of the logic model, such as inputs, activities and outputs and outcomes. As there are challenges to demonstrating health behaviour changes,⁹⁷ and the maintenance of these changes, logic models may assist in identifying what and when the challenges occur, why they have occurred and how they might be overcome.

A theory of change was implicitly articulated in the ESTEEM intervention protocol in the description of intervention components.³ I translated this description into a logic model which represents a more explicit formulation of the way the intervention was expected to achieve its impact. My intention was to use the logic model to help interpret the qualitative data collected on women's, their partners and health professionals' views and experiences of the ESTEEM intervention.

I was interested in knowing more about how outputs were produced and what was significant about the varying conditions in which the ESTEEM intervention took place, in practice, as interventions are limited activities that occur in wider social settings. I wished to find out more about what might impact upon participants' engagement with the intervention. I wanted to grasp how women viewed the support they were provided during the ESTEEM intervention.

1.3.9 Summary of chapter and overview of whole thesis

This chapter has presented the background for my thesis and my research approach. The literature on nutrition, diet, pregnancy and health has been discussed in relation to my research interest, that of how women, their partners and health professionals view and experience dietary interventions to address metabolic risk factors in pregnancy. The ESTEEM intervention has been described in detail and a logic model for the ESTEEM intervention has been presented. The next chapter describes and reviews theories and models relevant to explaining health behaviours and health behaviour change such as healthy eating and physical activity to give further context for the empirical work presented in this thesis

1.3.10 The research questions

The structured research questions I will answer and the issues covered in each chapter in this thesis are presented in table 3 below.

Table 3: Research questions and issues covered by each chapter in thesis

<i>Chapter number</i>	<i>Question/Issue:</i>
1	<i>Introduction to the thesis covering background literature, key concepts, methodological approach and context</i>
2	<i>Theories and models relevant to behaviour change</i>
3	<i>How did a systematic review and the randomized trials within it on diet and lifestyle interventions for pregnant women report on the acceptability, attitudes, beliefs and experiences of women?</i>
4	<i>Methods</i>
5	<i>How do pregnant women with metabolic risk factors experience a dietary intervention and what are the factors that influence their engagement with the intervention?</i>
6	<i>How do partners of pregnant women with metabolic risk factors view and experience a dietary intervention to improve pregnancy outcomes and how do these support women's participation?</i>
7	<i>How do health care professionals view and experience a dietary intervention for pregnant women with metabolic risk factors and what implications do these suggest for the design and delivery of such dietary interventions?</i>
8	<i>Key finding and interpretation, strengths and weaknesses, relationship to previous literature and implications for policy, practice and research?</i>

Chapter Two – Theories and models related to learning, health and behaviour

2.1 Introduction

In chapter one, I highlighted some of the reasons given by women for non-participation in dietary interventions. These include disinterest, concern about overemphasis on diet in pregnancy, anxiety regarding body image and social pressures.³⁸ Women's beliefs about the importance of food intake for a healthy pregnancy are entrenched in many women's psyche⁴⁰, additionally, women do not feel they have any control over gestational weight gain⁹⁸. Others report that advice to restrict weight gain can cause distress.^{40,54} Motivations and beliefs strongly influenced women's decision-making about acceptability and adherence to a dietary intervention.⁹⁹

In order to arrive at a better understanding of these dynamics, key theories and models related to learning, health and behaviour have been mentioned here. These have been discussed, to show how these guided the development of my study.

In this chapter I provided a backdrop using theories and models related to learning, health, and behaviour as these were pertinent to the question I was asking about engagement with, participation in, and implementation of the ESTEEM dietary intervention. After some consideration of these, I was led to look at social theory in relation to food and eating. I have also used a logic model to structure my investigation which provided a theoretically-underpinned explanation.

Theories of adult education hold that learning must be built upon what the person knows.¹⁰⁰ Peoples' prior knowledge must be taken into consideration when helping them adapt to a new way of eating. Knowledge of food and the way they are informed about this, would strongly impact upon how they were able to engage with an intervention. Another thread which was relevant to my theoretical underpinning was the theory of social cognition. I was aware that participants would have particular reasons for participating or not, in a health programme. National guidance used to inform health care for pregnant women has also been included in this background. Women had particular pregnancy needs during the ESTEEM intervention as they had metabolic risk factors. Relevant concepts from this field were then included.

2.2 Theories of adult learning

Theories of learning are of interest because we need to understand how and why a person understands, accepts, changes, disapproves of, or rejects, to engage or not engage, with an intervention. Participants in an intervention are going through a process of learning and adapting and they are learning how to find a suitable way through this process.

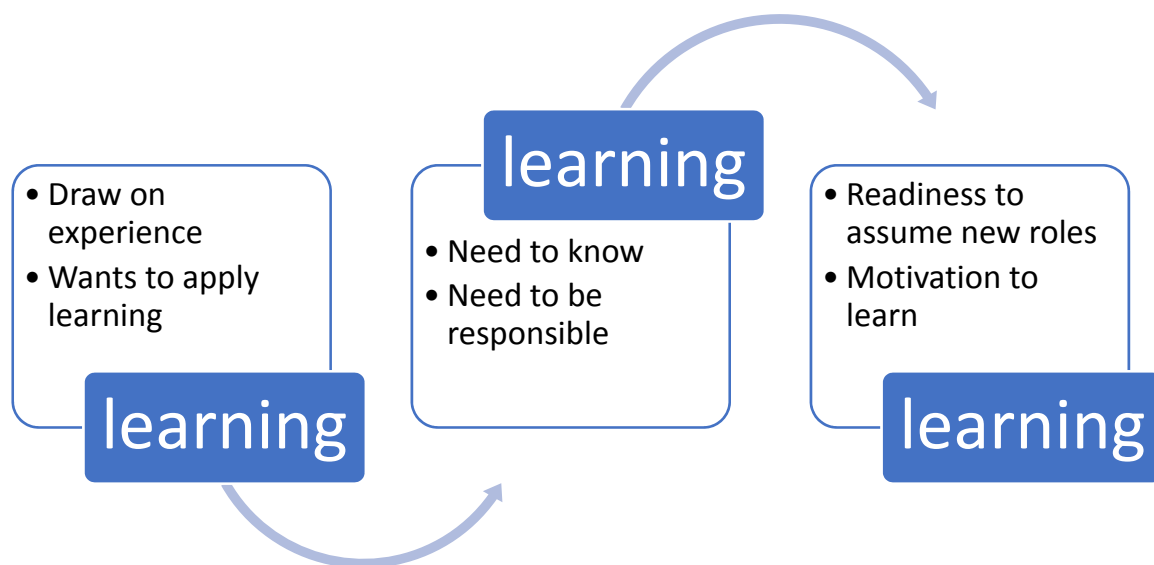
Any useful learning situation has got to contain an element of trust, security and co-operation.¹⁰¹ It is the job of the person who provides information to create an ambience where learners have the faculty of self-determination.¹⁰⁰ Instruction between people occurs when they communicate.^{102,103} To evoke understanding in the person who is learning and to improve learning situations, first of all a trigger is required, to encourage co-operation and communication between the learner and the learning. To achieve this is not easy. Many things in the life and pregnancy of the women, even the ambience, the environment, can facilitate or hinder the learning which is taking place.

The learner constructs theories (in action or thought) to make sense of their experiences.¹⁰⁴ New questions arise for which theory is not adequate. Piaget¹⁰⁵ who embraces the idea that learning is a movement towards better, “though never perfect knowledge” would support this notion. Von Glasersfeld¹⁰⁶ maintains that knowledge is goodness of fit with experience, is a means for the solving of problems. These writers all subscribe to the notion that learners have previous experience and knowledge. They all embrace the idea that learners have their own abstract notions. The idea of “fit” of the learning with what the person already knows, is more adequate than “match” with experience.

The “art and science of helping adults learn”¹⁰⁷ is also known as andragogy. Knowles saw andragogy as an up-and-coming expertise which enables the development and application of adult learning activities. This model is founded on six assumptions about the adult learner. The first assumption informs us that adults need to know the reason why they are to learn. The second assumption is to do with experience. Adults use previous experience to inspire their learning. Thirdly, adults also need to be responsible for their educational choices and take part in planning and appraisal of their learning. The fourth assumption about the adult learner is that the adult’s learning readiness is related to their taking up new social roles. The fifth assumption

that the individual who acquires new knowledge wants to use this straight away to problem-solve. The final assumption was later added, and indicates that as the individual becomes more mature, they receive their motivation to learn from internal influences.

Figure 1. The six assumptions which enable the development and application of adult learning activities: (1) Drawing on experience, (2) wants to apply learning, (3) need to know, (4) need to be responsible, (5) readiness to assume new roles and (6) motivation to learn



All learning originates from experience. ^{101,108} Real Learning begins when a reaction or response is called for in relation to an experience. ¹⁰⁷ It then follows that if a person is unchanged by a situation, whether real learning has occurred. ¹⁰¹ New experiences also need to be reflected upon in order for effective learning to be gained and used.

Experiential learning is referred to education that occurs as a direct participation in the events of life. Learning is then achieved by the practice of reflection upon our daily experiences. ¹⁰⁹ Kolb furthered this definition of experiential learning by developing a model which details the learning process through experiences. Kolb and Fry's ¹⁰⁹ experiential learning model is an uninterrupted, spiral process, which consists of four basic elements:

1. Concrete experience
2. Observation and reflection
3. Forming abstract concepts

4. Testing in new situations

Our observation and reflection, therefore our understanding, is based upon our immediate learning or concrete experiences. These observations and reflections are integrated and adapted into mental impressions from which new propositions for action can be derived.¹⁰⁹ The adult learner can enter the process of learning at any one of these elements, and moves to the subsequent stage once he/she has processed their experience in the previous one. One principal feature of adult learning, not found in those of children or adolescents, is that of life experience. Life experience provides meaningful advantages to adult learners.¹⁰⁸ The sum total of adult experiences provides adult learners with a number of reference points with which to discover and apply new learning and develop knowledge.

2.3 Health theories and social cognitive theory

Many theories and models within health psychology examine health behaviour and change.^{110,111} These are able to help us predict and change health behaviours. They highlight the impact which health beliefs have on influencing health behaviour and show us that knowledge about health, is not effective in the prediction of health behaviour.^{112,113} The theories may be developed into two main categories which are social cognition theories and change models.¹¹¹ Social cognition theories are a group of related theories, all of which identify a number of cognitive and affective (beliefs and attitudes) aspects as being the proximal determinants of behaviour.^{114,115} The most noteworthy of these and most widely used by health and behaviour researchers are the health belief model, the protection motivation theory, self-efficacy theory, the theory of reasoned action and the theory of planned behaviour.¹¹⁵

The social cognitive theory, developed by Bandura serves as a foundation for many health behaviour models and stipulates that behaviour is regulated by factors such as incentives, expectancy and social cognition.¹¹⁶ Theories of social cognition mainly concern the individual. As human action is socially situated, it is the product of a dynamic interaction between personal and situational influences.¹¹⁶ Incentives indicate that human behavior is directed by perceived personal benefit.¹¹⁶ Expectancies may be either related to situation outcome expectancy, outcome expectancy or self-efficacy expectancy.¹¹⁵

The construct of perceived self-efficacy was introduced by Bandura in 1977 in the context of cognitive behavioural modification.¹¹⁷ A fervent sense of personal efficacy is equated with better health, higher achievement and good social integration. Behavioural change is enabled by the individual's sense of control. If the individual believes that they are able to take action and to problem-solve, they become more inclined to doing so. They become more steadfast in their decision.

Some-one who believes they can cause an event to happen is also able to run a more active and self-determined life-course. Such "can-do" reasoning reflects a sense of control over the individual's environment and demonstrates a belief of being able to overcome demanding situations by adjusting their behaviour. Levels of self-efficacy can enhance or prevent the motivation to take action. People with high self-efficacy are more apt to complete more challenging undertakings and are more likely to set themselves higher goals and stick to them.¹¹⁸ People with high self-efficacy make greater effort and persist longer than those with lower levels of self-efficacy.

2.4 Beliefs about health

Health is dynamic and multi-faceted - whether it is made up of components forming an 'absence of disease' perception, or whether it is holistic. Having one perception or the other, is influenced by the individual's life course, living conditions, cultural or social context. It is therefore dynamic and changing in nature depending upon these factors. It is therefore important to acknowledge the relationship between the individual as well as the social context in which health is experienced and lived. This allows us to gain a fuller understanding of the person's health-related perceptions and beliefs.

One health belief of note is that of the perception of risk. This belief can be understood using the perspective of "unrealistic optimism", whereby an individual may continue to engage in unhealthy behaviour because of their unrealistic optimism, corresponding to their perception of risk¹¹⁹. In Weinstein's study¹¹⁹, 100 college students compared their own chances of contracting different health problems with those of fellow students. A significant optimistic bias for the perceived occurrence of these hazards resulted, with students consistently considering their own chances to be lower than average. Perceived controllability and lack of previous experience were proposed as factors that tend to increase unrealistic optimism. The

same study ¹¹⁹ also looked at the importance of beliefs and emotions as determinants of personal interest in assuming precautions to reduce their own risk. It found that: (a) beliefs about the likelihood and severity of the risk, and worry about the risk all independently contributed to the individual's motivation to reduce risk; (b) unrealistic optimism undermined the impetus in risk reduction indirectly by decreasing worry and concern; and (c) beliefs about risk likelihood and severity were not sufficient to explain the amount of worry and concern expressed about different hazards.

2.5 Theories of health and Locus of control (LoC)

One of the key psychological constructs identified in the literature is the effect of locus of control (LoC), which is the extent to which people believe they have power over events in their lives. A person with an *internal locus of control* believes that they are capable of influencing events and their outcomes, whereas someone with an *external locus of control* attributes the cause of these events to independent factors. One way of appraising the health locus of control to find out whether individuals regard their health as controllable by themselves or whether this is determined by external factors over which they have no control i.e. consequences or outcomes of certain events (eg. over-exposure to sunshine and skin cancer) are a result of fate and destiny (good-fortune, luck) ¹²⁰

According to social learning theory, locus of control is an expectancy, as opposed to a motivational construct and should therefore only be measured by expectancy items. Seeking health information is one behaviour which may lead to further behaviours, which ultimately will improve health. ¹²¹ From the above, a hypothesis about preventive health information seeking can be affirmed. Given the opportunity to gather information about a health problem which may or may not affect the person, the person who values health highly will seek more information than one who does not value health or who holds external beliefs. This was demonstrated in a study by Seeman and Evans, ¹²² who found that tuberculosis patients with internal LoC knew more about their condition, sought more information about it, and were less satisfied with the feedback from medical and nursing staff than those with external LoC. From previous studies, generalized expectancy internal/external control of reinforcement has been shown to influence information-seeking behaviours, in some healthcare settings. ^{120,122}

Although the link between pregnancy, obesity, diet, health and locus of control is of significant relevance currently, a recent review of evidence in this area shows that little research into the effects of locus of control has been carried out.

Society does have a bearing on the power and the agency of the individual. It may be conceptualized as a pressure experienced by an individual or felt as a context which unconsciously configures and governs their behaviour. All the above theories and constructs involve health behaviour at the individual level. In spite of this, many social circumstances may influence health behaviours. The social-ecological framework¹²³ also contributes to the discipline by stating that intra-personal factors, interpersonal processes and groups, institutional factors (socially recognised and organisational features), community dynamics and public policy (local, regional, National regulations and laws)¹²⁴ are all determinants of health behaviour.

2.6 Social-ecological Models

Social ecological models see individuals as rooted within larger social systems. They explain the interrelated characteristics of individuals and environments that lie beneath health outcomes.^{123,125,126} Ecological models claim that many layers of influence exist and further claim that these layers of influence are both interactive and reinforcing. The many physical, social and cultural aspects of a person's environment have then a cumulative effect on their health.¹²³ The environment also has multiple levels, as organisations and communities are set in greater social and economic structures. As well as this, the environmental context may influence the health of individual people in various ways. This may also be further impacted by peoples own views, beliefs and habits. Dietary change and health behaviour then is complex. Generating sustainable health improvements would be most successful if all of the above dynamics are targeted in a concerted way.

Diet is one of the most important and modifiable life-style factors that determines people's health. Malnutrition strongly impacts health therefore interventions are needed to improve population health through dietary means.¹²⁷ Interventions and change can occur at individual, local or national level. Examples of national campaigns include for example the "5-a-day" initiative to improve knowledge and skills. Traffic light and food labelling are also part of this drive. Supplementing food for example adding folates to flour, fluoridation of water is carried out. As well as this, collaborating with food companies so that fat, sugar and salt content is reduced, occurs. The National Healthy Schools Programme (NHSP) involves schools in its programme to acquire healthy schools' status. At community level skills development encourages planning, organising, budgeting, preparing and shopping. In the workplace innovations such as healthy vending machines, healthy workplace cafeterias are

promoted. At the individual level, counselling mainly happens in the primary care setting and is specific to a condition, such as diabetes or high blood pressure. It is tailored to the person.

Many techniques can be used to assess the impact of nutritional interventions.¹²⁷ Physical growth may be measured, biomarkers using laboratory techniques may be employed, and, the impact of interventions may be gauged using clinical, morbidity and mortality data. Dietary assessments which estimate food and nutrients intake can be used, but these are prone to inaccuracies.¹²⁷ Some interventions look at diet and physical activity where both of these factors need to be measured. Finally, some nutritional interventions are assessed using behaviour change and psychological indicators. One example of this may be to look at interventions for obesity and the impact of these on self-esteem.¹²⁷

2.7 Health behaviour

In the main, research on health behaviour looks at the difference of between-variation in certain health behaviours.¹¹⁴ Examples of research questions are “Why do some women engage in regular exercise and others do not? However, it is also needful to understand why within-individual-variation exists.^{112,114} This can tell us such things as why a woman engages in exercise, but then does not continue to do so. We may then learn why a person’s behaviour may vary over time and within different situations.^{114,128}

Models are quite different in structure to social cognition theories but use similar concepts.¹¹¹ In models, behaviour change is believed to involve a number of distinct stages. Various factors are thought to be important at these different stages.¹¹¹ People therefore require different interventions to help them move on to the subsequent stage in the cycle.¹²⁹ The models of health behaviour which hypothesise stage progression include the transtheoretical model (TTM)¹¹¹ and its various alternatives¹³⁰ but the TTM is the major one in the discipline. The most popular form of TTM to be used recently is the DiClemente five stage model, which comprises the stages of precontemplation, contemplation, preparation, action and maintaining the behaviour.¹²⁹

One of the most widely quoted behaviour theories is the theory of planned behaviour (TPB). The theory of reasoned action (TRA) is also considered a significant model as it places the individual in their social context and it adopts a cognitive approach to explaining behaviour which focuses on the attitudes and beliefs of the individual. The TPB^{112,128,131} evolved from the theory of reasoned action¹³² which speculates that intention to act as the most credible

predictor of behaviour. Intention is itself a consequence of the individual's various attitudes towards a behaviour. In other words, intention is the calculation or estimation (good or bad) of a behaviour and its foreseeable conclusion and subjective norms which are an individual's perception of what others (peers) believe about a behaviour and the preference of the individual to conform to these.

The theory of planned behaviour (TPB) has been widely exploited within the health arena and enhances the prediction of behaviour and the retrospective analysis of behaviour.¹³³ It is not considered useful or effective in relation to planning and designing the type of intervention that will result in behaviour change^{134,135} but the theory may serve to pinpoint some expected behaviours and be of value in distinguishing specific influences on behaviour that can then be pursued. One other dynamic of the TPB affecting intention and behaviour is the aspect of perceived behavioural control. This is the perceived facility or difficulty with which the individual will be able to accomplish a behaviour, and, is comparable to the notion of self-efficacy (see Bandura, above).

According to the TPB, human behaviour is influenced by beliefs and the identification of these is indispensable in the conception of behaviour change interventions. Research carried out in a school in Manchester looked at the influence of attitudes and beliefs and women's weight loss.¹³⁶ A qualitative approach using semi-structured interviews was employed for this. Seventeen overweight and obese participants were recruited. The participants reported beliefs associated with the benefits of weight-loss and the emotions related to dieting. The more positive the beliefs were, the more positive their attitude regarding the diet appeared to be. The findings attribute the importance of follow-up in creating a subjective norm to maintain a diet. Perceived behavioural control concerning diet seems to be related to beliefs about social support, whilst beliefs about lack of will-power to overcome temptation appears to decrease perceived control over eating habits.

These data seem to support the propositions of the TPB and offers valuable insights to enable further development of research, and on dietary behaviour-change interventions. Health professionals could use the TPB to assess an individual's attitudes, beliefs and expectations when on a diet. This information would provide insight into which aspects are applicable for individuals when following a diet and could assist in the design of more effective diet behaviour-change interventions.

2.8 Concepts underpinning care for women

The hallmarks of care for women should be kindness, respectfulness and dignity. Women's views, beliefs and values in relation to their care and that of the pregnancy should be sought. ¹³⁷ Women should be able to make informed decisions about their own care and their treatment, together with their healthcare professional, and good communication is vital. ¹³⁷ Evidence-based, written information should be used to tailor women's needs. The treatment, care, and the information women are given, should be culturally appropriate. It should also be accessible to women with additional needs and to women who do not speak or read English. ¹³⁷ Partners and family members at the behest of women, should be provided with the information and support which they need and should be involved in decisions about women's treatment and care. ¹³⁷

Women participating in a dietary intervention should be able to make informed decisions with their health care professional. ¹³⁷ They should have care which is tailored to their requirements. Good communication backed by written information should support women's decision-making. Care should be culturally appropriate. Equally, partners and families need to be provided with support and information, in order to ensure that women's needs are met. Many maintain that not all women are truly at the centre of their care, some are denied their choices, and some want more and better interaction with midwives. ¹³⁸ Maternity care should seek a co-designing experience for women, to allow their needs to be met. ¹³⁹ This should take place within what women call a supportive environment.

2.9 Women in society, women's roles and food

The act of swallowing divides food's two cultures. ¹⁴⁰ The pre-swallowing domain, which involves behaviour, culture, experience, society; and the post-swallowing world of biology, physiology, chemistry and pathology. ¹⁴⁰ This may in part explain why the discipline of nutrition gives little consideration to the pre-swallowing and social features of food and eating.

¹⁴⁰

Many health theories examine food and eating as a behaviour. As behaviour is not always strictly under the control of the person, we may overstate the extent to which rational choice impacts what we eat. This may lead to an underestimation of how eating is embedded in daily occupations. Our eating patterns are partly formed in relation to others around us, within and surrounding our daily activities. Our family groups, workplace colleagues and our student peers

at school affect our choices. ¹⁴⁰ Our choices are limited to some extent by the context in which it occurs. Social theory therefore may provide some theoretical input for the study of the social nature of eating, by looking at eating as part of the context in which it happens. ¹⁴⁰

Women, through history carry most of the responsibility both for the mental and the manual work related to the provision of food in the home. ^{141,142} Women bear the burden of performing the greater part of food-related work and this constructs who they are in the world. How women are involved with food either as individuals, as family members and as providers, is complex and contradictory. ¹⁴³ This affects them in many ways.

Academics in the field of food hold contrasting perspectives on women's responsibility regarding the feeding of others. ¹⁴² One is that this may give them power in the family, or, this makes them revert to their subordinate gender role. By providing food for others, women signify their attachment to family and they also maintain their cultural traditions which characterise their identity.

Many studies demonstrate how women construct their identities, cultures and class positions through providing food. ^{144,145} Women's everyday work with food connects them in informal and in close ways with family, friends and others. Immigrants maintain their cultures by providing traditional foods and meals. Women from upper-middle class circles display their class position by providing fruit, vegetables and fine wine, for example. ¹⁴¹

Because food is about women, it is also about men and families. ¹⁴² Women, wives, mothers try to prepare and cook food that is wholesome, nutritious and which is the "epitome" of good home-cooking, for their families. ¹⁴² Women strive to provide their ideal of proper meals.

It may come as no surprise that as women are mainly responsible for shopping, cooking and preparing food, some research shows that men know less about the health benefits of particular foodstuffs. Reports also show that men may have little interest in their "ailing bodies" ¹⁴⁶ and rely on women for advice and support when they need it. ¹⁴⁷ There are very few studies which look at men's construction of food and health, with respect to the relationships between men, food and health. ¹⁴⁸ The properties which are attached to food, particularly by men have not been researched in depth. ¹⁴⁸

In order to understand the less visible elements of family feeding, we need to pay attention to these, that is, the implicit understandings which occur during the daily planning, the organisation, the skills required for, the monitoring needed, to co-ordinate the preparation of

food.^{149,150} Relationships which strongly affect eating, from both parent and children's perspectives, occur in a social network, and go far beyond the individual and the household.

149

2.10 Discussion

As regards adult learning theories, experiential learning theory accentuates the role that experiences play in peoples' learning processes. This is what distinguishes it from other learning theories. Cognitive learning theories stress cognition over affect. Behavioural learning theories reject any role for subjective experience within the learning development.

All knowledge is therefore personal. All learners are individuals. Previous experience must be drawn upon in order to give responsibility to the learner. For learning to take place, this must be applied to the individual's situation. Women on a dietary intervention therefore, have their own way of learning and knowing. The nature and the reality of behaviour change is such that knowledge, skills and attitudes must all be assimilated by the women on the dietary intervention. The acquisition of these different types of knowing (knowledge, skills and attitudes) must be developed alongside each other.

In the main, health belief theories would posit that feedback and support facilitate change in health behavior and they put a varying emphasis on the belief of self-efficacy. Much of rational human behaviour is primarily coordinated in our thoughts and our beliefs in the efficacy of our actions, this then helps us develop expected circumstances which we imagine and then practice. Individuals with a high awareness of efficacy envisage achievement which in turn reinforces positive performance, whereas individuals who doubt their efficacy imagine disappointment and let-down and tend to focus on this, making success hard to achieve.

It could be said that theories of behaviour and models have one weakness - the social gap. Individual models of behaviour are intensely instinctive, apparent and explicit, moreover, it is clear that individual agents engage in deciding upon and selecting, their behaviour. Nonetheless, the majority of models that focus on individual cognitive processes and decisions massively undervalue the influence of social circumstances. This has in all probability to do with the complexity related to quantifying social factors. There is some propensity to handle society as a peripheral item or object, involving people in decision-making procedures, but

where they are not really involved as part of that process. Social pressure and social context undoubtedly play a significant role in regulating behaviour.

Effective behaviour change interventions require intervention at several levels, simultaneously and consistently. Through certain interventions (education, persuasion, incentives, coercion, training, enablement, modelling, environmental restructuring and restrictions), change can occur if the essential conditions i.e. capability, opportunity and motivation are present. Ultimately, there is a need for policy change (environmental/social planning, communication/marketing, service provision, regulation, fiscal measures and guidelines) to enable change.¹²³

A number of models and theories exist, yet the application of these to practice and to the daily life of the women in our care is lacking. Co-ordinated approaches have considerable potential to change women's dietary and lifestyle habits. Interventions and approaches must address both the individual as a decision-maker together with the wider social context in which they live. This means that interventions are likely to be required for the effective promotion of sustainable diet and lifestyle behaviours in pregnancy and beyond.

Contemporary maternity care espouses the concepts of continuity and choice. Women want to see professionals who they know and are familiar with. Relationships with their health care professionals are important to women. However, women also want to be cared for by credible practitioners and need to feel safe. Feeling safe allows the woman to understand what she is told and also enables her to find ways of adapting her care to her own needs.

Women perform the greater part of food-related work and this constructs who they are in the world. How women are involved with food either as individuals, as family members and as providers, is complex and contradictory. It is then necessary to understand each woman's perspective and priority regarding food preparation, cooking and eating. Only in this way are we able to help women adapt intervention foodstuffs to their taste, their household and their lifestyle. Furthermore, little research has been done around men's food and health and their relationships with these and the properties which are attached to food, particularly by men have not been researched in depth.

Interventions must seek to understand the individual as a decision-maker within the wider social context in which they live. Diet and lifestyle intervention then become truly effective. A

number of interventions may be required to effectively introduce and establish sustainable behaviours. The conclusion from the evidence regarding interventions to affect behaviour change requires being mindful of the material context in which people live, to enable effective change. As shown above, social-ecological models may be useful to explain the interrelated characteristics of individuals and environments that lie beneath health outcomes. They may also expose the many layers of influence that impact the physical, social and cultural aspects of a person's environment and that have a cumulative effect on their health.

This theoretical underpinning provides some insight into how interventions may affect people and also, how people have unseen, and not always obvious needs and influences which may impact upon their participation during a dietary intervention.

The next chapter contains a systematic review of the evidence contained in randomised controlled trials on diet and lifestyle interventions in pregnancy. This will provide further background for my thesis which focuses on the acceptability of these for women.

Chapter 3: Systematic review of randomised controlled trials

This chapter looks at the evidence contained in randomised controlled trials on diet and lifestyle to evaluate the conduct and reporting of any qualitative component within these on their acceptability and feasibility. This information will provide further backdrop for the overall thesis, drawing from the literature on how RCTs which have been carried out were conducted, and, how they reported any element regarding their acceptability, feasibility or participant experience. This will add to the main concepts discussed in chapter one and the theoretical models presented in the previous chapter.

This evidence will clarify how the research process impacts upon people's lives and shed light on how people who are participating in research experience interventions. It is essential to find out if we are providing care and developing research strategies that are acceptable and suitable for people. Input from women, families and health care professionals involved in a study would provide us with a complete and first-hand report of their research experience. These insights would provide a rich and in-depth account which could inform practice.

Pregnant women with metabolic risk factors who experience trials as well as interventions have many adaptations to make, as well as health concerns and their own responsibilities on top of their daily commitments. It is imperative that we provide an experience for women and their families that is acceptable and feasible for them within their social situation.

The research question for the systematic review of the literature was:

What do we know from randomised controlled trials included in a systematic review of diet and lifestyle interventions for pregnant women about women's (and their partners wider families) views and experiences of these types of interventions?

3.1 Introduction

A copious amount of research has already been carried out on diet and lifestyle interventions in pregnancy to assess their effects on both gestational weight gain and pregnancy outcomes.

^{2,34} Individual studies on lifestyle interventions vary as regards the effectiveness of these, in the main they benefit women and babies by reducing weight gain in pregnancy, and improving pregnancy outcomes. Adherence to the intervention during pregnancy is crucial for improved outcomes. ^{2,77,151} Dietary adherence depends on how acceptable women find the proposed diet. Not only is it important to find out if the intervention diet works, but, determining whether or not the woman is able to maintain it is key.

Many issues complicate the practicalities of carrying out research and dietary interventions. Numerous logistical influences can come into play influencing uptake and adherence of these. Women's knowledge as well as their preferences may influence the uptake of, and, adherence to any dietary intervention in pregnancy. It is a challenge for researchers and health care professionals alike, to find an appropriate diet and intervention which suits women and families. Many approaches include one-to-one, group, intensive, flexible, or continuous interventions, in order to find one which improves the acceptability of these. By being acceptable to women, adherence to these will be more assured.

It is widely acknowledged that social support, motivation and suitability are key to acceptability and adherence of interventions. The use of qualitative research is increasingly being used alongside trials to carry out process evaluations. Qualitative methods are able to provide information about what works best for participants and gives insight into what is acceptable for them. In this way women's experience of the intervention is made known. ¹⁵² The impact of mixed-methods research is greatest when both quantitative and qualitative aspects of a trial are combined. ¹⁵³ As previously stated, the integration of the qualitative and the trial findings is still not common practice, despite being endorsed as best practice. ^{153,154} Furthermore, structuring the processes involved using a logic model will also add value and precision by highlighting the mechanisms occurring during a process evaluation to provide us with a robust case. A systematic review was therefore carried out to evaluate the conduct and reporting of research on acceptability, attitudes, beliefs and experiences on pregnant women in randomised trials of diet and lifestyle interventions. See Appendix 4 for Table of characteristics of the women and details of the randomised controlled trials included in the study. The systematic review was published in the European journal of obstetrics and gynaecology and is attached in Appendix 5.

Literature search

A previous literature search of randomised trials on diet and lifestyle interventions in pregnancy that was conducted in 2012 was used (Appendix 6). This search had been further updated on two instances, at the beginning of 2016 and 2017. The details of the search strategy are provided in previous publications.^{4,27,37}

3.1.1 Study selection and quality assessment

Two reviewers, myself and a research midwife with an interest in the area, independently assessed the identified randomised trials for possible qualitative components (AH and AN). The full manuscripts of all the randomised trials were obtained. Studies that contained a qualitative component or which reported aspects of research on acceptability, attitudes, beliefs and experiences of pregnant women were included in the review. Research which did not include a nested qualitative component, quality of life evaluation or which did not contain views or experiences of participants or health care professionals was excluded. When more than one publication of the same trial existed, the version that contained the largest sample size (qualitative evaluation), and those which contained the most detailed component regarding research on acceptability, attitudes, beliefs and experiences on pregnant women was chosen. We reviewed the studies and evaluated the methodological quality of the reporting of the included studies. The Critical Appraisal Skills Programme (CASP) framework was used.¹⁵⁵ A third reviewer was approached (ST) if any divergence of opinion arose, and a recognised qualitative researcher also provided expertise.

3.1.2 Data extraction and analysis

Qualitative data was extracted by myself and AN, in duplicate using a pre-designed form which we had piloted. Data were extracted regarding the type of the intervention, study objectives, methods and the important outcomes which were reported. As we wanted to find any qualitative element contained in the trial report, we looked for information about women's awareness and knowledge, acceptability of the intervention, intention to adhere, any mention of behaviour or change of behaviour, knowledge and attitude, and any factor which may influence any of these. Our domains were developed borrowing insights gained from the use of a similar approach in another field, which proved useful and gave structure to our data

extraction. The component within each of these domains was allocated as yes, no, or unclear. The proportion of studies that reported these elements was counted and we provided the results of these in percentages.

3.2.3 Results

Out of 110 trials on dietary interventions, 24 of these reported qualitative data which included assessment of acceptability, views and experiences, beliefs or intentions of women.

Table 4. Trial characteristics

Characteristic	Subcategory	Number of participants	Percentage of participants
Ethnicity	N. & S. America & Canada	8	37%
	Europe	8	37%
	Australia & New Zealand	5	23%
	Far East	3	14%
Weight	Normal/overweight	4	18%
	Overweight/obese	8	37%
	Obese	5	23%
	All weights	7	31%
Trial size	Total number of participants in all trials	3581	-
	Size of trials (ranges)	20-445	-
	Average number of participants per trial	149	-

3.2.3.1 Characteristics of the included studies and interventions

The interventions within the trials were in two main groups, diet, of which there were 2 and diet and lifestyle interventions, of which there were 22. The qualitative components we were looking for were absent in all of the studies on physical activity. The studies were carried out

in N. and S. America/Canada [8], Europe [8], Australia and New Zealand [5] and Far East [3] (Table 4).

The trials which we included studied the effect of interventions on women who were normal/overweight [4]; overweight/obese [7]; obese [5] or all women [6]. The total number of women included in the trials was 3,581; trials varied in size from between 20 to 445 women, with an average of 149 participants in a trial (Table 4, above).

A wide range of techniques and approaches were used to deliver the interventions and these included group sessions, one-to-one, use of food diaries, motivational techniques, counselling and weight monitoring. Behavioural interventions using goal-setting video, websites, Facebook chats with weight-control elements were also employed. The many health behaviour models used in the studies were based largely on social cognitive theory and the health belief model.

3.2.3.2 Quality assessment of the studies

Almost all studies reported the relationship between the researcher and participants. The suitability of the participants was discussed in the main, in studies. Three quarters of the studies stated the aim of the research clearly and a similar proportion reported the subject experience of participants. Data were collected to address the research issue in about half of the studies, congruity between the research question and data analysis, and congruity between the research question and data analysis were reported in a third of the studies. Data analysis was sufficiently rigorous in around a fifth of the studies examined (Appendix 7).

3.2.3.3 Acceptability of diet and lifestyle intervention

The most commonly reported component regarding acceptability of the intervention was for information received, almost all, and the acceptability of the intervention for the woman was found in two thirds of cases, as was the timing of the intervention, as well as the resources provided. The time required for the intervention, the location for the trial and also cost was reported in almost a half of the trials we reviewed. Few studies (a fifth) reported on incentives provided during the intervention, and about a tenth of the trials reported any family involvement (Appendix 8).

3.2.3.4 Intention to adhere to diet and lifestyle intervention

Two-thirds of trials assessed women's intention to adhere to the intervention during pregnancy, and half of the studies evaluated women's intention to carry out physical activity. Women's intention to adhere to the intervention after childbirth was reported in only a sixth, which was similar to the reporting of the family's intention to adhere to lifestyle changes. And finally, the mother's intention to adhere to the intervention outside the home environment was found in less than a tenth of cases (Appendix 9a).

3.2.3.5 Change in behaviour on diet and lifestyle intervention

Overall, studies evaluated any improvement in women's diet and lifestyle behaviour. Half of these reported increase in vegetable and fruit intake. Family decision-making and involvement of others in diet and lifestyle modification were a lot less commonly reported, about a sixth of the studies examined for this, and a similar proportion of studies reported on fish consumption. The use of olive oil and nuts in the diet was minimal, reported in about a tenth of studies (Appendix 9b).

3.2.3.6 Knowledge and attitudes on diet and lifestyle intervention

Women's knowledge of food constituents was reported in three quarters of cases and their attitude to weight gain in pregnancy was reported in two thirds of the studies. Information about women's attitude to research participation was reported in about half of the studies, and women's awareness of difficulty of postpartum weight loss appeared in about a quarter of the studies. Women's knowledge of food labelling and of saturated fats were less frequently quoted, found in about a quarter of the studies

Women's knowledge of previous diet was insignificant as was the reporting of women's attitude to the weight of the health care professional (Appendix 9c).

3.2.3.7 Factors influencing participation in study on diet and lifestyle intervention

Women's experience of receiving personalised support were evaluated in all studies, but for group meetings this was reported in less than half. Women's impressions of the control of diabetes with lifestyle changes were evaluated in a third of all studies, and a quarter of the studies assessed the supportive role of partners, family and friends. Beliefs about potential benefit of the diet such as lowered cholesterol levels and the impact on baby's health were infrequently reported, in about a tenth of the studies.

Travel was the main factor affecting women's participation in a trial and this was reported in four fifths of the studies. Women's life events were reported as barriers to participation in a sixth of the studies. Other influencing factors such as pregnancy symptoms, nausea and the women's perception of her baby's needs and her beliefs about pregnancy myths were reported in less than a tenth of all trials (Appendix 10).

3.3 Discussion

The systematic review of randomised controlled trials on diet and lifestyle interventions to evaluate the conduct and reporting of any qualitative component within these on their acceptability and feasibility, contained wide disparities. There was little mention of engaging with the woman's family, her social network and to an even lesser degree, her life outside the home. The emphasis was on the woman in isolation. A diverse and extensive use of models and theories to support interventions were employed, to measure the determinants of women's beliefs, attitudes and behaviours.

Mainly, these theories were borrowed from social cognition, and would posit that support and feedback facilitate change of behavior.¹¹⁶ Self-efficacy refers to a person's own belief in their ability to solve a problem, or, complete an undertaking. Ideally, self-efficacy is marginally above the person's ability, yet, sufficiently high to present a challenge.¹¹⁶ Interestingly, researchers remarked that psychological factors; feelings, perceptions, emotions, thoughts, beliefs – as these affect motivations, may discourage women's change of behavior, and suggested that these also need to be taken into consideration within interventions.

In studies outside of pregnancy, personality traits have been found to be as accurate as other well-defined health risk factors, like socio-economic status, in predicting health. These may be useful to facilitate change in women's behaviours.^{156,157} Psychological disposition, indicated by measures of personality and the temperament, high conscientiousness being described as being self-disciplined, task oriented, well organized; low conscientiousness as lacking in self-control and long-term planning, is strongly linked with obesity.¹⁵⁷ The value of psychological

traits, if identified in women, may provide an important means to control weight gain in pregnancy.¹⁵⁶

Intentions include the person's motivation to achieve a goal. Intentions also refer to how motivated a person may be as well and how strong their motivation is. Intentions are a necessary prerequisite for behaviour change, and must be understood, if change is to occur.^{32,36} Evidence regarding women's intentions to observe the diet during the intervention and following it, was scarce. As perceived control of a person's eating seems to be related to their beliefs about social support,¹⁵⁸ and as beliefs about lack of self-efficacy appear to reduce the person's perceived control over dietary behaviour, then, interventions occasioning substantial changes in intention, will lead to a change of the person's behaviour. Women's intentions to adhere to dietary interventions both during and after pregnancy were reported. Here again, little indication regarding how women's change of behavior occurred, was provided. Information about women's intentions is a prerequisite for effective dietary change, therefore, an approach based on an understanding of women's individual intentions and beliefs is required for an intervention to be successful.

There was a paucity of information about the acceptability of the intervention from the woman's point of view. Little description was provided about how data regarding this was collated or analysed. It is well documented that it is essential to work with women's family and also their social network, as behaviour change is strongly associated with beliefs about social support mechanisms.^{32,36} Overall, a small number of the studies indicated that some family members engaged in dialogue about dietary change within the home, however, little evidence about women's change of behaviour was found.

This is a distinctive review in that it reports on the acceptability of diet and lifestyle interventions in randomised trials on pregnant women. The views, experiences, beliefs and intentions of women were assessed. A validated checklist was employed to assess the quality of the studies within this review and ensures its legitimacy.¹⁵⁵ We wanted to find out what factors influence women's participation in dietary interventions. This review is also theory-based and is methodically organized, but as there was little detail provided about how data of

interest was recorded, this limits its usefulness. In particular, there was a lack of data regarding women's beliefs and their perceived benefits of the dietary interventions.

Some studies show ambiguous findings regarding the frequency and timing of the intervention. The details about the actual setting where interventions took place and complications related to engagement with and of women were also unclear.^{5,159} It is well reported that pregnant women have little knowledge about obesity, weight gain in pregnancy and its significance. Women, furthermore, are not aware of available, effective weight control strategies.⁵⁶ Studies showed that women are aware of the long-term health risks related to obesity rather than its perinatal risks. There is a need to raise awareness of women's perinatal health risks related to excessive pregnancy weight gain.¹⁵⁸ This may encourage women to control their weight gain in pregnancy.¹⁵⁸ As women were shown to be unaware of how difficult it is to lose weight post-natally,³³ knowledge about this may appreciably improve their perinatal outcomes.
34,158,160

Pregnancy may be a period whereby changes in dietary habits can be successfully introduced.³³ Much of the literature depicts this time as presenting unique occasion for dietary change.^{33,161,162} The literature revealed that it may be possible to identify women at risk to substantial weight-gain in early pregnancy. Weight gained in the first half of pregnancy is an accurate indicator of overall weight gain in pregnancy.³⁴ Studies recruited women at booking, the majority of these was by the twelfth week of pregnancy, this therefore may provide an opportunity to envisage weight control endeavours at this time. Women found the timing of the interventions sufficiently acceptable, but it was the time that some of the more complex interventions took which was less acceptable to women.

Discovering the factors which are more likely to improve women's engagement with dietary interventions remains a challenge to researchers. Ensuring that once change has occurred this will be sustained is a greater test. Greater still is the question about how to engage and involve women's partners and family long-term. Incorporating significant others, including weight loss strategies within interventions as well as combining healthier family lifestyles could be a viable proposition for future research and should be taken into consideration when developing interventions. Weekly contacts and ongoing feedback as well as education resulted in women being able to control pregnancy weight-gain.^{10,34,76,151,161,163} Weight control endeavours may also have incidental effects on other family members and friends.

As well as including families' participation in interventions, the social and professional lives of women need to be taken into consideration as there is a need for more realistic and practical approaches to these. As continual support is required to instigate and then sustain dietary change as women have individual and inimitable experiences of food. Knowledge of these factors would also influence partners and families, helping them engage with and adapt to long-term diet and lifestyle modifications.

Ensuring women have suitable learning ¹⁰⁵ and support, as regards their weight management, both during and after pregnancy, is vital in confronting obesity in this group. We need more insights into issues surrounding the problems of logistics, feasibility and acceptability as well as adherence to these types of intervention. The women's perspective as well as her support network need to be understood in order to provide them with suitable advice and support.^{36,162,164}

It may be useful to clarify and explicate the mechanisms that generate the success of more complex interventions, even though they may be difficult to describe and replicate.³⁰ Insights into the distinct elements occurring during a trial may be brought to light by using qualitative research methods. The internal and external influences may be revealed in order to understand these more complex and curious health care interventions. Quantitative measures alone will not suffice to bring to light the behavioural and social processes we need to grasp.³⁰

3.4 Conclusions

The literature we examined conveyed little about women's social support during an intervention. Women's beliefs, intentions, attitudes and behaviours were poorly described. Interventions must seek to understand the individual as a decision-maker within the wider social context in which they live. The conclusion from the evidence regarding interventions to affect behaviour change requires being mindful of the material context in which people live, to enable effective change.

This review completes the background for my study and the next chapter will provide explanations about the methods I used for this thesis.

Chapter Four: Research design and methods

4.1 Introduction and overview

Having determined the gap in knowledge and enunciated my research questions, in this chapter I have provided an overview of my research design and the methods I used in this study. I employed a qualitative approach using phenomenological inquiry to further develop the qualitative frame of my work. The design and methods also included interviews and focus groups, examined by means of thematic analysis. The ethics and governance issues behind the study were also included here.

4.2 Research design

The overall purpose of this study was to explore the views and experiences of a dietary intervention for pregnant women with metabolic risk factors (high blood pressure, raised lipids or high BMI). Qualitative research helps us explore the ways in which we make sense of our own reality and how we attach meaning to it. It provides insights into how we interpret and make sense of our experiences and the world in which we live.¹⁶⁵ I have used a qualitative approach in order to put pregnant women with risk factors, their partners and those professionals involved in the intervention at the centre of this inquiry, as I strived to understand their views and experiences *or world*, of the ESTEEM dietary intervention.¹⁶⁶ This was appropriate as I wanted to understand participants' views and explore the meaning given to phenomena.¹⁶⁶ My intention was to treat people as who they are and what they do elsewhere, and not as if the person in the situation I was studying was exclusively a product of that particular situation.¹⁶⁷

This study is founded on a qualitative approach of discovery that appropriately frames an interpretist philosophical position. This is because it focused primarily on the experience and understandings within a pregnant woman with metabolic risk factors' world.¹⁶⁸ Qualitative research is a "process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem".¹⁶⁸ (P. 99) As a researcher, I was building a complex, holistic picture, analysing words and reporting detailed views of participants.¹⁶⁸ I was conducting the study in a natural setting, the setting of the ESTEEM intervention. The emphasis was on how individuals constructed meaning and knowledge through interactions within their social context about their diet and health.

My research aligned itself with a phenomenological approach therefore I sought to use phenomenological inquiry to further develop the qualitative frame of my study. This methodology assisted discovery and understanding within the data rich environment which evolved from the lived experiences of the participants. Some methodologies strive to determine opinions and a generalization through hypotheses. Phenomenology seeks to explore contextual meaning through the situational knowledge of those being researched.¹⁶⁸ My study sought to develop understanding through the lived experiences of the participants and open the door to continued discovery.¹⁶⁶

Many interpretive traditions have root in the philosophical approaches of phenomenology found within the writings of Husserl¹⁶⁹ and Shutz.¹⁷⁰ Husserl's work posits that objects in the world are not passively understood, but are actively constituted through consciousness and subjective experience.^{166,169} To fully understand the essence of phenomena, an understanding of how the "life-world" is experienced is needed.^{169,170} Merleau-Ponty declares that by setting aside common assumptions (bracketing) we may see beyond our current thinking and achieve a deeper level of understanding (of phenomena).¹⁷¹ Scholarly perspective is derived from emerging themes reduced through a process of prior reflection, continued reflection, and clarifying reduction.¹⁷² My study involved researching women's, partners' and health care professionals' views. I wanted to explore the meaning given to phenomena, the phenomena or themes were related to peoples' experiences and the meanings of these within the ESTEEM dietary intervention setting. I used the stages of thematic analysis as proposed by Braun and Clarke¹⁷³ to carry out the inductive and interpretive process of reflection, continued reflection and clarifying reduction.¹⁷² This provided me with a framework and direction for the development of a qualitative description¹⁷⁴ and conveyed a mechanism for the generation of credible and meaningful subject knowledge.⁹¹

As proffered by Moustakas,¹⁷⁵ bracketing or focusing the researcher's interest ensured my study design remained methodically connected to my research questions. In this way I compiled the stories associated with the lived personal experience of the participants on the intervention. The next step of horizontalization¹⁷⁵ guided me to assign equal value to each developing segment of meaning within the data. These ideas defined the essence of the phenomena by leading me to focus on my participant's described experiences through the consciousness rooted in their self-awareness.¹⁷⁵ Continued analysis of the data-rich material I had acquired occurred through coding where issue-related cluster developments transformed

into experiential themes.¹⁷⁵ To do this I was compelled to seek rich data about how participants experienced and understood the dietary intervention.

To capture the information that I needed I developed criteria to ascertain who to include in my study. I aimed to recruit women who had a good insight into how the intervention worked in order for them to be able to comment on how they experienced this. I wanted to collate information about the facilitators and barriers to women's engagement with the intervention. From the literature and from my own practice experience, I believed that by interviewing women, partners and health care professionals would provide me with a different and interesting perspective adding to what we know about women's engagement with a dietary intervention. I aimed to explore ideas about women's engagement with the ESTEEM dietary intervention. I did this by drawing upon the perspectives of their partners and understand more about how partners supported women's engagement with the diet. I also wanted to understand how health care professionals experienced the delivery of the dietary intervention and what implications this would have for the design and delivery of future interventions of this kind. The professionals would provide a rich adjunct to my research.

4.3 Research Methods - Sampling and recruitment

4.3.1 Women

My aim was to produce a sample that was representative in a way of the whole population of interest.¹⁶⁶ I wanted each woman on the ESTEEM intervention to have an equal chance of being selected. This also depended on what I wanted my sample to "do",¹⁶⁶ which was related to my research questions. Although there is no set answer to the question of how many participants to include in a qualitative study,^{166,176-178} one practical answer is provided by Green and Thorogood: "However many will be credible to the users of your research".¹⁶⁶ (P. 119) The overall aim of purposive sampling is to include information-rich cases for in-depth study¹⁷⁹ (P. 182) therefore a number of different strategies may be used to achieve this.¹⁶⁶ I included women from a wide range of social, locality and ethnic backgrounds who had differing maternity health needs and experiences. This would not guarantee transferability of findings but would contain pertinent information that would not be dismissed as irrelevant to practice and would be generalisable. For qualitative findings to be credible for those likely to use the results it is important to choose participants from a range which they would identify as representative.¹⁶⁶

A sample was chosen that broadly reflected the width and diversity of the childbearing women of East London served by the maternity units where the ESTEEM trial was ongoing. I used purposeful sampling to select women for interview. To ensure that an unbiased sample was arrived at I used the trial log and approached women at around week 16-20 weeks of pregnancy, with the object of ensuring a balanced mix of age (18-45), parity (0-3) and ethnicity to reflect the local population (Asian 14, UK white 7, African 4, European 3, N&S American 2). Criterion sampling,¹⁶⁸ further focused the sampling strategy by finally including 30 participants who also:

- Had been participating on the ESTEEM intervention for at least two months
- Had at least one contact with the ESTEEM dietitian
- Had received ESTEEM provisions (extra virgin olive oil, nuts)

This reflected overall, the ESTEEM trial, of whom a third were in their first pregnancy (330/1205). Two thirds of the women were African or Asian.⁹⁵ Women on the intervention were approached in the second trimester (weeks 16-20) to be asked if they would be willing to share their experiences of the intervention. Verbal information was provided and at the same time information sheets were given to participants two weeks prior to the meeting which left the women time to desist if they so desired, and consent was then gained. Requests for voluntary participation was made until the number of women was reached (30). It was feasible to attain this number, as this was a large intervention. Interviews were carried out in the third trimester, at a time which was convenient for women.

4.3.2 Partners

There is little research around participation of partners in dietary interventions of this sort, therefore I approached this pragmatically. I chose to interview 16 partners to compliment the data from the 30 interviews with women. From the outset of my study I was keen to find out how partners viewed women's participation in the ESTEEM intervention. When I read Keely's⁴¹ study on pregnant women and partners' perceptions and experiences of pregnancy and care, I was compelled to find out more about these influences. Partners have significant impact upon women's weight gain^{41,180} and dietary intake. Couples do have shared health behaviours and shared values.⁴¹ This is what strengthened my resolve to find out more about how partners viewed and supported women's participation during a dietary intervention. With some input

from partners I would have a more authentic and complete narrative about what I wanted to find out about. By including both women's and partners' perceptions I would be able to see how the dietary intervention worked for both. I would be able to see how couples experienced the intervention and this would better reflect the reality of the ESTEEM intervention experience in real-life. However, as the criteria and sampling used to include women was set, then my sampling of men was determined in part by this. I interviewed 16 men whose partners were in the group of women I had interviewed and this gave me a sample that broadly reflected how partners supported women during the dietary intervention. Purposive sampling of maximum variation had already been achieved by including the kinds of variation that was wanted in the women's sample. Demographic variation, that is people-related characteristics, age, number of children, was arrived at by interviewing an adequate mix of the women. I then had an appropriate sample which was chosen pragmatically, of 16 partners to broadly reflect the width and diversity I wanted.

Partners were approached in the second trimester (weeks 14-20) to be asked if they would be willing to share their experiences of the intervention. In some cases, partners were invited by telephone, after I had received women's consent to do this. Information sheets were provided to partners two weeks prior to the meeting and verbal information was also provided. Consent was gained, leaving them adequate time to desist if they so desired. Requests for voluntary participation were made until the number of partners was reached (16 partners) and as previously stated, I employed a pragmatic approach to my sampling.

4.3.3 Health Care Professionals

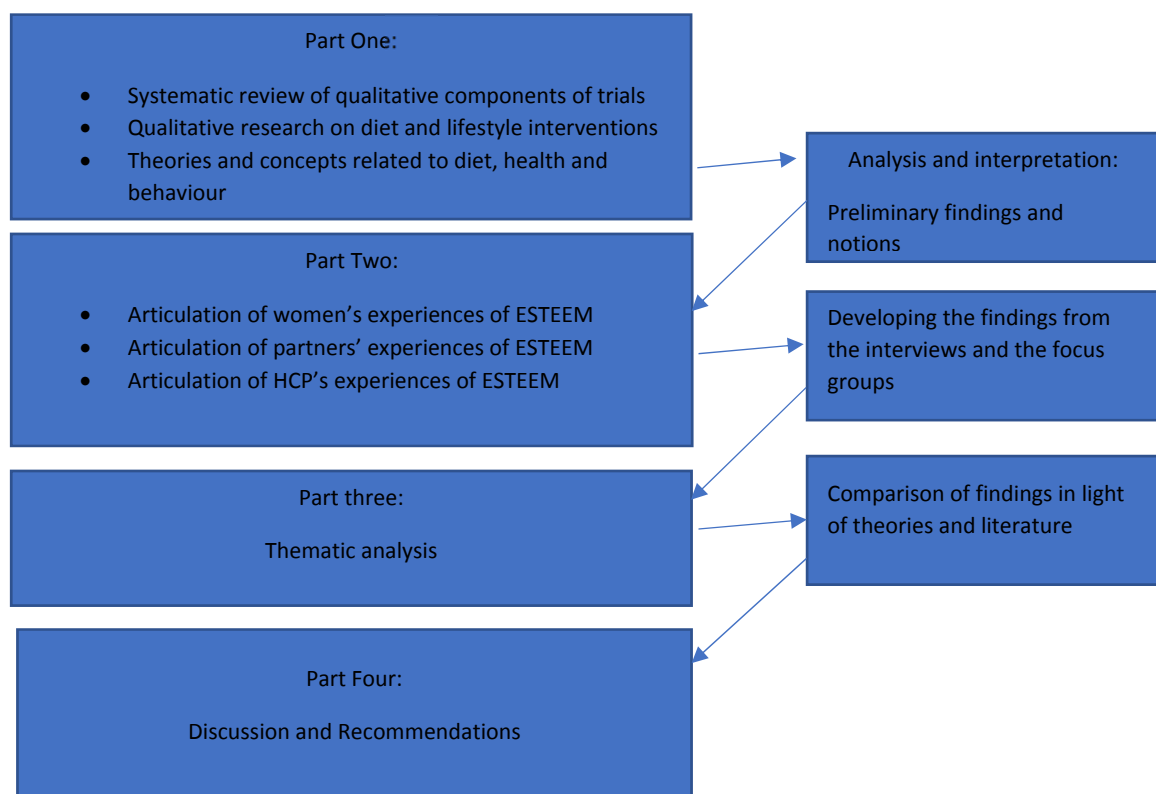
Focus groups of researchers and health care professionals participating in the ESTEEM intervention would provide me with "more than a collection of individual interviews".¹⁸¹ (P. 240) Data were generated by the interaction of the group participants and their contributions were refined by what they heard others say. Focus groups allow insights into group norms, group meanings and group processes and this made this a useful adjunct to the other methods of research used, in this case it complimented the women's interview data.¹⁶⁶ The sample size was related to coverage and to the number of participants required to generate in-group discussion.^{165,182} The focus group typically contains six to eight participants, but may range from three to fourteen in size.¹⁶⁵ The optimum size of the groups reflected the characteristics of participants (midwives, dieticians, researchers and ultra-sonographers). Participants for the focus groups were recruited through purposive sampling techniques.¹⁶⁵ A good coverage of

the population therefore two or three participants from each professional group was invited.
¹⁶⁵ Three focus groups with 9, 3 and 4 professionals were carried out. In this way, a substantial cross-section and number of participants (almost all health care professionals working on ESTEEM trial) was achieved. These health care professionals were acquainted with the delivery of the intervention and also had insight into how women experienced it.

Information sheets were provided to participants two weeks prior to the meeting. Consent was gained before the commencement of the focus group, leaving the participant adequate time to desist if they wanted to do so. Prospective participants were identified using the trial delegation log and were invited to participate by myself. They were also recruited from the range of sites where the trial was taking place.

My study comprised several components which allowed me to answer the main research question. The first of these was the carrying out of a systematic review of evidence contained in randomised controlled trials on diet and lifestyle to evaluate the conduct and reporting of any qualitative component within these on their acceptability and feasibility. The next stage involved interviewing women who were participating in the dietary intervention. Alongside these I interviewed partners and also carried out three focus groups made up of health care professionals and researchers on the intervention.

Figure 2. Flowchart of how the parts of the study were conducted



The aim of my analysis of the qualitative data was to discover patterns, concepts, themes and meanings. Ritchie and Spencer ¹⁸¹ highlight the need for searching the data for “patterns” which may explain or identify causal links in the data base. In the process, I concentrated on the data corps, then attempted to take it apart and re-construct it again more meaningfully, using a thematic analysis approach. ¹⁷³ Categorisation helped me to make comparisons and contrasts between patterns, to reflect on certain patterns and composite sequence of the data deeply, and make sense of them. The process of data analysis began with the familiarisation, then categorisation and organisation of data. ¹⁷³ This was described more fully later in this chapter.

4.4 Research Methods - Data collection

4.4.1 Women

Clear indications of the areas for discussion were outlined at the outset of the interview. The length of the meeting was around one hour and a suitable room was used either at the participant’s home, or, at the maternity hospital or community clinic, whichever was convenient for the participant.

I carried out in-depth interviews where interviewees provided “thick descriptions” ¹⁸³ and by questions and other verbal and non-verbal cues. I encouraged detailed and comprehensive responses. I became adept at listening, waiting and pursuing answers to my research questions and procuring material and evidence through my observations and my awareness. At times I simply listened and enjoyed women’s experience and honest impressions. At other moments I became less focussed as I was affected by some of the amusing, sad and sometimes fascinating narratives. I maintained my composure and kept focus on my research questions. I tried to sift through what was being said to ensure I followed up on any threads of what would be relevant to my own inquiry.

Question schedules were used to collate data regarding how women experienced the ESTEEM diet and what factors influenced their engagement with it. These schedules outlined the basis for the interviews and covered topics such as pre-pregnancy dietary habits, information received about this, how the diet differs from women’s experience of other eating plans and

their overall view and experience of the ESTEEM diet. Table 5 below, provides the women’s interview schedule.

My dual purpose behind the interview was to recognise any pattern, and identify any contradictions within women’s accounts of their experiences of food and of the dietary intervention. I also wanted to detect any resonance between these and the background concepts that were identified in the initial chapters of my thesis.

Table 5. The women’s interview schedule - Questions and prompts

Topic covered	Interview question	Probe for elicited response
Pre-pregnancy dietary habits and eating patterns	Can you tell me about your first experiences of food, as a child, growing up? Think back to the time before you became pregnant... Can you tell me about your eating and the food you ate, before you became pregnant? How would you describe your eating habits? Tell me about a normal day shopping, cooking, eating	First recollections and experiences of food. Learning to cook. Who is responsible for the cooking and food preparation in your family?
Information about the ESTEEM diet	Tell me about how you got information about the ESTEEM diet? Tell me about the information you received from the midwife?	Amount and frequency of visits and contacts with professionals
How the dietary plan differed to any previous diets or eating plans	Have you been on any diet before? Can you tell me about this and what happened?	Slimming world, other In what way did these work for you?
The experience of the ESTEEM dietary intervention	What made you think about starting this diet? Can you tell me how often you saw the dietician and what happened at these meetings? Tell me about how the diet how the diet worked for you When you look back to commencing the diet – What were your thoughts and feelings about it?	Anticipated changes in pregnancy, morning sickness, changes in eating pattern, Amount and frequency of visits and contacts with professionals What were the most significant or important aspects of the ESTEEM intervention, in your mind?

Health concerns for self or baby	<p>Did you have any concerns about the diet when you started it?</p> <p>How about before you started the diet, did you have any particular thoughts about what or how much you eat?</p> <p>What do you think about diet and health? Do you see these things as being connected?</p> <p>What things make you think about your own health and health of others?</p>	<p>Concerns about weight gain, weight gain in pregnancy</p> <p>Concerns about high blood pressure</p> <p>What benefits does the diet have for yourself, baby and family?</p> <p>-associated with weight, heart condition, diabetes, physical activity?</p>
Overall experience of the ESTEEM diet	<p>What sort of things did you enjoy about the ESTEEM eating plan?</p> <p>Can you tell me about anything which made the eating plan more difficult or hard to do?</p> <p>Overall, how would you describe your pregnancy and the visits, information and advice you received?</p> <p>How did you find the ESTEEM experience – the time you spent on the diet plan?</p> <p>How do you see things happening in the future now that you have had this time on the intervention?</p>	<p>Are the recollections related to activities, eating, cooking, family meals?</p> <p>-associated with meetings with staff members, hospital?</p> <p>-associated with supportive communication from staff?</p> <p>-associated with her health and well-being?</p> <p>Have you made changes now, following this dietary experience?</p> <p>Tell me about family, social occasions, children’s food, your health, physical activity</p>

I carried out in-depth semi-structured interviews, in the main, at women’s homes. This made it easier for the woman to converse with me and talk in a more meaningful manner about her own unique experience of food and pregnancy and of her ESTEEM dietary experience. Using semi-structured interview and the interview guide, a shared encounter between the woman and myself was made possible. I was able to find a balance between guiding the interview and encouraging a voluntary exchange of information which was participant-led. I used a starter question such as “Can you tell me about your early experiences of food and eating habits as you grew up”. This was an ice-breaker, but also served as a starting-point, leading to a conversation about diet and food before focussing on health, pregnancy and the ESTEEM dietary intervention.

The interviews were transcribed professionally and each transcript was checked for word-to-word accuracy by repeated listening to the audio-recordings. A pseudonym was given to each woman.

4.4.2 Partners

Interviews were carried out in the third trimester, at a time which was convenient for partners. Clear indications of the areas for discussion were outlined at the outset of the interview. The length of the meeting was around one hour and a suitable room was used either at the partner's home, or, at the maternity hospital or community clinic, whichever was convenient for them. Question schedules were used to collate data regarding partners' views and experiences of the ESTEEM dietary intervention and how these supported women's participation. These schedules outlined the basis for the interviews and covered topics such as the partners' dietary habits, information received about how the ESTEEM diet differed to other eating plans, their health concerns and their overall view and experience of the diet.

My intention was to recognise any pattern, and identify any contradictions within the accounts of partners' experiences of food and of the dietary intervention. I also wanted to detect any similarities between these, women's accounts and the background concepts that I had previously identified in the first two chapters of this thesis. I was interested in finding out about how partners spoke about supporting women's engagement with ESTEEM.

Table 6. The partner interview schedule - Questions and prompts

Topic covered	Interview question	Probe for elicited response
Dietary habits and eating patterns	Can you tell me about your first experiences of food, as a child, growing up? Think back to the time before your partner became pregnant... Can you tell me about your eating and the food you ate, before your partner became pregnant? How would you describe your eating habits? Tell me about a normal day shopping, cooking, eating	First recollections and experiences of food. Learning to cook. Who is responsible for the cooking and food preparation in your family?
Information about the ESTEEM diet	Tell me about how you got information about the ESTEEM diet? Tell me about the information you received from the dietitian or any other health care professional	Amount and frequency of visits and contacts with professionals What was this information about? What were your thoughts on this? Did different people give you information?
How the dietary plan differed to any previous diets or eating plans	Have you been on any diet before? Can you tell me about this and what happened?	Slimming world, other? How did these work for you? Did you find any particular aspects of them enjoyable?
The experience of the ESTEEM dietary intervention	What made you think about starting this diet?	Anticipated changes in eating pattern,

	<p>Can you tell me how often you saw the dietician and what happened at these meetings?</p> <p>Tell me about how the diet worked for you?</p> <p>Did you receive any particular items during the ESTEEM intervention?</p> <p>How did you use any of these?</p> <p>When you look back to commencing the diet – What were your thoughts and feelings about it?</p>	<p>Amount and frequency of visits and contacts with professionals</p> <p>What were the most significant or important aspects of the ESTEEM intervention, in your mind?</p>
Health concerns for self or baby	<p>Did you have any concerns about the diet when you started it?</p> <p>How about before you started the diet, did you have any particular thoughts about what or how much you eat?</p> <p>What do you think about diet and health?</p> <p>Do you see these things as being connected?</p> <p>What things make you think about your own health and health of others?</p>	<p>Concerns about weight gain, weight gain in pregnancy</p> <p>Concerns about high blood pressure</p> <p>What benefits does the diet have for yourself, baby and family?</p> <p>-associated with weight, heart condition, diabetes, physical activity?</p>
Overall experience of the ESTEEM diet	<p>What sort of things did you enjoy about the ESTEEM eating plan?</p> <p>Can you tell me about anything which made the eating plan more difficult or hard to do?</p> <p>Overall, how would you describe your partner's pregnancy and the visits, information and advice you received?</p> <p>How did you find the ESTEEM experience – the time you spent on the diet plan?</p> <p>How do you see things happening in the future now that you have had this time on the intervention?</p>	<p>Are the recollections related to activities, eating, cooking, family meals?</p> <p>-associated with meetings with staff members, hospital?</p> <p>-associated with supportive communication from staff?</p> <p>-associated with her health and well-being?</p> <p>Have you made changes now, following this dietary experience?</p> <p>About family, social occasions, children's food, health, physical activity,</p>

I carried out in-depth semi-structured interviews mainly at the partner's home. This facilitated the discussion which was around partners' views of food, eating, health, pregnancy and the ESTEEM dietary intervention. The use of a semi-structured interview based on the interview guide provided me with useful insights, for my study. I employed starter questions to trigger conversations and this prompted a good discussion. The interview was concluded by summarising the main points we had discussed, to ensure I had grasped the partner's meaning. Table six provides an example of the interview guide. The interviews lasted between 45 and 70 minutes, were transcribed professionally and a pseudonym was given to each partner.

4.4.3 Health Care Professionals

The focus group schedule was used to find out how the professionals involved in the delivery of the intervention perceived this. Various relevant questions covered topics which were designed to elicit information about women's diet, their experiences of health and the intervention. Some probing questions were used to enable health care professionals further develop answers and expand on these.

Table 7. The focus group schedule - Questions and prompts

Topic covered	Interview question	Probe for elicited response
Women's dietary habits and patterns	How does the woman describe her and her family's eating habits?	Eating pattern, favourite meals, favourite food
	What does the woman say about a normal day: shopping, cooking, eating?	Preparation of meals Organisation
Information about the ESTEEM diet	In what way were you involved in giving information about the ESTEEM diet?	Amount and frequency of visits and contacts with women
	Tell me about the information you gave and in what way this was provided to women	Information leaflets, sessions, reception, understanding, interest
How the dietary plan differed to any previous diets or eating plans for the women	Can you tell me how often you saw women and what happened at these meetings?	Amount and frequency of visits and contacts with professionals
The experience of the ESTEEM dietary intervention for women	When you look back to commencing the ESTEEM trial – What were your thoughts and feelings about it? – How did it work?	What are the strongest memories, or recollections that you have?
	Did you adopt particular approaches or strategies?	
	What did women say about the diet? –Did they compare this to any previous diets?	Midwife, doctor, dietician, family member, other, advertising, shops
	What do you think influences women's decisions of what they eat during pregnancy?	
Women's health concerns for self, partner or baby	Did you notice if women had any concerns about the diet when they started it?	Concerns about weight gain, weight gain of partner during pregnancy
	Did you have any particular concerns about administering the ESTEEM diet?	Health concerns

	<p>How do you think the diet affects the woman, her partner and her health?</p> <p>Tell me about how you view maternal responsibility and health in pregnancy</p> <p>Do women see any benefits of following the ESTEEM diet?</p>	<p>What benefits does the diet have for the woman, her partner and her family?</p> <p>Weight control, less risk of complications</p>
Women's overall experience of the ESTEEM diet	<p>What sort of things do you think women enjoyed about the ESTEEM eating plan?</p> <p>How do you think the dietary intervention worked?</p> <p>Can you tell me about anything which made the eating plan difficult or hard to achieve, for women – their families?</p> <p>Tell me about how you think women find the ESTEEM diet experience – the time they spent on the diet plan?</p>	<p>Are the recollections related to activities, eating, cooking, family meals?</p> <p>-associated with meetings with staff members, hospital, disruption? Time-consuming?</p> <p>-associated with communication with staff?</p> <p>-associated with the health and well-being of the woman or her family?</p> <p>Do you think women have made changes, following this dietary experience?</p>

The first focus group was carried out in the maternity unit which also incorporated the antenatal clinic, ultra-sound scan department and maternal and fetal assessment unit (MFAU). Conducting the group in a clinical setting made it more convenient and made it accessible for staff to attend. This appeared to give the meeting authenticity. The eight participants in this group were from diverse professional backgrounds.

The second focus group was carried out in the research department of the University. The dietitian who had launched the intervention was present which provided valuable insights into the initial stages of the trial and how it had been established, developed and become embedded. Other participants included the trial co-ordinator and the senior research project manager. This group would provide insights into the facilitation and the organisation of the trial, making a unique contribution.

The third focus group took place at another maternity site of the same Trust, in the research midwives' office of the research department. As members of staff worked on other sites, this location would be more convenient for these health care professionals to attend the focus group. The group was made up of four participants, two research midwives, a data manager and a

research fellow. As the members of this group were from three different sites and had various roles, this group too, provided a rich mix of professional views and perspectives.

By conducting the focus groups at three different sites and by providing choice for the location of these where the intervention was on-going, I was able to include most of the staff involved on ESTEEM. In this way I was able to obtain insights into the views of a large number of health care professionals who were in contact with women experiencing the intervention. This represented, more exactly, their views and experiences and provided a more candid picture of how the intervention was being delivered.

4.5 Research Methods - Data Analysis

Data were analysed using thematic analysis. The language and concepts which I have used in this account were in keeping with my epistemological position for my analysis. As an active researcher in this process, themes did not just emerge, assumptions about thematic analysis and my approach to the method were clearly elucidated. ¹⁸³

Thematic analytical processes were used, similar to a grounded theory approach in the way in which this involves "both jumping ahead and returning to rework earlier ideas" to make sense of the data (P. 310). ¹⁸⁴ An important aspect of an inductive approach that I used was that it was driven by my data ¹⁸⁵ Patton describes the processes of inductive analysis as "discovering" patterns, themes, and categories in the data. ¹⁸⁶ This approach complemented the research questions by allowing the tenets of constructionism to be integral to the process of thematic analysis, allowing themes to emerge directly from the data using inductive coding. Coding the data allowed me to organise my data, from which themes were then identified and developed.

As I was not working as a team ¹⁶⁶ I discussed and agreed my evidence for themes and codes as I consulted with my supervisor during all stages of analysis. ¹⁶⁶ My frequent discussions and progress showed the elaboration of the analysis and how my story and analytical account occurred through the advancement of my developing themes. This stage was one of building explanations, was a challenging process and it required a thorough knowledge of the data. ¹⁸⁷ (P. 77) Analytic induction is one way of developing explanations and building research. ¹⁸⁷ This involves an iterative testing and retesting of theoretical ideas using the data. As I analysed my data, I was careful to acquaint myself fully with the three data sets. I started with the set of women's interview data and after reading the transcripts several times and listening to the

recordings a number of occasions, I started sorting the data. It seemed that women were often saying that they felt “told” to eat particular things and that they spoke of how they had learned to cook themselves. I was careful not to ascribe too much meaning to these elements, but as I continued, I saw that how people learned was central to my understanding of how women experienced and engaged in the intervention. Please see appendix 11 for the sequence of analysis of the some of the women’s interview data. Bloor describes how this method was used by researchers.¹⁸⁸ Essentially, the researchers examined a set of cases, developed hypotheses and constructs thus testing their suggestions.

“Good thematic analysis” will make obvious the theoretical framework it carries with it and it is important that the assumptions about the kind of data and what they represent in terms of experience and existence are made clear by the writer (P. 26).¹⁷³ The result of an interpretive description is a comprehensible and conceptual account supported by thematic forms which both characterise the experience under study and also accounts for individual differences between these.⁹¹ From a constructionist perspective, meaning and experience are socially produced and reproduced⁸⁸ and do not reside in the individual. As this study was conducted within a constructionist framework, I did not seek to focus completely on motivation or the individual mindset, but tried to theorise and conceive the social and cultural context of women and the underlying conditions that allowed for the individual stories they, their partners and health care professionals told.

The phases of thematic analysis are described by Braun and Clarke¹⁷³ as: familiarisation with your data 2/ generating initial codes 3/ searching for themes 4/ reviewing your themes 5/ defining and naming themes and 6/ producing your report. This was a very manageable system to use and was very similar to the procedures depicted in Fereday and Muir-Cochrane.¹⁸⁹ I presented below with some clarifications, how these were used in my own study.

Phase One: Familiarisation with the data

The familiarisation stage consisted of my reading and rereading the transcripts and listening back to the audio-recorded interviews to become familiar with the whole of my data corps. I found that at this stage repeated listening to my recordings, over and over again gave me a good handle on my data and greatly simplified the coding and interpretation of data, later on. I knew my participants and recognised chunks of data and some characteristic samples of each of the data sets. My initial impressions of these were documented in the margins. This was done

where divergent views were expressed or opinions were fervently held by participants.¹⁷³ It also allowed me to find my way more readily around the numerous pages of transcript, later on, during my analysis.

During the familiarisation stage I was not only gaining an overview of the richness, depth and diversity of the data, but was also beginning the process of abstraction and conceptualisation. I kept notes on the breadth and types of participant responses, recurrent themes were identified and issues which seemed to be important to the participants were recorded. My notes on my initial impressions which I wrote up after the interviews also accommodated this.

Phase Two: Generation of initial codes

Coding was carried out by underlining segments of text of interest using the left-hand margin to describe the content of each passage with a label or code. This was done by using a few words, or, using parts of sentences or whole paragraphs. The right-hand margin I also used, to note more detailed notes or ideas, for example, questions to consider as my analysis proceeded or, ideas for patterns or explanations of the data as these came to me.

Following familiarisation with data collected from 30 women, 16 partners and 3 health care professional focus groups, the interview transcripts of these were inserted into the QSR NVivo data management system. A comprehensive process of data coding and identification of themes was then carried out. Boyatzis¹⁸⁵, defines a “good code” as one that catches the qualitative richness and intensity of the phenomenon. The same author identifies a theme as a “pattern in the information that a minimum describes and organises the possible observations and at a maximum interprets aspects of the phenomenon”. (P.161) This process involved recognising an important instance and encoding it, before progressing to the next step of interpretation. This activity is expressed as seeing a significant instance within the data set, and then, seeing it as something.¹⁸⁵ After generating some codes rather painstakingly I soon understood what was meant by seeing something and little by little things began to take shape as initial codes gained silhouette forms.

As outlined by Braun and Clarke¹⁷³ my work eventually comprised a list, made up of codes to be applied to organise text, or the data, for interpretation. As the primary objective of my data collection was to demonstrate the subjective viewpoint of pregnant women who shared their views and experiences of engagement with the dietary intervention, the choice of codes for the

study was important because it served as a data management tool for organizing segments of similar or related text to assist in interpretation. ¹⁹⁰

Phase Three: Searching for themes

Thematic analysis may be referred to as a search for themes that become apparent and which are significant to the explanation of the phenomenon of interest. ¹⁹¹ This involves careful reading and rereading of data. ¹⁷⁷ It is a procedure whereby patterns within the data are identified and where emerging themes become the categories for analysis. ¹⁸⁹ It took me some time to realise that themes were the actual key aspect of interpretation. Themes are where the interpretive analysis of the data occurs and in relation to which arguments about the phenomenon come to mind. ¹⁷³

The process of searching for themes involved the organising of the discrete codes into broader themes and gathering of all the important coded data extracts contained in the identified themes. Overall, various codes were carefully considered to see how these could come together. A thematic map was developed for this purpose which enabled this process of familiarisation of data, identification of codes and consideration of the data and correspondingly, allowed me to search for themes. Braun and Clarke ¹⁷³ suggest playing around with these, organising them into “theme piles” to see where and how these fit or figure. It was at this stage that it was important to reflect upon associations between my codes, between themes and between different levels of themes. At times I was overwhelmed by the breadth and depth of my data and progress was sometimes painstakingly slow.

However, at this point some codes may be rejected, some codes may convert to main themes and others may appear in a subtheme. Braun and Clarke ¹⁷³ mention the convenience of housing codes within a temporary theme if at the time they are not suited to any others. Finally, this phase resulted in a compilation of my possible themes together with all of the data extracts which had been coded corresponding to them. No prospective matter was disregarded at this juncture as the meaning and the importance of the themes was emerging and the next phase entailed examining the themes more comprehensively. Without looking at all of the extracts in detail I did not know whether the themes would remain as they were, whether they would be joined together, or if they would be amended or removed.

Phase Four: Reviewing Themes

This phase started with my set of proposed themes. These themes were then refined. As the process advanced it became apparent that some of the proposed themes did not subsequently materialise to be themes. This could have been because there was insufficient data to support them or, that the data were too varied or incongruent. Other themes collapsed together, and became one theme. Data within themes should hang together in a unified way, at the same time there should be clear and recognisable contrasts between these.¹⁸⁹ As my approach considered specific aspects, latent themes and is constructionist, the development of the themes themselves involved interpretive work.

Braun and Clarke¹⁷³ mention two purposes of reviewing the themes which are reading the collated extracts for each theme to ensure that their arrangement is plausible and, secondly, across the entire dataset, the validity of the individual themes is confirmed to see whether the proposed thematic map truly represents the significance that the dataset holds, overall.

I carried out this review for two important reasons, one was to check to see if the themes had fit in relation to the dataset and also to see if any codes had been overlooked. Re-coding from the dataset was a necessity as coding was a rolling and gradual process. Whenever this fine-tuning was not contributing anything further of significance, I stopped. However, this depended likewise, upon the theoretical approach I was using. This phase was complete when I had a satisfactory impression of the various themes I had obtained. I observed how they fit together, and how a comprehensive picture they provided about the data, was finally arrived at.

It was during the initial search for themes that I started to see the importance, and the influence, that others had on women's eating habits. I considered modifying my initial research question, thinking this was too long. Later on, however, this seemed very well-matched to what I was aiming to do:

How do women construct and make sense of the dietary intervention, its benefits for themselves, their baby and their family?

Women clearly made decisions within their own resolve and understood the beneficial and less beneficial aspects of their diet inside their own biological, medical, social and structural existence. I was satisfied with the direction I was going but as I was wanting to find out what factors influenced women's engagement with the intervention, I reformulated my questions to

reflect this. I wished to find out how women, partners and health care professionals viewed and experienced the intervention and what affected engagement with this. My research questions then became:

1. What do we know from randomised controlled trials included in a systematic review of diet and lifestyle interventions for pregnant women about women's (and their partners wider families) views and experiences of these types of interventions?
2. How do pregnant women with metabolic risk factors experience a dietary intervention and what are the factors that influence their engagement with the intervention?
3. How do partners of pregnant women with metabolic risk factors view and experience a dietary intervention to improve pregnancy outcomes and how do these support women's participation?
4. How do health care professionals view and experience a dietary intervention for pregnant women with metabolic risk factors and what implications do these suggest for the design and delivery of such dietary interventions?

Phase Five: Defining and naming themes

As an acceptable thematic map had been developed, the next phase entailed further defining and refining of my themes. My aim was to distinguish the core of each theme and what it represented together with the other themes, inclusively. It was also important for me to establish what feature of my data each theme described or portrayed. By returning to the organised data extracts for each of the themes these were categorised into comprehensible and centrally consistent interpretations, together with their narrative. At this point a key element of my analysis was to recognise what was of interest and why. A simple paraphrasing of the contents of my data extracts would not be adequate.¹⁷³

My next step was to write a detailed analysis for each of the themes, relating the story which was told to the broader more general illustration deriving from the data, in relation to the research question. In this way, my themes were taken account of, individually, and collectively. As part of this process, consideration was given to themes and whether these included subthemes. Subthemes were particularly useful for organising a very large or diverse theme and for illustrating the importance of various features of my data. By the end of this phase the themes had become clearly distinguished. I checked this, by making attempts to describe the

extent and the focus of each theme in a few sentences.¹⁷³ If this was not feasible the themes received further attention. Even if my themes had been given names, these operational names were changed to more arresting or succinct ones. I found I had to work at this, and required substantial supervisory support before these were finally designated, and had a good fit.

Phase Six: Producing the report

This phase started with my set of tested themes and consisted of the final analysis and production of my report. The challenge was to tell the convoluted story of my data in such a way that the reader was persuaded of the value and the dependability of the analysis I had carried out. It was crucial that my analysis afforded a succinct, articulate and logical interpretation of my data both within and throughout themes. Data extracts were used to show how frequently a theme occurred and evidence my themes within the data had to be adequately supported.

Extracts which encapsulated the spirit of the ideas that I wished to communicate were employed. I wished to avoid unnecessary jargon and rambling and used data excerpts to try to make my findings readily understood for the reader. I kept in mind that good analysis was more than a description of data and must provide a sound case in respect of my research questions. My supervisor supported me, and insisted on the proper development of this area of my work.

Some important misconceptions of thematic analysis exist warn Braun and Clarke¹⁷³ and I paid attention to these. To begin with, the significance of a theme is not determined by its frequency but by its ‘substantive significance’¹⁹² (P. 467). This refers to the consistency of themes across and within the data set. Consistency requires systematic coding techniques to produce reliability so that other researchers using the same dataset and following the same procedures, would assign the same or similar themes for data extracts. Themes are significant by virtue of the skilful identification of new themes and confirmation of themes identified in the existing literature and, confidence in the systematic nature of the coding procedure. What is important about a theme is in terms of whether it captures something important, in relation to the overarching research question.¹⁷³

Clarity around my practice and my process was vital.¹⁷³ It was important to obtain a match between the theoretical framework, the methods, and that which I, as researcher wanted to know. I made every effort to ensure that my method of analysis was driven by my research

question and my broader theoretical assumptions. In this way I tried to keep a balance between being loyal to my methods and faithful to my research topic, research content and research question. ^{173,193}

4.6 Ethics

Ethics is the way in which the research study is negotiated and developed and is an integral part of the research process. My primary imperative was to answer meaningful questions and pursue worthwhile enquiry as effectively as possible. ¹⁹⁴ However, I was also mindful of the ethics of care required and the need to engage an “intuitive and receptive mode” ¹⁹⁵ (P.7) to ensure mutual respect, dignity and connectedness. ¹⁹⁶

NHS Research Ethics Committee approval was acquired for the three sites through the UK IRAS research application system by The South East Coast - Surrey Research Ethics Committee, REC Ref: 15/LO/211

Upset:

Obesity or excessive weight gain may be associated with a certain stigma or may be disturbing, for some pregnant women to talk about. In the unlikely event of a woman becoming upset, a pause will take place. After a break and some reassurance, the interview will continue, or, if the woman does not wish to continue, the interview will stop.

Consent:

As women participating in the ESTEEM dietary intervention have already been consented to this, the researcher will be sensitive and gain consent in a sensitive and clear and honest manner and take care not to impose on the time of the women.

Time issues:

As women attend antenatal care appointments and also see the dietician during the study there was potential for considerable intrusion, I was therefore attentive to the amount of time required for the interview which is why this took place at a suitable time and location, for example following a meeting with the dietician at the maternity unit, in a quiet room, or in the woman’s own home. Appointments at home were often well received by the women as they found this convenient. Appointments were made with partners at suitable times following a hospital appointment of their pregnant partner, or at their home to reduce any extra travel and also to minimise any inconvenience caused.

User-friendly vocabulary and input from women:

The interview schedules for women and partners were reviewed by both members of the Maternity Services Liaison Committee (MSLC) and by two women on the ESTEEM intervention who were asked to make comments about these. They all commented positively about the question schedule and confirmed that this would answer the main research questions.

Confidentiality and anonymity

To ensure participants' confidentiality, both the digital recording and the transcripts of the participant interviews and health-care professionals' comments who took part in focus groups showed only coded identifying information recognisable solely by myself. I kept a code-list in a password protected file on my work computer which was network protected. Pseudonyms were chosen when comments were quoted to protect the participants' confidentiality. Any identification of the hospital is not disclosed in this work or in any other publication or presentation to protect the anonymity of both participant and health-care professional.

This qualitative study complied with the Department of Health Research Governance Framework in its aim to explore the perceptions and experiences of the ESTEEM dietary intervention to pregnant women with risk factors.

4.7 Trustworthiness of the study

To ensure consistency of the qualitative methodology I used, I employed Hammersley's *Objectivity: A Reconceptualisation* work. Objectivism, Hammersley¹⁹⁷ states treats the word objectivity as having a single sense. He says that what objectivity refers to is the effort to prevent our passions, our personal involvement, our social location from leading us into factual error.¹⁹⁷ Seale similarly points out that qualitative studies frequently contain level of "implicit causal reasoning", one that is hard to avoid.¹⁹⁸

Objectivity

Hammersley emphasises the need to see objectivity as one of several essential research epistemic virtues.¹⁹⁷ He portrays these as a commitment to truth and truthfulness, intellectual

sobriety (which is a determination to find an equilibrium between over-caution and excessive enthusiasm) and intellectual courage (to resist fear in the pursuit of knowledge). These can be accomplished by using reflexivity, confirmability and by examining any wide variations within the dataset. The input and expert advice from known authorities in the field (which I had received continuously throughout my PhD development) enhanced the research process and ensured objectivity and robustness within this study. Reflexivity and confirmability also ensured that this work was credible in nature and objective.

Reflexivity

Reflexivity is defined as a 'self-aware, critical reflection on the ways in which a researcher may have influenced the objectives, process and outcomes of the research' ¹⁹⁹ (P. 262). Reflexivity is the process of evaluating both oneself as researcher, examining one's own assumptions and preconceptions, and how these may affect research decisions, particularly, the selection and wording of the research questions. I have been reflecting on my relationship to the participants, and how the relationship dynamics affected women's and men's and health-care professionals' responses to questions as I was seeking to understand meaning. But I did not assume that meanings were fixed and constant. I did not expect the "truth" to be found out there waiting to be discovered by asking the right questions. I did not assume that my questions were objective, nor did I assume that respondents' answers would have straightforward, definitive meanings that would mirror a singular "reality." I considered that all meanings were interactively and culturally constructed by social actors.

Confirmability

A fundamental procedure for establishing confirmability is the use of an audit trail. Sandelowski ²⁰⁰ tells us that auditability, justification and therefore confirmability is achieved when the researcher leaves a clear decision trail in such a way that another researcher can follow the progression of events and discern the decisions taken in the study and understand the reasoning behind these. Throughout this study I have employed a field journal and entered the data management tools that I developed in the analysis stage to provide an audit trail of the methods of data collection, analysis and interpretation. The audit trail aimed to demonstrate as clearly as possible the identification and interpretation processes that led to the development of the constructivist approach used here. Furthermore, the use of reflexivity outlined in this section above further enhanced the confirmability of the study. The use of university systems such as "Skills points" and the "Supervision log" also provided a good audit trail.

Expert review and support

A process of expert review as I stated, was also utilised during this study as part of the PhD supervisory procedure. Supervisory meetings and data matching and appreciation were used to cross-check my research activities against the literature, the research protocol and the development of the theoretical foundation. University appraisals during the process also enhanced my critical skills and allowed me to reflect on my research perceptiveness. Many of the supervisory meetings impelled me to look at how my work developed around solid frameworks and encouraged me to use structures and methods appropriately. Initially I could not visualise how to espouse epistemological stances or embrace some of the principles of qualitative research. It was whenever I considered that I had a handle on the more intricate and finer niceties of qualitative research methods including those of thematic analysis, that I could actually see this applying to my own emerging story of women and the ESTEEM diet in pregnancy to understand their value and usefulness.

The use of wide or seemingly conflicting variations within the evidence and dataset

Any striking or disparate evidence or theme deriving from the body of data was closely examined and scrutinised for meaning and location to see how this refuted, approved or corresponded to concepts, to understand what their significance could be. The discovery of individual complexity and of deviant cases helped to develop the analysis of the dataset. Analysis of deviant cases could revise, broaden and confirm the patterns which were emerging from data analysis.²⁰¹

4.8 Chapter summary

This study is based upon interviews and focus groups which highlight the views and experiences of pregnant women, their partners and healthcare professionals involved in a dietary intervention. The phases of data collection and the data analysis I carried out underpinned the development of a comprehensible theoretical explanation of the views and experiences of the dietary intervention in a pregnant cohort with metabolic risk factors. This chapter has provided a summary of the various phases of the study and the ethical considerations. The following part of my work will now discuss each stage of the empirical research in detail.

Chapter Five: Women’s views and experiences of the ESTEEM intervention

In this chapter, I present the findings from my analysis of data generated from interviews with women participating in the ESTEEM intervention. My analysis was aimed at understanding women’s experiences of participating in the ESTEEM dietary intervention. Through analysing women’s accounts, I explored the factors that influenced their engagement with the intervention, what they liked and did not like, what helped them adhere to the diet recommended in the intervention and what barriers they encountered. This stage of my study positions women’s perspectives at the centre of the investigation.

The key question of the phase of the study presented in this chapter was:

How do pregnant women with metabolic risk factors experience a dietary intervention and what are the factors that influence their engagement with the intervention?

5.1 Summary of the characteristics of women interviewed

The majority of the participants were in their thirties and expecting their first baby (Table 8). Just under half the women were Asian and about a quarter reported themselves as white British. About half of the participants were educated to university level and half were employed full time, with two thirds of the participants working either full or part time.

Table 8. Demographic characteristics of women participants (n=30)

Characteristic	Subcategory	Number of participants	Percentage of participants
Age (years)	20-29	11	37%
	30-39	17	57%
	40-49	2	6%
Parity	1 st pregnancy	16	53%
	2 nd pregnancy	7	23.5%
	3 rd or 4 th pregnancy	7	23.5%
Ethnicity	Asian	14	47%

	UK White	7	24%
	African	4	13%
	European	3	10%
	N. & S. American	2	6%
Time in UK	Born in UK	13	45%
	In UK 1-5years	5	15%
	In UK 6-14 years	12	40%
Education	University	13	43%
	College	17	57%
Employment	Full time	14	47%
	Part time	5	15%
	Unemployed	11	38%

I used maximum variation sampling to achieve a good mix of ages, number of previous pregnancies, occupations, ethnicities and education levels. About half of the women were interviewed around the 28th week (45%) and the remainder at the 36th week of pregnancy (55%). This meant that the sample included women who were in the middle of their pregnancies as well as those at the end of their pregnancies. This also meant that the sample included those who were halfway through the ESTEEM intervention as well as those who had completed the ESTEEM. I was trying to see if there was any difference between these women's experience of the intervention, that is, those at 28 weeks gestation and those at 36 weeks gestation. Most of the women I asked agreed to an interview (women were invited to participate in interviews around week twenty of their pregnancy and had time to decline if they wanted). The reasons women gave for not wanting to participate in the intervention were related to not wanting to consent to cord bloods being taken as they thought this may not be in keeping with their religious beliefs, and others said that the ESTEEM diet and the time this required would be too demanding for them. Women were contacted mainly face-to-face, to arrange a suitable time for interview. I let women choose the place for interview, at home, the maternity, or other, for their convenience.

The overall attendance at the ESTEEM meetings from the trial results reported 74% (410/553) of women in the intervention group attended the first intervention session, 52% (288/553) attended two sessions, and 41% (225/553) attended all three sessions (TABLE 9). All women taking part in the qualitative study attended the first ESTEEM session, almost all attended two of the three sessions and 83% attended all three. This latter figure is almost twice the proportion of women in the overall intervention group, although numbers were smaller in the qualitative study.

Women had to be able to speak English in order to be recruited to the ESTEEM trial, so that ongoing advice from the dietitian could be received and phone contact could be made. This prevented women who were not English speaking from participating. However, two women I interviewed did not speak English fluently, and although these interviews were shorter than the others, I did not wish to exclude them.

Table 9. The number (%) of women’s attendance at ESTEEM sessions meetings for overall trial and for the qualitative study

Characteristic	Attendance at One (1 st) Session	Attendance at Two sessions	Attendance at All three sessions
ESTEEM Intervention Participants (n=553)	410 (74%)	288 (52%)	225 (41%)
Qualitative study Participants (n=30)	30 (100%)	27 (90%)	25 (83%)

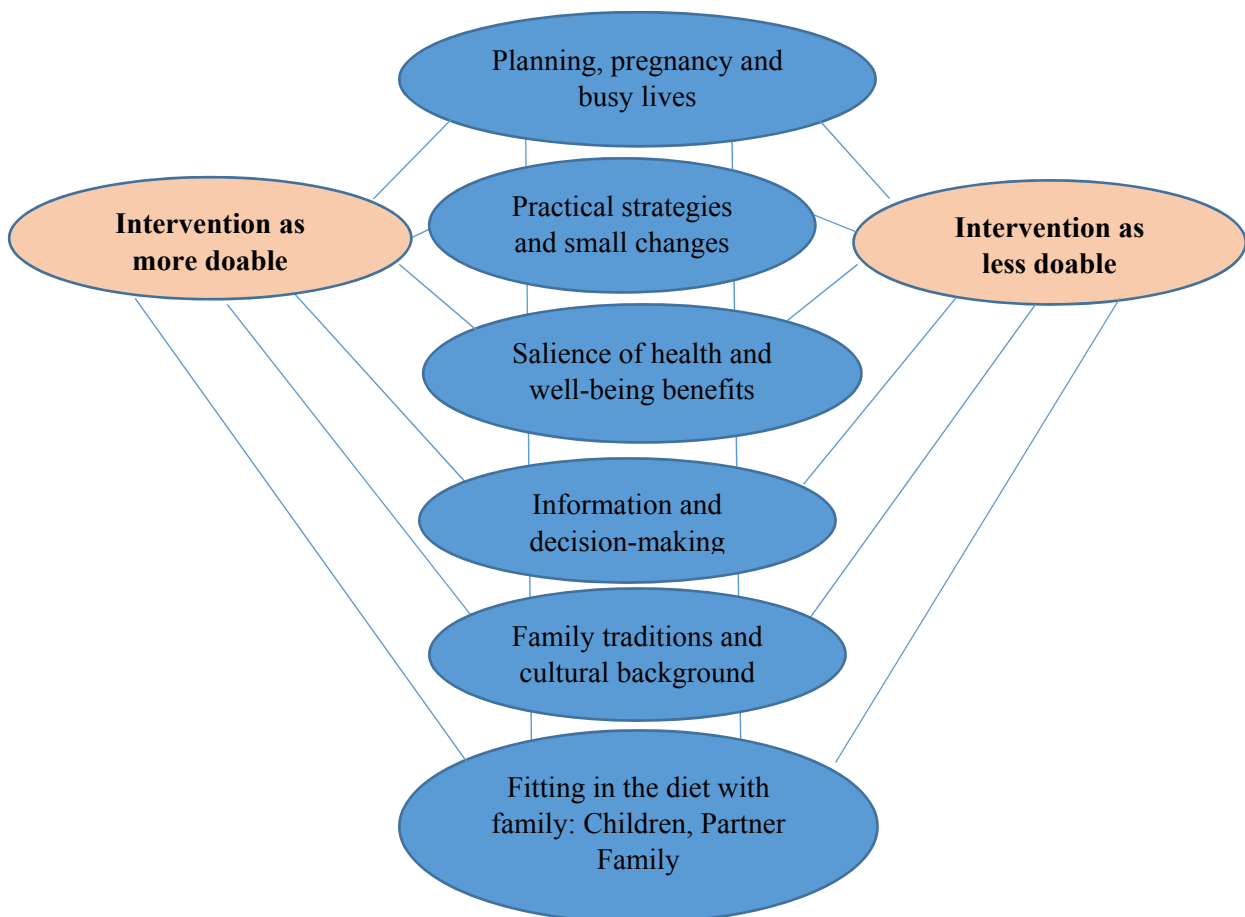
5.2 Themes

Analysis of data revealed six key themes which captured women’s experiences of participating in the ESTEEM intervention and the factors that influenced their engagement (Figure 3). After a lengthy involvement with my data, I added the categories “Intervention as more doable” and “Intervention as less doable” to my thematic map to reflect how women felt able and willing or not, to engage with the intervention. Women’s engagement was bound by their concerns, choices and decisions at this particular time in their pregnancy. Women’s concerns were related to their health, pregnancy and family. Women’s engagement with the intervention was strongly affected by how they perceived the intervention as doable, for themselves and their family. The

term doable, although not explicitly mentioned, lay tacitly in what women said about their experiences of participating in the intervention and was alluded to as they explained how they felt about participation.

The thematic map illustrates the links between the categories “Intervention as more doable”, “Intervention as less doable” and the six themes. The factors that influenced at risk pregnant women’s engagement with the dietary intervention were related to “Planning” for example and “Information and decision-making”. These underpinning themes were also inter-related and influenced each-other, as shown below.

Figure 3. Thematic map of findings from interviews with women about their experiences of the ESTEEM intervention



The six identified themes revealed a wide range of factors that influence how ‘doable’ the intervention was felt to be. The importance of planning was highlighted in women’s accounts (“Planning, pregnancy and busy lives”) and women had to find practical ways to incorporate the elements of the ESTEEM intervention to their own needs (“Practical strategies and small changes”).

Women's ideas about perceived benefits of the dietary intervention varied widely ("Salience of health and well-being benefits"). Perception of pregnancy risk factors, previous pregnancy experience, attitudes to weight management, and their future health and that of their children, influenced the extent to which women were engaged with the ESTEEM intervention. Women wanted and needed information to better understand and make their own decisions ("Information and decision-making"). As women already had metabolic risk factors, when information was given to them, this had the effect of heightening their awareness of these. This caused them anxiety or confusion.

Women's food traditions and food preferences influenced the extent to which they were able to fully engage with the dietary intervention ("Family traditions and cultural background") and women's accounts of the ESTEEM diet frequently involved how it fitted with other family members ("Fitting in the diet with family"). If others in the home did not support the diet or eat the same meals or foods, the intervention became less doable for women.

Planning, pregnancy and busy lives

Perhaps unsurprisingly, women emphasized the fact that planning was needed to enable them to follow the ESTEEM diet and attend sessions with the dietitian. Some women were making efforts to think ahead and make their food early, so that they ate what was recommended by the ESTEEM diet. Other women were adept at planning as this was part of their daily discipline:

"I'm uh, really love planning things" Nena, 37yrs, 2nd pregnancy

"to incorporate all those things, to incorporate your lentils and your—your nuts and your meat and your fish—which I'm uh, really planning things" Aisa, 31yrs, 2nd pregnancy

A plan for implementing the ESTEEM diet was needed as without one, women thought they would not succeed in adhering to it. Life events, women said, could take over. Advance planning was done by many women and included strategies such as leaving food and recipes conveniently near so that they were available at the needed time. Forward planning such as

viewing menus online before going to the restaurant was also used. Starting to make food in a timely way was also tried to make sure women were adhering with their dietary plan.

“I do try to do things earlier than usual...If I start things early on then I can at least have the stuff I need to, rather than going for an easy option on cooking”. Jera, 34yrs, 3rd pregnancy

Being pregnant and leading a busy life, however, was not always compatible with being able to plan ESTEEM food. The demands of everyday life sometimes frustrated women’s plans to follow their dietary plan. For example, as I interviewed Bili, she told me that she intended to make her healthy soup. When she ran out of oil to make this, she reverted to using her own oil and not the extra virgin olive oil supplied during the ESTEEM intervention.

“Right now is finished (extra virgin olive oil), so I’m now going back to my oil”. Bili, 37yrs, 4th pregnancy

When working, some women were not always able to pick up their phone, or could be occupied doing something, when the ESTEEM dietitian called them. They were on occasions unable to communicate with the ESTEEM team, and did not receive the provisions of olive oil and nuts, and were unable to make their appointments. Women then, did not always find it easy to adhere to the intervention. The frustration of trying to engage with the intervention and plan busy, everyday lives was tangible for working mothers, at home mothers, or first-time mothers.

“You use so many pots and pans and you’re like “oh, what’s the point in being healthy?”” Dana, 30yrs, 2nd pregnancy

“I probably don’t eat as many nuts...It’s hard, I think you need a booklet of how to eat nuts different” Maye, 32yrs, 3rd pregnancy

Even when plans were made and preparations carried out, life events and minor changes to daily routines thwarted the attempts women made to adhere to their ESTEEM eating plan. Dana explained how she left the house without her healthy snack of nuts which she had left in her handbag the previous day:

“cos I keep it in my handbag, but then I’ve got so many different handbags, I have to change sometimes – you leave, and you’re out and you’ve got nothing”. Dana, 30yrs, 2nd pregnancy

Some women found that work gave them structure and were able to plan and organise their ESTEEM intervention diet and activities around this, saying it was easier to stick to their dietary plan. Others spoke of having more difficulty engaging with their dietary plan at the end of pregnancy, during their maternity leave. Therefore, having more time was not always conducive to being able to plan and follow the dietary intervention.

“...(I’m) on maternity leave and I’ve just been at home with no structure to my day with nothing kind of particularly set in a routine.....Need to be occupied or something, needs a steady routine all day otherwise, I’ll just eat all day.” Jone, 29yrs, first pregnancy

In summary, some women interviewed liked to make plans. This was part of their way of living. They were able to make schedules and stick to these, or, adapt them. This made adhering to the ESTEEM diet “more doable” for them.

Planning the ESTEEM dietary food was not always easy for other women to do. It involved being able to answer the phone, making and attending appointments and having sufficient ESTEEM provisions. Women were not always able to fulfil all these requirements. Even though some women did plan, their exacting lives, or the occurrence of unpredictable events, undermined their plans, making the intervention “less doable” for them.

Practical strategies and small changes

Although other factors did affect engagement with the ESTEEM intervention, for many women, practicality came first. To work every-day, women developed practical strategies to incorporate the food of the dietary intervention into their routine. Many practical tips and suggestions were provided by the dietitian during the ESTEEM sessions. By using the recipes, extra virgin olive oil, and nuts, women were able to adapt food and cooking to their own liking. Women used little bowls to make portions look more palatable (smaller looking), added vinegar to dressings, used oil and black pepper for salads, using a teaspoon of oil to cook, all of which reduced the fat content of meals. These strategies made the diet healthy and in keeping with the ESTEEM intervention. They were able to develop strategies and practical ways of improving their intervention food.

The ESTEEM intervention provided a practical means for women to change what had become the sameness of their meals as they kept making food in a similar way. Women’s eating habits had become repetitive and their food had become “boring”. They were short on ideas for menus

and welcomed an opportunity to try other foods. Women were ready and open to discuss and consider changes to their diet and they welcomed the prospect to vary it.

“That was another good thing about the um, seeing – having appointments ‘cause, ideas...sometimes you need – you just get used to your own ways”. Dana, 30yrs, 2nd pregnancy

Women found it helpful to have suggestions from the dietitian which enabled them to engage with the intervention. This helped them make their choices and decisions:

“It’s nice to have some-one say “Oh, you could maybe you could do this””. Dana, 30yrs, 2nd pregnancy

Their successes emboldened women and facilitated their engagement with their ESTEEM dietary plan. The small changes which they made, and the ways in which they adapted their food worked for each woman, individually. Each success then, made women more confident, and sure of their ability to participate, which involved a process.

“Yeah I try and take the good advice ... I build up or continue my good habits” Rasa, 31yrs, 1st pregnancy

So, they (the family) get used to like this new routine you know the food..... So I’m trying this thing, continuously doing this.” Moti, 26yrs, 1st pregnancy

Women spoke of slipping in and out of their ESTEEM eating plan. They sometimes had a good start and then were no longer able to continue their eating plan. They went through stages and phases, as health-related and other hardships sometimes prevented them from engaging with their dietary plan.

“But like, I’ve been, -- I go through phases where it’s really good, and then something will change, and then it’ll slip. So, it’s almost like a yo-yo, and up and down”. Maye, 32yrs, 2nd pregnancy

The ESTEEM intervention was found to be adaptable, and was practical for each woman, within their home, family and professional situation. Women found individual ways and personal strategies to engage with their ESTEEM diet. The intervention was fitted and made convenient by themselves in order to suit their daily activities and lifestyle. The intervention itself, the phone calls and attendance which was required, was found to be supportive and helpful.

The ESTEEM intervention was key to supporting women change their diet as they saw this as a way to make their food less repetitive. Some women were already looking for ways to change their food and diet. They welcomed the ESTEEM diet, and this was “doable” for them.

Practical strategies and small changes were important for women and the ESTEEM intervention helped them to adhere to the diet. Still, sometimes, women would slip off the diet, even if these practical strategies were in place. In these cases, the intervention was “less doable”.

Salience of health and well-being benefits

The ESTEEM intervention was embraced by women as a number of women interviewed had two or three miscarriages, had suffered pregnancy loss or had spent many years awaiting their pregnancy. Women saw benefits of engaging with the dietary intervention which included controlling their blood pressure, diabetes and ensuring baby’s well-being. The well-being benefits of the intervention were viewed by women as being related to three main areas of their baby’s health, weight management and future health.

A heightened awareness of their pregnancy risk factors resulted from their participation in the ESTEEM intervention. Women became more conscious of being at risk of preeclampsia, diabetes and high blood pressure as they had been recruited to the trial for these reasons.

The well-being of their baby was foremost in women’s mind, the ESTEEM diet was viewed as key to contributing to it. Women prepared for the birth of their baby by freezing food and thinking ahead. They were wanting to breastfeed and recognised this was good for the health of their baby. Women said that in this way their baby was also eating healthy intervention food. They perceived that the goodness of their diet would benefit their child.

“Umm, I’m, uh, planning for the breastfeeding.... more health for the baby... because I’m eating healthy food, and baby, (too).” Suti, 37yrs, 1st pregnancy

Dana was in her second pregnancy when she participated in the ESTEEM intervention. At that time her first child was small and she was concerned about her infant’s diet. Dana was aware of the risk of allergy as her child was allergic to dairy products. She worried that her second child could also be allergic to dairy products.

“Even now, I eat a lot of cheese. Partly, that's because of I'm scared that this baby will get dairy allergy, like my little boy has, 'cause I didn't have it last time. But I eat softer cheeses this time, if I can”. Dana, 30yrs, 2nd pregnancy

This situation reveals how the conditions and the context under which the salience of health and well-being benefits of different foods can either support or undermine adherence to the ESTEEM dietary intervention. Dana was at risk of pre-eclampsia and at the same time thought about her child's risk to allergies. The intervention diet was not in keeping with her need to ensure what she thought was best for her baby as she decided to eat cheese, thinking this would prevent dairy allergy occurring in her second baby.

Prevention of childhood obesity was crucial to many women and they saw the ESTEEM diet as a way to prevent their children from having a similar food experience to their own, which they cited as negative, or bad. They were trying to teach their children to eat what they saw was a healthy diet, saying they did not want them to “suffer” as they had done.

“I had overweight. So we, I'm trying to, my husband, My child they are not gonna suffer”. Moti, 26yrs, 1st pregnancy

The dietary changes made during the ESTEEM intervention and the health and well-being benefits of it were seen by women as being interlinked. One health benefit impacted upon another, and improved both their medical condition and their pregnancy:

“As I am following her advice (the dietitian), now my diabetes is under control and also I have seen my pressure (blood pressure) is also normal”. Muta, 40yrs, 1st pregnancy

“They said (diabetic specialists) “Your baby also weight is okay””. Muta, 40yrs, 1st pregnancy

Participating in the ESTEEM diet was key to controlling women's weight and a number of women were aware that if they gained an excessive amount of weight during pregnancy that this was very hard to lose following the birth of their baby. Their previous pregnancy experiences showed this. Some second-time mothers were engaged in the intervention and attended all of the intervention sessions as they had large weight increases of twenty-five kilos and more in their first pregnancy. This made it difficult for them to return to their prepregnant weight afterwards.

Yeah. Because I didn't eat like that before pregnancy....., It took me nearly two years to lose the weight". Jona, 25yrs, 2nd pregnancy

Feeling well and less tired were viewed as big advantages of the ESTEEM intervention and women were engaging with the dietary intervention because they felt better and also regarding their appetite, women spoke of feeling satisfied, but in a better way, and did not feel so full.

"You feel full as well but the better way. Like you don't feel bloated...and your digesting system is better." Feha, 31yrs, third pregnancy

The ESTEEM foods made some women feel better internally, as well as feeling that their digestion had improved, since commencing the dietary intervention. They explained how they felt changed "inside" and how this good feeling of well-being pleased them. Although this was not visible, they were quite clear that their body felt better internally.

"I'm liking this feeling so, means that my inside is feeling more better – also I want to keep (this way)" Mori, 27yrs, first pregnancy

Long term health and the desire to live a long healthy life was a strong motivator for women to engage with the ESTEEM dietary intervention as they wanted to be able to see their children and their own grandchildren grow up. Eating what was considered to be a healthy diet was viewed as a way of achieving it. Becoming forty years old was also cited by women as a reason to make real, healthy, dietary changes.

"... because...[at the age of] 40 there's a point where you kind of just have to stop. Bura, 33yrs, 2nd pregnancy

Women identified a wide range of benefits as they engaged with the ESTEEM dietary intervention. Ideas about perceived benefits of the intervention varied widely. Perception of pregnancy risk factors, previous pregnancy experience, attitudes to weight management, future health and that of their children, influenced how women participated in and were engaged with the ESTEEM intervention. Women also wanted to live long, healthy lives which made the intervention more doable for them.

Family traditions and cultural background

The ESTEEM food was widely accepted as it provided a way for women to eat food which was related to their sense of belonging to family and to their traditional background. Women often preferred food they were familiar with as this had special meaning for them. Their food

traditions and food preferences influenced the extent to which they were able to fully engage with the dietary intervention.

Several women were not able to eat some of the food suggested on their ESTEEM plan as it did not sit with their family traditions and their cultural background. They preferred what they called tasty food and on occasions, the intervention foodstuffs and the cooking techniques proposed were not acceptable to them. Food recommended on the intervention needed to be in keeping with, and adapted to, what women valued and liked.

“I am an African person, I don’t eat soup and chicken and all these things. But we have things like red pepper and stuff to make my soup. I eat my soup, my African soup.” Bili, 37yrs, 4th pregnancy

The occasion of the ESTEEM intervention however, provided women with ways to adapt their individual and preferred ways of cooking. Women who had learned to cook early in life through observation and participation were keen to cook. Being brought up to cook influenced women’s desire and ability to cook. Cooking from scratch was understood as being both important and economical and was also seen as proper.

“We would cook from scratch every day, but then, that’s how we were brought up, I guess to cook proper meals every single day, they were all homemade and all cooked from scratch..” Lana, 34yrs, 1st pregnancy

It was easy for women to apply the ESTEEM diet principles in situations where women were already confident about cooking. Confidence and competence to prepare and cook food was related to being exposed to cooking and being able to see others cook and prepare food. Women who had tried cooking food at home, early in life with parents and family were then able to cook food themselves. Women who had pleasure in preparing, cooking and eating food were able to engage in the intervention and try new recipes.

“I make fish now and it’s good, ‘cause I’ve got new recipes”. Dana, 30yrs, 2nd pregnancy

Lack of confidence to cook and try different food was an obstacle to participation in the ESTEEM intervention. Some women did not have confidence to cook and said that they were short of ideas or lacked skills about how to cook certain foods. Women who had not had experience of cooking said that they did not know how to cook vegetables, or, did not know

what to do with fish. This prevented them from cooking these foods, which were encouraged as part of the ESTEEM eating plan.

“I think it was harder for me to come up with, um, vegetable dishes, I couldn’t think of ways to make vegetables interesting.” Lana, 29yrs, 1st pregnancy

Essentially, women said that they had to eat food which they liked and which provided them with a pleasurable experience. Here Aisa said that she liked trying different food, then added, “...but Algerian or French style”.

“Algerian olive oil is stronger, it is really, really olive, olive oil you know in my country yeah. I like trying but my country or other country, yeah, yes. Algerian style or French style.” Aisa, 31yrs, 2nd pregnancy

As French and Algerian diets in general contain a lot of herbs, salad, vegetables and components of the Mediterranean diet, Aisa was able to enjoy a lot of these elements on the dietary intervention.

Women were told how to cook in a healthy way whilst participating on the intervention. Sometimes, this did not fit with what women did culturally or with what they viewed as good cooking or good “tasty” food.

“...So that’s the way I cook and they say maybe I overcook the food, all the nutrients will have gone out for me. That’s what she said that day. I don’t know how I’m going to cook to- to make the nutrients stay. But I have to cook this way.” Bili, 37yrs, 4th pregnancy

Cooking in a way which was in keeping with their own traditions was important to women participating on the ESTEEM intervention. Women’s home cooking was appreciated by their partners, and they did not want to disappoint, and wanted to continue cooking good food, as they were told they were a good cook. At the same time, women had misgivings about continuing with their own style of cooking and about making “nutrients stay” in their food. It was at these times it was difficult for women to fully engage with the ESTEEM dietary intervention.

Women engaged with the dietary intervention depending on how well it fitted with their family traditions and their cultural background. Also, it seemed that the ability to cook and the

confidence to cook played an important role in how women engaged with the dietary intervention. As one woman said:

“If you enjoy cooking from scratch or you have the ability to, then I think it (ESTEEM) is a good plan”. Sama, 31yrs, 2nd pregnancy

Women remembered the food which they had eaten early in life. They knew how to cook, after observing cooking practices early in life. Food then became a pursuit. Other women did not know how to cook certain foods, making the ESTEEM diet “less doable” for them.

Women wanted to provide what they saw as being good food, within their cultural and traditional context. In order to be able to fully engage with the intervention, their food had to be adapted to this. At times, the need to be viewed as a good provider, culturally and traditionally, did not match with women’s desire to engage with the dietary intervention, making this “less doable”.

Information and decision-making

Participation on the ESTEEM intervention required women to have pregnancy risk factors present. Women then wanted information, and sought to be reassured about their pregnancy. They would go to lengths to try to understand how a medical condition could affect themselves or their baby. They searched to find information that would help them understand their situation. Women found these times during the ESTEEM intervention difficult and filled with anxiety.

“And I was kind of in that dark shadow there for first two months. um, you know, I see, I play at night. I would say I would play the night on the computer just, you know, googling everything about this, this condition. And then while I was there, I would just, you know, eat whatever I wanted to”. Bura, 33yrs, 2nd pregnancy

During her interview with me Bura spoke of her pregnancy experience during the ESTEEM intervention and of how anxiety affected her diet and sleep. She sought information from the literature, on-line materials, professional sources as well as from the family, in order to get reassurance. At this time Bura was completely taken up with looking for help and trying to find more details about her pregnancy. This was her number one priority at the time.

Receiving information on ways to adapt and personalise their food was key to women on the ESTEEM intervention. One example given was to use a teaspoon of salad cream in order to

limit eating this. Women, it was thought, would incorporate more olive oil into their diet. Two women received similar advice about this, but, one woman who was told to “use olive oil for salad” thought this meant adding it directly to lettuce. She could not eat salad that way. The other woman was able to successfully make changes to her salad by using less salad cream. Information about food and recipes was perceived and understood by different women in very different ways. One of the women mentioned was not familiar with vinaigrette, or about using olive oil in a sauce for salad.

Lack of certainty about such issues made women ambivalent and doubtful about some of the advice given to them during the ESTEEM intervention. It was difficult for women to believe information that contradicted what they previously believed. Cooking with olive oil was a major recommendation of the ESTEEM intervention diet. Some women who had previous knowledge about olive oil and cooking with this above a certain temperature were dubious about using it. Women were then left in doubt and needed more information about this to enable them to confidently and safely use olive oil to cook food.

“Yes I know there is a myth that you can’t make fried food with olive oil. Usually they say you shouldn’t fry food in olive oil isn’t it like, I don’t know, it’s not good – you shouldn’t boil above certain temperature and then it’s not good for you or something.”

Jera, 34yrs, 3rd pregnancy

Bili, had an ultrasound scan just prior to her ESTEEM interview with me and was informed that there was “a lot of water around the baby”. She had been asked if she was diabetic as the baby’s “tummy was measuring big”. Bili then proceeded to ask herself questions about her diet and the health of her baby. She questioned the usefulness of the effort, the reason for continuing to carry on with the ESTEEM intervention.

“Is it really benefiting us, are they really getting any benefit? Cause if I have not heard what I heard today I might still be eating what I like- - but right now I am thinking, “Oh, you need to-- you need to try and do some things to make the baby-- Yes, is that-- that will be good. I think the problem with us is if we don’t see something happened you don’t get to-- you don’t get to-- you don’t-- you don’t know the importance of what they are doing for you. Like me now when I heard this” Bili, 37yrs, 4th pregnancy

Bili was concerned that she had not done enough regarding her adherence to the ESTEEM dietary intervention. The ultrasonic scan showed a high level of amniotic fluid. She did not know the exact significance of this but was very concerned. Knowing that the amount of

amniotic fluid was greater than normal worried Bili. She was asked by the ultra-sonographer if she was diabetic, which then increased her anxiety.

In Tede's case she said that initially she was able to adhere to the ESTEEM intervention, however, after some time she "slipped". Being told about her cholesterol levels made Tede try to adhere to her dietary plan and, but at the same time, made her afraid and anxious.

"I think about my diet but then as time goes on, you kind of slip out of it, don't you? You don't realize the importance". Tede, 30yrs, 2nd pregnancy

In order to fully appreciate the benefits of the intervention, women said these needed to be visible and tangible. The intervention would then be "more doable". It was hard for women to fully understand the importance of the intervention if they did not actually perceive and see the benefits and results, of engaging with it. As seen in Bili's statement above, when she said "...you don't know the importance" if "we don't see something".

Women talked about wanting to know and wanting to understand better and make their own decisions. They said they wanted and needed more information. But, when information was given, the meaning of this was misconstrued, causing women anxiety or confusion. As women already had risk factors, participating in the ESTEEM intervention heightened their awareness of these. This had the effect of discouraging women and worsened their pregnancy experience.

"It's just managing the stress I think is the thing". Maye, 32yrs, 2nd pregnancy

Fitting in the diet with family life

This theme incorporates three parts and presents how factors related to women's family influence women's engagement with the ESTEEM dietary intervention. The three areas contained within this theme are children, the partner and the family, and will be presented in this order.

Those mothers on the ESTEEM intervention who already had children reflected a desire for their children to eat properly. When mothers found that the children enjoyed the food recommended by the ESTEEM diet, it was much easier for them to stick to it. Mothers also found that their children had differing reactions to the dietary changes during the intervention. Some women observed that their younger children would engage with the dietary intervention foods more easily.

“My actions, I can see a change between them because he -- the -- my youngest son is much more health conscious about what he chooses. And I seem to have put all those bad habits on the old one. So you have to concentrate a little bit more on him with regards to his choices”. Tani, 34yrs, 3rd pregnancy

“Uh, the nuts, the youngest one is getting crazy with that, he loves that....because the oldest one, he didn't like (walnuts)” Amie, 38yrs, 3rd pregnancy

Provisions of the ESTEEM dietary intervention such as nuts were not commonly given to children before this time. Once they tried, children would eat them. One mother's children had all changed from eating crisps and chocolate to eating nuts and fruit. Others said they did the same, and noticed it was more economical to buy fruit at the local market than to buy biscuits and chocolate.

Introducing the concept and the components of the ESTEEM dietary intervention was foremost in women's mind as they wanted their children to eat a healthier diet. It was sometimes difficult for mothers to find a way to encourage their children to do so. They said that they thought it would be a case of trial and error and were not completely sure how to approach this.

“I would like them (the children) to get a-- eat healthily, but not entirely sure how to get there, from where I am now”. Lina, 29yrs, 1st pregnancy

On the contrary, other women were encouraged by the fact that their children were engaging with ESTEEM foods and healthier eating behaviours. Some parents and children tried out the new ESTEEM recipes together. This made the changes easier as the whole family then participated together and adapted their food, collectively.

“My husband made the spicy nuts recipe that we were given as well...both my daughter and my husband loved it”. Sama, 31yrs, 2nd pregnancy

Children's food was a main concern of mothers. They tried different ways to adapt the ESTEEM intervention foods to suit them. Overall, children responded well to changes in their food when these (nuts, fruit) were tasted. Some mothers said that small children adapted well. Many women had not given nuts to their children to eat prior to the ESTEEM intervention.

A principal factor that influenced women's engagement with the ESTEEM dietary intervention was their partner. Women, in the main described their partners as supportive. Partners made attempts to encourage women to eat what they considered to be a healthy diet. On occasions,

partners had already been changing their food and lifestyle. During these instances, the ESTEEM intervention was easier for women to adapt to as partners were already making efforts along the lines of the ESTEEM diet, or, had particular motivations, for example, to control their weight.

“But me and my husband are trying already to eat quite healthy. We tried to eat healthy, even before (ESTEEM)”. Maha, 30yrs, 1st pregnancy

The ESTEEM dietary intervention promoted involvement of the partner in planning, shopping, preparing and cooking food. The partner became engaged, by the nature of the group sessions. This provided mutual support and shared understanding of the intervention. Shopping became a shared occupation as the couple became proactive about choosing foodstuffs in keeping with the ESTEEM diet. This facilitated the couple’s engagement with the dietary intervention.

He helped like with the shopping list and I’d be the one who would go for shopping and I try to take something and he would be like I check the sugar....He was really helpful”. Dori, 29yrs, 1st pregnancy

Sharing was a sure way of reinforcing knowledge of the ESTEEM diet. Discussion of the couple’s preferences took place to enable the intervention food to fit them both. Women appreciated the shared learning which took place during the intervention activities with their partners. Being made aware of the fat content of milk by the dietitian, for example, Dana’s partner was able to receive this information on-line together with dates of the meetings. This then enabled the partner to attend sessions and, also prompted further discussion and more interest in the intervention by the couple.

“So, it’s good I could show him, and then, Um, the next time I went in (to attend ESTEEM meetings) he came. I was more mindful too, when I went shopping. Dana, 30yrs, 2nd pregnancy

Having embraced new rules regarding the ESTEEM intervention and new ways of eating at home, within the couple a sort of banter occurred. Both partners mutually corrected and supported each other when shopping, preparing and eating food.

“Even in the last two days we, me and my husband go; “You’re putting too much butter on that. If you’re gonna use, use this butter””. Dana, 30yrs, 2nd pregnancy

Some women were told during the ESTEEM intervention by their partners to eat what was good for their pregnancy. Partners tried to influence the food women ate and stopped them eating what they considered to be “unhealthy food” such as too much crisps, sweets or chocolate.

“He says: No, you have to. Don’t do it for yourself, do it for the baby”. Zana, 31yrs, 1st pregnancy

At other times women found it hard to control their eating and stick to their ESTEEM plan as they felt obliged to cook for and eat with their husband/partner when he came home from work. They said they made really nice food which was difficult for them to resist.

The ESTEEM dietary intervention promoted involvement of the partner in planning, shopping, preparing and cooking food. The partner became engaged, by the nature of the group sessions.

The family’s influences on women’s engagement with the intervention was notable. Generally, women were the main cook in the home therefore others had changed their diet as well, as the family food had been adapted during the intervention.

“And, uh, um, obviously I cooked it for everybody, so everybody's going through the change with me [laughs].” Jera, 34yrs, 3rd pregnancy

Conversely, other women did not see the intervention diet as being for other family members and that it did not include them. They saw themselves as needing the diet and did not see this as part of an adjustment to be made more broadly within their family or social setting.

“It's a-- it's hard in some way because I'm the only who needs diet. So sometimes I-- it's not-- with my kids, my-- my partner, my-- I can't sometimes make my own foods by myself”. Bili, 37yrs, 4th pregnancy

But, women’s engagement with the dietary intervention would depend upon family-members participating in it. Without agreement, a long-term or genuine engagement with the intervention could not occur. Women would be unlikely to engage with the dietary intervention if others in the home could not eat the same meals or foods, making the intervention “less doable”.

Summary and conclusions

This chapter has presented the findings of the data from women's interviews. The themes I identified from the data showed the extent to which women were able to fully engage with the dietary intervention, how they found it more or less doable.

In summary, these themes covered the practical aspects involved for women in taking part in the ESTEEM intervention and following the ESTEEM diet, such as women's ability to plan during pregnancy and the strategies they used within the context of their busy lives; women's beliefs about health, pregnancy and risk, and the decision-making and information required to manage and negotiate these; and wider family, social and cultural issues such as fitting the diet in with family traditions and involvement of children and partners.

Many women were able to plan and adapt their food and use ESTEEM to their own and other family members' advantage. Conversely, some of the information provided during the ESTEEM intervention made women more aware of their metabolic risk factors and more anxious, regarding these. It was also striking to see how women found their own solutions to their individual concerns and needs. These may not have been in keeping with current professional advice, but helped women cope with their pregnancy.

Due to the nature of the ESTEEM group sessions, knowledge of the ESTEEM diet was reinforced and discussion of the couple's preferences took place, the partner then became engaged. Women appreciated the learning activities carried out with their partners as it promoted their involvement in planning, shopping, preparing and cooking food.

Overall, children responded well to changes in their food when these (nuts, fruit) were tasted. Some mothers said that small children adapted well. Many women had not given nuts to their children to eat prior to the ESTEEM intervention.

This chapter has completed the first phase of the analysis of my study. The second phase of this in the subsequent chapter will present the findings from my analysis of interviews with the partners of the women involved in the dietary intervention.

Chapter Six: Partners views and experiences of the ESTEEM intervention

This chapter will present the findings of my thematic analysis of interviews with the partners of pregnant women with metabolic risk factors who were participating in the ESTEEM dietary intervention (described earlier, chapter 1). This was the second phase of my analysis.

In my previous chapter, I analysed women's experience of the dietary intervention and explored factors that influenced their engagement with the intervention. My aim in the analysis reported in this chapter was to explore the views and experiences of men whose partners took part in ESTEEM. I was particularly interested in how partners can play a role in supporting women's participation in the intervention.

The key question of this phase of the study was:

How do partners of pregnant women with metabolic risk factors view and experience a dietary intervention to improve pregnancy outcomes and how do these support women's participation?

6.1 Summary of the characteristics of the partners interviewed

Sixteen partners were interviewed. All of these were male, the majority of whom were in their thirties and expecting their first baby (TABLE 10). About half of the partners were Asian and a third reported themselves as being white British. All of the partners were employed either full or part time with the vast majority employed full time. The partners had jobs ranging from managerial posts to skilled labour.

Table 10. Demographic characteristics of partner participants (n=16)

Characteristic	Subcategory	Number of participants	Percentage of participants
Age (years)	20-29	4	25%
	30-49	12	75%
Parity	1 st pregnancy	10	63%
	2 nd pregnancy	3	18.5%
	3 rd pregnancy	3	18.5%
Ethnicity	Asian	8	50%

	UK White	5	32.5%
	African or S. American	3	17.5%
Employment	Full-time/Part-time	16	100%
	Managerial	10	63%
	Skilled	6	37%

6.2 Themes

Six key themes were identified from my analysis of the data which captured partners' views and experiences of the ESTEEM intervention and the ways in which they supported women's engagement (Figure 4). After prolonged engagement with my data, I explored further from each theme how partners might have been more or less supportive of women participating in the ESTEEM dietary intervention. The notion of being supportive, although not explicitly stated by partners, permeated their accounts of their experiences of participating in the intervention.

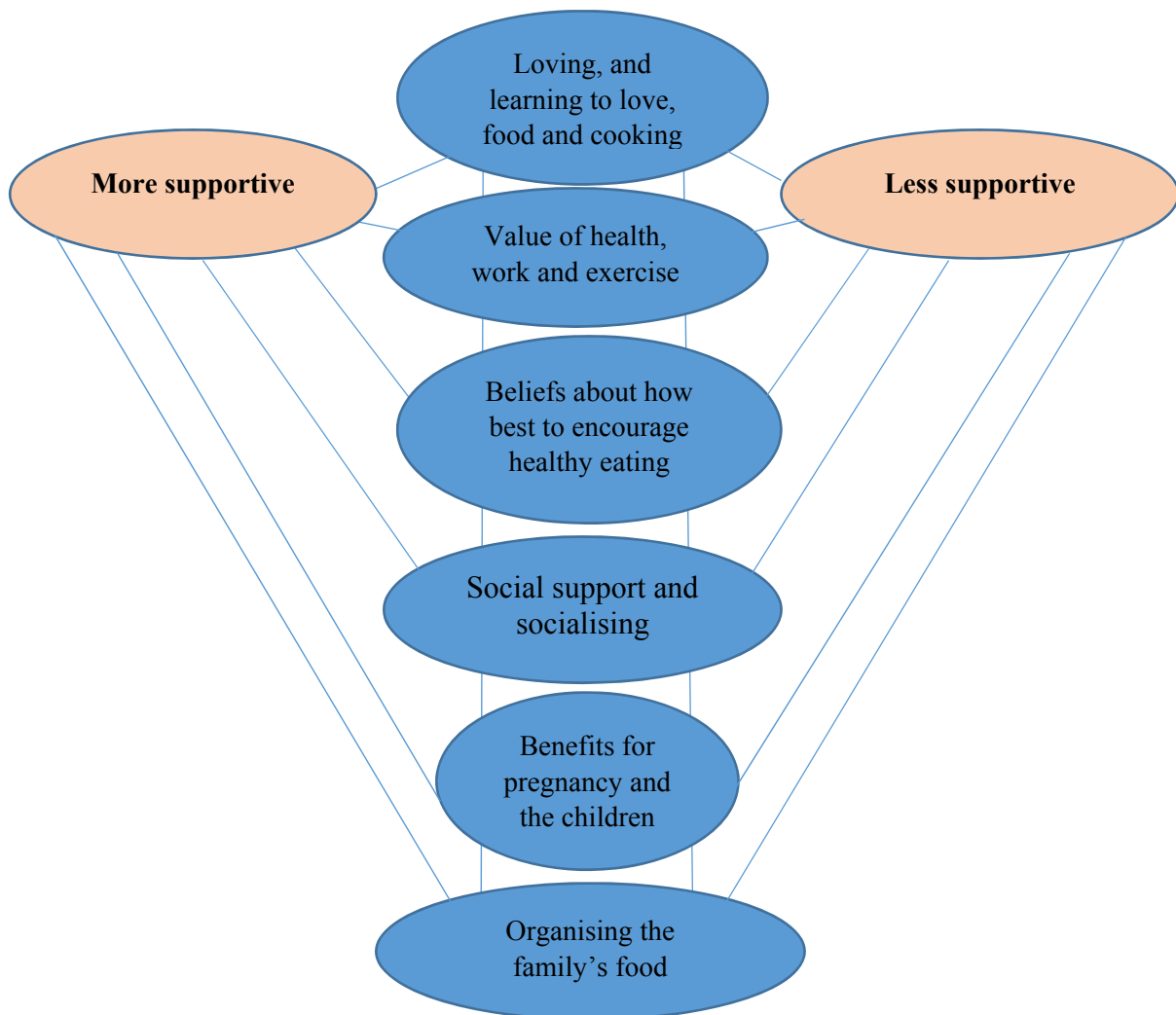
The importance of food was emphasised in the partners' accounts as they participated in the ESTEEM intervention and developed their cooking skills ("Loving, and learning to love, food and cooking"). The value men placed on their own health and well-being was a key driver for partners to incorporate some elements of the ESTEEM intervention as they could see the health benefits it offered for them ("Value of health, work and exercise"). As many partners were already making lifestyle changes such as adapting their diet to a healthier one, due to their own health needs (high cholesterol levels, family history of diabetes), they were ready and willing to take part in the ESTEEM study making it easier for them to get alongside women to support their engagement.

Partners came to appreciate the educational element built into ESTEEM and enjoyed learning new things about healthy eating ("Beliefs about how best to encourage healthy eating"). Eating away from home and the social support provided by their partner was cited as being a time which was more difficult to fully adhere to the ESTEEM diet. At these times partners adapted their portion size and made food choices to try to continue eating healthier food ("Social support and socialising").

Partners valued the long-term benefits of the ESTEEM diet and wanted their children to engage in healthy eating habits ("Benefits for pregnancy and the children"). There was a view that

women’s diets improved during the intervention and that this impacted positively on pregnancy and family health. The accounts of the ESTEEM diet provided by partners often included examples of how they made food more suitable for the family. They also helped with the household shopping, preparing and cooking of family food (“Organising the family’s food”). When partners were involved in these aspects, they were more supportive of women’s engagement with the intervention.

Figure 4. Thematic map of findings from interviews with partners about their experiences of the ESTEEM intervention



Loving, and learning to love food and cooking

A number of partners described how they had a keen interest in food and cooking prior to their involvement in the ESTEEM intervention. For some this was shaped by their early-life, dietary experiences, through for example, watching and learning from their mothers, and the mothers of their friends. Healthy eating was therefore cited as part of their childhood and what they grew up with.

“My mother she told me all the time”, “I’ve learned everything from my mum” Sah, 32yrs, husband of Dana, 2nd pregnancy

Observations of mothers cooking and serving food made life-long impressions, with Rob, for example remembering these “fantastic meals” (*Rob, 30yrs, husband of Beka, 1st pregnancy*). For others, a love of food and cooking was developed after meeting their partners.

“It took me to meet my wife and to have been a little more involved in, not only cooking, but showing me how to make food that I wasn’t into, to taste.” Sev, 41yrs husband of Lana, 1st pregnancy

When men described what they liked about the ESTEEM dietary intervention, they highlighted the opportunities it provided them to perfect their own cooking skills, try new and different foodstuffs such as the extra virgin olive oil and various types of nuts, and experiment in the kitchen. Partners who valued these opportunities were more likely to join in the intervention with women, getting alongside them to support them on the intervention, recognising the benefits of this for themselves.

“I suppose and it’s been me jumping on the band-wagon as well with her – and – but it has helped me yes definitely, that’s definitely helped me.” Tom, 35yrs, husband of Tani, 3rd pregnancy

The dietary intervention also offered a way to break out of eating the same meals out of habit, which had become monotonous, bland and unimaginative. Partners viewed the ESTEEM diet as providing more variety. It enabled them to take more risks in trying new foods, which they had previously rejected.

“Now I like vegetables, now I start getting into it” Rob, 30yrs, husband of Beka, 1st pregnancy

The novelty of the ESTEEM diet and the opportunities for change it presented appeared to be key for engaging partners in the intervention. They could try new foods, new ways of cooking and new menus and become more knowledgeable and proficient in their cooking.

“It’s just amazing, you cook bits, so I couldn’t go away from that now. I’m very much into exploring new flavours and things as well.” Rob, 30yrs, husband of Beka, 1st pregnancy

The desire to try new things and to develop their cooking skills were linked by partners to media coverage and the contemporary portrayal of food, and cooking and healthy lifestyles. The ESTEEM diet and the different recipes and foodstuffs it provided were in keeping with this media coverage. Some partners, however, would not embrace all the food recommended on ESTEEM, reporting that they were unwilling to try certain ‘fashionable’ foodstuffs with several mentioning fish and seafood, especially.

The ESTEEM dietary intervention appears to have engaged partners through their pre-existing love of food and cooking and/or by their desire to try new things, learn new things, learn new cooking skills and introduce variety into their eating habits. Through joining in with the ESTEEM intervention some reported becoming more involved in preparing and cooking food with their partners, thereby supporting them with their engagement with the dietary intervention. The ESTEEM intervention appears to have provided some male partners with a “safe” way to try those foods they had previously been unwilling to eat. It also provided a structure within which to make desired changes to their diet. ESTEEM’s consistency with media coverage of contemporary food and cooking was recognised by partners and for some this supported their engagement with the dietary intervention.

Value of health, work and exercise

The ESTEEM diet was in keeping with partners’ aspirations to remain healthy and this was fundamental to their engagement with the intervention. They looked upon the ESTEEM intervention pragmatically, and saw that it had the potential to maintain and/or improve their health. It was also viewed by partners as a way of being able to continue work which was crucial to them. Mobility and fitness were important factors to partners and the ESTEEM intervention was key to facilitating this. As the majority of partners participated regularly in sports and in activities such as gym, running, swimming, cycling and yoga, they could envisage

using the diet in conjunction with their exercise regime as they also realised the impact their food had on their energy levels.

“...now I feel brilliant ‘cause obviously I’ll just feel better in myself that I’m changing the way I’m eating”. Dan, 38yrs, Husband of Ralu, 3rd pregnancy

The ESTEEM diet was seen to have the potential to reduce the risks of some medical disorders such as heart disease and diabetes. Being aware of family medical histories and the impact of these upon their health was a key factor in making partners receptive to dietary change. The ESTEEM dietary intervention was viewed as being particularly beneficial by partners who had had their cholesterol levels checked or who had received some dietary advice from their doctors. Partners who already had received some medical and dietary advice about their health were able to use the ESTEEM diet to improve their health and also build upon the dietary advice they have acquired. As the ESTEEM diet was adjustable and also applicable to the dietary advice partners had already received, they were able to eat suitable foods from the ESTEEM list which was consistent with the advice they had been given. The ESTEEM diet appears to be viewed as being simple and easy to adapt to by these partners.

“It (ESTEEM food) ties in with the healthier lifestyle and the healthier diet”. Sev, 41yrs husband of Lana, 1st pregnancy

Although partners saw the need to engage with the ESTEEM intervention and improve their diet, a combination of setbacks such as long working hours, minor injuries and being less able to engage in their chosen sport prevented them from making the dietary changes they wanted to.

Although partners were invited to the ESTEEM group sessions, as most worked full time they were not always able to attend these. When they did attend these with women, they felt very informed about most aspects of the intervention and they valued this. In these cases, men referred to the ESTEEM dietary intervention as being influential in making changes to their own and their partner’s diet (e.g. types of food eaten, meal times and portion sizes).

Of note, it was the partners who considered themselves to be eating a healthy diet who had a negative influence upon some women participating on the ESTEEM dietary intervention. As they had some eating trends which were stringent, such as eating only low-fat meat (less than 3%).

"I'd wake up at five o'clock in the morning have my first real meal and then every three hours, I'd have a meal and that would go on throughout the whole day". Sah, 32yrs, husband of Dana, 2nd pregnancy

As well as passing comments about what they were eating, which they considered to be unhealthy compared to their own 'healthy diets', this type of diet was at odds with the ESTEEM diet, nutritional needs in pregnancy and also women's views of what constitutes a healthy diet that is sustainable over the longer-term.

The particular stage of the life-course the men were at, appeared to be key to partners' engagement with the ESTEEM intervention. Many partners were in the process of changing their eating habits as they were approaching the age of 40. This was understood by them as being a meaningful age and partners thought they needed to become more proactive about their food and health. Becoming older was also associated by partners with gaining weight and they wanted to pay particular attention to aspects of their diet for this reason. The ESTEEM diet provided a timely opportunity for them to do this.

"...so it really affect when we cross 40. I know I will start gaining weight. I have to look after my food, a lot." Ali, 36yrs, husband of Bura, 2nd pregnancy

During the ESTEEM intervention partners reported that injury and ill-health had an impact upon the physical activity which they were able to engage in. Tom spoke of how his daily six-mile cycle commute was deterred by a knee injury and he expressed some concern about his increasing weight. He had suffered a pulmonary embolism and was prescribed life-long anti-coagulation therapy. A significant number of other men were also affected by various long-term ailments. As they started to put on weight their condition kept them from carrying out sport.

"It's been a little bit difficult for me...what with medications and things, I've actually put on a lot of weight over the last six months I would say. Um, but obviously trying to get back into where I was before". Tom, 35yrs, husband of Tani, 3rd pregnancy

The theme "Valuing health, work and exercise" highlights partners' views of their diet and its relationship to their health by focussing on the links they see between exercise, diet and health. Men wanted to be healthy and to control their weight, they felt better during the ESTEEM intervention and enjoyed an internal sense of well-being. This fostered their interest in the ESTEEM intervention and they perceived that they would be able to improve their health,

mobility and continue their work and pastimes. As men gained interest and they actively engaged with the dietary intervention, with the potential to therefore support their partner's engagement. The ethos of the intervention was in keeping with some partners' aspirations to care for their own health through dietary management. Their perceived health needs motivated them to join with their partner and engage with the dietary intervention. However, when men suffered injuries, they were prevented from taking part in physical activities and sport and could then experience difficulties with controlling their weight. This had a disheartening effect on them which could undermine their attempts to follow a healthy diet.

It was striking that eleven of sixteen men carried out regular sport activities. What was even more remarkable was the number of men who had serious injuries and health conditions. Partners were well aware of the difference to their health and well-being when they stopped doing sport. This had implications for their health, their work, mobility, weight-control and long-term health. These were the things which partners valued.

Beliefs about how best to encourage healthy eating

The ESTEEM intervention had appeal for partners and they were aware of the food bulletins and updates, offered as part of the ESTEEM, keeping themselves informed about news and reports of some of the latest dietary information. In general partners felt that they knew a lot about healthy foods and were not all convinced that they needed dietary education themselves. They were hesitant about giving dietary advice to others as they perceived that this knowledge was commonplace.

“I think from my perspective I've always known what I should be or I shouldn't be eating” Tom, 35yrs, husband of Tani, 3rd pregnancy

There appeared to be some mis-match in beliefs about how best to encourage healthy eating between the ESTEEM dietary intervention and partners. Most partners thought they could deviate once or twice a week from any diet, rather than rigidly adhering to these. Partners believed that it was not always possible to follow a diet all of the time. They felt able to have periods of more flexibility, and allowed themselves breaks from dietary restrictions. Partners believed they would be able to get themselves back on track if they deviated from a diet. They did not expect to be told how to behave during one, nor would they tell others how to behave diet-wise.

“I wouldn’t tell other people what to do because they’re aware of what is good for them” Sev, 41yrs husband of Lana, 1st pregnancy

However, as partners participated in the ESTEEM intervention they learnt more and gained new understandings about food. They viewed the intervention positively as they found that it was educational. Partners cited needing to understand the benefits and reasons for engaging in healthy eating, as these would induce them to participate, and also, motivation was primarily required they thought, in order for them to learn. As well as this, some ways to encourage them to continue was needed, to help them adhere to the diet.

“Personally, I liked it because it actually motivates people to actually to have more understanding – even though you’re well educated, it doesn’t matter – sometimes motivation is required” Ram, 34yrs, husband of Jera, 3rd pregnancy

Some determination was required in order to adhere to the ESTEEM intervention, and determination was cited as being key to being able to successfully adapt to the diet. Partners believed that it took time to change and engage with the food recommended by the intervention. They thought that ‘stickability’ was required, and that the benefits of the intervention needed to be recognised and valued, both by themselves and their partner, as this helped the two of them adhere to ESTEEM foods. The effort they made had to produce what they considered to be some meaningful results, or partners became less committed to the diet. As partners began to adopt some of the components of the intervention, they experienced a growing sense of accomplishment and became confident about their adherence.

“Once you get this idea, you follow this idea and try to keep it up” Tam, 41yrs, husband of Muta, 1st pregnancy

The theme “Beliefs about how best to encourage healthy eating” revealed how partners’ own experience of the intervention was partly influenced by their beliefs about how to provide dietary education.

As noted above, there appeared to be some mis-match in beliefs about how best to encourage healthy eating between the ESTEEM dietary intervention and partners. They did not expect to be told how to behave during one, nor would they tell others how to behave diet-wise, but as partners participated in the ESTEEM intervention they learnt more and gained new

understandings about food. This fuelled their motivation and opened them up to learning and to changing their behaviour. Continued motivation was required, efforts producing visible and meaningful results. As men got on board with the intervention, they were more able to support their partners.

Social support and socialising

Men reported that initially, it took their own individual will-power to embark on the ESTEEM intervention, but that their on-going adherence to the ESTEEM diet required continuous support from their partner, family and wider social networks.

Eating out and socialising impacted on what partners ate, and therefore also impacted on their ability to adhere to the ESTEEM dietary intervention. Partners felt impolite if they did not eat food they were offered, as an invited guest, and felt they had to accept it. They revealed that they managed these occasions by eating smaller amounts, if the food was not what they believed to be healthy. Partners wanted to eat what was listed as ESTEEM intervention healthy food, but at the same time, they wanted to eat what they considered to be tasty meals. Within the couple, partners influenced each other, spoke for each other and also ate similar foodstuffs. The intervention needed to work for both partners. Partners indicated that the planning, information and support had to be organised in such a way that partners were able to develop their own ways of applying ESTEEM principles.

“Maybe you know manage the resources,find out exactly what we would enjoy”.

Ric, 30yrs, husband of Dori, 1st pregnancy

At the same time, the food had to work for their partnership. It was important from what partners said to take account of how both partners viewed food, so that they both have a diet which they enjoy and which can be combined and shared.

Yes, it’s very important to us, yeah. We wanna enjoy our tasty food and at the same time healthy one, yeah” Ric, 30yrs, husband of Dori, 1st pregnancy

Professional obligations such as long, irregular hours, entertaining clients after work, eating late and feeling obliged to drink alcohol hindered some partners from sticking to their ESTEEM intervention food. Busy periods of work made it difficult for them to prioritise and find the will power to continue the ESTEEM diet. At these times, partners cited needing to get back to where they were before and tried to manage their lifestyle as best as they could, but this was difficult as there were many temptations when working.

Benefits for pregnancy and the children

During my interviews with partners, it was revealed that many couples participating on the ESTEEM intervention had long awaited pregnancies, or pregnancies complicated by diabetes. Partners expressed how this made them mutually support each-other within their couple, and therefore during the ESTEEM intervention, they attended the group sessions.

Women, partners reported, recognised the value of the ESTEEM intervention and the impact that dietary change may have on their health. Partners emphasised the importance of the intervention for controlling women's diabetes and keeping women's blood pressure within normal limits, in pregnancy. As highlighted in the previous chapter, both women and their partners generally viewed the ESTEEM intervention positively and thought it was good for themselves, their partner and their child. Partners also reported that women were able to observe improvements in their condition during pregnancy which gave them control.

“She controls her health as her sugar level and probably keeps her um, pressure level (blood pressure) as well in good condition.” Tam, 41yrs, husband of Muta, 1st pregnancy

“It really opened her eyes up to a lot of the necessity and understanding of food and its impact on your health” Dan, 38yrs, Husband of Ralu, 3rd pregnancy

The ESTEEM intervention was also seen by some partners as being beneficial for women's long-term health. Partners observed positive changes in the well-being of women who were participating in the intervention. As well as recognising the benefits of the dietary intervention for the pregnancy, partners observed that their pregnant partners following the dietary intervention had more energy. They perceived that this was due to their healthier eating pattern which beforehand had been poor. Partners also viewed the larger benefits and impact the dietary intervention may have on their children and also upon future generations. They thought that the children who adopted a healthy diet, may also influence their own children, leading them to do the same.

“She now understands the impact that, you know, having a healthy diet will have, you know, on herself and on her future baby, yeah.” Ric, 30yrs, husband of Dori, 1st pregnancy

“... for the home, family and the baby who is growing in her tummy.” Fas, 28yrs, husband of Feha, 1st pregnancy

There were many references made to the ESTEEM intervention as being a key factor in preventing childhood obesity. Partners were keen for their children to develop a healthy diet and lifestyle. Partners supported women’s engagement with the intervention as in doing so their children were also eating a healthier diet. Many expressed the hope that their children picked up better attitudes towards food and would eat a more varied diet. Partners also felt that they needed to be a good role models for their children:

“Mainly (I participate) because I want to teach my son how to eat healthily, and so he’s always eats good for his health - and for our health. And so we have to set an example.” San, 26yrs, husband of Jona, 2nd pregnancy

Partners felt that women needed encouragement to teach children how to eat and snack in a healthier way. The ESTEEM intervention was viewed as central to this. Healthy snacking was fundamental to eating well and also in being able to develop and continue healthy eating habits for children. Partners described some children as fussy eaters and that this made it difficult to encourage their children to develop healthy eating habits. But when both partners made a concerted effort, they said this became easier.

Obvious improvements to their partner’s eating habits whilst on ESTEEM was cited by men as a key motivator for themselves to also join in the diet. These changes in the mother’s diet impacted upon the eating habits within the household. As children became involved in the dietary changes, they too developed healthier eating inclinations, as they tried new foods and also became more engaged with some components of the intervention.

“What it has done is improved some of the things that my wife’s eating, which should I know, she has an impact on what you are eating as well - and – also you know straight through to the children, that they have been taught as well, so trying to get them to try new things, trying to get them to buy into it as well.” Tom, 35yrs, husband of Tani, 3rd pregnancy

“One thing that I’ve seen that she started eating nuts, which I am very happy and she pushed the little one as well to eat nuts.” Ram, 34yrs, husband of Jera, 3rd pregnancy

Although the ESTEEM intervention was viewed as enabling changes in children's eating habits, partners believed that a total or absolute approach to any change of diet may not be suitable for children. They wanted to employ a more flexible and fostering approach.

“We are trying to encourage them to make the right choices in terms of food but there will always be an element of there being chocolate in the fridge or there will be a biscuit sometimes” Tom, 35yrs, husband of Tani, 3rd pregnancy

The theme “Benefits for pregnancy and the children” captures men's views about the value of ESTEEM in terms of both its visible benefits such as improvements in their partners health and in their children's eating habits and the more invisible and intangible benefits such as its role in reducing childhood obesity and the effects across generations. Interestingly, partners viewed the mother as being mainly responsible for feeding the children but that she would require some support to do this. Some degree of flexibility they claimed may be necessary, to achieve a healthy diet, within the family context and to be more supportive of women.

Organising the family's food

Men's accounts highlighted a range of views around the organisation and resources required to support healthy eating on ESTEEM. They reflected on how simple or complex it may be for them to plan, organise, shop and cook family meals. Some indicated they had a suitable kitchen for cooking, or a proper dining area to sit and eat, or a garden to grow vegetables and some did not.

Planning of family food during the ESTEEM intervention was essential for its success. This was an important aspect of partners' daily lives as they tried to find meals which suited each family member and also food which may also comply with the ESTEEM diet. They cited the numerous phone calls and texts made by themselves during the day to agree a suitable evening meal for the family. In this way the planned meal was made acceptable for all the family. This was not always a simple decision, and in some cases was reckoned to be a “bone of contention” (*Tom, 35yrs, husband of Tani, 3rd pregnancy*). Preparation was cited as being the hardest part of the ESTEEM intervention. It was recognised that these decisions may take a little time to be made and that will-power was also required as the introduction of the ESTEEM intervention food may necessitate some adjustment of the usual family way of eating.

Changes made during the ESTEEM intervention entailed adapting the household shopping as well as the cooking in the home. Family shopping lists had changed as these were modified to incorporate food more in keeping with the ESTEEM dietary intervention. In this way, partners demonstrated that they were providing some practical help.

Digestion and sleep were matters which were important to partners and they believed that the ESTEEM intervention was helpful in preventing unhealthy eating habits such as eating a lot of food late at night and having large meals. They became more conscious of these issues during the intervention as food portion size and eating times were included in the ESTEEM information, and this made them change. Other examples cited of adopting better eating routines were having an adequate breakfast and drinking more water.

“becoming a bit aware about the timing, portion and those kinds of issues” regarding healthy eating. Fas, 28yrs, husband of Feha, 1st pregnancy

As mentioned above, access to appropriate kitchen and sitting amenities was needed by families to implement the ESTEEM intervention. It was easier to organise if the household cooking and eating if the environment was suitable. One partner revealed that he had just got a new kitchen and another mentioned having a garden to cultivate home-grown vegetables. These assets were believed to impact upon the preparation, eating and ambience surrounding food and thereby, the context of the ESTEEM intervention.

“So having a kitchen put in meant I would spend hours in there...” Sev, 41yrs husband of Lana, 1st pregnancy

On the other hand, an example was given during the ESTEEM intervention of a dining room that was not big enough to have a dining table to sit around. This did not allow the family to eat and enjoy their meals together the way they wanted to.

The proximity and convenience to shops, was essential for obtaining ESTEEM foods and for permitting partners to pick up fresh produce to prepare and eat. For example, having a market nearby was cited by one partner as facilitating the purchase of whole-meal bread. Conversely, other things such as chicken-shops situated nearby on the high street influenced partners' purchases, and tempted them to buy some convenience or fast foods. Although partners

suggested that this may not happen frequently, they did highlight the number of convenience food-shops in close vicinity to their homes.

The theme ‘Organising the family’s food’ captured how men had to consider the complexity of planning, organising, shopping and cooking family meals. Men appreciated the learning they gained from being part of ESTEEM on organising their diet in terms of food portion size and eating times. Convenience of domestic and shopping facilities impact on how partners were able to support women to prepare, to cook and eat food.

Summary and conclusions

This chapter presented the findings from my analysis of data from interviews with the partners of women enrolled in the ESTEEM intervention. The six themes encompassed a broad range of perspectives covering men’s relationships with food, their professional and their family life, and the impact of the dietary intervention on these. The themes also captured men’s beliefs about healthy eating and how to best encourage this such as the importance of seeing tangible results from taking part in ESTEEM. Overall the partners of women taking part in ESTEEM appeared to be very positive about the intervention and descriptions of what ESTEEM had and could help them achieve featured heavily in their accounts.

Interestingly, partners saw diet and lifestyle as being connected, and felt very well when they were both eating healthily and exercising. As a good number of the men I interviewed had already been considering the benefits of healthy food and lifestyle, especially in the context of them getting older, the ESTEEM intervention appears to have engaged men to take part through its holistic promotion of healthy diet and exercise. However, it is important to note that some partners’ ideas around what constitutes a healthy diet were not always in keeping with the recommendations of the ESTEEM intervention and this could have a negative influence on the women taking part.

As for the findings from women, family and wider social support helped engagement with and adherence to the diet for partners. Decisions about organising family meals necessitated some adjustment to family eating which needed negotiation between partners. Men talked about some of the practical issues which they helped out with including buying and cooking food at home.

Partners also perceived the dietary intervention as having benefits for the mother as well as their children. Although men recognised that their partners needed support to provide good, healthy food for children, and that they needed to be good role models for their children, men appeared to hold mothers to be mainly responsible for feeding the children and ensuring that what they ate was healthy.

The following chapter will complete the third phase of the analysis of my study by presenting the findings from my analysis of data from the focus groups with health care professionals involved in the dietary intervention.

Chapter Seven: Health care professionals' views and experiences of the ESTEEM intervention

This chapter presents the findings from a thematic analysis of data generated from focus groups with the health care professionals, who delivered the ESTEEM trial. I carried out three focus groups which explored the health care professionals' perceptions of, and experiences in delivering, ESTEEM. My analysis of these data also considered the implications of the health care professionals' views and experiences for the future design and implementation of the ESTEEM intervention.

The key question for this phase of the study was:

How do health care professionals view and experience a dietary intervention for pregnant women with metabolic risk factors and what implications do these suggest for the design and delivery of such dietary interventions?

7.1 Summary of the characteristics of participants in the focus group

Three focus groups were conducted which included a broad and inclusive sample of health care professionals working on the ESTEEM intervention. A range of health care professionals who had either worked as part of the trial or intervention delivery team were invited to take part in the focus groups. Those who consented to participate in the focus groups included representation from the majority of health care professional groups working in affiliation with the ESTEEM intervention. Like the ESTEEM trial itself, the focus groups were carried out at three different maternity centres to enable ease of attendance for staff at each centre.

The groups were made up of 4 senior research midwives, 2 dietitians, 2 midwives, 2 midwife ultra-sonographers, a radiographer, a senior research co-ordinator, a senior research manager, a trial co-ordinator, a research fellow and a research administrator (Table 11).

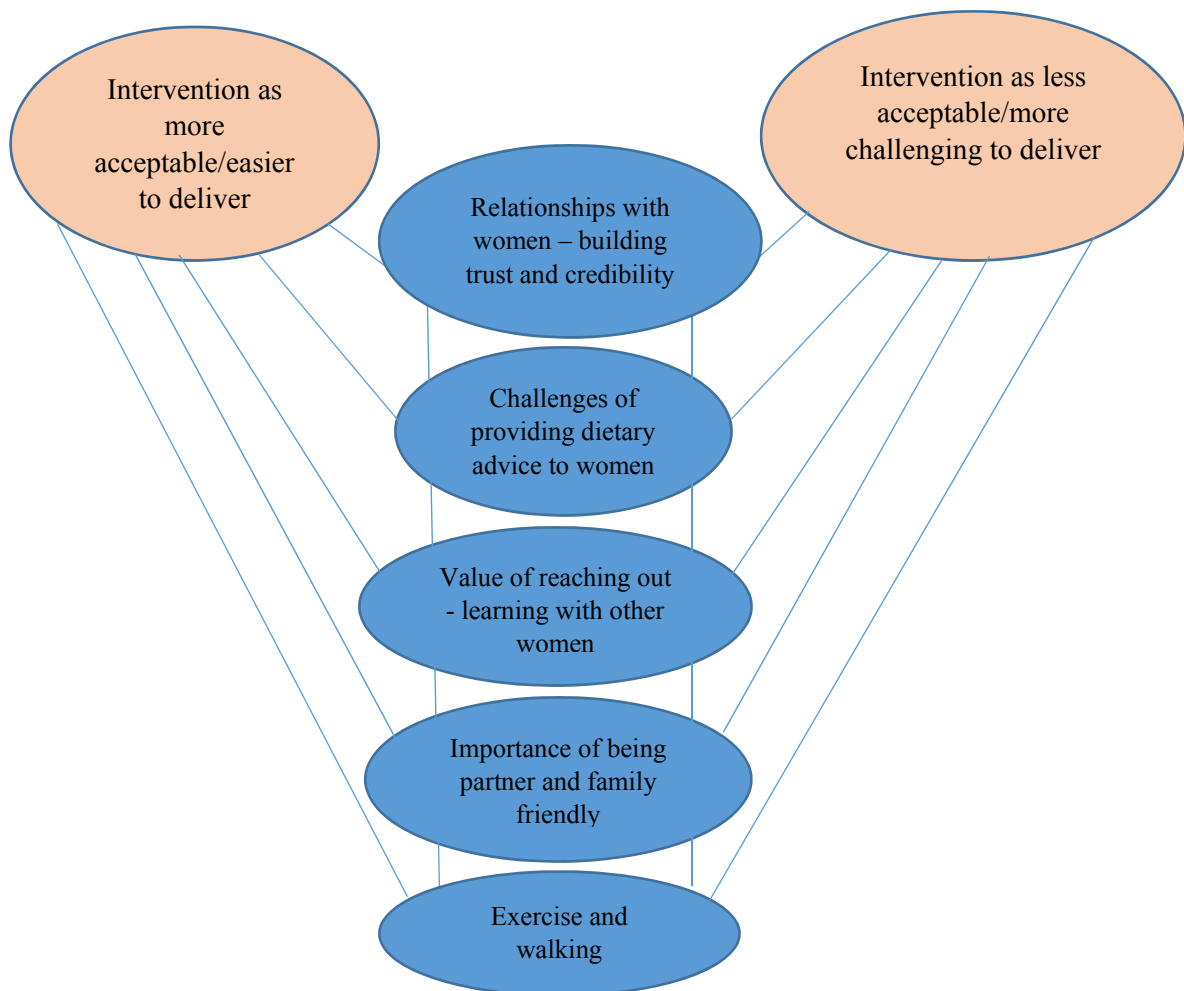
Table 11. Characteristics of the participants in the focus groups

Group Number	Title	Main role on the intervention	Place of meeting	Length of meeting
Group One	Senior research midwife	Recruitment, follow-up, collation of data	Seminar room, maternity unit, antenatal and US scan department	One hour 10 minutes
	Senior research midwife	Recruitment, follow-up, collation of data		
	Midwife	Recruitment		
	Midwife Ultra-sonographer	Recruitment and ultrasonography		
	Midwife	Recruitment		
	Senior Ultra-sonographer	Ultra-sonography		
	Dietitian	Information giving and on-going support of women		
	Senior research Co-ordinator	Overall organisation of trial and supporting staff		
Group Two	Senior research manager	Research lead of trials, funding and administration	Meeting room, Women's health research unit, university	40 minutes
	Senior dietitian	Dietitian who launched the intervention		
	Trial Co-ordinator	Management of ESTEEM trial		
Group Three	Research midwife	Recruitment, follow-up, collation of data	Research office in the research department	One hour 15 minutes
	Research midwife			
	Research fellow	Ultrasonography		
	Research administrator	Data management and clinical record manager		

7.2 Themes

Analysis of data revealed five themes which captured healthcare professional's views of the dietary intervention and the experiences of implementing ESTEEM (Figure 5). For each theme I considered potential implications for future design and delivery of the ESTEEM intervention.

Figure 5. Thematic map of findings from focus groups with health care professionals about the ESTEEM intervention



Developing and maintaining good relationships with women that built trust and credibility was considered by focus group participants to be fundamental to the success of the ESTEEM dietary intervention (“Relationships with women – building trust and credibility”). Those delivering the intervention, had to be flexible and skilled enough to adapt the way they provided dietary advice to accommodate the range of food preferences, prior knowledge of healthy eating and state of readiness to change eating habits women entered into the intervention with (“Challenges of providing dietary advice to women”).

Women valued the opportunity provided by the ESTEEM intervention to share and benefit from the expertise of other mothers and pregnant women (“Value of reaching out - learning with other women”). Health care professionals’ accounts of ESTEEM frequently emphasised the extent to which the diet was able to fit in with women’s partners and other family members as being key to its acceptability (“Importance of being partner and family friendly”).

The focus group participants also emphasised how they felt that ESTEEM had encouraged women to undertake the exercise recommended by the intervention (“Exercise and walking”). Although a smaller theme, it has significance for future interventions.

Relationships with women – building trust and credibility

Building and maintaining a good relationship with women on the ESTEEM intervention was seen by the health care professionals as fundamental to the success of the intervention. There were many potential challenges in this process and developing trust, credibility and a safe space for honest conversations about weight and diet were key.

Health care professionals described scenarios in which trust could be undermined. For example, Nelli one of the dieticians who delivered ESTEEM sessions, was conscious of offending or judging women who were overweight:

“You have to choose your words very carefully so you don’t make them feel judged, or, you know, trying to make them aware of what healthy even means – without making them feel – Oh, I’m perfect here”.Nelli, dietitian

As well as feeling a need to choose their words “*very carefully*” health care professionals were also aware of the importance of coming across to women as credible when providing advice about achieving a healthy weight and eating healthily. Credibility was thought to be undermined if health care professionals appeared to be “*perfect*” in terms of their own dietary habits (as Nelli, one of the dieticians notes above) or through being overweight themselves:

“Where they’re told by someone who might perceive as being much bigger than themselves what they should be eating, like, how come are you to tell me what to eat? Because – it’s clearly not working for you” Lizzy, midwife ultra-sonographer

At the same time, to build trust and credibility, health care professionals felt it was important to have what they considered to be a direct and honest approach in their interactions with women. They felt that women did need to be made more aware of what a healthy diet involved and should be told if they were at risk because of their weight and diet.

“You know you’re a bit on the high BMI side, Will this harm my baby? yes” Ann, midwife ultra-sonographer

However, the possibility of women worrying about their pregnancy and the health of their baby as a result of health care professionals being open and honest about risk was raised by focus group participants who felt this could make the dietary intervention less acceptable to women.

Health care professionals reflected on the different types of relationships that might be developed with a dietitian as opposed to a midwife, especially in terms of the benefits or otherwise for talking about weight and healthy eating. As midwives are more likely to have an on-going relationship with women and see them more regularly over a longer length of time, focus group participants felt that midwives might not be so comfortable talking about weight for fear of undermining any good relationship that had been developed with women. Dietitians were thought to have a different, intermittent sort of relationship with women as they typically see them less regularly than a midwife. As well as perhaps being more comfortable talking about weight and healthy eating, focus group participants felt that this less enduring relationship may enable women to be more honest with dietitians, for example, about what they ate.

“It doesn’t really matter if they’re [the dietitians] judging you or what they’re thinking about you because, actually, you don’t have to particularly perpetuate the relationship”. Nelli dietitian

The focus group participants also acknowledged that the distinction in the relationships between dietitians and women and midwives and women may also be a result of the fact that women were participating in research. Women had to provide informed consent to take part in the study and had time to fully consider whether they wanted to commit to taking part in research about healthy diets and weight through the recruitment process. They would have been aware that they may be going to see the dietitian and that they would be asked some questions about their diet.

There was significant discussion in the focus groups about the extent to which women were able to be honest about what they were actually eating with health professionals involved in ESTEEM. Focus groups participants reflected on the relative power and control held by health professionals compared to women. They highlighted how some women may fear their situation being flagged up to other specialists, if they did not conform to all the aspects of their ESTEEM diet, suggesting that this fear may lead women to be less likely to tell the whole truth about what they were actually eating. Embarrassment was also cited as a reason why women may not tell the whole truth.

“So you [the woman] may feel judged or you may feel bad because you know they [the health professionals] have that power of escalating and telling other people how bad you’ve been eating lately and what you do and say”.Lara, research midwife

On the other hand, focus group participants also expressed the view that some women did not necessarily feel they had to adhere to the dietary intervention and were not overly concerned about discussing their food habits.

“They just want to enjoy the fact that they’re not stigmatised you know...”I’m large, but I’m pregnant, so I’m going to enjoy the fact””. Maggie, dietitian

Challenges of providing dietary advice to women

The assessment of women’s diet and the subsequent provision of tailored advice around how to eat healthier were key components of the ESTEEM intervention. Focus group participants felt that providing dietary advice within ESTEEM required time, effort and skill in order to fully discuss and understand a woman’s assessment of her own food., noting that individuals may vary in terms of what they understand by a healthy diet.

“I think it kind of takes probing a bit, it also takesa kind of prompting that discussion ...So yeah, the perception of healthy diet is very – to everyone’s own perception. She [a pregnant woman] was “Yes, lots of fruit and veg, I’m doing that” Yeah.” When she may not actually”. Ann, midwife ultra-sonographer

It was felt that it was not always easy for health care professionals to provide tailored individual advice and that there was no perfect way to change women’s food habits. Focus group participants emphasised that considerable expertise and resources are required to achieve this such as having access to interesting, and arresting dietary information which could help women to see the choices available to them.

The practical skills taught on the intervention, such as learning to read food labels, ideas for healthy snacks, and learning to modify menus were, however, seen by focus group participants to be very simple and effective ways to support women to adjust their cooking and eating styles, for both themselves and their families.

Journals and food records were suggested by focus group participants as a way to enhance accuracy and understanding of foods eaten both for women themselves and for the health care professionals delivering the dietary intervention. The act of writing down what was eaten was suggested as a way for women to become more accountable about what they ate. They flagged up that they themselves would be significantly less likely to eat something that they should not have eaten if they had to write this down. Focus group participants suggested that keeping a food journal may also lead to greater self-awareness about what women were eating; on returning to their notes, women could be made more aware of what, and how much, they may have eaten.

The focus group discussions highlighted a lack of previous exposure to information and advice about healthy eating as a challenge to the provision of dietary advice within ESTEEM. For example, the midwives in the focus group highlighted that insufficient time is allocated to providing dietary advice to women in routine antenatal care. This meant that a lot of the dietary information women received during the ESTEEM intervention may have been new to them and therefore less easily assimilated within the relatively short duration of the ESTEEM intervention.

“I think it was hard [to provide dietary advice in routine antenatal care] - it is quite superficial - I think what generally we’re able to do as midwives in that kind of context”
Ann, midwife ultra-sonographer

Similarly, the existing eating habits and preferences that women brought with them to ESTEEM could make it more or less challenging to deliver ESTEEM. Focus group participants discussed the possibility that some women may be neo-phobic¹ in relation to trying new foods, which may lead to diets which contain little diversity. It was highlighted that those who were already willing and able to try new foods may find it easier to follow the ESTEEM diet. Those delivering ESTEEM would therefore need to take account of how open women and families were to trying out the ESTEEM recommended foods and adapt their intervention strategy

¹ The fear of anything new which can manifest as an unwillingness to try new things or break from routines.

accordingly. Focus group participants were aware that earlier intervention in childhood would be necessary to fully support women's adherence to a healthy diet in pregnancy (e.g. early exposure to a variety of foodstuffs).

“And so yeah, they haven't tried things and obviously they've reached that stage in life and have habits and are very likely to keep going without having it ... It's very important to expose your kids into new foods”. (Nelli, dietitian)

In terms of food likes and dislikes, focus group participants recognised that some women would have strong preferences for some foods such as a love of sweet things or an aversion to pulses. They considered these to be resistant to change and felt that advice should be adapted to take account of these.

“It's kind of like finding out what's the value-map for that person and then tailoring the delivery of the advice to them” Maggie, dietitian

Focus group participants suggested that trying out and tasting may be a way of gently introducing women to new foods within the ESTEEM diet.

“It's about being allowed to taste things but not necessarily to eat the whole plate of anything” Maggie, dietitian

“You don't have to eat it, just taste it and next you eat it then taste it again” Ann, midwife ultra-sonographer

It was also highlighted by focus group participants that ESTEEM dietary information and advice was not always viewed by women as reliable and was a reason why women may be less likely to accept some of the dietary advice. Women, they reported, wanted information and advice which they described as “solid”, and they also wanted this to be useful and practical. The dietary intervention was viewed as being more likely to be acceptable to women if they were provided with information and advice which had duly considered women's daily undertakings.

Value of reaching out - learning with other women

Focus group participants reported that women valued the opportunity that ESTEEM offered for them in the group sessions to reach out and learn with other women. The mutual support from other women during ESTEEM was highlighted by participants with consensus amongst the focus groups that peer groups were a really ‘positive thing’. Participating with other women

on the dietary intervention was said to give them space, an alternative health focus and also a diversion from their daily routine. Women were reported to value the sharing and comparing of both their experiences of pregnancy and also of their food, with the intervention offering them a place of social and psychological support. Women were reported to appreciate their discussions together as these were more real and helpful for them, and met their personal dietary needs more specifically.

“Sometimes they come here they take bad news or stressful news, sometimes it’s nice to take the focus off of that and just focus on something else, on food, because they think they never have the chance in pregnancy to think about food as a source of nutrients”.
Nelli, dietitian

The ESTEEM group sessions provided a vital space where women were more able to reach out, communicate with each other and exchange their ideas. The standard way of providing antenatal care was deemed by focus group participants to be less geared to this kind of approach. They pointed out that women participating in the ESTEEM groups may also compare themselves and their progress, gauging their accomplishments against each-other. This may have been a way for women to find out how well they were doing on the intervention. It was discovered by the focus group participants that as women understood they all had different food experiences, they were more likely to share their own tactics which worked better for their own diets, with other women. These interchanges were believed to help women adhere more readily to their diets. Women were also observed asking each other questions which were pregnancy related. The intervention was in this way, of valuable support to women as they reached out to each-other and found solutions to some of their minor pregnancy issues.

“I always see them asking questions to each other like “Did you have that?”, or “How are you dealing with that?”. It’s a good thing to see that there are other people that go through exactly the same things, yes, that you’re going through”. *Nelli, dietitian*

Women’s learning on the ESTEEM dietary intervention was perceived to be made more acceptable by giving them opportunities to reach others to feed-back to, about their eating. It was thought that by speaking to someone about their ESTEEM food and diet, often made women more responsible and mindful about their diets. This appeared to work for women as it seemed to have a confidence-building effect, and facilitated women’s endeavours to make the intervention more acceptable for themselves and their family.

Focus group participants reported that women had a desire to help other pregnant women and that this was a key reason for women wanting to take part in the ESTEEM trial and the intervention it evaluated. Women were reported to be considerate of the health and needs of other mothers and wanted to help other women become healthier and have more positive outcomes for their pregnancy. As women seemed to have had a sense of oneness with other mothers and future mothers, they wanted to participate in research to improve other mothers' health. Pregnant women were reported to be able to understand each other as they had family, health and pregnancy shared interests and concerns.

This theme "Value of reaching out - learning with other women" captured health professionals' perceptions of how women participating in the ESTEEM intervention seemed to compare their progress and gauged their accomplishments by reaching out and, learning from each other. Health care professionals felt that this provided a positive learning experience during the intervention and helped women reach ways and find personal strategies to make ESTEEM work more straightforwardly for themselves. It was also thought that participation in the dietary intervention was more acceptable for women as it gave them a space, an alternative health focus and also some social support, from other women.

Importance of being partner and family friendly

Focus group participants noted that women's decision-making regarding participation in ESTEEM, as well as their shopping, cooking and eating, were as likely to be influenced by their partners. They reported that family support could be key to women starting the dietary intervention and sticking with it. They also believed that women's diet may be affected by how much autonomy they had at home.

"They are searching on the internet, they find information, but when they go home culture is not leaving them to change a lot of things". Val, Research fellow

Research midwives in the focus groups reported that partners were not always willing to participate in the ESTEEM dietary intervention and that in some cases, the decision about whether women would participate in the ESTEEM diet was made by partners. Once women were taking part in the intervention, focus group participants were aware that some did not like the foods recommended by the ESTEEM which made it difficult for women to stick to the diet. Although women's partners were invited to the ESTEEM group sessions, health care professionals indicated that they did not always attend.

The ESTEEM intervention materials for women were tailored for their appropriateness for particular minority ethnic groups (e.g. women of Bangladeshi heritage) and with provided recipes adapted and made culturally relevant. However not all ethnic groups were catered for despite women being told that they would receive culturally adapted menus and when this did not occur, focus group participants reported that women found some recipes less attractive and less suitable for themselves and their families.

“Because some of the recipes written by Jamie Oliver they were in their language so they benefited more than the other people like the Bengali and doing the chapati things so they were in their language so it was easy for them to follow these recipes whereas other people like the East European told there was no recipe yeah”. Sandy, research midwife

Focus group participants reflected on the fact that the extent to which the meals prepared on the ESTEEM diet were family-friendly was somewhat dependent upon women, as they usually did the cooking. In many cases, it was therefore almost by default that the family joined in with ESTEEM and commenced eating the intervention foods. Focus group participants also pointed out that the provision of ESTEEM supplies made it easier for women to make some of the dietary changes for their family.

“She’s the one doing the cooking, it will definitely affect the whole family because she will start cooking with olive oil and adding nuts into the, you know, the meals, some of those things, she’s the one cooking, yes” Pat, research midwife

Equally, this may also lead to a perfunctory participation in the ESTEEM diet if the partner and family are not actively involved in it. In addition, it may be less likely that the family would continue on the diet, long-term.

Some of the challenges which women faced in the home impacted upon how easy or how difficult it was for them to provide ‘ESTEEM-friendly’ and ‘family-friendly’ menus. Focus group participants reported how mothers had to take account of their children’s food likes and dislikes when they incorporated ESTEEM changes into the family diet. Some families were reported to present additional challenges if family members had compounding health problems

and/or specific dietary needs. This may make it more demanding for women to find family-friendly, ESTEEM, dietary choices.

“If you’re living in a family structure where obesity is a big problem, or diabetes is a big problem, it’s very hard to – one person to change, within that family construct, if you don’t have the support there”. Maggie, dietitian

The possibility of preventing childhood obesity and improving children’s health were viewed as valuable characteristics of the ESTEEM dietary intervention by focus group participants. Many references were made by health care professionals to children’s dietary and health needs, particularly in relation to childhood obesity and the risk of diabetes. As well as this, they noted the importance of introducing children’s food and cooking education early on in life. This, they speculated, may lead children to have more interest in, and, a greater passion for food, and, would also have significant impact on the family-friendliness of the intervention.

Health care professionals also observed that a number of women participating on the ESTEEM intervention were at home for the greater part of the time, occupied with childcare. They witnessed the demanding schedule which women may face on a daily basis which could undermine their efforts to adhere to the dietary intervention.

The theme described in this section “Being partner and family friendly” captured health care professionals’ view that to gain partner and family support it was important that ESTEEM was as partner and family friendly as possible. As women were often the ones doing most of the cooking in the home, they had to be able to cater for a broad spectrum of needs within their family. Mothers had to take account of what their children were in the habit eating when they introduced different flavours and foods. They also had to consider the health problems that other family members may have, which may further complicate the introduction of some ESTEEM dietary changes to the family.

Exercise and walking

The ESTEEM intervention materials and advice recommended that women take part in physical activities such as walking. Focus group participants felt that women had taken this on board and were participating more regularly in physical activity. Walking was reported to be

more accessible and simpler for women to do. Women reported to health care professionals that this impacted positively on their digestion and also upon their sense of well-being. Focus group participants highlighted how they felt that women had become more aware that walking was exercise, which led them to view walking in a different light, as a valuable form of exercise.

“They could just walk and they didn’t need to go to the gym....It was really an eye opener to most of the women”. Sandy, research midwife

The family and wider social network of women was seen by health care professionals as key to both directly and indirectly increasing the amount of physical activity engaged in by women as part of their ESTEEM plan. Even if women would not immediately or independently participate in walking or physical activity, little reinforcements from those around them, promoted participation in these activities by women.

“If she is a young mom and then there is somebody older at home who is maybe going to, who goes to the gym. So it’s gonna, it’s not all negative to they will be some positive, know, prompting, prompting, from the house that will help you” Sandy, research midwife

Changes in physical activity and participation in sport by others in the home also supported changes in women’s own physical activity. Focus group participants believed that if other family members such as partners were active this may influence women and they may be more likely to start or join in and try some physical activities themselves. Couples, they reflected would then be more interested in developing a healthy lifestyle together.

“I think there’s also a lot of, uh, sometimes they connect better with their families and their husbands, for example I’ve seen a lot of women that., whose husband decides to have an intensive gym regime, so it actually works quite good for him, that the woman is careful with her diet as well”. Nelli, dietitian

Women’s levels of physical activity during the ESTEEM intervention may also be influenced by their cultural background. It was noted by focus group participants that some pregnant women were discouraged from doing housework by other family members. Women were advised to rest, which may lead women not to do exercise when pregnant.

Women, generally, were described as being positive about engaging with the physical activity recommended by the ESTEEM intervention. As exercise was seen as being part of the whole intervention, women were thought to be more likely to engage more fully with the dietary

component of ESTEEM if they were also exercising. This may enhance the value of the intervention for women through seeing the benefits of both the diet and the exercise.

Summary and conclusions

Focus group participants' views and experiences of ESTEEM covered the importance of the relationship between women and those delivering ESTEEM in terms of building trust and credibility and power relations, the various challenges for dietitians in providing individualised dietary advice, and the importance of ensuring that these kinds of dietary interventions are as family friendly as possible to enable partners and other family members to support women. Themes were also identified which reflected health care professionals' views about which aspects of ESTEEM seemed to be particularly effective and of value to women such as the opportunities offered to connect with other women and raising awareness of what activities can be considered to be forms of exercise such as walking. Overall, women's experience of the ESTEEM intervention was reported as positive by health care professionals and they felt that women drew benefit from the diet and felt better whilst they participated.

A key message from the focus groups was that the provision of individualised advice requires appropriate levels of skills and time and that there were limits to what the ESTEEM dietary intervention could achieve on its own. This was partly related to the level of previous exposure to information and advice about healthy eating and the various food preferences that women brought with them to the intervention. There was a recognition that earlier intervention is needed to encourage a broad and varied diet to encourage engagement with dietary interventions throughout the life-course. Children need to have early-life, varied and healthy, food encounters.

Another important point of interest was that health care professionals observed women enjoying sharing pregnancy experiences and dietary accounts with other women as they participated in the intervention. It appeared that being able to talk about their own concerns may give women a sense of community and togetherness. As women already had metabolic risk factors in pregnancy, additional support and information at this time may be particularly needed.

It became apparent to health care professionals that food is a social and family matter and must be viewed within the family context to enable change in dietary behaviours. To be acceptable

and effective, dietary interventions may need to include partners and children in recruitment as well as during the intervention in meetings and activities as more involvement may lead to greater acceptance and therefore better long-term adherence.

The findings from the third phase of my study complements those from the first two phases focused on pregnant women and their partners. The contributions from the focus groups with the health care professionals supported the findings which emerged in the first two phases, in particular the individual nature of women's dietary needs and the need for partner, family and social support. A comprehensive scheme which includes consideration of the above is needed to achieve ongoing and real dietary transformation for all. Earlier intervention and children's needs were mentioned as requiring particular consideration to support interventions during pregnancy. The following chapter will consider in more detail the findings of all three phases together in a critical discussion. The discussion concludes with recommendations for future practice and a final statement.

Chapter Eight: Discussion

The focus of this thesis was on reducing metabolic risk factors for pregnant women through dietary interventions. The primary research I conducted examined the views and experiences of participants and providers of the dietary intervention developed and delivered within the ESTEEM trial. The collective interpretation of the study findings involved an integrative process of three parts enveloping the findings that emerged from my thematic analysis of the women's interviews, partners' interviews and health care professional/researcher focus groups. The previous three chapters have presented the findings of the analysis and interpretation of data based on these. In this chapter, I summarised my principal findings, then I discussed the implications of these in the context of existing theory and evidence, and how my work added to the knowledge base. I compared my study to previous work, and explored any differences with these.²⁰² Next, I comprehensively examined the strengths and weaknesses of my study with equal emphasis.²⁰² I then explained the implications of my findings for practitioners and policy-makers avoiding "unjustified" or "overdramatic" conclusions.²⁰² Finally, I have discussed the implications of my thesis for research and made recommendations for future work.

The focus of this study was about reducing metabolic risk factors for pregnant women through dietary interventions. My main empirical work contributed to the literature by using qualitative methods. These were used to explore women's, their partners and health professionals' views and experiences of the intervention, delivered as part of the ESTEEM trial. This trial was designed to evaluate the impact of a dietary intervention for pregnant women with metabolic risk factors on pregnancy related outcomes. In the systematic review of trials of this type which I conducted for the thesis, there was little use of qualitative research to complement the quantitative findings. My study therefore makes an important contribution to what is known about the acceptability and feasibility of diet and lifestyle interventions for pregnant women from the perspective of women themselves, as well as partners and health care professionals. Little research has been carried out on the role of partners within these types of dietary interventions. This research then also provides important insights about the role of partners that are unique within the current literature.

8.1 Summary of the principal findings

A comprehensive exploration of the views and experiences of a dietary intervention within a specific group of pregnant women - those with metabolic risk factors, was carried out. Using an interpretive approach, I identified a diverse set of themes which captured how women were able to engage with a dietary intervention. Women's views and experiences were shaped at the individual level (preferences, beliefs, motivation), social level (family and wider social support networks) and the wider environment (e.g. availability of healthy food locally, cultural and social norms). I have briefly summarised the key findings of the systematic review. The subsequent sections considered the contribution of each of the three study phases to the overall findings of the thesis.

The Systematic review

As noted above, the systematic analysis of trials on diet and lifestyle interventions in pregnancy found that the evaluation of the interventions from the woman's perspective was sparse. Little detail was reported about the methods used to collate or analyse data from women's perspective. In the 24 trials (out of 122) that did evaluate women's perspectives, quantitative rather than qualitative methods were used to do this. The most frequently used quantitative measures included women's intentions to adhere to the dietary intervention, acceptability of information, and women's knowledge and attitudes. The focus of the intervention was on the mother in isolation. Few referred to engagement with the woman's social network, social activities and happenings away from home. There was little mention of the effect of partners and other family members in relation to food and the home.

These findings contrast with the recommendations for behaviour change interventions. Health belief models and behavioural change theories emphasise the importance of social support and family involvement. They implicitly measure intermediate processes and outcomes such as belief and attitudes, self-efficacy and motivation. Recommendations for the development and evaluation of complex interventions propose that qualitative methods are used alongside quantitative methods in evaluations of this kind. The ESTEEM trial therefore provided a unique and rare opportunity to use qualitative methods to explore participant and health professional perspectives of an intervention. As the intervention encouraged partner support and engagement, the intervention could be used to improve our knowledge of these.

Contribution of the findings from women's interviews – At an individual level

Women engaged with the intervention in the main because they thought it would benefit their pregnancy. Women were aware that their pregnancy was at risk. Women engaged with the

intervention initially because they saw a need to do so and viewed the intervention as a way of improving their health. They also recognised the potential advantage of this for their baby's and their family's health. Women may not maintain a diet following their pregnancy if this motivation is absent. For example, if the diet was believed to mainly control blood pressure and diabetes, women may not see any need to continue their diet outside of pregnancy.

Women frequently had early-life food preparation and cookery experience. This enabled them to engage with the ESTEEM foods and provisions. They were then able to adapt these to their own way of cooking. Others who had not had these opportunities or lacked interest in cooking were not able to cook some of the ESTEEM foods. They were not able to make certain foods "interesting". Foods such as vegetables and fish were mentioned as being difficult for women to incorporate as part of their diet. Despite this, women were able to find ways which enabled them to maintain the ESTEEM diet such as using their ability to plan. Some women would describe themselves as "planners". On occasions, some obstacle would also work against this. Women's working life, although busy and demanding, gave a certain structure to their day and they were able to plan around this. On the other hand, women found the period of maternity leave to be a time that was hard for them to manage their diet. They found it difficult to adhere to the diet at this time.

Women were attracted to some of the foods provided during the ESTEEM intervention. This assisted them to adapt their diet and introduce other foodstuffs. On occasions, women found it difficult to make their contacts and plan the ESTEEM diet. This meant that they did not have the benefit of the interaction with the dietitian. They also missed the contact with other women participating on the intervention. The fact that they ran out of the ESTEEM provisions further affected their cooking and their diet. This additionally had an impact on their motivation. Women then doubted the effectiveness of the ESTEEM diet and questioned the value of the effort they were making.

The conditions and the context under which the salience of health and well-being benefits of different foods can either support or undermine adherence to the ESTEEM dietary intervention was revealed. Women relied sometimes, on what they thought was right and managed and negotiated their own situations. As women already had metabolic risk factors, they became particularly conscious of these during the ESTEEM intervention. This made them more anxious. At the same time, they looked for more information to better understand their own situation. Not all explanations women received were fully understood. Some information given

to women was not in keeping with what they believed and thought to be correct. Their decisions were not all in keeping with evidence-based maternity care. Women made decisions based on what they considered would be good for themselves and their baby.

Successful adherence to the ESTEEM intervention emboldened women to carry-on with their diet. When results were observable, such as weight control or normal blood-pressure limits, it was easier for women to adhere to the ESTEEM diet. Women viewed walking twice a day for around 30 minutes positively as this improved their digestion, sleep and sense of well-being. Many women commenced walking during the ESTEEM intervention and started to view walking in a different light, and as a valuable form of exercise. On the contrary discouragements in the form of nausea, ill-health or bad news about their pregnancy, prevented women from being able to devote their attention to their food and prioritise this. Their engagement with the intervention then became jeopardized.

Contribution of the findings from partners' interviews – At a family and social level

The family strongly influenced women's decisions, particularly their partners and children. Women were able to plan and adapt their food and used ESTEEM to their own and other family members' advantage. During the ESTEEM group sessions, knowledge of the ESTEEM diet was reinforced and discussion of the couple's preferences took place. The partner then became engaged with the diet. The learning activities carried out by the couple promoted their involvement in planning, shopping, preparing and cooking of food. In addition, women appreciated the sharing of similar experiences both of their pregnancy and diet. ESTEEM provided a space of mutual support where women were able to share experiences and support each other. Children responded well to the ESTEEM changes in their diet when these were made. Some mothers said that small children adapted well. Mothers were referred to as being more in contact with children and therefore assumed the responsibility of preparing and cooking their food. Nevertheless, partners saw the need to be a role model for their children.

The ESTEEM intervention appears to have engaged men to take part through its holistic promotion of healthy diet and exercise. However, it is important to note that some partners ideas around what constitutes a healthy diet were not always in keeping with the recommendations of the ESTEEM intervention. This could have had a negative influence on the women taking part. Partners reported being motivated to commence the ESTEEM diet, but that they needed support to be able to continue with it. They were able to benefit from other aspects of healthy eating such as mealtimes and portion size.

Contribution of the findings from focus groups - At a wider level: cultural, environmental

It appeared that being able to talk about their own concerns gave women a sense of community and togetherness. As women already had metabolic risk factors in pregnancy, additional support and information at this time may be needed. There was also a recognition that earlier intervention is needed to encourage a broad and varied diet to encourage engagement with dietary interventions throughout the life-course as children need to have early-life, varied and healthy food encounters.

Women and partners wanted tasty and good food which was in keeping with their family and cultural expectations. Interestingly, men spoke for their partners, they ate similar foodstuffs and partners enjoyed the same meals. Fitting the diet in with family traditions and involving children and partners was not always easy to do. Activities outside the home influenced food and eating. The cooking environment and access to shops influenced the accessibility of food, and the proximity of large numbers of fast-food and convenience foods was also a temptation mentioned by partners. Furthermore, gatherings, workplaces and schools also influenced the diet of women, partners and children.

8.2 Discussion and critique of the theories and assumptions written in to the design of interventions in the light of findings

The findings of my work link with several theoretical concepts within the health profession and related more broadly to dietary change, society and women's roles. Education and learning were also key to implementing dietary change, therefore I also drew on ideas from this body of literature. In this part of my work I re-examined theories set out in chapter two, in the light of learning from the findings, to show the analysis and contribution of knowledge made by this work.

The findings show that although ESTEEM had built on learning from prior intervention studies, the intervention still has limits. The limitations of common theories and models (please see chapter two) like HBM and TRA show that other theoretical perspectives are needed so that these limitations are addressed. Early on in my research, I became aware of the need to ensure that women were informed and enabled to engage with ESTEEM in a way that was suited to their own dietary, health and family situation. The multi-layered complexity of the women's personal and social environment and the historical primary focus on biomedical models of the provision of maternity care has meant that dietary interventions have mainly attempted to consider these issues within the constraints imposed by a biomedical focus on the woman's

risk status. As well as this, health theories have been used (please see chapter two) which do not take into account women's social context (discussed further below). I see that situating this study within a social-ecological framework would enable an alternative view to be explored. A view which would be sufficiently reflexive was required to allow the complex interaction of dietary intervention factors to be grasped.

8.2.1 Adult learning theory

Adult learning theory provides us with some explanation about how the processes required to adapt and understand information provided during the ESTEEM dietary intervention may have occurred. The ESTEEM intervention entailed accurately assessing women's planning, shopping, preparing, cooking and eating of food. Women's own ability to use and adapt the provisions according to the requirements of the ESTEEM plan had to be carefully determined so that their needs could be met. The intervention also required developing support strategies for women so that their learning was built upon what they thought, understood and had experienced personally, about their food. The consequences of not finding out what women knew, experienced and understood was that some important attributes of the intervention would not be benefited from. The dietary plan and the activities required for its success would not be realised. This meant that women would not be able on these occasions to engage fully with the intervention. Those delivering an intervention need to be skilled and cognisant of the abilities, attitudes and awareness of women towards preparing, cooking and eating food. The dietary plan had to fit with the experience of the woman. There were occasions where women's situations were not entirely dealt with as some women reiterated "being told" what to eat and how to manage their diet. To fully appreciate the woman's point of view and her understanding of the components of the ESTEEM intervention greater emphasis should be put on asking women how they perceive securing the various requirements of an intervention. This would allow women to draw on their experience and apply their learning.^{107,108} Their readiness to assume new roles and their motivation to learn would be gratified.¹⁰⁷ I contend that women have aspects of learning, problem-solving, skills acquisition all of which are called upon in life circumstances or life transitions (adapting to a diet, adapting to pregnancy).²⁰³ I further contend that activities such as these have not only personal but cultural meaning and are related also to health, life satisfaction and which connect individuals through their shared interests.²⁰³ Meaningful participation in the intervention provided women with a sense of scaffolding as they envisaged how engagement brought them increasingly closer to their ideal of pregnancy and family health.

The provision of individualised advice requires an appropriate level of skill. This is partly related to the level of previous exposure to information and advice about healthy eating and the various food preferences that women brought with them to the intervention.²⁰⁴ Haby and colleagues²⁰⁴ carried out a study in Sweden, a lifestyle intervention at primary care level, to reduce gestational weight gain in obese women. Women were able to control weight gain. The ongoing visits, dietary adherence and accomplishment of the set physical activities correlated significantly with gestational weight gain. As in the ESTEEM trial, the ongoing support from the dietitian was reported as being key to the success of the intervention. This is reflected in other studies that also report women's need for a strong sense of emotional, instrumental and informational support. This is often found in their primary sources of social support.^{32,160} Ongoing support is therefore key to effective change of the individual's behaviour and to their engagement with a dietary intervention. The findings here showed that ongoing, consistent advice and support was key to the success of ESTEEM and this allowed women to engage more fully with the intervention.

8.2.2 The usefulness of health theories

Diverse and sometimes conflicting existing theories and models of behaviour and behaviour change provide some crucial and shared insights into my findings. These may be used to inform health professionals about ways to promote sustainable dietary change and improve peoples' health behaviours. Individual and socially focused theories of behaviour and behaviour change are quick to identify the social gap within these.¹³⁵ However, these analyses should not automatically be rejected for this reason. Individual models of behaviour may be strongly intuitive, evident and explicit, especially when considered against the somewhat obscure and diffuse impacts of social structures which are often very difficult to discern. It is however clear that individual agents do play some significant role in deciding upon or choosing their behaviour. All the same, most models of behaviour change that concentrate on individual cognitive processes and decisions greatly underestimate the impact of the social contexts of people. This seems to be mainly due to the complexity associated with measuring social factors.²⁰⁵ There is a tendency to treat society as being peripheral, or unimportant, which may bring individuals to a decision-making process, but which is not seen as part of the mental effort that constitutes that process. Social influences and situations undoubtedly play a role in defining people's behaviour, whether viewed as a pressure felt and dealt with, by an individual, or, as a framework which automatically forms and determines a person's actions. Society clearly does have an impact on the agency or power of the individual.¹³⁵ As well as the internalised meaning

that women and partners place on engaging in ESTEEM food occupations the outward demonstration of adapting their diet and reclaiming a new vision of food within the family and social environment and beyond is of key importance for them. The results of this study strongly support the applicability of a socially-inclusive approach. Further exploration is needed as to how socially-inclusive approaches may be driven forward.

Theories are not always considered useful or effective in relation to planning and designing the type of intervention that will lead to behaviour change.^{135,205,206} Even so, using theory to explain and predict likely behaviour may be a useful way for identifying some of the influences on behaviour and to direct change more effectually.²⁰⁶ To be successful, interventions must address both the individual as a decision-maker and the wider social context in which the person lives. Consequently, multiple interventions and/or multi-component interventions are likely to be needed to promote effective and sustainable new behaviours. This is exemplified in the body of evidence about interventions affecting dietary behaviour. This type of approach has the capacity to modify individual decisions, through the material context in which people live. Properly coordinated initiatives would have considerable potential to influence diet and behaviour change and these could be used by the health sector. This stance would have the potential to transform metabolic disorders of pregnancy and other long-term disease such as obesity, diabetes, high blood-pressure and arterial disease. There are opportunities for the healthcare sector to engage stakeholders and promote the adoption of sustainable dietary management behaviours. My study highlights the potential difficulties in changing stakeholder behaviour in circumstances where they do not perceive or have a problem, or where a problem affects them only indirectly or at some point in the future. The latter point is especially relevant to dietary change as the threats posed by this are often distant and somewhat abstract. Women are motivated to adhere to their diet when they perceive risks for themselves and their baby.²⁰⁷ At other times, women are not able to see the advantages of adhering to dietary change, and, on top of this, may perceive the effort required to do so as too onerous.²⁰⁷ The change of dietary behaviours in pregnancy is complexified by these numerous influences, as demonstrated in this study.

Change in dietary behaviour is more likely to occur and to be sustained as the amount of contemplation about it increases.¹⁹⁹ Social practice theory requires critical reflection in order to appropriately understand behaviour and understand what drives it. It was evident that many of the components of the ESTEEM (groups, partner support, recipes) for example, stimulated contemplation and through this engagement resulted. Interventions need to create situations

and processes where individuals, families and groups reflect critically on what they do and, within the context in which they act.

8.2.3 The notion of control within health theories

Many health theories comprise the notion of control. ^{112,128,131,132,208} If a person believes themselves to be unable do something, whether due to their perceived, limited, individual skill or knowledge, or to constraints within their environment, or if they feel that another action is easier, they are unlikely to do it. Evidently, how doable something is, relates in many ways to how widespread it is across society, and, how much this is recognised or practiced. ²⁰⁸ Interventions must exploit both the perceived and the actual achievability, or, “doability”, of sustainable behaviours, so that these can be attained by people. Sustainable health and dietary behaviours need to be promoted as both attractive to the person and be viewed as socially acceptable to them. Interventions must be doable. This can be achieved either by leadership or by example, thus removing barriers and facilitating change and innovation. New or proposed behaviours must be meaningful and effective for individuals. My findings link with the concept of control as it was distinctly apparent that women valued planning and practicality and that the dietary intervention had to be doable for women in their personal and family context. More than this, many of the key themes described in the findings from women’s and partners’ data highlighted the need for them to be able to find attractive ways to make food which fitted socially. The notion of control was implicit in the findings which showed that men wanted to master cooking skills, and thought that by improving diet they would acquire better health and be able to control their well-being. They also viewed the ESTEEM diet as a way of being a role model for their children. ESTEEM provided a mechanism by which women and partners were enabled to regulate and check their diet and influence this using the means proposed by the intervention.

8.2.4 Threat, risk and problem-orientation of health theories

Some health theories identify threats or risks as having significant influence on people’s health behaviours. ^{135,205} Others are more problem-oriented. ¹³⁵ Most theories identify these as some sort of signal to behave in a certain way or to change behaviour. At the very least, they may be a cue to reflect on behaviour. In order to influence behaviour, threats or problems need to be understood by individuals. They must see the real need for change of their behaviour. They must also have the capacity to have an impact on their health outcomes and on their lifestyles, in order to be able to change these.

Women viewed the risks and benefits of adhering the dietary intervention as having to be balanced against the risks and benefits of feeding themselves and their family within their own material context. Clearly, it was not the severity of their metabolic conditions, but the woman's own perception of their personal situation, pregnancy and health which took precedence. All of these influenced the women's engagement with the dietary intervention. It was the way in which women saw the risks and benefits and the way in which they perceived and/or accepted the information, advice and components of the dietary intervention that impacted strongly upon their engagement with this. Women demonstrated that during the early stages of the dietary intervention they had to perceive its benefits. Support in the early stages to develop and foster engagement requires consideration. Women were engaged early on in the dietary intervention due to the many inducements of food supplies, support from dietitian, one-to-one and group support. The presence of the partner was also key to contributing to what women saw as the benefits of engaging in the ESTEEM diet.

Interventions, or new behaviours, need to effectively address peoples' perceived threats and problems, as recognised by themselves.¹¹⁸ Change and solutions then, must focus on tackling these perceived threats, risks or problems. These need to be explained and communicated in a suitable and a meaningful way to women. Consideration of the dietary intervention can also be supported by understanding where the specific attributes of self-determination align with the broader context of diet and health. Understanding the complex nature of food, health and society will enable health care professionals to better address personal and family needs, in order to more effectively respond to these.

8.2.5 Dietary change and high-risk pregnancy

The commencement of a different diet in pregnancy results in a significant lifestyle change, besides the transition of pregnancy. Moreover, women participating in the ESTEEM intervention had complex pregnancy needs, due to the presence of metabolic disorders. Additionally, most women were working and as well as this, many had small children in their care. The mothers in this study experienced significant disruption to their lifestyle, routines and identities. Being a mother resulted in the superseding of other roles and pursuits.²⁰⁹ Different routines were engaged upon in order to allow the women to provide for and feed their children. This was prioritised above their own needs and even, their own food. Women found ways to fulfil their many obligations. Women were adaptable and although they had many imperatives and had envisaged a lot of the new demands, necessitated by participating on the intervention,

sustaining the ESTEEM diet still required significant effort and time. The extent of this role change relates to the changed demands and the imbalance that motherhood entails.²⁰⁹ As well as acquiring a new or more demanding role mothers may feel disconnected and experience difficulty in successfully negotiating the many significant disruptions to their routines and lifestyle.²⁰⁹ The added difficulties faced by at risk women means that they require more support to develop strategies to improve their health, well-being and subsequent role satisfaction.

Antunes Wilhelm et al²¹⁰ found as I did in my study, that women who face pregnancy risk become vulnerable and are afraid of what may happen to themselves or their offspring. Fear permeated their life during pregnancy, to varying degrees, causing them to lose their peace of mind. Although it is common for pregnant women to feel fearful and question their health status, in a high-risk pregnancy these feelings may be more marked. Antunes Wilhelm and colleagues went on to highlight the importance of health care professional's responsibility to provide extra emotional support to such pregnant women.²¹⁰ Furthermore, they urge professionals to take women's previous experiences and familiar practises into consideration when caring for them. This then allows women to find personal and fitting ways to adapt their diets.

Alongside fear, anxiety was frequently present in the interviews of ESTEEM participants as a common emotional factor. This was also found in another study which was aimed at understanding high-risk women's experience of pregnancy.²¹¹ The women interviewed expressed fear, anxiety and distress on hearing they were placed in the high-risk pregnancy category. Being classified as high-risk disturbed women and was seen as being serious and complex. In these situations, women felt they had little control. Women it was said, feared what they did not know. A lack of information about high risk pregnancy and a feeling of loss of control due to their pregnancy, compounded women's fear and anxiety.²¹⁰ These feelings are relatively common in high risk pregnancy. Anxiety is part of the transition to motherhood, and women's feelings often fluctuate between fear and joy.²¹⁰ Feelings of fear and anxiety experienced during a high-risk pregnancy can be alleviated by fully informing women about their condition and the care they receive.²¹¹ To achieve this, enabling proper dialogue is a major part of the health care professional's role. Facilitating women to express their doubts and fears is central to establishing a space and an environment where the care is provided is personalised and supportive, and allows women to feel more relaxed.²¹⁰ Creating an environment where women can be receptive to information and able to consider change, improved their ability to adapt within their own personal and family situation.²¹¹

8.2.6 Embodiment, women and pregnancy

The concept of embodiment applied to parts of my study, to women's experience of pregnancy. ²¹² Turner states that embodiment is a "life process". ²¹² It also requires learning of body techniques, such as walking, dancing, eating. It is said to be the collective bodily practices "which produce and give a body its place in everyday life". ²¹² (P. 71) Looking at the process of embodiment through the lens of interactionism, Neiterman ²¹³ refers to embodiment as being the inseparable transformation of body and self, saying it is difficult to determine between the body of a person and the interactions that make up the person. The body is indistinguishable from the process of embodiment. Others ²¹⁴ perceive that the interactionist abstraction of the body is always social, and is constructed by means of social interactions. Drawing on work by Schutz ¹⁷⁰ and Merleau-Ponty, ¹⁷¹ "the phenomenological body" discovers the meaning of the world via the detailed description of the lived experience. "Bodies of meaning" are created by human actions and also by the interpretation of these. ²¹⁴ (P. 9). The analysis of women's experiences of pregnancy as a process of embodiment shows how women experience their transition to motherhood in relation to medically established norms of pregnancy. Evidently, biomedical notions about pregnancy and reproduction shape women's experiences of pregnancy. In my study there was resonance found in the words by Frederick ²¹⁵: "These women's experiences illuminate the normalcy project as a central tenet of scientific motherhood." (P.74) Furthermore, I argue with her that "these women are labelled "risky mothers" under scientific motherhood, which prizes the management of risk...(pregnancy)" ²¹⁵ (P. 74)

8.2.7 Stigma, guilt and good motherhood

Women participating in the dietary intervention made enormous effort to fulfil their role as partner, yet were very mindful of the needs of their children. Frederick (above) contends the manifestation of a scientific motherhood, whilst work by Damaske claims there has been a societal shift towards intensive motherhood. ²¹⁶ This concept also resonates with the findings of my study. Total motherhood is proposed as a more suitable category by Wolf to describe the present norms of motherhood. ²¹⁷ The demonstration of maternal sacrifice remains constant, even when other conventions and concerns change. ²¹⁸ "Anticipatory motherhood" can pose many limitations on women's lives but these can be defended through the notion of maternal sacrifice. ²¹⁹ Chambers ²¹⁸ points out that women are expected to conform to pregnancy rules and not doing so undermines women's position as good mothers. Pregnant women's behaviour

is visibly observed in public. In the present study maternal ability also links strongly with maternal perceptions of competence.

Equally, many other authors have highlighted the concept of good motherhood. This includes ideas of selflessness and sacrifice. Chambers²¹⁸ points out that the growing number of restrictions placed on pregnant women is frequently presented to them as choice. However, the choice is presented as the option of taking risk, or, being a good mother and safeguarding the baby. Women's position is seen as having lesser importance than the developing baby and having responsibility for any adverse pregnancy outcome. The responsabilisation of pregnancy and motherhood for the health and well-being of the baby does not take account of any structural issues.²¹⁸ Women may live in poverty, or, women may live independent lives. Women are supposed to consider eradicating anything likely to be a risk to pregnancy despite the impact this may have on their own lives.²¹⁸ Likewise, the heightened awareness of maternal stress implies that women should check and control that they are feeling the right emotions.²¹⁸ And although it continues to be important for women to be good mothers, the actual feat required to achieve this position is not fixed. Some shifts and twists in the variation of requirements for good motherhood have been mentioned above. As stated by Hays in 1996,²²⁰ the trend was towards intensive motherhood, in 2008 Chambers'²¹⁸ appellation was of good motherhood, whilst Wolf in 2011²¹⁷ makes a case for total motherhood, saying this is a more suitable grouping for current norms of motherhood performance. By 2017 Frederick²¹⁵²¹⁵ has employed the term scientific motherhood.²¹⁵ Whether women are forced or are trying to be intensive, good, total or scientific, the pressure, challenges, expectations, stigma and guilt are great. This was clearly evident in the words of women here who described their experience of engaging with a dietary intervention to improve pregnancy outcomes.

Feeding is one of the earliest shared undertakings which occur between a mother and her infant.²²¹ It is one of the first exploits associated with motherhood. This activity is imbued with meaning, due to its socially recognisable occupation concerning mothering. When feeding is affected by things that impact the mother and child's ability to nourish and to develop successful eating habits, maternal competence can be called into question.²²¹ At the same time, satisfying the child and forming routines demands a sensitive maternal response. Maternal aptitude to respond to the child's needs, being soothing and consoling, links closely with maternal perceptions of competence. Mothers in this study were acutely mindful of the needs of their children and prioritised the dietary needs of their children. Women gave precedence to the needs and comfort of their children, and indeed, to those of their partner and family.

The current use of technology during pregnancy does not rank women as being the primary concern of health care professionals.²¹⁸ The emphasis is on the baby. Pregnant women are not at the centre of care. Women's experience of care has been radically changed by routine antenatal screening and the many various assessment procedures.²¹⁸ Although these are presented to women as being a choice, they have enormous impact on the experience of pregnancy. The attention is directed to technology, outcomes and results, and to a much lesser extent on the feelings and experience of the woman. This notion echoes with the findings of my own study. It is assumed that good mothers maximise the well-being of their baby and are selflessly committed to their children. Risk awareness is acute, and the emphasis of women's care is on safety. This makes women responsible for adverse outcomes as it appears, that increasingly, what Chambers describes as "the precautionary principle" is applied to more and more aspects of antenatal care.²¹⁸

Williams and Annandale²²² reveal in their phenomenological study on obesity, stigma and embodiment that the prevailing obesity discourse which emphasises personal, moral responsibility and lifestyle modification actually provokes stigma related to people's weight. Such a tactic is ineffective in reducing the incidence of obesity, and more than this, it appears to foster further weight gain in people.²²² Obesity stigma confuses the individual's objective and subjective experiences of their bodies.²²² People feel heavier when they had been involved in activities associated with gaining weight. However, this weight may not show on the scales used to weigh them. This was referred to by the researchers as the weight of expectation.²²² This indicates the continual ambiguity and, sense of right and wrong that typifies most people's experiences of weight control. It does not help encourage healthy gestational weight gain.

In summary, the theories and concepts from the literature related to this study were key to providing understanding of how women and families engage with a dietary intervention to improve pregnancy outcomes. These also provide useful insights into how to develop dietary interventions which are acceptable to people. Comparing the findings with the existing theory highlights two main outcomes. First of all, the findings were looked at in the light of some core theoretical constructs related to theories of health including health beliefs, motivation to change health behaviour, control and risk. This study provides an opportunity for a detailed understanding of how the experiences of women, partners and health care professionals relate to these constructs. These can be used with good effect to underpin the development of future dietary interventions in pregnancy. Secondly, these research results provide a description of

the process of engagement within a dietary intervention experienced by women at risk. The research results considered the concepts of “Dietary interventions in at risk pregnancy”, “Embodiment, women and pregnancy” and “Stigma, guilt and good motherhood”, providing an opportunity for a detailed understanding of the experiences of at risk women during this dietary intervention. The model that illustrates this process will have applicability to clinical practice (See Figure 7, P. 158). An increased understanding of the process of engagement with a dietary intervention may also have broader population health relevance. Having discussed the theories and assumptions written in to the design of interventions in the light of findings, I now turn to exploring the position of findings within the evidence base.

8.3 Position of findings within the evidence base

The findings of this study link closely with many notions found in the body of literature related to dietary interventions in pregnancy. Challenging the idea that women have little invested interest in participating in dietary interventions, women on the ESTEEM diet purposefully used the dietary intervention to influence their pregnancy health. They varied their food in order to improve what they saw were their health needs. Food is an everyday factor and activity and has health-modifying effects, which require knowledge and attentiveness. Some writers found that women express a sense of loss of control during pregnancy, taking on a more passive role.⁵⁴ In this study, women did not appear to take passive roles. In fact, many decided how to best engineer their situation in order to improve their personal health and achieve their pregnancy and birthing goals. These included their wish to have a normal birth. Women were keeping their weight within normal limits (which enabled them to have a normal birth). It can then be said that dietary means may be used to support women achieve their health aims and their birthing options.

Food and diet may be typically understood as having internal and enduring meaning for people, but my data suggest that it is more shifting, contradictory, and constantly negotiated. My findings agreed with previous research^{52,53} showing that pregnancy is a time when women are motivated to make dietary changes. A healthy pregnancy outcome is a major incentive for mothers. However, research¹¹⁸, also shows that some women were not intrinsically motivated and do not always make food choices for their own health. Although pregnancy is indeed a strong stimulant for positive behavioural change it has also been demonstrated during this life event, that women perceive healthy changes of diet to be “sacrificial necessities”²²³, these are

seen to benefit offspring rather than being pleasurable, and intrinsically motivated, for their own personal health advantage. The problem with this thinking is that change will not be maintained into the postpartum period as it has not been incorporated into the woman's lifestyle or psyche.

There is a need to be aware of the person's underlying beliefs about health. Attitudes, intentions and behaviours are more successfully altered when the person's beliefs are comprehensively understood.¹¹² The range of behaviours involved in purchasing, preparing and cooking food is complex, therefore it is understood that predictive power of the theory of planned behaviour is usually weaker as regards to dietary behaviours.²⁰⁸ Beliefs about food are often part of a broader beliefs system which attempts to order the universe as the society sees it.⁷¹ In the main, these beliefs concern qualities assumed to inhere in the food, which is then able to alter the physiological response of the consumer. The most common food beliefs are those that attribute heating and cooling properties to food.⁷¹ This was evidenced in women on the ESTEEM intervention who referred to being told not to eat nuts as they were hot and therefore should be avoided in pregnancy. In this study, women believed certain cultural practices, for example, the need to cook meat thoroughly. Their beliefs led them to do so. When told to cook food less thoroughly as this destroyed some of its food value, they could not. Not only did this not fit in with women's beliefs, but they became discouraged, as they could not see how they would be able to adhere to their eating plan. As well as this, women varied their diet to keep with what they saw as good, family, tasty and culturally acceptable.

Previous studies have shown an association between locus of control and socio-economic status and diet and lifestyle behaviours. A sense of control was governed by individual socio-economic status where those who considered themselves to be of higher socio-economic status had more control over their present and future health behaviours.²²³⁻²²⁵ In this multi-ethnic and widely diverse sample this was not found. One investigation looked at how pregnant women dealt with advice from their own social network, which contradicted mainstream biomedical advice.³⁹ It was found that although all women faced a misalignment of advice, the ethnic minority groups (Turkish, Moroccan) were found to have misalignment which presented a challenge for them. This then made their decision-making problematic, as they felt they had to heed the advice from their family and social network.³⁹ In my study no such challenge was found and women were able to discuss with confidence the difficulties and barriers they faced within their social networks. They were able to negotiate ways to fulfil their eating plan.

Ethnicity was not an influencing or impelling factor. However, some women did say that they had advice about pregnancy which they heeded during their first pregnancy. In subsequent pregnancies they relied on the information they sought and on their own decision-making ability.

Hromi-Fiedler's study²²⁶ on barriers and facilitators to improve fruit and vegetable intake among pregnant Latinas reports that women received support from family and friends (partners, mothers, fathers, grand-mothers in-laws sisters, brothers) as well as children. This showed that children can play an important part in supporting dietary behaviour change. Social support is a primary factor driving antenatal dietary behaviour change.²²⁶ Feeding children was a main area of preoccupation for parents and providers in this research. In yet another study about the experiences of obese pregnant women it was found that participants said similarly: "I don't want them to have the same issues that I've got"⁴¹ Women make efforts to engage in more healthy behaviours for the sake of their children. In all of these studies women wanted their children to be fit and were engaged with elements of the intervention for their own and for the future health of their children. Future research and interventions must consider how to take account of children's needs as these are the foremost object of women and partner's interest.

Women were proficient in searching and obtaining information in certain areas of antenatal care. They wanted to know and to learn, but also needed to be reassured about their health and the health of their baby. Many studies on behavioural interventions in pregnancy^{54,56} show that information and advice during pregnancy originates from three main sources. These were family and friends, the media and health professionals. Advice about healthy diet and lifestyle seems to be powerfully linked to the views and attitudes of women's own support network during pregnancy. Findings were similar in the present study where women referred to their support networks and social structures frequently. Women in this study spoke in the main of searching and gaining information about health and pregnancy using the media.

A recent review suggested that there is still lack of evidence on how to best deliver physical activity and diet interventions to ethnic minority populations.⁶⁵ Part of the reason may be that ethnic minority populations lack understanding of the relationship between unhealthy behaviour and disease⁶⁵ and therefore may not take part in behaviour change interventions that are not culturally appropriate. This may require wider understanding of how health is understood within certain populations, and the associated health beliefs and perceptions, as this

may be considerably different than the majority. Previous research suggests taking account of cultural norms and individualistic perceptions in interventions, which is consistent the findings of my study.²²⁷

Learning to eat is a mysterious skill to acquire.⁷² We learn to eat mainly without discerning that we are actually doing so.⁷² By the same token, we are not aware when we have learned ways of eating that are erroneous as they have become such a part of ourselves.⁷² This fact, when looked at through the lens of pedagogy, would seem to corroborate the thinking that children can be encouraged to take an interest in food preparation and eating and would also be able to participate more actively in the ESTEEM dietary intervention. As found in a phenomenological study of obese women's experiences of participating in a lifestyle intervention by Petrov Fieril⁵², women perceived that the intervention had instigated other eating habits such as eating an ample breakfast, forward-planning of food, changing shopping habits (buying more healthy options), reducing portion size, eating regular meals and not eating late as night. These changes were also perceived as being less onerous than previously imagined and minor changes in dietary behaviour led to unexpected and successful results such as weight loss.

Many women struggle with their relationship with food and women are ten times more likely than men to be reported as having an eating disorder. This is said to be an issue of self-care, and self-esteem, and self-actualization.²²⁸ A dietary intervention then may be a means to improve women's self-care, increase their self-esteem and help women to be more objective about themselves and their body. The main shortcoming of studying eating as a behaviour under the control of the individual is that it may overestimate the extent to which rational choice influences what people eat. It underestimates the extent to which eating behaviours are rooted in the person's day-to-day living.²²⁸ The individual's eating habits form in relation to other people, those they live alongside, against the daily activities which take place in families and groups. Sometimes eating does involve individual choice, however, it is choice that is conditioned by the context within which it occurs.²²⁸ Social theory provides theoretical explanation for looking at the social nature of food and eating. It provides a way of understanding food and eating as inherently linked to context.

8.4 Summary of Implications for theory

In addition to the discussion and critique of the theories and assumptions written in to the design of interventions in the light of findings of this study (8.2), the linking of my findings to the evidence base (8.3) offers additional, significant conclusions. First of all, regarding food, this study reveals that women have a vested interest in participating in a dietary intervention and that pregnancy provides a valuable opportunity for women and partners to engage in dietary change. Food and diet have shifting, contradictory meanings for people, beliefs about food have substantial impact on the individual's diet, therefore must be taken into account when considering intervention development. Secondly, people's family and social situations have been shown to both positively and negatively influence their dietary intake. Advice about healthy diet and lifestyle is powerfully linked to the views and attitudes of women's own support network during pregnancy and originates from three main sources: family and friends, the media and health professionals. Thirdly, learning to eat is a mysterious skill to acquire, and moreover, people (this includes children) want to learn and develop. Using a socio-ecological approach, I will now explore the transactions that may occur between each aspect of the proposed model (See Figure 7, P. 158).

Social ecological models

As I have established, a broader, family-oriented and socially-inclusive approach is required to enable and ensure the engagement of women, partners and families with a dietary intervention. By using a socio-ecological model I explored the transactions that may occur between each aspect of the model. Focusing on the individual, interpersonal, organisational, community and public policy levels it may be possible for us to identify strategies that could serve to overcome the barriers to engagement and ensure that women are supported during a dietary intervention. The findings from this study show that the concepts derived originated from the many levels of the women's personal health status, their practical approach, their family needs and the social context wherein their food and eating took place. This was situated within the wider political, economic environment and context.

I employed several strands to provide a theoretical framework for my study. Factors affecting engagement with the dietary intervention were viewed through a social cognitive theoretical perspective, application of some principles from adult learning theory and also by viewing social theory, in relation to women and food. By using aspects borrowed from these theories I

was able to examine, via a logic model which provided structure for this, how activities of the ESTEEM intervention influenced engagement. Framing this within a social-ecological model, I was able to provide some ideas to develop propositions for practice. Using the findings, I looked at the ESTEEM intervention and examined this in the light of theory, providing propositions for future interventions of this type.

Many phases of engagement may be needed as people go through dietary change.⁴⁸ Engagement with a dietary intervention involves key junctures. Although Ahlgren's work was carried out on women outside of pregnancy, it has implications for my own study.⁴⁸ This research informs us that engagement in a dietary intervention comprises four phases. These include the "Honeymoon phase", the "Everyday life phase", the "It's up to you phase" and the "Crossroads phase".⁴⁸ In the earlier stages of the intervention, women's experiences were positive, weight loss was noticed and support was prevalent. The following or middle stages of the intervention were characterised by the obstacles they presented. Significantly, the middle stages contained the biggest obstacles to dietary change. The later stage revealed that the home environment was highly influential and was crucial for the maintaining of dietary change or relapse to former behaviours. Some of the ideas here have relevance to my own study. As I considered the implications of the health belief models and theories of health literature, I saw that the above concurred with many notions contained within these. The need for readiness to change and the need to set a personal goal, for example are required before engaging in change, or, are needed to successfully change behaviour.

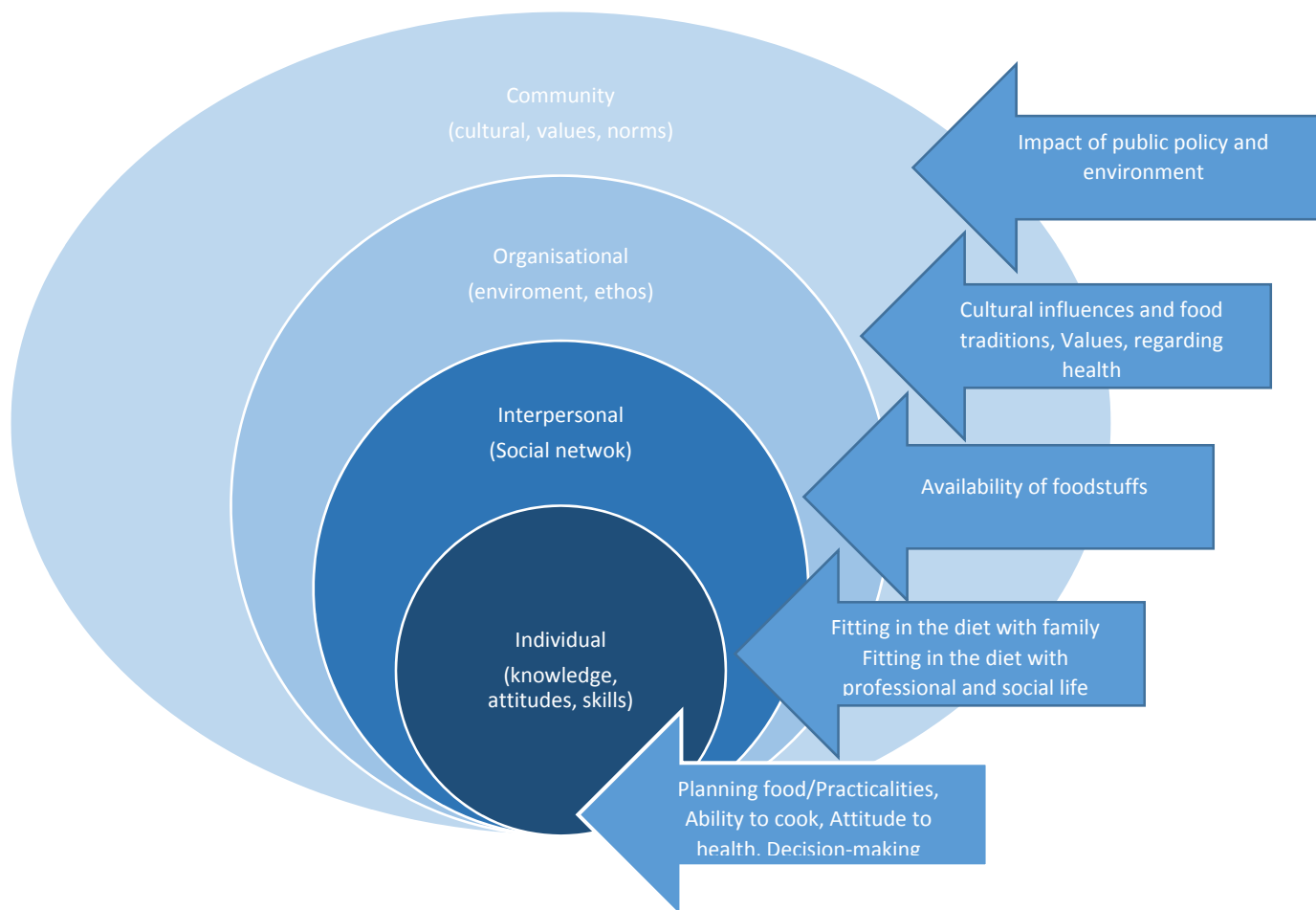


Figure 6. Analysis of the potential individual, Interpersonal, Organisational, Community and Environmental transactions of a dietary intervention using a social-ecological model

8.5 Implications for practice

Interventions for change must also consider the ability of the person to continue and maintain the changes undertaken. Many interventions discuss the ways to initiate change and the drivers needed for change. The way to uphold these changes and find ways to continue are shown in the way in which women demonstrated their need to adapt the ESTEEM intervention to their own lifestyle by finding practical means to do so. Furthermore, my evidence suggests that planning facilitates and sustains the engagement. The practical ways women find require planning. This is implied in the study by Ahlgren,⁴⁸ where, following the initial stages of “Honeymoon” the engagement of women became more onerous and maintenance of the diet became impossible due to many obstacles faced by the women. The planning and practicalities required to make engagement with it enduring no longer materialised. One reason why the ESTEEM diet was appreciated by women was that obstacles were overcome by support from

home, from partners and from the dietitian. This ensured the continuance of the engagement, therefore the regime.

The engagement and continuation of this, with a dietary intervention depends primarily upon whether the person understands the need to change and has the will to do so. Engagement occurs furthermore, when practical methods are found, and food planning is carried out. Women are then able to maintain the dietary intervention. Engagement is an ongoing process and women need both family and professional support. Without these and without the continued availability of her own planned and practical dietary prerequisites women are clearly not able to sustain interventions in the long-term. This is because women prioritise feeding their children. On top of this, partners strongly influence the eating which takes place in the home.

This study shows that we need to understand what people believe about food. It is difficult to capture all the predictors of complex behaviours, including food choices. Food consumption as revealed here, is complex in nature and in reality, involves a number of behaviours - shopping, preparing, cooking and eating.²⁰⁸ All of these need to be considered, when designing and planning future dietary interventions for women. Indirect facilitation and encouragement were shown to be useful, to initiate women's behavior change. Traditional instruction did not always account for the reality of women's situations. Women's inclinations, predispositions, attitudes, knowledge and experience needed better deliberation as these influences and their dynamics must be allowed for. They made the intervention doable or not doable for women. Women-centred and personal information is needed to help women engage more readily in an intervention.

In the research, women tried to maintain a certain activity such as a walk once or twice a day, which was in keeping with the ESEEM intervention. This activity made women feel healthier and they reported that it improved their digestion. Women said that the ailments usually associated with pregnancy occurred to a much lesser extent such as constipation and fatigue, saying that they were generally "feeling better". It seems that many interventions may underestimate the advantages of simple low-cost, accessible forms of exercise such as walking which may easily be integrated into dietary and lifestyle interventions and also improve significantly women's sense of well-being. As mentioned above, initiatives may be organised to ensure a socially-inclusive approach to this which is sustainable

Social-Ecological Models: Opportunities for practice

Examining the different levels of influence, I assert that an approach using knowledge of women's and families' own circumstances is needed to get a sense of how they see themselves adapting their food so that the intervention works at a family level. It is important to let women take control and make suitable plans for their dietary needs and preferences. Insight into contextual factors helps identify what and who influences the effectiveness of an intervention. Perceptions of diet and lifestyle are socially connected and are understood differently by different groups.⁵⁴ The social milieu in which pregnant women live influenced the intervention outcomes of this diet and lifestyle.

Women showed that their diet and lifestyle change was influenced by social network and family members who provided facilitation and encouragement, and this was a factor which led to healthy dietary modification. Out of home situations must also be considered so that women are able to continue their diet when not at home. For this reason, health care professionals and researchers saw that a more inclusive ESTEEM dietary approach, about family, may be more likely to engage members of the household. Education regarding diet was more likely to succeed if it took a family-wide view into account, and would also work more long-term, and better, practically, for partners and families. This would ensure that the ESTEEM dietary needs of the family are met more fittingly. Also, health care professionals considered that both the partners, as well as the family would be more be enthusiastic about their diets.

Appreciating a health need, having a personal goal and support from family and friends are of major importance to the long-term continuance of dietary change. It is also necessary to bear in mind the gender relations which exist within the household. These present a possible obstacle for women engaging in a dietary intervention.⁴⁸ As I continued to reflect on the significance of the health theories, the social-ecological model and the work by Ahlgren,⁴⁸ I conceived a model of change for interventions based on aspects borrowed from these.

Table 12. Emergent themes and suggestions for future ESTEEM and intervention delivery

Emergent theme	Suggestions for future ESTEEM and intervention delivery
Planning food and practical issues	<ul style="list-style-type: none"> • Seek to understand women, partners and children’s involvement as central to the delivery of the dietary intervention. • Pursue and understand which dietary activities are meaningful to women and partners and foster opportunities for their engagement in these. • Ensure training of staff to emphasise the use of problem-solving, question and answer strategies during ESTEEM group meetings. • Increase opportunities for women and partners to ensure frequent and appropriate provision of information. • Ensure provision of supportive items such as food diaries, simplified ESTEEM sheet to note food intake, also appropriate use of goal setting. • Provision of opportunities for women to express their emotional needs and concerns. • Promote opportunities for women to engage with other women to provide a sense of solidarity. • Provision of opportunities for women to celebrate successes (adherence to diet, regular walking, achievement of goals).
Fitting in the diet with family, social and professional life	<ul style="list-style-type: none"> • Seek to position women, partners and children’s involvement as central to the delivery of the intervention. • Promotion of a family-centred design of intervention which provides sufficient support for women and partners to develop and maintain their own diet. • Encourage participation in activities that promote shared understanding of healthy eating styles (eg. group sessions could be

	<p>planned in the evening to include more partners in these sessions. Sessions may also be made available on an optional or booked online basis to increase the flexibility and uptake of these).</p> <ul style="list-style-type: none"> • Provision of tasting sessions or a weekly challenge to eat nuts or vegetables or any food recommended by the ESTEEM food list that women or partners are reticent to try. • Promote child-friendly ESTEEM sessions that support children’s involvement in food preparation and education.
Availability of foodstuffs	<ul style="list-style-type: none"> • Promote availability of suitable food which is in keeping with the ESTEEM diet by approaching large food stores. Provision of “tasting tables” and meal ideas about how to mix and change foods to suit the individual and family. • Involvement of celebrities and local dignitaries or chefs from nearby restaurants who could commit some time to help with the above. • Community involvement by local Trusts, schools, local counsellors, churches, mosques and tabernacles by holding a workshop to see how community activities such as the food store initiative above could be best co-ordinated. • Promote farmer’s markets and mini pop-up markets or stalls to sell vegetables in the community, squares and streets, (eg. by providing bowls of vegetables and healthy foods to take away).
Cultural influences and food traditions, values, regarding health	<ul style="list-style-type: none"> • Promote joint ESTEEM walking groups, planned weekly by women and partners and/or a 30-minute walk with children (eg. nearby or in a park or convenient place). • Provision of incentives for partners (eg. a cholesterol level blood test, or blood pressure check)

	<ul style="list-style-type: none"> • Promote working with fast food shops to help them adapt their food and add healthy options (eg. provision of fruit juices, smoothies, chunks of vegetables with healthy dips).
Impact of public policy and environment	<ul style="list-style-type: none"> • Development of policies by local councils for community gatherings and events to ensure the provision of healthy foodstuffs. • Promote a culture of support and encouragement through media using a watchword such as “don’t stop starting again” to foster engagement with the ESTEEM diet. • Community involvement by local Trusts, schools, local counsellors, churches, mosques and tabernacles by holding a workshop to see how community activities such as the food store initiative above could be best co-ordinated. Use the idiom “don’t stop starting again” to encourage interest and participation and the involvement of others in the ESTEEM diet. • Promote availability of suitable food which is in keeping with the ESTEEM diet by approaching large food stores. Provision of “tasting tables” and meal ideas about how to mix and change foods to suit the individual and family. – Do this by also using the slogan “don’t stop starting again”

Although these preliminary suggestions draw on the findings of the study, the literature review and the body of evidence support the alignment between a broader family-oriented approach and the engagement of women, partners and families with a dietary intervention. It is likely that the effecting of these suggestions may still encounter the same difficulties as set out in chapter two. In the remaining part of this chapter I will explore the potential for population health approaches within future dietary interventions and the implications for policy.

8.6 Strengths of the study

The use of a logic model, which pinned down elements and which elicited various activities comprising the ESTEEM intervention, advanced my interpretation. By identifying the apparent mechanisms tacitly present in my logic model, I became aware how implicit they were to the whole of the process of the inquiry. These were implied in my interpretation of the data-corps.

Until now few studies have explored factors that influence women's food choices and lifestyle behaviours within dietary intervention for pregnant women.²²³ The strength of this study lies in its overall approach which takes account, not only of how the dietary intervention is experienced by women, but also the views and attitudes of the partners and health care professionals/researchers involved. This study provides a broader, more inclusive picture. This was a novel qualitative study carried out to identify factors influencing women's and partners engagement with a dietary intervention in pregnancy and which includes views of health care professionals and researchers.

My study design, data collection and thematic analysis were devised to better understand an enigmatic and confusing topic.²²⁹ My purpose was to generate understanding.²³⁰ I had advice from senior academics with expertise and knowledge in the field. I designed the sampling strategy, collected my data and developed my analytic emphasis using robust methodology. A suitable sample was achieved with all the important characteristics of women, partners and health care professionals/researchers to achieve maximum variation and a rich data-corps. As data were collected, I refocussed my work to ensure that I gained rich and useful perspectives of women's lived experience of engagement with the dietary intervention, together with the views of partners and health care professionals/researchers. Focussing on the research question and tailoring this was needed as I applied my methods of analysis rigorously to my data.

As thematic analysis is a flexible method, I needed to be clear and exact about what I was doing and to do precisely what I was saying I would do.¹⁷³ Data collection and analysis was continued until I had identified themes of interest to report, relevant to my research question. I did not wish to subscribe to what Fine¹⁷³ describes as simply a "giving voice approach" to my data. It was important to me that the theoretical framework I used, the methods I employed and what I wanted to know, all matched.

This study included women's lived experience of engaging with the dietary intervention. Women came from diverse socio-cultural and educational backgrounds. I captured knowledge about a variety of women's diet and food habits, their understandings of food, and their complex pregnancy needs. Partners' views proved to offer significant and practical insights

into how the dietary intervention was experienced, both complimenting and sometimes contrasting with women's experiences. The addition of partners' interviews complimented areas which would have been lacking if I had relied uniquely upon the women's interviews. The gender dimension was clearly present as men expressed their need to work and do sport.

8.7 Limitations of the study

The study design had limitations due to the inclusion of women and partners at the latter stages of pregnancy as this meant that those who were participating at this point had been engaged in the ESTEEM intervention. As two thirds of the women were over the age of thirty and half of the women were in their first pregnancy, it could be said that these women would also be more likely to engage with the intervention for their pregnancy health. Although a number of methodological lessons have been learnt from ESTEEM,⁹⁴ my study has limitations regarding generalisability. Women who did not participate were not included at several steps. We cannot assume that this qualitative data can shed light on findings on work conducted in a culturally different setting.

The control group in studies of this kind may have a potential "Hawthorne effect" upon participation in the trial. Women who were recruited to the trial and received the information positively were keen to be part of the intervention group. These women clearly expressed their disappointment at not being part of the intervention group, some requesting at the recruitment stage to be part of the intervention group. Furthermore, health care professionals voiced their opinions that these women may have been particularly motivated and would have adhered to the ESTEEM diet. Women, having been told of the positive aspects of participating in research and also the acknowledged benefits of a Mediterranean (high-fibre, high pulses and legumes), may have adapted their diet in some way. Although the food frequency questionnaires were carried out at regular intervals, this was only done on the intervention group.

Although a number of methodological lessons have been learnt from ESTEEM,⁹⁴ my study has limitations regarding generalisability. The methods I used were interviews of women and partners (46) and I used three focus groups of health care professionals in order to create a dynamic discussion. Focus groups are explicitly designed to capitalise on group interaction to provide distinctive types of data. Sometimes focus groups are employed simply as a quick and convenient way to collect data from several people simultaneously. I used focus groups to provide a way which was socially oriented to study participants in an atmosphere more natural

than a one-to-one interview. However, the issue of power dynamics is real in a focus group setting and the interviewer has less control over a group interview than a one-to-one. Having considered the advantages and disadvantages, I decided to use focus groups for collecting data from health professionals and researchers also for pragmatic reasons.

The practice of having another researcher read and code/analyse some of the transcripts to compare these was not carried out. However, analysis and discussion of interpretations was carried out in a lengthy manner with my supervisor. I have included examples of the development of the analysis to show how this progressed and was elaborated upon. Please see appendices 11a-c.

This data reveals gaps in current understandings of dietary interventions in pregnancy, but it has not allowed us to explore these in detail. My sample was skewed toward Asian men and may not apply equally to all, although there is little research on men⁴¹ and their participation in and impact upon dietary interventions and women's engagement with these. Partners were very agreeable to participating in the interviews, although at first it was thought that it may be difficult to achieve the intended 16, there was no problem in arriving at this number. Partners were not participating in the ESTEEM to the same extent or in the same way as the women. Partners viewed ESTEEM as an intervention which their partner needed to follow, for the good of the pregnancy. As I was mainly interested in the women and her needs, I wanted to interview an adequate number to find out how they engaged with the intervention. It would have been interesting to have equal numbers of women and partners. The findings here show that a joint ESTEEM venture, one which would include women, partners, family, social, cultural and environmental aspects should not be underestimated. Ideally the whole family and social network needs to participate with women. This would, from necessity, include partners from the outset of the intervention. The signing up to the research seemed to have significance for the women who were participating. If partners in some way signed up, from the start, they would be more involved with a shared ESTEEM experience and to a greater extent, the responsibility, both as regards supporting the woman and being more able to involve children.

As the ESTEEM intervention comprised a dietary advice component, women were required to speak English which ruled out a number of women who were not fluent and could not be included for this reason. This consequentially led to women who had substantial dietary and health needs being excluded from taking part. They may also have been able to participate and

benefit from the support that other women had gained, mutually from participating in the ESTEEM intervention.

8.8 Implications for research

Future randomised trials:

The prospect of maintaining behaviour changes made in pregnancy beyond this time, needs more exploration. Unequivocally, children need to be more actively included in further interventions as well as taking into consideration the role of partners, family and friends. The role of empowerment and self-efficacy play a significant role in women's and partners' engagement. Future dietary interventions must further develop components of ESTEEM to build upon these, so that partners and others are included more consistently in interventions of this type. Although the partner was invited to the ESTEEM group sessions, health care professionals indicated that they did not always attend. A more proactive approach to recruiting the couple, involving both partners and women, would lead to more partners attending ESTEEM sessions. This would be expedient from the beginning of the intervention. This would create greater shared interest, and more collaboration as regards food provision during the ESTEEM intervention, within the couple.

Provisions or incentives are a good way to encourage and support engagement and the ESTEEM provisions were well received. These encouraged women and their partners to participate as they had the provisions nearby and ready to include in their meals, and to snack with. Provision of some foods which may be included in the intervention recipes may be a real incentive for people to participate in an intervention. In the ESTEEM intervention provisions were welcomed by most of the women partners and children. As well as this, companies and other bodies and agencies may be able to benefit from participation using advertising, tax-relief and community development to improve their social and political links and influence.

It may be significant to the development of future interventions of this type to note that health care professionals alluded to the amount of interest that women had in participating in, and in knowing about, the results of this research. Health care professionals inferred that this may lead women to ask to join a trial and that they may also want to be part of research. It was also indicated that women may want to know about the outcomes of the study, and asked if they may be informed about the results. Researchers of this type of intervention may be able to find

ways to ensure that women who want to know about the results of the study, in particular the intervention group should be more informed about the outcomes of this.

Future research on interventions of this kind need to include partners and children in recruitment as well as during the intervention in meetings and activities as more involvement may lead to greater acceptance and therefore better adherence and thereby increased long-term continuance. This could be tested over the long-term. It was also perceived by many health care professionals that in order to be more likely to engage with dietary interventions, women, partners and children may need to have early-life, varied, healthy, food encounters. This may be more likely to enable them to embrace food changes and they may also be more apt to take healthy food options. It may be conceivable that women bring a child to the ESTEEM meetings as this may lead to small children becoming more food aware. This may also have family-friendly impact, as well as dietary education potential for the intervention participants. It would be of interest to find out if this would be more likely to lead to the adoption of ESTEEM diet options in the home, as these may be proposed by the children.

8.9 Implications for policy

Behaviour change within interventions is not possible if these are carried out in a socio-cultural vacuum.²³¹ Individual education could be underpinned with community support to enhance its social and cultural appropriateness. Previous work has indicated that support from family and friends is a strong facilitator of healthy lifestyle change in pregnancy^{53,207} and this underlines the importance of involvement of social support in future planning of interventions. Although many researchers report the need to provide social support during dietary intervention in pregnancy, little evidence of practical ways to do so was found. Further ways to ensure that serious efforts are made to support women, partners and children are required. Policies which drive shops, schools, places of worship and community gatherings to facilitate the provision of suitable food and education and support are needed. Local councils could develop policies for community gatherings and events to ensure provision of healthy foodstuffs.

Other factors influencing eating must be remembered when planning interventions and developing policy in this area. The ongoing research around the area of “mindless eating” is of importance. This shows how lifestyle related to television viewing, eating alone, driving, all affect our perception of hunger and thereby our food consumption. Policies which support and enhance awareness of all these factors are needed so that the population is made more conscious

of times and situations when they may be more susceptible to the hazards of mindless eating and alert to this possibility, and are then able to avoid its menace.

Women's motivation was improved by the support from other pregnant women. Women had a sense of oneness with other mothers and future mothers. Pregnant women were able to understand each-other as they had many family, health and pregnancy shared-interests and concerns. Group sessions provided an opportunity for women to communicate with each-other and exchange ideas. The design of antenatal care and its delivery is not always geared to this kind of interface. Maternity guidelines and policies may look at ways in which peer-support mechanisms could operate to better support women. This would be especially useful to women during the antenatal period regarding diet.

Previous dietary initiatives such as the "Five-a-day" fruit intake has caught on due to this catchy idiom. For engagement with a dietary intervention it could be proposed that a message such as "Don't stop starting again" could be used. As participants said they slipped on and off the intervention a non-blaming and encouraging dictum could drive the point home in a supportive manner. This could have positive results for engagement and maintenance with the diet, the focus is on getting back on, thus removing blame. Engagement during a dietary intervention as revealed in this study, is a process, over time. Policies may become more attractive and be embedded more readily if friendly language and approaches were used to engage the public.

8.10 Conclusions

By using a logic model, the mechanisms of the ESTEEM dietary interventions were made more explicit and revealed more about how to improve its suitability for women. The theories I employed to provide a theoretical framework for my study, social-ecological theories, social cognitive theory, adult learning theory and also by viewing social theory, in relation to women and food, propositions for future dietary interventions were found.

Women want practical and real-world advice which supports their own, their partner's and their children's needs. As a one-size does not work, individually, for the family, nor within the out

of home situation, food needs to be tailored for each woman and family. A family model and a socially-friendly approach is needed to engage people in a healthy diet.

Women are more likely to find ways which support their lifestyle if they work this out with support from those around them. The ESTEEM diet was welcomed by the majority of women, but by making a few changes such as those suggested here, women will be more supported by their partners, partners will be enabled to support their children with food choices, and children by engaging earlier with food preparation and cooking, will be more able to adapt and find good, tasty, healthy food, over their lifespan. Any future intervention must consider the woman's individual, family and social situation.

Although the findings here suggest that pregnancy may be a good time to intervene in family-centred dietary change, it remains to be seen whether such initiatives can influence long-term engagement. This is one study of a group of women and partners on a dietary intervention to improve pregnancy outcomes for at risk women. It includes the perspectives of researchers and health care professionals, thus needing further exploration. A sustained and multi-agency approach will be needed to maintain and promote women's pregnancy health. This has the potential to influence family and population health across the lifespan.

References

1. Koivusalo SB, Rönö K, Klemetti MM, et al. Gestational Diabetes Mellitus Can Be Prevented by Lifestyle Intervention: The Finnish Gestational Diabetes Prevention Study (RADIEL): A Randomized Controlled Trial. *Diabetes Care*. 2016;39(1):24-30.
2. Nascimento SL, Surita FG, Parpinelli M, Siani S, Pinto e Silva JL. The effect of an antenatal physical exercise programme on maternal/perinatal outcomes and quality of life in overweight and obese pregnant women: a randomised clinical trial. *BJOG*. 2011;118(12):1455-1463.
3. Al Wattar BH, Dodds J, Placzek A, et al. Effect of simple, targeted diet in pregnant women with metabolic risk factors on maternal and fetal outcomes (ESTEEM): study protocol for a pragmatic multicentre randomised trial. *BMJ Open*. 2016;6(10):e013495.
4. Thangaratinam S, Rogozinska E, Jolly K, et al. Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ*. 2012;344:e2088.
5. Poston L, Briley AL, Barr S, et al. Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); assessment of behavioural change and process evaluation in a pilot randomised controlled trial. *BMC Pregnancy Childbirth*. 2013;13:148.
6. Wadden TA, Webb VL, Moran CH, Bailer BA. Lifestyle modification for obesity: new developments in diet, physical activity, and behavior therapy. *Circulation*. 2012;125(9):1157-1170.
7. WHO. WHO | Obesity and overweight. *WHO Fact sheet*. 2018(February 2018).
8. Wing RR, Lang W, Wadden TA, et al. Benefits of modest weight loss in improving cardiovascular risk factors in overweight and obese individuals with type 2 diabetes. *Diabetes Care*. 2011;34(7):1481-1486.
9. excellence NNifhac. Maternal and child nutrition | Guidance and guidelines | NICE. In. *Public health guideline [PH11]*: NICE; 2018.
10. Willcox JC, Ball K, Campbell KJ, Crawford DA, Wilkinson SA. Correlates of pregnant women's gestational weight gain knowledge. *Midwifery*. 2017;49:32-39.
11. Mamun AA, Callaway LK, O'Callaghan MJ, et al. Associations of maternal pre-pregnancy obesity and excess pregnancy weight gains with adverse pregnancy outcomes and length of hospital stay. *BMC Pregnancy Childbirth*. 2011;11:62.
12. Haugen M, Brantsæter AL, Winkvist A, et al. Associations of pre-pregnancy body mass index and gestational weight gain with pregnancy outcome and postpartum weight retention: a prospective observational cohort study. *BMC Pregnancy Childbirth*. 2014;14:201.
13. Faucher MA, Hastings-Tolsma M, Song JJ, Willoughby DS, Bader SG. Gestational weight gain and preterm birth in obese women: a systematic review and meta-analysis. *BJOG*. 2016;123(2):199-206.
14. Kowal C, Kuk J, Tamim H. Characteristics of weight gain in pregnancy among Canadian women. *Matern Child Health J*. 2012;16(3):668-676.
15. Boyle A, Timofeev, J., Halscott, T', Desale, S., Driggers, R., Ramsey, P. Is 40 the New 30?: Pregnancy Outcomes by Degree of Weight Ga... : *Obstetrics & Gynecology*. *Obstetrics and Gynaecology*. 2014(May 2014).
16. Weisman CS, Hillemeier MM, Downs DS, Chuang CH, Dyer AM. Preconception predictors of weight gain during pregnancy: prospective findings from the Central Pennsylvania Women's Health Study. *Womens Health Issues*. 2010;20(2):126-132.
17. Rasmussen KM, Kjolhede CL. Maternal obesity: a problem for both mother and child. *Obesity (Silver Spring)*. 2008;16(5):929-931.

18. Rasmussen KM, Catalano PM, Yaktine AL. New guidelines for weight gain during pregnancy: what obstetrician/gynecologists should know. *Current opinion in obstetrics & gynecology*. 2009;21(6):521-526.
19. Sattar N, Greer IA. Pregnancy complications and maternal cardiovascular risk: opportunities for intervention and screening? *BMJ*. 2002;325(7356):157-160.
20. Monteiro LJ, Norman JE, Rice GE, Illanes SE. Fetal programming and gestational diabetes mellitus. *Placenta*. 2016;48 Suppl 1:S54-S60.
21. Barker DJ. Fetal origins of coronary heart disease. *BMJ*. 1995;311(6998):171-174.
22. Herman D, Taylor Baer, M. Adams E., Cunningham-Sabo, L., Duran, N., Johnson, D., Yakes, E. Life Course Perspective: Evidence for the Role of Nutrition | SpringerLink. *Maternal and child health journal*. 2014;18(2):450-461.
23. Hocher B. More than genes: the advanced fetal programming hypothesis. *J Reprod Immunol*. 2014;104-105:8-11.
24. Dunstan JA, Simmer K, Dixon G, Prescott SL. Cognitive assessment of children at age 2½ years after maternal fish oil supplementation in pregnancy: a randomised controlled trial. *BMJ*. 2008;93(1).
25. Hammiche F, Laven, J., van Mil, N., de Cock, M., de Vries, J., Lindemans, J., Steegers, E., Steegers-Theunissen, R. Tailored preconceptional dietary and lifestyle counselling in a tertiary outpatient clinic in the Netherlands. *Human Reproduction*. 2011;26(9):2432-2441.
26. Vidailhet M. Omega 3: is there a situation of deficiency in young children? - Abstract - Europe PMC. *Europe PMC*. 2007.
27. Rogozińska E, Marlin N, Yang F, et al. Variations in reporting of outcomes in randomized trials on diet and physical activity in pregnancy: A systematic review. *J Obstet Gynaecol Res*. 2017.
28. Muktabhant B, Lawrie TA, Lumbiganon P, Laopaiboon M. Diet or exercise, or both, for preventing excessive weight gain in pregnancy. *Cochrane Database Syst Rev*. 2015(6):CD007145.
29. Glasgow RE, Emmons KM. How can we increase translation of research into practice? Types of evidence needed. *Annu Rev Public Health*. 2007;28:413-433.
30. Donovan J, Mills N, Smith M, et al. Quality improvement report: Improving design and conduct of randomised trials by embedding them in qualitative research: ProtecT (prostate testing for cancer and treatment) study. Commentary: presenting unbiased information to patients can be difficult. *BMJ*. 2002;325(7367):766-770.
31. Olander EK, Fletcher H, Williams S, Atkinson L, Turner A, French DP. What are the most effective techniques in changing obese individuals' physical activity self-efficacy and behaviour: a systematic review and meta-analysis. *International Journal of Behavioral Nutrition and Physical Activity*. 2013;10(1):29.
32. Jing W, Huang Y, Liu X, Luo B, Yang Y, Liao S. The effect of a personalized intervention on weight gain and physical activity among pregnant women in China. *Int J Gynaecol Obstet*. 2015;129(2):138-141.
33. Huang TT, Yeh CY, Tsai YC. A diet and physical activity intervention for preventing weight retention among Taiwanese childbearing women: a randomised controlled trial. *Midwifery*. 2011;27(2):257-264.
34. Harrison CL, Lombard CB, Teede HJ. Limiting postpartum weight retention through early antenatal intervention: the HeLP-her randomised controlled trial. *Int J Behav Nutr Phys Act*. 2014;11:134.
35. Callaway LK, Colditz PB, Byrne NM, et al. Prevention of gestational diabetes: feasibility issues for an exercise intervention in obese pregnant women. *Diabetes Care*. 2010;33(7):1457-1459.

36. Herring SJ, Cruice JF, Bennett GG, Rose MZ, Davey A, Foster GD. Preventing excessive gestational weight gain among African American women: A randomized clinical trial. *Obesity (Silver Spring)*. 2016;24(1):30-36.
37. Rogozinska E, D'Amico MI, Khan KS, et al. Development of composite outcomes for individual patient data (IPD) meta-analysis on the effects of diet and lifestyle in pregnancy: a Delphi survey. *Bjog*. 2016;123(2):190-198.
38. Dodd JM, Turnbull D, McPhee AJ, et al. Antenatal lifestyle advice for women who are overweight or obese: LIMIT randomised trial. *BMJ*. 2014;348:g1285.
39. Schölerich VL, Ghorashi H, Denктаş S, Groenewegen P. Caught in the middle? How women deal with conflicting pregnancy-advice from health professionals and their social networks. *Midwifery*. 2016;35:62-69.
40. Heery E, McConnon A, Kelleher CC, Wall PG, McAuliffe FM. Perspectives on weight gain and lifestyle practices during pregnancy among women with a history of macrosomia: a qualitative study in the Republic of Ireland. *BMC Pregnancy Childbirth*. 2013;13:202.
41. Keely A, Cunningham-Burley S, Elliott L, Sandall J, Whittaker A. "If she wants to eat...and eat and eat...fine! It's gonna feed the baby": Pregnant women and partners' perceptions and experiences of pregnancy with a BMI >40kg/m². *Midwifery*. 2017;49:87-94.
42. Warin J, Dempster S. The salience of gender during the transition to higher education: male students' accounts of performed and authentic identities. *British Educational Research Journal*. 2007;33(6):887-903.
43. Cecchini M, Warin L. Impact of food labelling systems on food choices and eating behaviours: a systematic review and meta-analysis of randomized studies. *Obesity Reviews*. 2015;17(3):201-210.
44. Warin M, Moore V, Davies M, Ulijaszek S. Epigenetics and Obesity: The Reproduction of Habitus through Intracellular and Social Environments. *Body & Society*. 2015;22(4):53-78.
45. Warin M, Turner K, Moore V, Davies M. Bodies, mothers and identities: rethinking obesity and the BMI. *Social Health Illn*. 2008;30(1):97-111.
46. Crane JM, White J, Murphy P, Burrage L, Hutchens D. The effect of gestational weight gain by body mass index on maternal and neonatal outcomes. *J Obstet Gynaecol Can*. 2009;31(1):28-35.
47. Blumfield M, Hure A, MacDonald-Wicks L, et al. The Association between the Macronutrient Content of Maternal Diet and the Adequacy of Micronutrients during Pregnancy in the Women and Their Children's Health (WATCH) Study. *Nutrients*. 2012;4(12).
48. Ahlgren C, Hammarström A, Sandberg S, et al. Engagement in New Dietary Habits-Obese Women's Experiences from Participating in a 2-Year Diet Intervention. *Int J Behav Med*. 2016;23(1):84-93.
49. Fieril DP, Olsén PF, Glantz D, Premberg D. Experiences of a lifestyle intervention in obese pregnant women - A qualitative study. *Midwifery*. 2017;44:1-6.
50. Davis EM, Stange KC, Horwitz RI. Childbearing, Stress and Obesity Disparities in Women: A Public Health Perspective. *Maternal and Child Health Journal*. 2012;16(1):109-118.
51. Atkinson L, Olander EK, French DP. Acceptability of a Weight Management Intervention for Pregnant and Postpartum Women with BMI ≥30 kg/m²: A Qualitative Evaluation of an Individualized, Home-Based Service. *Matern Child Health J*. 2016;20(1):88-96.
52. Petrov Fieril K, Fagevik Olsén M, Glantz A, Larsson M. Experiences of exercise during pregnancy among women who perform regular resistance training: a qualitative study. *Phys Ther*. 2014;94(8):1135-1143.
53. Sui Z, Dodd JM. Exercise in obese pregnant women: positive impacts and current perceptions. *Int J Womens Health*. 2013;5:389-398.
54. Campbell F, Johnson M, Messina J, Guillaume L, Goyder E. Behavioural interventions for weight management in pregnancy: A systematic review of quantitative and qualitative data. *BMC Public Health*. 2011;11(1):491.

55. Weir Z, Bush J, Robson SC, McParlin C, Rankin J, Bell R. Physical activity in pregnancy: a qualitative study of the beliefs of overweight and obese pregnant women. *BMC Pregnancy Childbirth*. 2010;10:18.
56. Shub A, Huning EY, Campbell KJ, McCarthy EA. Pregnant women's knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BMC Res Notes*. 2013;6:278.
57. Gupton A, Heaman M, Cheung LW. Complicated and uncomplicated pregnancies: women's perception of risk. *J Obstet Gynecol Neonatal Nurs*. 2001;30(2):192-201.
58. Heslehurst N, Bell R, Rankin J. Tackling maternal obesity: the challenge for public health. *Perspect Public Health*. 2011;131(4):161-162.
59. McParlin C, Bell R, Robson SC, Muirhead CR, Araújo-Soares V. What helps or hinders midwives to implement physical activity guidelines for obese pregnant women? A questionnaire survey using the Theoretical Domains Framework. *Midwifery*. 2017;49:110-116.
60. Furness PJ, McSeveny K, Arden MA, Garland C, Dearden AM, Soltani H. Maternal obesity support services: a qualitative study of the perspectives of women and midwives. *BMC Pregnancy Childbirth*. 2011;11:69.
61. Baron R, Heesterbeek Q, Manniën J, Hutton EK, Brug J, Westerman MJ. Exploring health education with midwives, as perceived by pregnant women in primary care: A qualitative study in the Netherlands. *Midwifery*. 2017;46:37-44.
62. Campbell R, Pound P, Pope C, et al. Evaluating meta-ethnography: a synthesis of qualitative research on lay experiences of diabetes and diabetes care. *Soc Sci Med*. 2003;56.
63. de Jersey SJ, Nicholson JM, Callaway LK, Daniels LA. An observational study of nutrition and physical activity behaviours, knowledge, and advice in pregnancy. *BMC Pregnancy Childbirth*. 2013;13:115.
64. Lucas C, Charlton KE, Yeatman H. Nutrition advice during pregnancy: do women receive it and can health professionals provide it? *Matern Child Health J*. 2014;18(10):2465-2478.
65. Lucas A, Murray E, Kinra S. Heath beliefs of UK South Asians related to lifestyle diseases: a review of qualitative literature. *Journal of obesity*. 2013;2013:827674-827674.
66. Price BB, Amini SB, Kappeler K. Exercise in pregnancy: effect on fitness and obstetric outcomes—a randomized trial. *Med Sci Sports Exerc*. 2012;44(12):2263-2269.
67. Miller YD, Holdaway W. How communication about risk and role affects women's decisions about birth after caesarean. *Patient Education and Counseling*. 2017.
68. Cahn E. *No More Throw-away People*. 2004.
69. Spencer L, Ritchie J, Lewis J, Dillon L. *Quality in Qualitative Evaluation: A framework for assessing research evidence*. London: Cabinet Office; 2003.
70. Mol A. *The logic of care : health and the problem of patient choice*. London: Routledge; 2008.
71. Wilson G. Family Food Systems, Preventive Health and Dietary Change: A Policy to Increase the Health Divide. *Journal of Social Policy*. 1989;18(2):167-185.
72. Wilson Ba, Lee Ai. *First bite : how we learn to eat*.
73. Gelfand M. An attempt at suicide. The importance of understanding the Shona cultural background. *Cent Afr J Med*. 1971;17(3):57-58.
74. Williams SJ. Theorising class, health and lifestyles: can Bourdieu help us? *Sociology of Health & Illness*. 1995;17(5):577-604.
75. Aphramor L. Is A Weight-Centred Health Framework Salutogenic? Some Thoughts on Unhinging Certain Dietary Ideologies. *Social Theory & Health*. 2005;3(4):315-340.
76. Ronnberg AK, Ostlund I, Fadl H, Gottvall T, Nilsson K. Intervention during pregnancy to reduce excessive gestational weight gain—a randomised controlled trial. *BJOG*. 2015;122(4):537-544.

77. Rauh K, Gabriel E, Kerschbaum E, et al. Safety and efficacy of a lifestyle intervention for pregnant women to prevent excessive maternal weight gain: a cluster-randomized controlled trial. *BMC Pregnancy Childbirth*. 2013;13:151.
78. O’Cathain A. Maximising the impact of qualitative research in feasibility studies for randomised controlled trials: guidance for researchers. *Pilot and feasibility studies*. 2015;1(1).
79. O’Cathain A, Thomas KJ, Drabble SJ, Rudolph A, Hewison J. What can qualitative research do for randomised controlled trials? A systematic mapping review. *BMJ Open*. 2013;3(6).
80. O’Cathain A, Goode J, Drabble SJ, Thomas KJ, Rudolph A, Hewison J. Getting added value from using qualitative research with randomized controlled trials: a qualitative interview study. *Trials*. 2014;15:215-215.
81. Burr V. *Social constructionism*. 2nd ed. ed. London ; New York: Routledge; 2003.
82. Conrad P, K Barker K. *The Social Construction of Illness Key Insights and Policy Implications*. Vol 51 Suppl2010.
83. Olafsdottir S. Social Construction and Health. In: Cockerham WC, ed. *Medical Sociology on the Move: New Directions in Theory*. Dordrecht: Springer Netherlands; 2013:41-59.
84. Lupton D. Risk and emotion: towards an alternative theoretical perspective. *Health, Risk & Society*. 2013;15(8):634-647.
85. Tulloch J, Lupton D. *Risk and everyday life*. London: Sage; 2005.
86. Pescosolido BA, Martin JK, Lang A, Olafsdottir S. Rethinking theoretical approaches to stigma: a Framework Integrating Normative Influences on Stigma (FINIS). *Social science & medicine (1982)*. 2008;67(3):431-440.
87. Sikorski C, Lupp M, Kaiser M, et al. The stigma of obesity in the general public and its implications for public health - a systematic review. *BMC Public Health*. 2011;11(1):661.
88. Burr V. *An introduction to social constructionism*. London: Routledge; 1995.
89. Willig C, Stainton Rogers W. *The SAGE handbook of qualitative research in psychology*. Los Angeles, Calif. ; London: SAGE; 2008.
90. Paterson B, Thorne S, Canam C, Jillings C. *Meta-Study of Qualitative Health Research*. Thousand Oaks, California: Sage; 2001.
91. Thorne S, Jensen L, Kearney MH, Noblit G, Sandelowski M. Qualitative meta-synthesis: reflections on methodological orientation and ideological agenda. *Qual Health Res*. 2004;14.
92. Ellis PM. Attitudes towards and participation in randomised clinical trials in oncology: A review of the literature. *Annals of Oncology*. 2000;11(8):939-945.
93. Sofi F, From the Department of Medical and Surgical Critical Care TC, University of Florence, Florence, Italy (FS, RA, and GFG), the Agency of Nutrition AO-UC, Florence, Italy (FS and AC), et al. Accruing evidence on benefits of adherence to the Mediterranean diet on health: an updated systematic review and meta-analysis. *The American Journal of Clinical Nutrition*. 2010;92(5):1189-1196.
94. Al Wattar BH, Dodds J, Placzek A, et al. Mediterranean diet based intervention in pregnancy to improve maternal and fetal outcomes: Methodological challenges and lessons learned from the multicentre ESTEEM study. *Contemporary Clinical Trials Communications*. 2017;6:72-77.
95. H. Al Wattar B, Dodds J, Placzek A, et al. Mediterranean-style diet in pregnant women with metabolic risk factors (ESTEEM): A pragmatic multicentre randomised trial. *PLOS Medicine*. 2019;16(7):e1002857.
96. Weiss CH. *Evaluation : methods for studying programs and policies*. 2nd ed. ed. Upper Saddle River: Prentice Hall ; London : Prentice Hall International; 1998.
97. Shepherd J, Harden A, Rees R, Brunton G, Oliver S, Oakley A. *Young People and Healthy Eating: A systematic review of barriers and facilitators*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London; 2001.

98. Warriner S. Women's views on being weighed during pregnancy. <http://dxdoiorq/1012968/bjom200081017111>. 2013.
99. Warren L, Rance, J. and Hunter, B. Feasibility and acceptability of a midwife-led intervention programme called 'Eat Well Keep Active' to encourage a healthy lifestyle in pregnancy - ProQuest. *BMC Pregnancy and Childbirth*. 2012;12(27).
100. Clark MC. Transformational learning. *New Directions for Adult and Continuing Education*. 1993;1993(57):47-56.
101. Merriam SB. Andragogy and Self-Directed Learning: Pillars of Adult Learning Theory. *New Directions for Adult and Continuing Education*. 2002;2001(89):3-14.
102. Lazaro J. The Relationship between Education, Politics and Society in the Thought of Paulo Freire: A Reflection about Mozambique's Education System. *Revista Internacional de Formação de Professores*. 2017;2(2):159-169.
103. Bruner JS. *On knowing : essays for the left hand*. Expanded ed. Cambridge: Harvard University Press; 1962.
104. Soylu F. An Embodied Approach to Understanding: Making Sense of the World Through Simulated Bodily Activity. *Frontiers in psychology*. 2016;7:1914-1914.
105. Salkind NJ. *SAGE directions in educational psychology*. Los Angeles ; London: Sage Publications; 2011.
106. von Glasersfeld E. Cognition, construction of knowledge, and teaching. *Synthese*. 1989;80(1):121-140.
107. Knowles MS. *Andragogy in action*. San Francisco ; London: Jossey-Bass; 1984.
108. Illeris K. Peter Jarvis and the understanding of adult learning. *International Journal of Lifelong Education*. 2017;36(1-2):35-44.
109. Bergsteiner H, Avery GC, Neumann R. Kolb's experiential learning model: critique from a modelling perspective. *Studies in Continuing Education*. 2010;32(1):29-46.
110. Noar SM, Zimmerman RS. Health Behavior Theory and cumulative knowledge regarding health behaviors: are we moving in the right direction? *Health Education Research*. 2005;20(3):275-290.
111. Prochaska JOURI, Cancer Prevention Research Consortium, Kingston, US, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. *American Psychologist*. 1992.
112. Ajzen I, Joyce N, Sheikh S, Cote NG. Knowledge and the Prediction of Behavior: The Role of Information Accuracy in the Theory of Planned Behavior. *Basic & Applied Social Psychology* Apr-Jun2011. 2011;33(2):101.
113. Brogan MMPP, Bristol, RI, US, Prochaska JO, Prochaska JM. Predicting termination and continuation status in psychotherapy using the transtheoretical model. *Psychotherapy*. 1999;36(Summer 1999/Number 2):105-113.
114. French D. *Health psychology*. 2nd ed. ed. Oxford: Wiley-Blackwell; 2010.
115. Sutton S, Baum A, Johnston M. *The Sage handbook of health psychology*. London: SAGE; 2004.
116. Bandura A. *Self-efficacy : the exercise of control*. New York: W.H. Freeman; 1997.
117. Schwarzer RF, R. Self-Efficacy and Health Behaviours. <http://userpage.fu-berlin.de/~gesund/publicat/conner9.htm>. Published 1995. Accessed.
118. Locke HS, Braver TS. Motivational influences on cognitive control: Behavior, brain activation, and individual differences. *Cognitive, Affective, & Behavioral Neuroscience*. 2008;8(1):99-112.
119. Weinstein ND. Unrealistic optimism about susceptibility to health problems. *J Behav Med*. 1982;5(4):441-460.
120. Wallston BS, Wallston KA, Kaplan GD, Maides SA. Development and validation of the health locus of control (HLC) scale. *J Consult Clin Psychol*. 1976;44(4):580-585.

121. Rotter JB. *Social learning and clinical psychology*. Englewood Cliffs, NJ, US: Prentice-Hall, Inc.; 1954.
122. Seeman MaE, J. W. Alienation and Learning in a Hospital Setting. *American Sociological Review*. 1962;27. Accessed 20 March 2018.
123. Golden SD, McLeroy KR, Green LW, Earp JAL, Lieberman LD. Upending the Social Ecological Model to Guide Health Promotion Efforts Toward Policy and Environmental Change. *Health Education & Behavior*. 2015;42(1_suppl):8S-14S.
124. Sommestad T, Karlzén H, Hallberg J. A Meta-Analysis of Studies on Protection Motivation Theory and Information Security Behaviour. <http://servicesigi-global.com/resolvedoi/resolve.aspx?doi=104018/IJISP2015010102>. 2015.
125. F. Sallis J, Owen N, Fisher E. Ecological Models of Health Behavior. *Health Behavior and Health Education*. 2008;4.
126. Stokols D. Toward a Science of Transdisciplinary Action Research. *American Journal of Community Psychology*. 2006;38(1-2):79-93.
127. Gibney MJ, Margetts BM, Kearney JMa, Arab L. *Public Health Nutrition*. . Oxford Blackwell Science; 2004.
128. Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision Processes*. 1991;50(2):179-211.
129. DiClemente CCUH, TX, US, Prochaska JO, Fairhurst SK, Velicer WF, Velasquez MM, Rossi JS. The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*. 1991.
130. Plotnikoff RC, Hotz SB, Birkett NJ, Courneya KS. Exercise and the Transtheoretical Model: A Longitudinal Test of a Population Sample. *Preventive Medicine*. 2001;33(5):441-452.
131. Madden TJ, Ellen PS, Ajzen I. A Comparison of the Theory of Planned Behavior and the Theory of Reasoned Action:. <http://dxdoiorg/101177/0146167292181001>. 1992.
132. Fishbein M, Ajzen I. *Belief, attitude, intention and behavior : an introduction to theory and research*. Reading, Mass. ; London: Addison-Wesley; 1975.
133. Armitage CJ, Conner M. Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *Br J Soc Psychol*. 2001;40(Pt 4):471-499.
134. Hardeman W, Johnston M, Johnston D, Bonetti D, Wareham N, Kinmonth AL. Application of the Theory of Planned Behaviour in Behaviour Change Interventions: A Systematic Review. <http://dxdoiorg/101080/08870440290013644a>. 2010.
135. Webb T, Joseph, J., Yardley, L., Michie, S. Using the Internet to Promote Health Behavior Change: A Systematic Review and Meta-analysis of the Impact of Theoretical Basis, Use of Behavior Change Techniques, and Mode of Delivery on Efficacy. *J Med Internet Res* 2010;12(1):e4 <http://www.jmir.org/2010/1/e4/>. 2010.
136. Barberia AM, Attree, M. and Todd, C. Understanding eating behaviours in Spanish women enrolled in a weight-loss treatment - Barberia - 2008 - Journal of Clinical Nursing - Wiley Online Library. 2008.
137. NICE. Antenatal care for uncomplicated pregnancies | Guidance and guidelines. NICE. <https://www.nice.org.uk/guidance/cg62>. Published 2017. Accessed 14/11/18.
138. Jenkins MG, Ford JB, Todd AL, Forsyth R, Morris JM, Roberts CL. Women 's views about maternity care: How do women conceptualise the process of continuity? *Midwifery*. 2015;31(1):25-30.
139. Hunter B, Berg M, Lundgren I, Ólafsdóttir ÓÁ, Kirkham M. Relationships: The hidden threads in the tapestry of maternity care. *Midwifery*. 2008;24(2):132-137.
140. Crotty P. The Value of Qualitative Research in Nutrition. *Annual Review of Health Social Science*. 1993;3(1):109-118.
141. Allen P. Realizing justice in local food systems. *Cambridge Journal of Regions, Economy and Society*. 2010;3(2):295-308.
142. Charles N, Kerr M. *Women, food and families*. Manchester University Press; 1988.

143. Allen JD, Coronado GD, Williams RS, et al. A systematic review of measures used in studies of human papillomavirus (HPV) vaccine acceptability. *Vaccine*. 2010;28(24):4027-4037.
144. Counihan C. *Around the Tuscan table : food, family, and gender in twentieth-century Florence*. New York ; London: Routledge; 2004.
145. D'Sylva A, Beagan BL. 'Food is culture, but it's also power': the role of food in ethnic and gender identity construction among Goan Canadian women. *Journal of Gender Studies*. 2011;20(3):279-289.
146. Zellner DA, Saito S, Gonzalez J. The effect of stress on men's food selection. *Appetite*. 2007;49(3):696-699.
147. Blaxter M. *Health and lifestyles*. Tavistock/Routledge; 1990.
148. Gough B, Conner MT. Barriers to healthy eating amongst men: A qualitative analysis. *Social Science & Medicine*. 2006;62(2):387-395.
149. Backett-Milburn KC, Wills WJ, Roberts M-L, Lawton J. Food, eating and taste: Parents' perspectives on the making of the middle class teenager. *Social Science & Medicine*. 2010;71(7):1316-1323.
150. Grunert KG, Fernández-Celemín L, Wills JM, Storcksdieck Genannt Bonsmann S, Nureeva L. Use and understanding of nutrition information on food labels in six European countries. *Zeitschrift fur Gesundheitswissenschaften = Journal of public health*. 2010;18(3):261-277.
151. Polley BA, Wing RR, Sims CJ. Randomized controlled trial to prevent excessive weight gain in pregnant women. *Int J Obes Relat Metab Disord*. 2002;26(11):1494-1502.
152. Barnard ND, Gloede L, Cohen J, et al. A low-fat vegan diet elicits greater macronutrient changes, but is comparable in adherence and acceptability, compared with a more conventional diabetes diet among individuals with type 2 diabetes. *J Am Diet Assoc*. 2009;109(2):263-272.
153. Lewin S, Glenton C, Oxman AD. Use of qualitative methods alongside randomised controlled trials of complex healthcare interventions: methodological study. *BMJ*. 2009;339:b3496.
154. Murtagh MJ, Thomson RG, May CR, et al. Qualitative methods in a randomised controlled trial: the role of an integrated qualitative process evaluation in providing evidence to discontinue the intervention in one arm of a trial of a decision support tool. *Qual Saf Health Care*. 2007;16(3):224-229.
155. Critical Appraisal Skills Programme. CASP Tools & Checklists - Qualitative Checklist. <http://www.casp-uk.net/casp-tools-checklists>. Published 2017. Accessed 08/08/2017.
156. Kapadia MZ, Gaston A, Van Blyderveen S, et al. Psychological antecedents of excess gestational weight gain: a systematic review. *BMC Pregnancy Childbirth*. 2015;15:107.
157. Jokela M, Hintsanen M, Hakulinen C, et al. Association of personality with the development and persistence of obesity: a meta-analysis based on individual-participant data. *Obes Rev*. 2013;14(4):315-323.
158. Harrison JA, Department of Preventive Medicine and Community Health UoTMB, TX 77550, Mullen PD, Center for Health Promotion Research and Development SoPH, University of Texas Health Science Center at HoustonTexas, Green LW, Institute of Health Policy Studies UoCaS, USA. A meta-analysis of studies of the Health Belief Model with adults. *Health Education Research*. 1992;7(1):107-116.
159. Vesco KK, Karanja N, King JC, et al. Efficacy of a group-based dietary intervention for limiting gestational weight gain among obese women: a randomized trial. *Obesity (Silver Spring)*. 2014;22(9):1989-1996.
160. Hill B, McPhie S, Moran LJ, et al. Lifestyle intervention to prevent obesity during pregnancy: Implications and recommendations for research and implementation. *Midwifery*. 2017;49:13-18.
161. Daley AJ, Jolly K, Jebb SA, et al. Feasibility and acceptability of regular weighing, setting weight gain limits and providing feedback by community midwives to prevent excess weight

- gain during pregnancy: randomised controlled trial and qualitative study. *BMC Obes.* 2015;2:35.
162. Jackson RA, Stotland NE, Caughey AB, Gerbert B. Improving diet and exercise in pregnancy with Video Doctor counseling: a randomized trial. *Patient Educ Couns.* 2011;83(2):203-209.
 163. Bogaerts AF, Devlieger R, Nuyts E, Witters I, Gyselaers W, Van den Bergh BR. Effects of lifestyle intervention in obese pregnant women on gestational weight gain and mental health: a randomized controlled trial. *Int J Obes (Lond).* 2013;37(6):814-821.
 164. Hawkins M, Hosker M, Marcus BH, et al. A pregnancy lifestyle intervention to prevent gestational diabetes risk factors in overweight Hispanic women: a feasibility randomized controlled trial. *Diabet Med.* 2015;32(1):108-115.
 165. Barbour RaS, J. *Research Methods in the Social Sciences.* London: SAGE; 2005.
 166. Green J, Thorogood N. *Qualitative methods for health research.* 2nd ed. ed. London: SAGE; 2009.
 167. Hammersley M. Recent Radical Criticism of Interview Studies: Any implications for the sociology of education? <http://dxdoiorg/101080/01425690301906>. 2010.
 168. Creswell JW. *Qualitative inquiry and research design : choosing among five traditions.* Thousand Oaks, Calif. ; London: Sage Publications; 1998.
 169. Husserl E, Findlay JN. [*Logische Untersuchungen.*] *Logical investigations. Translated by J. N. Findlay from the second German edition.* London: Routledge & Kegan Paul; 1970.
 170. Shutz A. *Alfred Shutz on phenomenology and social relations.* Chicargo: University of Chicargo Press; 1970.
 171. Merleau-Ponty M. *Phenomenology of Perception.* London: Routledge and Kegan Paul; 1962.
 172. Husserl E. *Ideas : general introduction to pure phenomenology.* [S.l.]: Allen and Unwin; 1931.
 173. Braun VaC, V. Using thematic analysis in psychology. *Qualitative research in psychology.* 2006;3(2):77-101.
 174. Sandelowski M. Using qualitative research. *Qual Health Res.* 2004;14.
 175. Moustakas C. *Phenomenological research methods.* Sage; 1994.
 176. Britten N, Campbell R, Pope C, Donovan J, Morgan M, Pill R. Using meta-ethnography to synthesise qualitative research: a worked example. *J Health Serv Res Policy.* 2002;7.
 177. Pope C. *Qualitative research methods: a health focus* PL Rice, D Ezzy. Oxford: Oxford University Press, 1999, pp. 291. ISBN: 0 195 50610 3. *International Journal of Epidemiology.* 2001;30(1):185-185.
 178. Sandelowski M. Sample size in qualitative research. *Res Nurs Health.* 1995;18(2):179-183.
 179. Patton MQ. *Qualitative evaluation and research methods.* 2nd ed. Newbury Park, CA: Sage; 1991.
 180. Zhang YP, Liu XH, Gao SH, et al. Risk factors for preterm birth in five Maternal and Child Health hospitals in Beijing. *PLoS One.* 2012;7(12):e52780.
 181. Ritchie Jeoc, Lewis Jeoc, McNaughton Nicholls Ceoc, Ormston Reoc. *Qualitative research practice : a guide for social science students and researchers.* Second edition. ed.
 182. Webb CaK, J. Focus groups as a research method: a critique of some aspects of their use in nursing research - Webb - 2001 - Journal of Advanced Nursing - Wiley Online Library. *Journal of advanced nursing.* 2001;33(6):798-805.
 183. C S. *Qualitative Research Practice.* 2004.
 184. Jane Ritchie JL, Professor of Social Policy Jane Lewis, Carol McNaughton Nicholls, Rachel Ormston. *Qualitative Research Practice.* Second ed. London: SAGE; 2014.
 185. Boyatzis RE. *Transforming qualitative information : thematic analysis and code development.* Thousand Oaks, Calif ; London: Sage Publications; 1998.
 186. Patton MQ, Patton MQQem. *Qualitative evaluation and research methods.* 2nd ed. ed. Newbury Park, Calif. ; London: Sage; 1990.
 187. Pope C, Mays N. *Qualitative research in health care.* 3rd ed. ed. Oxford: Blackwell ; London : BMJ Books; 2006.

188. Bloor M. On the Analysis of Observational Data: A Discussion of the Worth and Uses of Inductive Techniques and Respondent Validation. *Sociology*. 1978;12(3):545-552.
189. Fereday JaM-C, E. Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development:. *International journal of qualitative methods*. 2006;5(1):80-92.
190. Crabtree BF, Miller WL. *Doing qualitative research*. 2nd ed. ed. Thousand Oaks, Calif. ; London: SAGE; 1999.
191. Broom A. Using qualitative interviews in CAM research: a guide to study design, data collection and data analysis. *Complement Ther Med*. 2005;13(1):65-73.
192. Patton MQ. Two Decades of Developments in Qualitative Inquiry: A Personal, Experiential Perspective. *Qualitative social work*. 2002;1(3):261-283.
193. Holloway I, Todres L. The Status of Method: Flexibility, Consistency and Coherence. *Qualitative Research*. 2003;3(3):345-357.
194. Hammersley Ma, Traianou Aa. *Ethics in Qualitative Research : Controversies and Contexts*.
195. Noddings N. *Caring : a feminine approach to ethics & moral education*. 2nd ed. ed. Berkeley, Calif. ; London: University of California Press; 2003.
196. Miller T, Birch Me, Mauthner MLe, Jessop Je. *Ethics in Qualitative Research*. Second Edition. ed.
197. Hammersley M, Traianou A. Moralism and research ethics: a Machiavellian perspective. <http://dxdoiorg/101080/136455792011562412>. 2011.
198. Seale C. Quality in qualitative research. *Qual Inq*. 1999;5.
199. Finlay L, Ballinger C. *Qualitative research for allied health professionals : challenging choices*. Chichester: John Wiley; 2006.
200. Sandelowski M. The problem of rigor in qualitative research : *Advances in Nursing Science*. 1986.
201. Patton MQ. Enhancing the quality and credibility of qualitative analysis. *Health Serv Res*. 1999;34(5 Pt 2):1189-1208.
202. Docherty M, Smith R. The case for structuring the discussion of scientific papers. *BMJ*. 1999;318(7193):1224-1225.
203. Price, Peter. *Occupation-centred practices: Providing opportunities for becoming and belonging (Doctoral thesis)*. Southern California, University of Southern California; 2003.
204. Haby K, Berg M, Gyllensten H, Hanas R, Premberg Å. Mighty Mums - a lifestyle intervention at primary care level reduces gestational weight gain in women with obesity. *BMC Obes*. 2018;5:16.
205. Taylor SE, Welch WT, Kim HS, Sherman DK. Cultural Differences in the Impact of Social Support on Psychological and Biological Stress Responses. *Psychological Science*. 2007;18(9):831-837.
206. Hardeman W, Johnston M, Johnston D, Bonetti D, Wareham N, Kinmonth AL. Application of the Theory of Planned Behaviour in Behaviour Change Interventions: A Systematic Review. *Psychology & Health*. 2002;17(2):123-158.
207. Jelsma JG, van Leeuwen KM, Oostdam N, et al. Beliefs, Barriers, and Preferences of European Overweight Women to Adopt a Healthier Lifestyle in Pregnancy to Minimize Risk of Developing Gestational Diabetes Mellitus: An Explorative Study. *J Pregnancy*. 2016;2016:3435791.
208. Dunn KI, Mohr P, Wilson CJ, Wittert GA. Determinants of fast-food consumption. An application of the Theory of Planned Behaviour. *Appetite*. 2011;57(2):349-357.
209. Horne J, Corr S, Earle S. Becoming a Mother: Occupational Change in First Time Motherhood. *Journal of Occupational Science*. 2005;12(3):176-183.
210. Antunes Wilhelm L, Neumaier Alves C, Carbonell Demori C, Silva S, Maria Konzgen Meincke S, Ressel L. Feelings of women who experienced a high-risk pregnancy: A descriptive study. *Online Brazilian Journal of Nursing*. 2015;14:284.

211. Oliveira VJ, Madeira AMF. Interagindo com a equipe multiprofissional: as interfaces da assistência na gestação de alto risco. *Escola Anna Nery*. 2011;15:103-109.
212. Turner BS. *The new medical sociology : social forms of health and illness*. New York: W.W. Norton; 2004.
213. Neiterman E. Doing pregnancy: pregnant embodiment as performance. *Women's Studies International Forum*. 2012;35(5):372-383.
214. Waskul DD, Vannini P. *Body/embodiment : symbolic interaction and the sociology of the body*. Aldershot: Ashgate; 2006.
215. Frederick A. Risky Mothers and the Normalcy Project: Women with Disabilities Negotiate Scientific Motherhood. *Gender & Society*. 2017;31(1):74-95.
216. Damaske S. Work, Family, and Accounts of Mothers' Lives Using Discourse to Navigate Intensive Mothering Ideals. *Sociology Compass*. 2013;7(6):436-444.
217. Wolf N. *Misconceptions: Truth, Lies, and the Unexpected on the Journey to Motherhood*. Anchor; 2003.
218. Chambers, Clare. *Sex, culture and justice: The limits of choice*. University Park, Pennsylvania, PA: Pennsylvania State University Press; 2008.
219. Waggoner MR. Motherhood preconceived: the emergence of the Preconception Health and Health Care Initiative. *Journal of health politics, policy and law*. 2013;38(2):345-371.
220. Hays, S. *The Cultural Contradictions of Motherhood*. New Haven and London: Yale University Press; 1996.
221. Olson JA. Mothering co-occupations in caring for infants and young children. *Mothering occupations: Challenge, agency, and participation*. 2004:28-51.
222. Williams O, Annandale E. Obesity, stigma and reflexive embodiment: Feeling the 'weight' of expectation. *Health*. 2018:1363459318812007.
223. O'Brien OA, Lindsay KL, McCarthy M, et al. Influences on the food choices and physical activity behaviours of overweight and obese pregnant women: A qualitative study. *Midwifery*. 2017;47:28-35.
224. Wardle J, Steptoe A. Socioeconomic differences in attitudes and beliefs about healthy lifestyles. *Journal of epidemiology and community health*. 2003;57(6):440-443.
225. Elo IT, Martikainen P, Smith KP. Socioeconomic differentials in mortality in Finland and the United States: the role of education and income. *European Journal of Population / Revue européenne de Démographie*. 2006;22(2):179-203.
226. Hromi-Fiedler A, Chapman D, Segura-Pérez S, et al. Barriers and Facilitators to Improve Fruit and Vegetable Intake Among WIC-Eligible Pregnant Latinas: An Application of the Health Action Process Approach Framework. *J Nutr Educ Behav*. 2016;48(7):468-477.e461.
227. Jackson C, Lawton R, Knapp P, et al. Beyond intention: do specific plans increase health behaviours in patients in primary care? A study of fruit and vegetable consumption. *Social Science & Medicine*. 2005;60(10):2383-2391.
228. Delormier T, Frohlich KL, Potvin L. Food and eating as social practice – understanding eating patterns as social phenomena and implications for public health. *Sociology of Health & Illness*. 2009;31(2):215-228.
229. Eisner EW. *The enlightened eye : qualitative inquiry and the enhancement of educational practice*. Upper Saddle River, N.J.: Merrill ; London : Prentice-Hall International (UK); 1998.
230. Stenbacka C. Qualitative research requires quality concepts of its own. *Management Decision*. 2001;39(7):551-556.
231. Greenhalgh T, Clinch M, Afsar N, et al. Socio-cultural influences on the behaviour of South Asian women with diabetes in pregnancy: qualitative study using a multi-level theoretical approach. *BMC Med*. 2015;13:120.

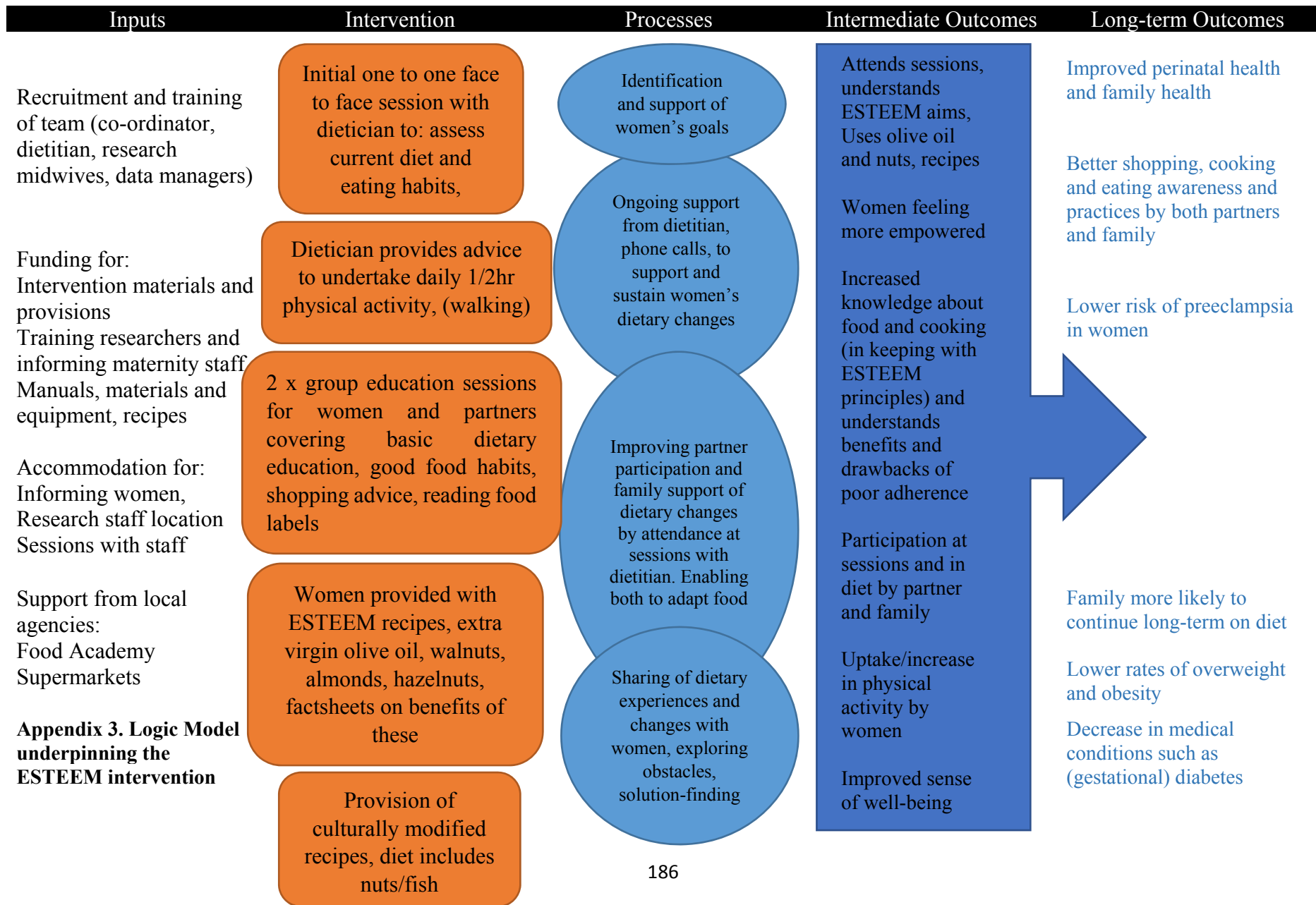
Appendix 1 Summary of factors identified in the literature relating to acceptability, feasibility and experience of diet and lifestyle interventions

Constraining factor	Specific issue identified	Author and date of publication
Contrast between expected and actual experience of trial	Not all women are convinced that control of gestational weight gain may be possible.	Petrov Fieril 2016
	Later stages of an intervention present largest obstacles to dietary change for women	Ahlgren, 2016
	Expressed need of support to implement new dietary habits	Petrov Fieril 2017
Social and family support	Women are strongly influenced by peer support structures	Campbell <i>et al</i> 201
	Need to be supported by non-judgmental people	Petrov Fieril 2016
	Support from family and friends are of major importance for long-term maintenance of new dietary habits Gender relations in the home may present obstacles to women's engagement with a dietary intervention Home environment must be supportive of long-term maintenance of dietary changes	Ahlgren, 2016
	Caring for other children, no help, family don't like healthy food, No pre-pregnancy healthy routine	Sui, 2013
	Cultural and societal pressures suggest women change their views due to societal views Negative risk avoidance strategies are less effective for women to change food	Paterson, 2016
	Support needed from other obese pregnant women Discussing healthy food with partner to consider together how to change diet Need to change to a healthier diet with partner for infant's sake The family must modify its diet in order to be supportive of women	Petrov Fieril, 2017
	Lack of partner support is a barrier to healthy behaviour change Little known about the views of pregnant women's partners	Keely, 2017
Communication with staff	Contradictory and confusing messages "Poor" information Fear of victimising women	Campbell <i>et al</i> 2011
	Need to be supported by non-judgmental people	Petrov Fieril 2016
	More frequent contact with advisors More practical support such as recipes	Atkinson, 2016

Knowledge and skills of staff	Antenatal clinic midwives were unprepared for talking to women about their weight Confidence and skills of staff in offering interventions to eligible women	Davis, 2012
Women's beliefs and motivation	Excuse to be big, justified overeating	Campbell <i>et al</i> 2011
	Fragmentation of self into "me "my pregnancy"	Padmanabhan <i>et al</i> 2015
	A clear personal goal is required by women	Ahlgren, 2016
	The opportunity to set own goals for lifestyle change is crucial Being alone in dealing with obesity in pregnancy "Focus inwards not just rush around"	Petrov Fieril, 2017
	"Don't like cooking" or "Don't feel like cooking" Worry about safety of baby Healthy food is expensive	Sui, 2013
	Lack of awareness of women's perceived barriers to healthy dietary change	Hill, 2013 Paterson, 2016
Process of change	From bad habits to conscious choices Phases of engagement in the process of a long-term dietary intervention Later stages of an intervention present the largest obstacles to dietary change for women	Ahlgren, 2016
Use of a model	Less likely to identify the aspects which improve the success of a dietary change without use of a model, Phelan, Intuitive eating	Paterson, 2016
Acceptability of time, place, provisions, incentives	No safe space for exercising Lack of healthy choices	Sui. 2013
Physical activity	Intention to exercise, self-efficacy, lack of time, tiredness Many women unhappy about their level of activity More restricted access to gym Women felt they must rest during pregnancy	Padmanabhan <i>et al</i> 2015
	Pregnancy ailments, lack of time, child care, concerns about safety Gym is expensive Weather is not conducive	Sui, 2013
	Lack of time for physical activity	Petrov Fieril, 2017
	Lack of partner support is a barrier to healthy behaviour change	Keely, 2017
Weight control	Weight maintenance on a long-term basis	Ahlgren, 2016
	Enhanced strategies required to actively involve pregnant women in self-monitoring and in managing their own weight	Daley, 2015
	Lack of partner support is a barrier to healthy behaviour change	Keely, 2017

Work commitments, travel	Working at a stressful tempo	Petrov Fieril, 2017
	Work commitments	Sui, 2013
Diet	Food choices are linked to social-cognitive factors	Padmanabhan <i>et al</i> 2015
	“Don’t feel like cooking”	Sui, 2013
	Changes made to women’s diets according to how they felt: hunger, nausea, choices, frequency, amount Inclined not cook because they do not want to clean up Less aware, not taught about the sensation of satiety or about intuitive eating	Paterson, 2016
	Lack of partner support is a barrier to healthy behaviour change	Keely, 2017
Pregnancy	May be a time when messages about the importance of counteracting excessive weight gain is seen to be less welcome	Petrov Fieril, 2017
	Short time span available for the intervention (only second and third trimester) Low salience placed on weight management during pregnancy Difficulty to identify key interventions for particular population subgroups	Hill, 2017
	Lack of knowledge about pregnancy outcomes	Sui, 2013
Conceptions of risk	Biomedical representations of risk as viewed by couples Couples need to navigate the “shadow of stigma” of obesity	Keely, 2017

Appendix 2. Example of ESTEEM Materials



Appendix 4. Table of the characteristics of the women and details of the randomised controlled trials included in the study

Author, Country of origin	Type(s) of intervention: Diet/ Physical Activity/Diet	Outcomes Measures	Informed by psychological, health promotion or health belief model or contains quality of life element? Y/N	Population description	Population of women for qualitative component	Setting (Location, context)	Inclusion criteria	Exclusion criteria
1. Vesco 2014, USA	Individualised calorie goals, dietary advice to maintain weight within 3% of randomisation, weekly group meetings. Pedometer provided and daily activity record kept D & PA	Maternal weight change at 34 weeks, 2 weeks postpartum & newborn weight	Y Behavioural self-management techniques	114 Obese pregnant women (recruited at 7-21 weeks gestation) INT=56, C=58	Intervention group	Portland, Oregon, Minimal ethnic diversity, only insured women, non-profit health maintenance organisation serving 470,000 population	English speaking, BMI>30, Aged 18 or older, at 7-21 weeks gestation	GDM or other medical condition, plans to leave area within 1st year postpartum. >21 weeks gestation at recruitment

<p>2. Daley 2015, UK</p>	<p>Weighing and plotting weight on a weight-gain chart, setting limit targets, giving brief feedback at each antenatal appointment, self-weighing weekly, women & MWs interviewed about the intervention</p>	<p>Feasibility and acceptability of the intervention to women with a process evaluation, attrition, weight change, measure the experience of the CMWs and the women of the trial, physical activity, depressions and anxiety, SAEs.</p>	<p>Y Self-regulation theory and Relapse prevention model</p>	<p>76 Low risk pregnant women INT=40, C=36</p>	<p>12 women on the intervention, 7 community midwives involved in community care</p>	<p>Birmingham (Ethics) otherwise no information, low risk women cared for in the community by midwives</p>	<p>Low risk pregnant women receiving community midwifery care, aged >18yrs, BMI 18-29.9 at 1st AN visit 6-8 weeks gestation</p>	<p>BMI >30, any woman receiving weight management support, any high risk (women receiving consultant led care)</p>
<p>3. Bogaerts 2012, Belgium</p>	<p>Group sessions of max 3 pregnant women 4X during pregnancy focusing on energy intake and energy expenditure. Weekly food diary D</p>	<p>Maternal data: age, marital status, occupation, ethnicity, previous miscarriage, smoking/alcohol, psychiatric history, current mental health status, BMI, GWG, Anxiety symptoms, pregnancy induced hypertension</p>	<p>Y Principles of lifestyle intervention programme based on Prochaska model</p>	<p>205 Obese pregnant women were randomised to 3 groups Control n=63, Brochure n=58, Lifestyle n=76</p>	<p>Same (all women completed anxiety and depression scores)</p>	<p>Antenatal units in 3 regional hospitals in Flanders</p>	<p>Obese pregnant women <15weeks gestation</p>	<p>>15 weeks gestation, type1 diabetes, multiple pregnancy, primary need for nutritional advice, Dutch speaking</p>

4. Callaway 2010, Australia	Individualised exercise programme with a weekly energy expenditure goal PA	Physical activity and metabolic outcomes (fasting Insulin and glucose), and Insulin resistance	N but goal centred	50 Obese pregnant women recruited at 12 weeks gestation	All	Women's hospital, Brisbane	Aged 18-45, BMI>30, pregnant women at 12 weeks gestation, able to consent	Non-English speaking, contra-indication or inability to exercise, medical or obstetric complication, type 1 diabetes, heavy smoker
5. Harrison 2014, Australia	4X45min individual behaviour change lifestyle sessions at 14-16, 20,24,28, weeks, Goals, weight-chart, Pedometer D & PA	Anthropometrics, physical activity, GDM diagnosis	Y Social cognitive theory	228 Overweight and obese pregnant women of mixed ethnicity and moderate socio-economic advantage	Intervention group	Mixed ethnicity (3 large metropolitan teaching hospitals in Victoria)	Overweight and obese pregnant women 12-15 weeks gestation, agreeable to glucose tolerance test at 28 weeks gestation	Multiple pregnancy, diagnosed type 1 or 2 diabetes, BMI>45, pre-existing chronic medical condition, non-English speaking
6. Hawkins 2014, USA	A 6-month antenatal programme using motivationally targeted, individually tailored strategies, with follow-up to 6 weeks postpartum, pedometers D & PA	Behavioural, physiological, sociodemographic and medical history collected at baseline, mid pregnancy and at 6 weeks postpartum.	Y trans theoretical model & social cognitive theory employed	68 Overweight or obese, Hispanic, pregnant women	Intervention group	Hispanic women living in USA	Overweight or obese, Hispanic, pregnant women, aged 18-40 years, <18 weeks pregnant, self-reported participating in <30 mins of moderate-intensity activity per week.	History of type ii diabetes, hypertension, heart disease or chronic renal disease, current medication that influence glucose tolerance, contraindications to participating in mod intensity physical acativity or a low-fat, high-fibre diet, self-reporting moderate exercise

<p>7. Herring 2016, USA</p>	<p>A technology-based behavioural weight control intervention using text messaging, Facebook and telephone counselling with a health coach D & PA</p>	<p>GWG, demographics, neonatal weight, Maternal obstet. Outcomes, examine intervention engagement by calculating self-response (texts etc) monthly until 24weeks, then 2-3 weekly >36weeks gestation</p>	<p>Y with acceptability questionnaire Social Cognitive theory & Social ecological model</p>	<p>66 overweight and obese Socially disadvantaged, low income, African-American pregnant women</p>	<p>Intervention group</p>	<p>2 Large outpatient, University, obstetric practices</p>	<p>>18years, self-identifies as African American, <20 weeks gestation, 1st trimester BMI 25-45, income proxy (support), cell-phone with unlimited text usage, Facebook member</p>	<p>Specialised dietary needs, endorsed current tobacco use, multiple pregnancy, obstetric provider consent</p>
<p>8. Huang 2011, Taiwan</p>	<p>Regular, individualised dietary and PA education plan 16weeks - 6 months postpartum Two intervention groups: Group1: pregnancy to 6 months postpartum, Group 2: birth to 6 months postpartum D & PA</p>	<p>Weight, BMI, health-promoting behaviour and psycho-social variables</p>	<p>Y with acceptability questionnaire Social Cognitive theory & Social ecological model</p>	<p>189 all North Taiwanese pregnant women attending an obstetric clinic</p>	<p>2 Intervention groups & 1 control group</p>	<p>Taiwan obstetric unit</p>	<p><16 weeks gestation, >18years old, no cognitive or psychiatric impairment, Chinese reading and speaking, non-participant in any other study, intends to birth at the site</p>	<p>N/A</p>

9. Hui 2014, Canada	Weekly trainer-led group exercise sessions instructed home exercise 3-5X/week from 20-36 weeks gestation and private dietary counselling twice during pregnancy D & PA	BMI, GWG, physical activity, nutrition data, NN birthweight	Y employed the Food Choice Map	113 Normal weight and overweight pregnant women	Intervention group	Recruited from prenatal classes and community antenatal clinics in Winnipeg	<20 weeks gestation, no existing diabetes, with signed consent	Medical or obstetric contraindication to exercise in pregnancy
10. Jackson 2010, USA	Video-doctor counselling tool on diet and exercise and pregnancy weight-gain D & PA	Nutrition knowledge, GWG	Y Used Video doctor based on principles of motivational interviewing	321 all weights, ethnically diverse, low-income, English speaking American women	All women	5 Prenatal care practices in the SF bay area including 3 public hospital practices, 2 academic practices and a community hospital	Non-smoking, non-alcohol users, English speaking, >18years, <26weeks,	N/A
11. Jing 2015, China	A personalised educational, intervention on health-belief model, with manual and a 121 counselling session by trainer D & PA	Demographics, GWG, dietary intake, time, intensity and categories of PA	Y Health belief model	262 all weights, Chinese pregnant women	Intervention group	University, city, hospital in Chengdu, China	Chinese pregnant (singleton) women, >18years, Chinese writing/speaking,	Preexisting diabetes, any pregnancy-related complication, or medical disorder

12. Koivusalo 2016, Finland	Individualised counselling on diet, PA and weight control +1 group meeting with dietitian (1X2hr group counselling sessions and 3Xnurse visits) D & PA	Incidence of GDM, 2nd: fasting plasma glucose, weight change, incidence of PIH and mode of delivery	N	293 Obese pregnant, women at high risk to GDM in Helsinki	Intervention group	Helsinki metropole (3 maternities) The Finnish GDM prevention study	Pregnant women, >18years, with a history of GDM and/or pre pregnancy BMI >30 enrolled at 20 weeks	Type i or ii diabetes, GDM diagnosed <20 weeks, corticosteroids or metformin use, multiple pregnancy, physical disability, substance user, severe psychiatric disorder, non-Finnish speaking
13 Nascimento 2011, Brazil	Weekly exercise under supervision with home exercise counselling (included nutrition element) Inclusion and 36weeks D & PA	Sociodemographic data, GWG, increased arterial BP perinatal outcomes and quality of life outcomes	Y as quality of life element	82 Overweight and obese pregnant women	Intervention group	Pregnant women seen at antenatal clinic of the women's healthcare centre, Campinas, Brazil	BMI >26, >18years, 14-24 weeks gestation,	Multiple pregnancy, regular exerciser, contraindications to exercise ie cervical incompetence, severe arterial hypertension, diabetes with vascular disease and risk of abortion
14. Polley 2002, USA	Stepped-care behavioural intervention on gaining appropriate GWG, exercise in pregnancy, healthful eating D&PA	GWG, demographic information, food intake, energy expenditure, NN birthweight, pregnancy & birth outcomes	N but behavioural goals set	120 Normal weight and overweight pregnant women,	Intervention group	Obstetric clinic in Pittsburgh	Low-income, <20 weeks, 4 cells, normal weight, overweight, black, white.	Underweight women, <18yrs, 1st prenatal visit >12 weeks, high risk pregnancy, previous complications in pregnancy, multiple gestation
15. Rauh 2013, Germany	2 Individual counselling sessions on diet, physical activity and weight monitor D & PA	GWG, weight retention, obstetric and neonatal outcomes	N but behavioural goals were set	250 all weight Healthy German pregnant women	Intervention group	8 Gynaecological practices in Munich	>18years, singleton, <18weeks gestation, BMI > 18.5, German speaking	Obstetric condition preventing physical activity, pre pregnancy diabetes, medical disease, mental ill health

16. Ronnberg 2014, Sweden	Education on GWG according to IOM, application of personalised weight graph, exercise and regular monitoring at every antenatal visit PA	Proportion of women with GWG above IOM guidelines, GWG	N but used motivational tools	445 all weights Swedish, healthy with BMI >19	Intervention group	County in central Sweden, 14 antenatal clinics	Age >18, Orebo county, at or <16 weeks on US	Eating disorder, earlier IUGR, chronic illness, Swedish speaking, BMI<19, multiple pregnancy
17. Price 2012, USA	moderate aerobic exercise 45-60min/4Xweek PA	Cardio-respiratory fitness; Strength, flexibility and discomfort; Pregnancy complications, delivery data, PP recovery, Maternal weight at 6 weeks postnatal	N	91 all weights, Sedentary, Texan women	All women	Texan obstetric practices	Non-aerobic exerciser, singleton, 12-14weeks, BMI<39, cleared by obstetrician	Exerciser, chronic heart/lung disease, poorly controlled diabetes, hypertension, epilepsy, hyperthyroidism, severe anaemia, no orthopaedic limitations, no history of premature labour, previous IUGR, or IUD
18. Korpi-Hyovalti 2012, Finland	Intensive dietary therapy including advice 6X/pregnancy D	Incidence of GDM, changes in nutrient intake, GWG and neonatal birthweight	N	54 normal and overweight pregnant women at high risk to GDM	Intervention group	Community-based setting	Women at high risk to GDM: One or more risk factor: 8-12 weeks gestation, BMI>25, history of GDM, Birthweight of baby>4500g, >40yrs, family HO diabetes	Women diagnosed as having GDM, women who had risk factors to GDM
19. Seneviratne 2015, NZ	A structured, home-based AN programme utilising magnetic stationary bicycles from weeks 20-35 PA	NN birthweight, GWG, aerobic fitness, QoL, pregnancy outcomes, PN body composition, Exercise compliance	Y as quality of life element	75 overweight & obese Multiethnic, pregnant women	Intervention group	Auckland region	18-40years, BMI>25, singleton, <20weeks,	Living outside Auckland area, smoker, multiple pregnancy, pre-existing contraindications to antenatal exercise

20. Poston 2013, UK	1-2-1 session with health trainer >week 17<week 17, 8week programme on diet and lifestyle D&PA	Attitudinal assessment questionnaire, Health status and mental health, dietary assessment, PA assessment, qualitative interviews (no number, ?all intervention women)	Y as quality of life element	183 Obese pregnant women from urban areas of high socio-economic deprivation	All women as control and intervention women were interviewed face-to-face (<i>n=17</i>), or telephone (<i>n=4</i>). Control (<i>n=12</i>), INT (<i>n=9</i>)., All sites included and maximum diversity sampling used. Audio diaries completed by health trainers	4 UK urban study sites for antenatal clinic	BMI>30, singleton, >15, <17weeks at recruitment	Unable to consent, preexisting diabetes or raised BP, renal disease, multiple pregnancy, SLE, APS, haemoglobinopathy, coeliac disease, taking metformin, throid disease, mental illhealth
21. Willcox 2017, Australia	Text messaging, weighing, checking of behavioural goals (weekly/fortnightly), study information website (video & Facebook chat) D & PA	Feasibility & Recruit/retention, protocol delivery & fidelity, contacts and use of elements delivered, acceptability, GWG, diet and physical activity	Y Social cognitive theory	100 Overweight & obese Pregnant women	Intervention group	Australian University maternity hospital	Singleton, 10+6 - 17+6 weeks, self-reported pre-pregnancy BMI>25, English speaking and writing, owning a mobile	<18years, multiple pregnancy, requiring medical/nutritional management, discontinuation of hospital care
22. Sun 2016, China	Diet, exercise and weight gain counselling weeks 8-12 and monthly plans 2nd trimester, feedback and followup phone calls/emails D&PA	GDM, GWG, Demographics	N but used goal setting and identification of barriers	74 Overweight & obese pregnant women	Intervention group	Peking O&G dept of a medical college hospital	Primigravid, prepregnancy BMI >24, booking at 8-12weeks gestation, singleton,	Preexisting diabetes, abnormal GTT, vaginal bleeding or severe medical condition preventing PA, mental illness

23. Asci 2016, Turkey	Individualised LS intervention on diet exercise and weight monitoring (12-5, 16-8, 20-4 & 37 weeks) D & PA	GWG, diet, lifestyle behaviours, post partum weight retention and obstetric outcomes	Y Pender's health promotion model	102 all weights , Middle-income, high immigrant population, pregnant, accessible free healthcare service in Istanbul	Intervention group	Family health centre in Istanbul, Turkey	Healthy pregnant, >18yrs, natural conception, P1 or P2, <12wks gestation	Pregnancy complications
24. Briley 2002, Australia	6 ante-natal individualised in-home nutrition assessment and counselling visits D & PA	Demographic data, weight gain, infant birthweight, nutrient consumption, energy intakes during pregnancy	N	20 all weight pregnant women, volunteers, African American	All	County in USA with representative rates of LBW, recruited through local county health department WIC Program	African-American pregnant women 24 weeks gestation or < no pre-existing health condition not following prescribed diet,	>24 weeks gestation,

Abbreviations: **D:** Diet, **PA:** Physical activity, **C:** Control, **INT:** Intervention, **BMI:** Body mass index, **GDM:** Gestational diabetes mellitus, **GWG:** Gestational weight gain, **Y:** Yes, **N:** N

Appendix 5.

Conduct and reporting of acceptability, attitudes, beliefs and experiences of pregnant women in randomised trials on diet and lifestyle interventions: A systematic review

Hamilton E. Adela A,^{1,2} Nowell Ann K,² Harden Angela,³ Thangaratinam Shakila^{1,2}

Affiliation:

¹BARC Barts Research Centre for Women's Health, Queen Mary University of London, London; ²Barts Health NHS Trust, The Royal London Hospital, London; ³University of East London, London

Corresponding author:

Adela Hamilton

¹Barts Research Centre for Women's Health Queen Mary University of London
London E1 2AB

E-mail. A.E.A.Hamilton@qmul.ac.uk

Abstract

Objective

To evaluate the conduct and reporting of views of pregnant women on the acceptability, attitudes, beliefs and their experiences in randomised trials on diet and lifestyle interventions.

Study design

We undertook a systematic review of literature of randomised trials identified from our previous search in major electronic databases (until February 2017) without language restrictions. We included trials on diet and lifestyle interventions that reported acceptability, attitudes, beliefs and experiences of pregnant women. The quality of papers was evaluated using the Critical Skills Appraisal Programme (CASP) framework. Data were extracted for the following domains: acceptability, intention, behaviour, attitudes and factors influencing participation. The proportion of studies that reported the various components in each domain was reported in percentages.

Results

Of the 122 trials on diet and lifestyle in pregnancy, 24 reported on views of pregnant women. Acceptability of the provided information to the woman was reported in 84% (20/24), compared to 12% (3/24) on acceptability to partner or to family. Mother's intention to adhere to intervention in pregnancy was reported in 68% (17/24) of studies vs. only 16% (4/24) on family's intentions to support adherence. Changes in mother's behaviour were reported for consuming specific components of diet such as nuts (8%, 2/24), olive oil (12%, 3/24) and fruit (40%, 10/24) vs. 16% (4/24) of trials reporting changes in family's behaviour. While knowledge of food ingredients (72%, 18/24), and attitude to gestational weight gain were commonly reported (66%, 16/24) in over two-thirds of studies, only half assessed attitude to participation in research (45%, 11/24). All studies reported facilitators for uptake of intervention such as personalised support (100%, 24/24), with half (52%, 13/24) on beliefs about weight, and less than 10% (2/24) about baby's health.

Conclusion

The focus on studies is mainly on the mother, and less on family. Further studies are needed with a holistic approach to ensure that such interventions when implemented are accepted by women and their families.

Keywords: pregnancy, randomized controlled trial, acceptability, diet, lifestyle intervention

Word count: 2,803

Introduction

The global obesity epidemic has led to an increasing number of studies on diet and lifestyle interventions in pregnancy to assess their effects on gestational weight gain and pregnancy outcomes.^{1,2} Although individual studies on lifestyle interventions vary in the magnitude of benefit,^{1,3,4} overall, they are beneficial in reducing weight gain in pregnancy, and improving pregnancy outcomes. Adherence to the intervention in pregnancy is crucial for improved outcomes.^{2,4,5} Dietary adherence depends on the acceptability of the recommended diet. The most pressing question is not whether the diet will work but whether it is sustainable.

Many practitioners and researchers have concerns about the participant's capacity to understand and adhere to the proposed diet. In addition to the women's preferences, numerous logistical factors affect uptake and adherence of intervention. Group sessions, one-to-one support, family or peer support or lack of this, and continuous or one-off input affect the acceptability and the adherence to an intervention. Social support, motivational techniques and flexibility are keys to acceptability and adherence. Process evaluation and qualitative data are essential to identify the role of these key elements in studies. Often, randomised trials include a qualitative evaluation component to assess women's experience, and obtain their partners' views to improve the uptake of a healthy lifestyle in pregnancy.⁶

The impact of mixed-methods research is maximised when the quantitative and qualitative aspects of a trial are integrated.⁷ There is an acknowledged gap in the integration of the qualitative and the trial findings.^{7,8} We undertook a systematic review to evaluate the conduct, and reporting of research on acceptability, attitudes, beliefs and experiences on pregnant women in randomised trials of diet and lifestyle interventions.

Literature search

We used a previous literature search of randomised trials on diet and lifestyle interventions in pregnancy that was conducted in 2012. The search had been further updated in January 2016 and February 2017 to identify additional studies. No language restrictions were applied. The details of the search strategy are provided in previous publications.⁹⁻¹¹

Study selection and quality assessment

Two reviewers (AH and AN) independently assessed the identified randomised trials for potential qualitative components. Full manuscripts of all randomised trials were obtained, and studies that contained a qualitative component or any reporting of research on acceptability, attitudes, beliefs and experiences of pregnant women were included. We excluded research which did not include a nested qualitative component, quality of life evaluation or which did not contain any participant or clinician input or opinion. When there was more than one publication of the same trial, we selected the version that contained the largest sample size in qualitative evaluation, and those which contained the most detailed component regarding research on acceptability, attitudes, beliefs and

experiences on pregnant women. Two independent reviewers assessed the methodological quality of the reporting of included studies using the Critical Appraisal Skills Programme (CASP) framework.¹² Any disagreements were resolved through discussion with third reviewer (ST).

Data extraction and analysis

Two independent reviewers (AH and AN) extracted qualitative data in duplicate using the predesigned and piloted data extraction forms. Data were extracted on the characteristics of the interventions, study objectives, methods and relevant outcomes that were reported. We extracted data on adequacy of evaluation of the following components:¹³ Awareness and knowledge; acceptability of intervention, intention to adhere, change in behaviour, knowledge and attitudes and influencing factors. Each component in the domains were scored as yes, or no / unclear. We calculated the proportion of studies that reported these, and provided the results in percentages.

Results

Overall, of the randomised trials on diet and lifestyle in pregnancy, 24 contained qualitative evaluation, including evaluation of acceptability, attitudes, beliefs and experiences of women (Fig 1).

Characteristics of the included studies and interventions

The interventions in the trials were categorised into two main groups: those on diet [2] and those on mixed lifestyle interventions [22]. No studies on physical activity contained the desired components in the domains we were examining. The studies originated from North and South America and Canada [8], Europe [8], Australia and New Zealand [5] and Far East [3]. The included trials studied the effect of interventions on women who were normal/overweight [4]; overweight & Obese [7]; obese [5] or all women [8]. The total number of women included in the trials was 3,581; trials varied in size from 20 to 445 participants, with an average of 149 women (Table 1).

The dietary interventions ranged from intensive dietary therapy and group sessions focusing on energy expenditure using a weekly food diary to mixed interventions using individualised assessment, counselling and weight monitoring. Behavioural interventions using goal-setting¹¹ video, websites, Facebook chats with weight-control elements;¹⁴⁻¹⁶ individualised diet¹⁷ and lifestyle interventions,¹⁸⁻²² with regular health trainer and/or weekly energy expenditure measurement. Regular diet, exercise;²³ personalised counselling;^{4,24} and also group-based interventions were also used.^{1,25} Some interventions used home-based approaches,^{2,26} with pedometers,²⁷ stationary bicycles,²⁸ whilst others employed intensive aerobics,²⁹ personalised weight graphs with regular monitoring,^{5,30,31} or group trainer-led exercises with private diet counselling.³ The many health behavior models employed in the studies were based largely on social cognitive theory and health belief model.

Quality assessment

The relationship between the researcher and participants was reported suitably in all studies, and the appropriateness of the participants discussed in 92% (23/24) of studies. 76% (19/24) of the studies had a clear statement of the aim of the research, and a similar proportion (80%, 20/24) reported the subject experience of participants. Data were collected to address the research issue in 52% (14/24) of the studies; congruity between the research question and data analysis, and congruity between the research question and data analysis were reported in 28% (7/24) of the studies. Data analysis was sufficiently rigorous in 20% (5/24) of studies (Fig 2).

Acceptability of diet and lifestyle intervention

The most commonly reported component regarding acceptability of the intervention were for information received (80%, 20/24) and the acceptability of the intervention for the woman (68%, 18/24). The timing of the intervention and the resources provided were evaluated in 64% (16/24) of the studies and time required for the intervention in 52% (13/24), the location used in 50% (12/24), and the cost in 40% (10/24) of the studies. Fewer studies reported on incentives provided during the intervention (20%, 5/24), and very few reported on the acceptability of the intervention to partners and family members (12%, 3/24) (Fig 3).

Intention to adhere to diet and lifestyle intervention

Two-thirds of trials assessed women's intention to adhere to the intervention during pregnancy (68%, 17/24), and half evaluated specifically to physical activity (50%, 12/24). The women's intention to adhere after childbirth was less commonly reported (16%, 4/24), as were the family's intention to adhere to lifestyle changes (16%, 4/24), and mother's intention to adhere outside the home environment (8%, 2/24) (Fig 4a).

Change in behaviour on diet and lifestyle intervention

Most studies assessed any improvements in women's dietary and lifestyle behaviours (92%, 23/24); only half specifically reported on change in intake of fruit and vegetables (40%, 10/24). Less commonly reported changes in behaviour included family involvement in decision-making about diet and lifestyle (16%, 4/24), consumption of fish (20%, 5/24) the use of olive oil (12%, 3/24) and inclusion of nuts in the diet (8%, 2/24) (Fig 4b).

Knowledge and attitudes on diet and lifestyle intervention

Knowledge of food nutrients and women's attitudes to weight gain (64%, 16/24) were commonly reported (72%, 18/24). Information about women's attitude to research participation was reported in 44% (11/24), and women's awareness of difficulty of postpartum weight loss in 28% (7/24) of studies. Less commonly reported aspects included women's knowledge of food labeling and

saturated fats (24%, 6/24). Reports of women's attitude to the weight of health care professionals and knowledge of any previous diet were of insignificant proportion merely (4-8%, 1-2/24) (Fig 4c).

Factors influencing participation in study on diet and lifestyle intervention

Beliefs about receiving personalised support were evaluated in all studies, but for group meetings was reported in only 40% (10/24) of the studies. Specific beliefs regarding control of diabetes with lifestyle changes were evaluated in a third (32%, 8/24) of studies, and few studies assessed the supportive role of partners, family and friends (24%, 6/24). Beliefs about potential benefit of the diet such as lowered cholesterol levels (12%, 3/24), and impact on baby's health (8%, 2/24) were seldom reported. While the role of travel as the main factor negatively affecting women's participation was assessed in 84% (21/24) of the studies, life events as barriers to participation was only reported in 16% (4/24) of studies. Potential barriers such as nausea and pregnancy symptoms, women's own beliefs about baby's needs, and beliefs about pregnancy (myths) were assessed in less than a tenth of all trials (4-8%, 1-2/24) (Fig 5).

Discussion

There are wide variations in the reporting of acceptability, attitudes, beliefs and experiences on diet and lifestyle interventions in randomised trials on pregnant women. The main focus is the mother in isolation, and less on engagement with the woman's social network, social engagements and activities away from home. There is considerable diversity in the use and the reporting of models and theories underpinning interventions to gauge the determinants of women's intentions and support the application of a life-style intervention in pregnancy. In the main such theories would posit that feedback and support facilitate change in health behavior and they put a varying emphasis on belief of self-efficacy. Self-efficacy is a person's own belief in their ability to complete a task or solve a problem. The ideal self-efficacy is slightly above a person's ability, high enough to present a challenge. There was a distinct lack of involvement of family members and support persons within the interventions, furthermore, researchers have commented that psychological factors such as feelings, emotions, thoughts, beliefs - about body image, self-efficacy and motivation, may impede change of behavior, therefore need also to be targeted. Outside of pregnancy, personality traits have been found to be as accurate as other well-established health risk factors, such as socio-economic status and smoking, in predicting poor health and may be key to women's change of behavior and improvement of population health.^{32,33} Psychological disposition, indicated by measures of personality and the personality trait conscientiousness (high conscientiousness is described as being self-disciplined, task oriented, well organized; low conscientiousness as lacking in self-control and long-term planning) is strongly associated with obesity.³³ The value of personality and other psychological traits exemplifies an important opportunity to optimise gestational weight in all pregnant women.³²

We found that evaluation of the acceptability of the intervention from the woman's perspective was sparse, with no detail of the methods used to collate or analyse these data. Although the intentions of women to adhere to the diet either during or after the intervention were somewhat present in

the studies, these were not commonly reported. Intentions comprise a person's motivation towards a goal regarding direction and intensity and are a mandatory prerequisite for lifestyle change and must be made apparent if change is to occur.^{14,19} The importance of working with women's family members and social connections is essential to the success of change in behavior as this is related to beliefs about social support.^{14,19} This was not commonly reported in the studies examined. Change in behaviour was reported in a small proportion of the studies and this was in relation to family members being involved in discussion about change.

The strength of this review lies in its uniqueness regarding the reporting of acceptability, attitudes, beliefs and experiences on diet and lifestyle interventions in randomised trials on pregnant women. The use of a validated checklist to assess the quality of the included studies ensures legitimacy. This review seeks to address factors such as women's intentions, their behavior, knowledge and attitudes, and factors influencing participation on the intervention. It is theory-based and systematically organised. The wide variety of definitions and the insufficient detail of reporting of how data was acquired, and how these were analysed, limit the usefulness of the research we examined. We were constrained by the sparsely reported information on women's perceived benefits and women's beliefs about diet and lifestyle, which was lacking in the studies.

Previous studies show equivocal findings on difficulties with engaging women, with no clear details on ideal setting, frequency and timing of the intervention.^{25,27} It is also known that pregnant women have poor knowledge about obesity, weight gain and its consequences, and are not aware of management strategies.³⁴ Women are more aware of long-term health risks than that of obesity-related perinatal risks. Hence improving awareness of perinatal complications associated with excess weight gain in pregnancy may be a motivating factor for women to keep their weight within normal limits. Our review showed that women were not aware of the difficulty of post-partum weight loss, and such awareness may significantly improve outcomes for mothers and babies.

Perceived behaviour control of diet appears to be related to beliefs about social support and beliefs about lack of self-efficacy seem to reduce perceived control over eating behaviours. Interventions resulting in significant changes in intention are also likely to lead to change in behaviour. Women's intentions to adhere to the intervention during and after pregnancy were reported however, little evidence about how change of behavior occurred is provided. As information regarding women's intentions is essential for effective diet and behaviour change an intervention approach based on knowledge and insights into women's individual intentions and beliefs is needed.

The timing of the intervention is an important factor to its success. Pregnancy is a transition and as such may be the best time to introduce changes in lifestyle as intervention during pregnancy is depicted by a unique treatment adherence.^{15,18,30} It may be possible to identify high risk women early in pregnancy, as weight gained in the first 20 weeks has been shown to be a good indicator of overall weight gain. The studies recruited women at booking, the majority by twelve weeks gestation therefore improving efforts to control weight-gain. Our results show that women found the timing

of the intervention reasonably suitable, however, it was the time that it took which made the intervention less acceptable to them.

The challenge facing health care researchers is to uncover the factors and mechanisms that that increase engagement with a healthy lifestyle, and to sustain such changes in the woman, her partner, and children in the long run. Incorporating significant others and weight loss strategies within interventions for a healthier family lifestyle should be taken into consideration when developing research and population health. There is a need to include families and consider the psychological, social and professional functions of women which would enable them to find a more realistic and dependable way to change diet and lifestyle in pregnancy. Diet and lifestyle changes require a sustained approach to promote women's health and well-being and facilitate the application of the intervention to practice, moreover, women have individual and inimitable experiences of food and knowledge of these could be used to influence families to engage in and adopt an enduring, healthy lifestyle. Studies within the review demonstrated that weekly contacts and ongoing feedback and education result in participants' success to control their gestational weight-gain. ^{1,5,16,30,31,35}

Pregnancy is a stage of a woman's life characterised by change and is an opportune time to influence diet and lifestyle together with the family. Weight control endeavors may also have incidental effects on other family members and friends. Providing women with knowledge, skills and attitudes to facilitate and support weight management during and following pregnancy is essential in tackling obesity in this group. More evidence is urgently needed to examine ways in which the problems of logistics, feasibility, acceptability and retention are handled and this from the person's own perspective, together with her/his entourage. Furthermore, women from disadvantaged backgrounds and from specific ethnic groups have more complex health concerns, and need a targeted approach to improve their engagement in research. ^{14,15,22}

As complex interventions are difficult to describe and replicate it would be useful to elaborate upon the mechanism or active ingredient that engender their success. ³⁶ Qualitative research methods can provide insights into the elements of interdependence and independence within a trial and also account for multidimensional explanatory pathways. The effects of complex health and social care interventions comprise of many social and behavioural processes that are not fully discernible, solely using quantitative means. ³⁶ The design and process as well as the content and delivery of the randomised trial must be acceptable, as these are essential to its success.

Conclusions

Factors relating to women's social support and their beliefs and understanding of their lifestyle choices are remarkably absent in the literature examined. There is a need to identify factors that not only improve uptake of healthy interventions but also which support adherence throughout pregnancy and beyond.

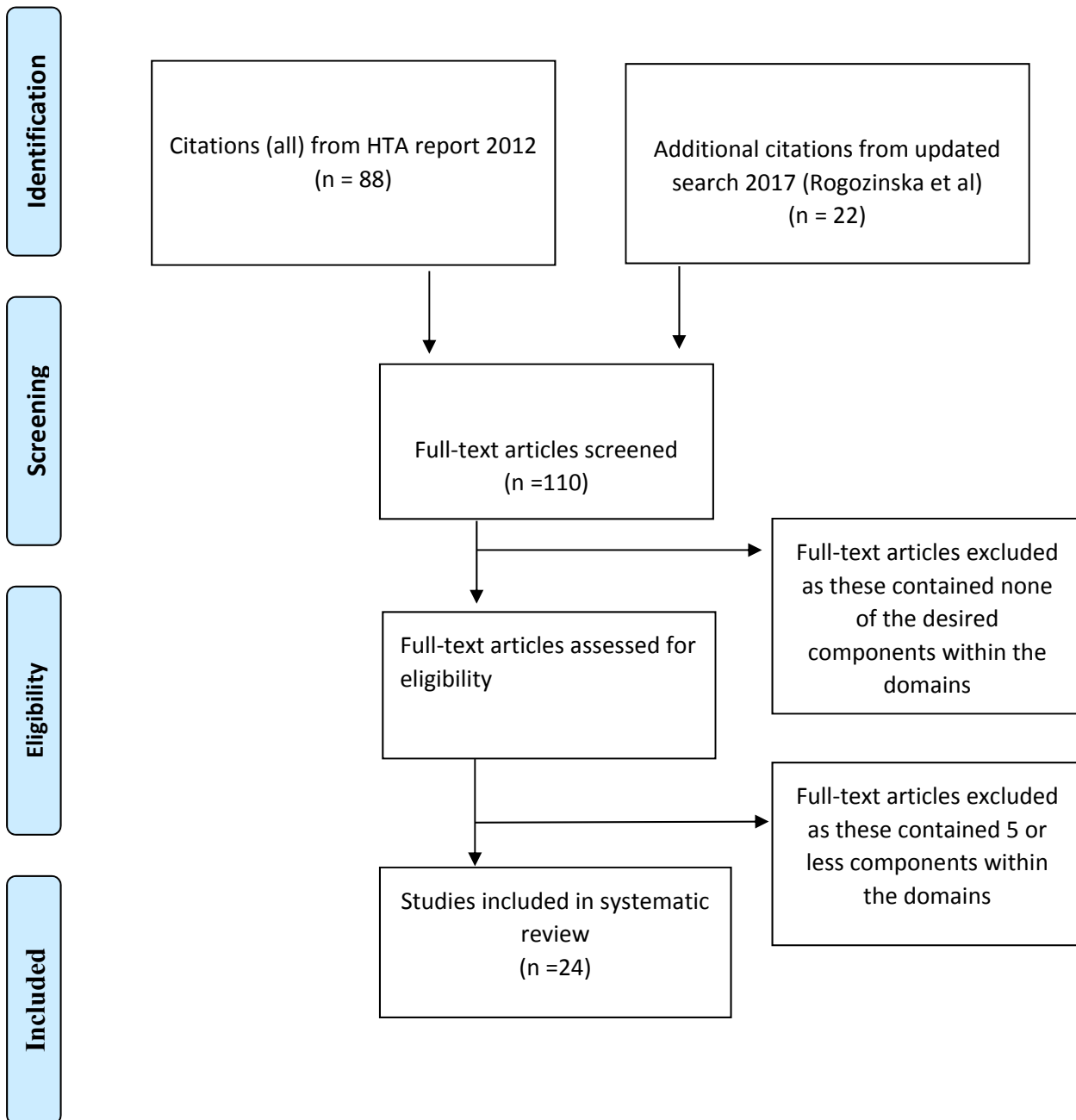
References

1. Harrison CL, Lombard CB, Teede HJ. Limiting postpartum weight retention through early antenatal intervention: the HeLP-her randomised controlled trial. *Int J Behav Nutr Phys Act.* 2014;11:134.
2. Nascimento SL, Surita FG, Parpinelli M, Siani S, Pinto e Silva JL. The effect of an antenatal physical exercise programme on maternal/perinatal outcomes and quality of life in overweight and obese pregnant women: a randomised clinical trial. *BJOG.* 2011;118(12):1455-1463.
3. Hui AL, Back L, Ludwig S, et al. Effects of lifestyle intervention on dietary intake, physical activity level, and gestational weight gain in pregnant women with different pre-pregnancy Body Mass Index in a randomized control trial. *BMC Pregnancy Childbirth.* 2014;14:331.
4. Rauh K, Gabriel E, Kerschbaum E, et al. Safety and efficacy of a lifestyle intervention for pregnant women to prevent excessive maternal weight gain: a cluster-randomized controlled trial. *BMC Pregnancy Childbirth.* 2013;13:151.
5. Polley BA, Wing RR, Sims CJ. Randomized controlled trial to prevent excessive weight gain in pregnant women. *Int J Obes Relat Metab Disord.* 2002;26(11):1494-1502.
6. Barnard ND, Gloede L, Cohen J, et al. A low-fat vegan diet elicits greater macronutrient changes, but is comparable in adherence and acceptability, compared with a more conventional diabetes diet among individuals with type 2 diabetes. *J Am Diet Assoc.* 2009;109(2):263-272.
7. Lewin S, Glenton C, Oxman AD. Use of qualitative methods alongside randomised controlled trials of complex healthcare interventions: methodological study. *BMJ.* 2009;339:b3496.
8. Murtagh MJ, Thomson RG, May CR, et al. Qualitative methods in a randomised controlled trial: the role of an integrated qualitative process evaluation in providing evidence to discontinue the intervention in one arm of a trial of a decision support tool. *Qual Saf Health Care.* 2007;16(3):224-229.
9. Thangaratinam S, Rogozinska E, Jolly K, et al. Effects of interventions in pregnancy on maternal weight and obstetric outcomes: meta-analysis of randomised evidence. *BMJ.* 2012;344:e2088.
10. Rogozinska E, D'Amico MI, Khan KS, et al. Development of composite outcomes for individual patient data (IPD) meta-analysis on the effects of diet and lifestyle in pregnancy: a Delphi survey. *Bjog.* 2016;123(2):190-198.
11. Rogozińska E, Marlin N, Yang F, et al. Variations in reporting of outcomes in randomized trials on diet and physical activity in pregnancy: A systematic review. *J Obstet Gynaecol Res.* 2017.
12. Critical Appraisal Skills Programme. CASP Tools & Checklists - Qualitative Checklist. 2017; <http://www.casp-uk.net/casp-tools-checklists>. Accessed 08/08/2017.
13. Allen JD, Coronado GD, Williams RS, et al. A systematic review of measures used in studies of human papillomavirus (HPV) vaccine acceptability. *Vaccine.* 2010;28(24):4027-4037.
14. Herring SJ, Cruice JF, Bennett GG, Rose MZ, Davey A, Foster GD. Preventing excessive gestational weight gain among African American women: A randomized clinical trial. *Obesity (Silver Spring).* 2016;24(1):30-36.
15. Jackson RA, Stotland NE, Caughey AB, Gerbert B. Improving diet and exercise in pregnancy with Video Doctor counseling: a randomized trial. *Patient Educ Couns.* 2011;83(2):203-209.
16. Willcox JC, Wilkinson SA, Lappas M, et al. A mobile health intervention promoting healthy gestational weight gain for women entering pregnancy at a high body mass index: the txt4two pilot randomised controlled trial. *BJOG.* 2017.

17. Korpi-Hyövälti E, Heinonen S, Schwab U, Laaksonen DE, Niskanen L. Effect of intensive counselling on physical activity in pregnant women at high risk for gestational diabetes mellitus. A clinical study in primary care. *Prim Care Diabetes*. 2012;6(4):261-268.
18. Huang TT, Yeh CY, Tsai YC. A diet and physical activity intervention for preventing weight retention among Taiwanese childbearing women: a randomised controlled trial. *Midwifery*. 2011;27(2):257-264.
19. Jing W, Huang Y, Liu X, Luo B, Yang Y, Liao S. The effect of a personalized intervention on weight gain and physical activity among pregnant women in China. *Int J Gynaecol Obstet*. 2015;129(2):138-141.
20. Aşçı Ö, Rathfisch G. Effect of lifestyle interventions of pregnant women on their dietary habits, lifestyle behaviors, and weight gain: a randomized controlled trial. *J Health Popul Nutr*. 2016;35:7.
21. Koivusalo SB, Rönö K, Klemetti MM, et al. Gestational Diabetes Mellitus Can Be Prevented by Lifestyle Intervention: The Finnish Gestational Diabetes Prevention Study (RADIEL): A Randomized Controlled Trial. *Diabetes Care*. 2016;39(1):24-30.
22. Hawkins M, Hosker M, Marcus BH, et al. A pregnancy lifestyle intervention to prevent gestational diabetes risk factors in overweight Hispanic women: a feasibility randomized controlled trial. *Diabet Med*. 2015;32(1):108-115.
23. Callaway LK, Colditz PB, Byrne NM, et al. Prevention of gestational diabetes: feasibility issues for an exercise intervention in obese pregnant women. *Diabetes Care*. 2010;33(7):1457-1459.
24. Sun Y, Zhao H. The effectiveness of lifestyle intervention in early pregnancy to prevent gestational diabetes mellitus in Chinese overweight and obese women: A quasi-experimental study. *Appl Nurs Res*. 2016;30:125-130.
25. Vesco KK, Karanja N, King JC, et al. Efficacy of a group-based dietary intervention for limiting gestational weight gain among obese women: a randomized trial. *Obesity (Silver Spring)*. 2014;22(9):1989-1996.
26. Briley C, Flanagan NL, Lewis N. In-home prenatal nutrition intervention increased dietary iron intakes and reduced low birthweight in low-income African-American women. *J Am Diet Assoc*. 2002;102(7):984-987.
27. Poston L, Briley AL, Barr S, et al. Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); assessment of behavioural change and process evaluation in a pilot randomised controlled trial. *BMC Pregnancy Childbirth*. 2013;13:148.
28. Seneviratne SN, Jiang Y, Derraik J, et al. Effects of antenatal exercise in overweight and obese pregnant women on maternal and perinatal outcomes: a randomised controlled trial. *BJOG*. 2016;123(4):588-597.
29. Price BB, Amini SB, Kappeler K. Exercise in pregnancy: effect on fitness and obstetric outcomes—a randomized trial. *Med Sci Sports Exerc*. 2012;44(12):2263-2269.
30. Daley AJ, Jolly K, Jebb SA, et al. Feasibility and acceptability of regular weighing, setting weight gain limits and providing feedback by community midwives to prevent excess weight gain during pregnancy: randomised controlled trial and qualitative study. *BMC Obes*. 2015;2:35.
31. Ronnberg AK, Ostlund I, Fadl H, Gottvall T, Nilsson K. Intervention during pregnancy to reduce excessive gestational weight gain—a randomised controlled trial. *BJOG*. 2015;122(4):537-544.
32. Kapadia MZ, Gaston A, Van Blyderveen S, et al. Psychological antecedents of excess gestational weight gain: a systematic review. *BMC Pregnancy Childbirth*. 2015;15:107.
33. Jokela M, Hintsanen M, Hakulinen C, et al. Association of personality with the development and persistence of obesity: a meta-analysis based on individual-participant data. *Obes Rev*. 2013;14(4):315-323.

34. Shub A, Huning EY, Campbell KJ, McCarthy EA. Pregnant women's knowledge of weight, weight gain, complications of obesity and weight management strategies in pregnancy. *BMC Res Notes*. 2013;6:278.
35. Bogaerts AF, Devlieger R, Nuyts E, Witters I, Gyselaers W, Van den Bergh BR. Effects of lifestyle intervention in obese pregnant women on gestational weight gain and mental health: a randomized controlled trial. *Int J Obes (Lond)*. 2013;37(6):814-821.
36. Donovan J, Mills N, Smith M, et al. Quality improvement report: Improving design and conduct of randomised trials by embedding them in qualitative research: ProtecT (prostate testing for cancer and treatment) study. Commentary: presenting unbiased information to patients can be difficult. *BMJ*. 2002;325(7367):766-770.

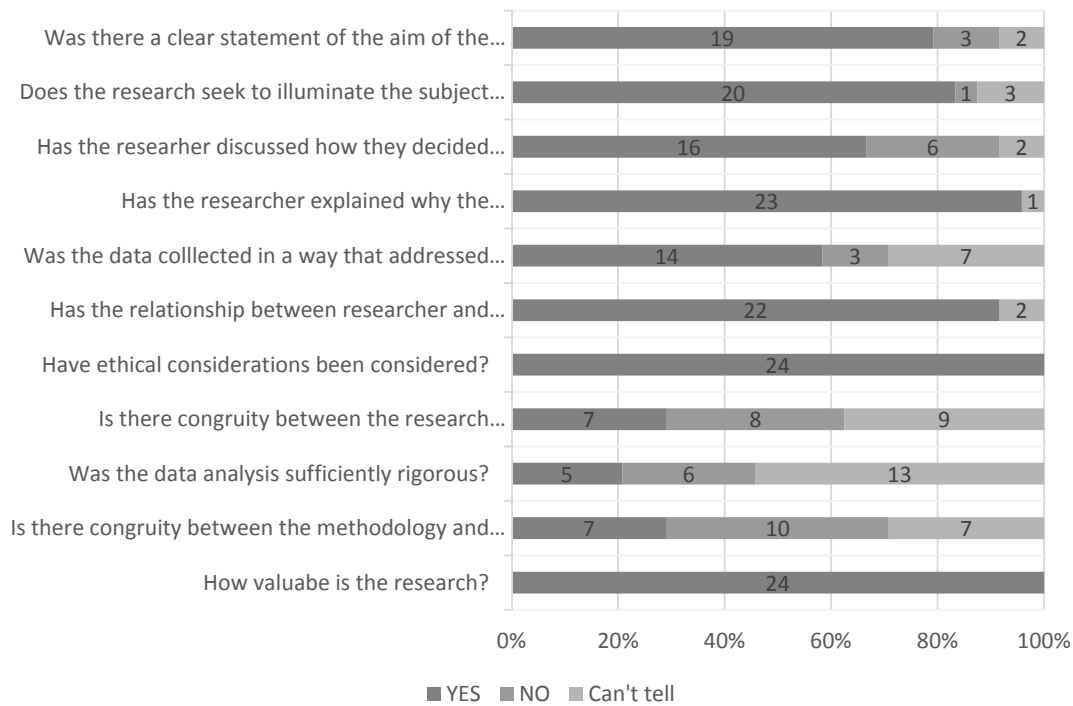
Appendix 6. Flow-diagram describing the process of study selection about diet and lifestyle in pregnancy, based on PRISMA guideline (2009)



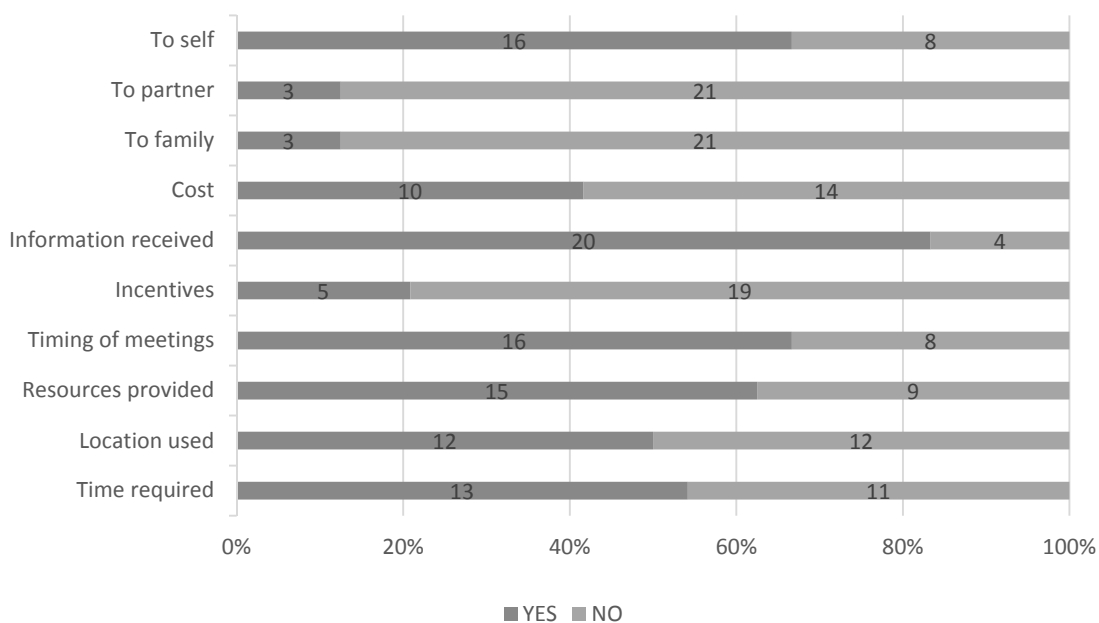
HTA Report: Thangaratinam S, Rogozińska E, Jolly K, Glinkowski S, Duda W, Borowiack E, et al. Interventions to reduce or prevent obesity in pregnant women: a systematic review. *Health Technol Assess* 2012;16(31).

Updated search of: Rogozińska E, Marlin N, Yang F, Dodd JM, Guelfi K, Teede H, et al. Variations in reporting of outcomes in randomized trials on diet and physical activity in pregnancy: A systematic review. *J Obstet Gynaecol Res*. 2017.

Appendix 7: Quality assessment of randomised trials on diet and physical activity that reported details on views of women

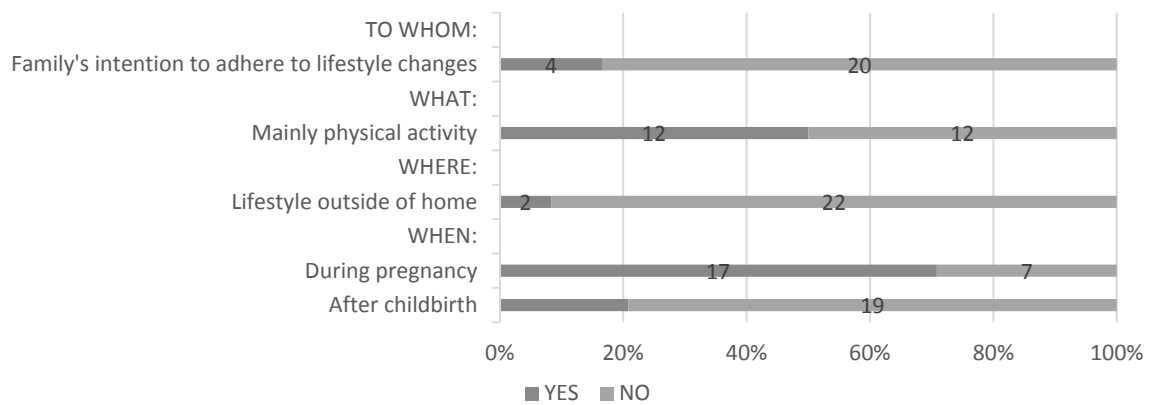


Appendix 8: Acceptability of the various components of the intervention reported in randomised trials on diet and physical activity in pregnancy

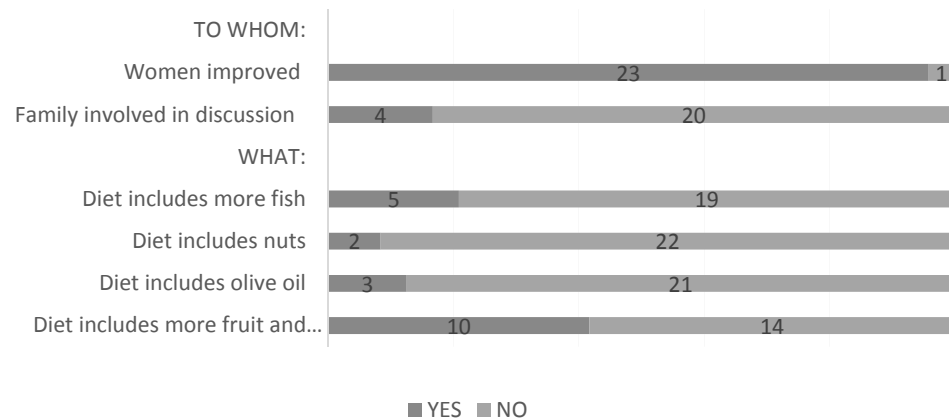


Appendix 9: Trials reporting women’s intention to adhere to diet and lifestyle intervention, change in behaviour and their knowledge and attitudes

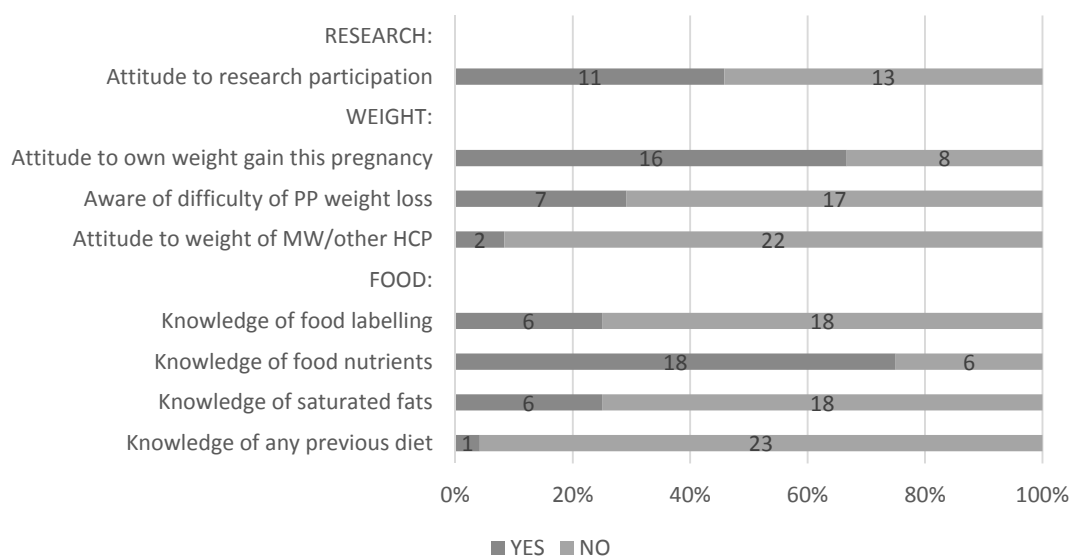
a. Intention to adhere



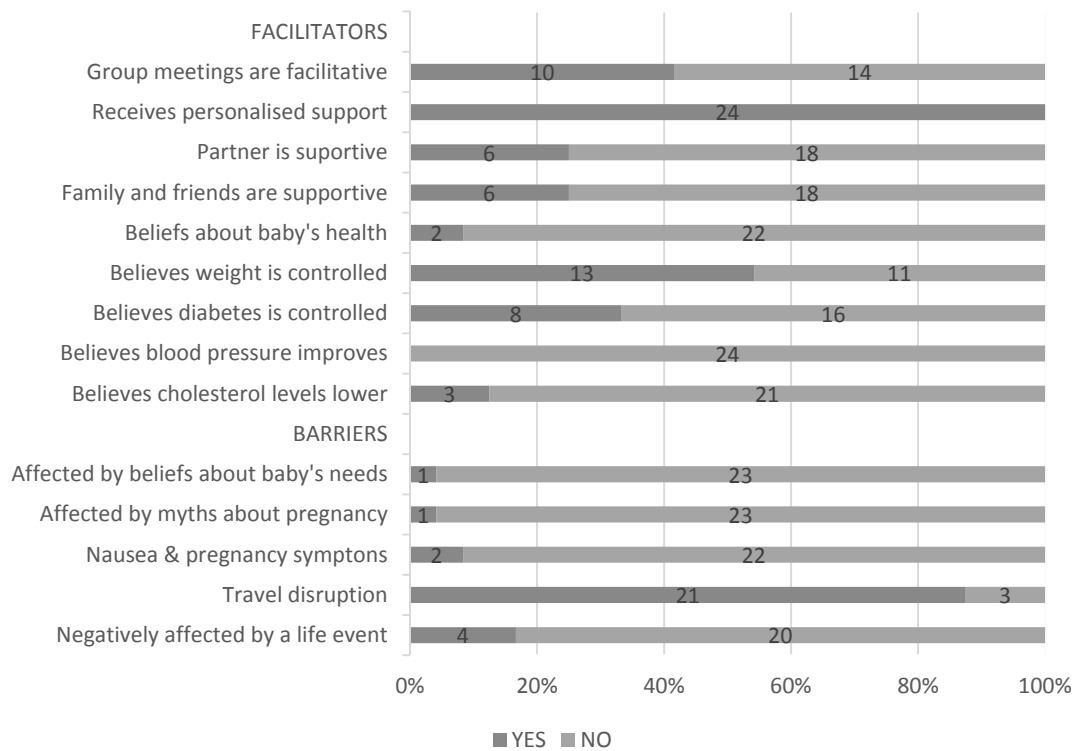
b. Change in behaviour on diet and life style intervention



c. Knowledge and attitudes



Appendix 10: Factors influencing participation reported in randomised trials on diet and physical activity in pregnancy



Appendices 11a, 11b, and 11c. Example of development of coding and analysis of data

Appendix 11b Table of development of codes, themes and over-arching themes of findings from interviews with women participating on the ESTEEM dietary intervention

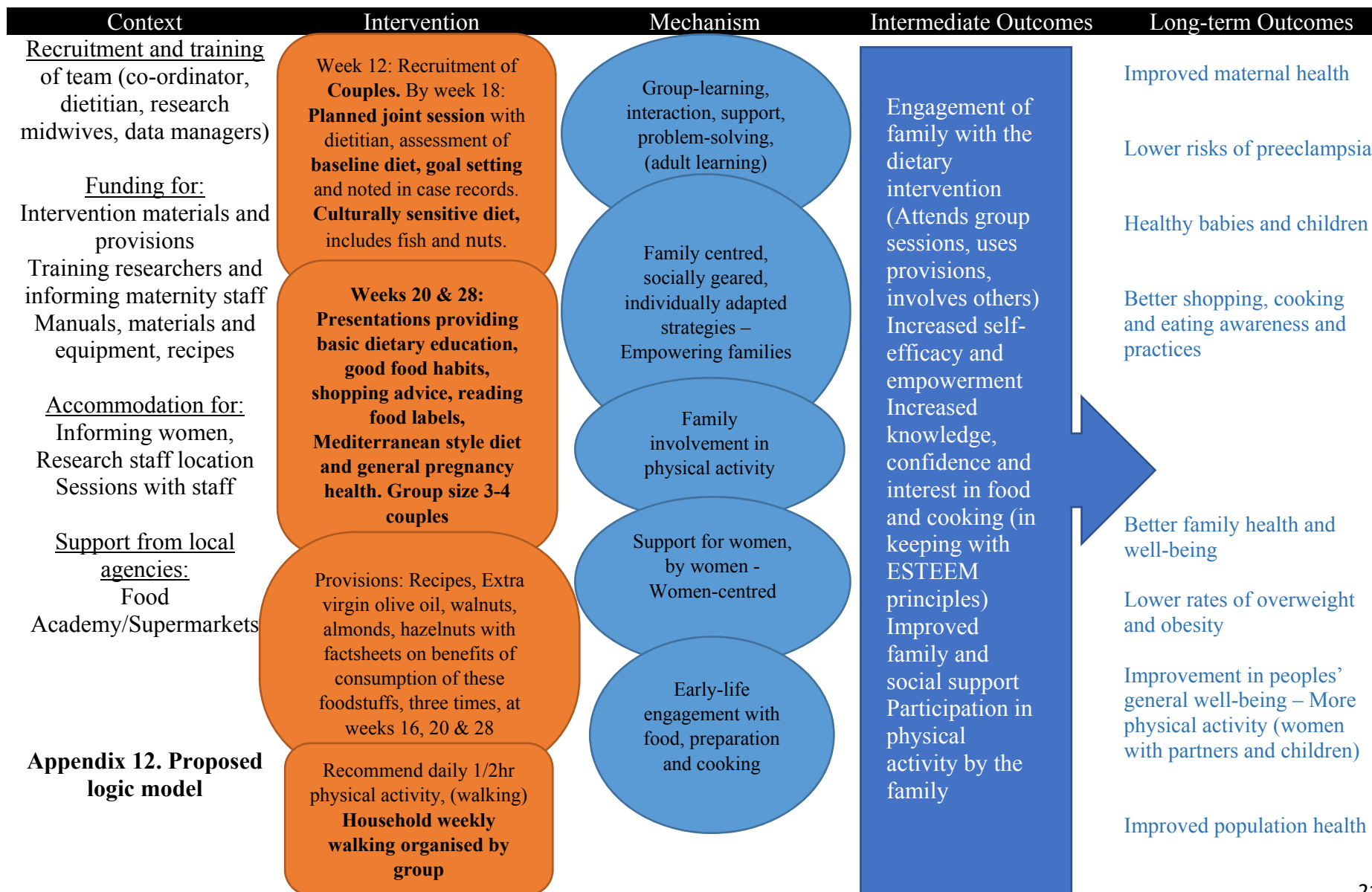
Codes	Themes	Over-arching themes
Also for the kids		
Presence of partner, Love 'n' food		
Parts of pregnancy, healthy pregnancy and baby	My food	
Cultural, social, (eating out) professional and personal beliefs and influences		
Difficult moments to control eating, struggling, and Dietary dislikes	My will, my way	
Previous eating habits - Butter cake and croissants - Very lazy with food		
ESTEEM and change Availability and facility to eat healthful food, organising food, cost of food, other diets	My pregnancy	
ESTEEM for health and Valuing health and long life		
Exercise		
Health concerns and birthing priorities		
Health Professionals and health care provision		
If you don't have a plan...things take over - and - Being Naughty		
Listening to my body, my feelings - Women's understanding of food, pregnancy and health		
There was a lot of things going on	My child	

ESTEEM - Learning and Support		
Enjoying ESTEEM and telling others	My partner	
Presence and support of family and others		
Attitude to weight and body image	My family	
My future plan		
Value of research		

Appendix 11c. Table of development of codes, underpinning themes and overarching themes of findings from interviews with women

Codes	Underpinning themes	Overarching themes
Also for the kids		
Presence of partner, Love 'n' food		
Parts of pregnancy, healthy pregnancy and baby	Planning, pregnancy and busy lives	
Cultural, social, (eating out) professional and personal beliefs and influences		
Difficult moments to control eating, struggling, and Dietary dislikes	Practical strategies and small changes	Intervention as doable
Previous eating habits - Butter cake and croissants - Very lazy with food		
ESTEEM and change - Availability and facility to eat healthful food, organising food, cost of food, other diets	Salience of health and well-being benefits	
ESTEEM for health and Valuing health and long life		
Exercise	Family traditions and cultural background	
Health concerns and birthing priorities Health Professionals and health care provision	Information, choice and empowerment	Intervention as not doable
If you don't have a plan...things take over - and - Being Naughty Listening to my body, my feelings –		
Women's understanding of food, pregnancy and health		
There was a lot of things going on	Fitting in the diet with family:	
ESTEEM - Learning and Support		

Enjoying ESTEEM and telling others	With children
Presence and support of family and others	With partner
Attitude to weight and body image	With family
My future plan	
Value of research	



Appendix 12. Proposed logic model

