

**Understanding women's weight-related health behaviours across pregnancy: A qualitative longitudinal study**

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## Abstract

**Background:** Women's weight-related health behaviours (WRHBs) during pregnancy can contribute to excessive gestational weight gain, which can be retained throughout life. In this study, WRHBs are health behaviours which have the potential to impact on women's gestational weight gain, but are not necessarily engaged in with the intention of weight change. Lacking from the evidence is an understanding of women's WRHBs and their determinants across pregnancy and utilising psychological theory when designing antenatal behaviour change interventions.

**Aim:** To understand women's experiences of WRHBs across pregnancy, with a view to explore if this varies throughout the journey of pregnancy.

**Methods:** Pregnant women were recruited at their antenatal appointment in two areas of a Northern UK city and interviewed at three timepoints (two antenatal, one postnatal), two of which are presented here: approximately 10-16 weeks and 28-32 weeks gestation. Interview data were first inductively analysed to generate a thematic framework. WRHBs were identified from the thematic framework and subsequently mapped to existing psychological theory.

**Findings:** Eighteen women with differing demographic and obstetric characteristics (e.g., area of deprivation, body mass index and parity) participated in the study. Four themes with sub-themes were identified across both timepoints; which reflected similarities and nuanced differences in women's WRHBs across pregnancy. Twenty-five WRHBs were identified; 8 of which were the same across both timepoints. Women's WRHBs were disrupted in early pregnancy due to physiological and psychological factors, with women motivated to engage in WRHBs by changes in beliefs towards 'health'. In later pregnancy women indicated passivity towards their WRHBs. Motivation primarily drove women's WRHBs, whilst also interacting with other behavioural determinants.

**Conclusions:** Engagement in pre-pregnancy WRHBs, changing physiological and psychological factors all interact with each other to impact on women's WRHBs across pregnancy. This interaction is not the same for every WRHB, and each WRHB should be considered individually in future research.

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## List of Abbreviations

BCT	Behaviour Change Technique
BMI	Body Mass Index
CASP	Critical Appraisal Skills Programme
CMACE	Centre for Maternal and Child Enquiries
COM-B	Capability Opportunity Motivation – Behaviour
ENTREQ	Enhancing Transparency in Reporting the Synthesis of Qualitative Research
GP	General Practitioner
GWG	Gestational Weight Gain
HCP	Healthcare Professional
HRA	Health Research Authority
IMD	Index of Multiple Deprivation
IoM	Institute of Medicine
IPA	Interpretative Phenomenological Analysis
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NRES	National Research Ethics Service
PICO	Population Intervention Comparison Outcome
PIS	Participant Information Sheet
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QL	Qualitative Longitudinal
RCOG	Royal College of Obstetricians and Gynaecologists
SPIDER	Sample Phenomenon of Interest Design Evaluation Research type
TDF	Theoretical Domains Framework
TP1	Timepoint One
TP2	Timepoint Two
UK	United Kingdom
WHO	World Health Organisation
WRHBs	Weight-related health behaviours

## **Chapter 1 Background**

### **1.1 Introduction**

The research presented in this thesis has been carried out within a PhD study in the School of Healthcare at the University of Leeds; it is applied health research, with the application of a health psychology lens. This study will explore women's experiences of and engagement in weight-related health behaviours (WRHBs) longitudinally; across pregnancy. It will provide an in-depth insight into the experiences of WRHBs, a theoretical understanding of women's engagement in these behaviours, and how these change across the course of pregnancy. In the context of this thesis, the term weight-related health behaviours (WRHBs) refers to health behaviours which have the potential to impact on a woman's gestational weight gain (GWG), but are not necessarily engaged in with the intention of weight change; examples include the consumption of healthy foods and engagement in physical activity.

This chapter will first provide an overview of the wider literature within this field of research and in doing so, will situate the research undertaken in this study within the wider public health area of obesity. It will present the rationale and relevance of this study with reference to the existing literature by first introducing the wider problem of obesity and maternal obesity; followed by the importance of and its management; discussing pregnancy as a teachable moment and how theory can contribute to this understanding. It concludes with overall aims and objectives for this PhD study; and a brief overview of the thesis structure.

### **1.2 Obesity and maternal obesity**

Obesity is a major global health challenge which is increasing (Ng et al., 2014). In 2014, over half of women in the UK were overweight or obese (Conolly & Saunders 2017). Obesity is defined by an individual's body mass index (BMI), which is calculated by dividing their weight in kilograms by their height in metres squared; this number is then categorised. See Table 1.1 for the World Health Organisation's (WHO) classifications.

Table 1.1 BMI and weight classifications provided by World Health Organisation

BMI	Weight Classification
<18.5 kg/m <sup>2</sup>	Underweight
18.5 - 24.9 kg/m <sup>2</sup>	Healthy weight
25 kg/m <sup>2</sup> – 29.5 kg/m <sup>2</sup>	Overweight
30 kg/m <sup>2</sup> – 34.9 kg/m <sup>2</sup>	Obese (Class I)
35 kg/m <sup>2</sup> – 39.9 kg/m <sup>2</sup>	Obese (Class II)
>40 kg/m <sup>2</sup>	Obese (Class III)

With an increasing prevalence of obesity in the UK, more women are beginning their pregnancy with a raised BMI (Heslehurst et al., 2010; Marchi et al., 2015; Ng et al., 2014). The number of women beginning their pregnancy with a BMI > 30kg/m<sup>2</sup> in the UK has increased from 15.6% in 2007 (Heslehurst et al., 2010) to 23% in 2019 (NHS Digital Maternity Statistics).

Beginning pregnancy with a raised BMI increases the risk of various pregnancy complications and health implications for both mother and developing child such as: miscarriage, pre-eclampsia, postpartum haemorrhage, gestational hypertension, gestational diabetes, caesarean delivery and post-operative complications and longer stay in hospital post-birth, long term obesity and associated co-morbidities for the mother; and neural tube defects, large for gestational age babies, mortality and morbidity, childhood obesity and insulin resistance for the unborn baby (Catalano and Ehrenberg, 2006; Heslehurst et al., 2008; Mamun et al., 2011; Marchi et al., 2015; Rasmussen et al., 2008; Pern et al., 2014; Sebire et al., 2001). The rising prevalence of maternal obesity, and the increased understanding around adverse outcomes for mother and unborn baby, has prompted research into how best to manage the increased risk of pregnancy complications and health implications.

### 1.2.1 Management of maternal obesity during pregnancy

Previous research investigating maternal obesity has indicated that women should not attempt to lose weight during pregnancy. This is because gestational weight loss does not reduce the risk of health and pregnancy complications, and can instead have negative consequences on the development of the unborn baby (Institute of Medicine (IoM), 2019; Kapadia et al., 2015; Catalano et al., 2014; Meloche, et al., 2020). This means women who begin their pregnancy with a raised BMI, should not attempt to lose weight during their pregnancy as a means of decreasing weight-related risk



factors. Subsequently, as the health risks of beginning a pregnancy with a raised BMI cannot be reduced through gestational weight loss, most of the pregnancy-related complications associated with beginning a pregnancy with a raised BMI are currently managed by healthcare professionals. Routine antenatal care in the UK involves calculating women's BMI at their first antenatal appointment. It is recommended that women who begin their pregnancy with a raised BMI require additional obesity-specific care to manage the increased risk of pregnancy complications (NICE, 2008; Modder & Fitzsimons 2010; Denison et al., 2018).

The focus of care based in BMI differs between different hospital trusts and the risk factor being screened i.e. whilst some risk factors such as gestational diabetes define a raised BMI as a BMI  $\geq 30$  kg/m<sup>2</sup>, some obesity-specific care pathways during pregnancy are implemented on the basis of a higher BMI such as BMI  $\geq 40$  kg/m<sup>2</sup> (NICE, 2008; Modder & Fitzsimons 2010; Denison et al., 2018). Obesity-specific care pathways can be effective in clinically managing the increased risk of pregnancy complications associated with beginning pregnancy with a raised BMI (Dodd and Briley, 2017), but do not necessarily span to reducing weight retention postnatally and the long-term health implications of having a raised BMI during pregnancy.

### **1.2.2 Implications of targeting pregnant women based on their pre-pregnancy BMI**

Qualitative research has found that women on maternal obesity care pathways report feeling judged and stigmatised by the additional monitoring and screening which are focussed on their weight (Smith & Lavender 2011; Dadouch, Hall, Du Mont, et al., 2020). The women perceived their antenatal care as primarily focussed on their increased risk of complications and the well-being of their unborn baby, rather than of them as a mother and baby as a whole (Furber & McGowan, 2011; Keely et al., 2016; Smith & Lavender, 2011; Stockton & Nield, 2020). This, in turn, was found to invoke feelings of shame, embarrassment, humiliation and anxiety in the women (Christenson, Johansson, Reynisdottir, Torgerson et al., 2019; Furber & McGowan, 2011; Johnson et al., 2013; Keely et al, 2016; Nyman et al., 2010; Mulherin et al., 2013). This focus on risk and an increase in medical monitoring has led to the increased medicalisation of pregnancy (Lennon, 2016), which is reported as particularly pertinent in women's experiences of beginning pregnancy with a raised BMI (Cook, LeMarre, Rice & Friedman, 2020; Furber & McGowan, 2011; Keely et al, 2016; Kerrigan, Kingdon & Cheyne, 2015; Olander et al, 2015; Smith & Lavender, 2011). This has implications for the experiences of women who begin their pregnancy with a raised BMI. Furthermore, for some women to resist the stigma they experience of beginning their pregnancy with a raised BMI, they are accepting of their pregnancy

start weight and wish to focus on their weight status and the associated health implications after pregnancy (Keely et al., 2017).

A more person-centred approach has been suggested to reduce the negative experiences of women orientated around weight focussed antenatal care (Heslehurst et al., 2015; Olander et al., 2015). Additionally, although women are less interested in their pregnancy start weight, they are interested in learning about pregnancy specific weight gain, the related health behaviours and any associations between their own health and their unborn baby's health (Brown & Avery, 2012; Lavender and Smith, 2016; Nikolopoulos et al., 2017; Stengel et al., 2012; Lucas et al., 2014). This suggests that focussing on GWG may be more acceptable than focussing on their start weight (Anderson, 2001). Recent reviews of studies exploring GWG discussions have identified that whilst some women do receive GWG advice, the information provided is often inconsistent between healthcare professionals and not consistent with guidelines (Weeks et al., 2018; Whitaker et al., 2020).

Similar to the women's experiences, interviews with midwives in the UK found that midwives' experiences of delivering obesity focussed care were awkward and embarrassing, as they were acutely aware of the potential for upsetting women due to the sensitive nature of, and emphasis on the topic of weight (Johnson et al., 2013). Midwives were subsequently unsure of how best to communicate weight related messages with women who start their pregnancy with a raised BMI, without jeopardising their relationship with them (Heslehurst et al., 2011; Foster & Hirst, 2014; McParlin, Bell, Robson et al., 2017). Attempts at minimising the risk of upset in the women often inadvertently led to poor communication around weight-related information by midwives as they discouraged discussions around weight management (Duthie, Drew & Flynn, 2013; Furness et al., 2015).

The role of the midwife has considerably expanded to include more public health messages in recent years, which now included maternal obesity and health promotion during pregnancy (Biro, 2011; Mattison, Lavis, Wilson, Hutton et al., 2020). Obesity is regarded by midwives as a long-term health issue, which they can have little to no impact on, thus questioning their role in its management (DeVivo & Hills, 2019; Smith, Cooke, & Lavender, 2012). This is in contrast to other public health messages midwives are expected to address, such as smoking cessation, which has immediate short-term benefits to both mother and unborn baby (Beenstock et al., 2012). They do, however, consider providing pregnancy specific information related to GWG more relevant to their role (DeVivo & Hills, 2019; Smith et al., 2012; Wilcox et al., 2012).

### **1.3 Gestational weight gain**

Regardless of a woman's BMI when they begin their pregnancy, it is expected that they will gain weight during pregnancy. GWG is important to accommodate the unborn baby, placenta, associated fluids and an increase in maternal adiposity (Catalano, 2007). Unlike a woman's pregnancy start BMI, GWG is not determined at the beginning of pregnancy, and can therefore be modified. There are guidelines which indicate the optimum amount of GWG associated with the best outcomes for mother and unborn baby (IoM, 2009). However, women still frequently exceed these recommendations (Crozier et al., 2010; Goldstein et al., 2017). A large survey study in the UK which followed over 12,000 women from before pregnancy, during pregnancy, after pregnancy and their children born during the study (Crozier et al., 2010) found nearly 50% of the women gained weight in excessive of the IoM's (2009) guidelines. A more recent large systematic review and meta-analysis including over 1.3 million women from various countries, including those in North America, Asia and Europe, identified that 70% of women gained weight outside of the recommended amount during pregnancy (Goldstein et al., 2017). Excessive GWG was substantially higher than inadequate weight gain; with nearly half of all the women (47%) gaining more weight than the recommended range; and 23% gaining less than the recommended amount (Goldstein et al., 2017). In light of the high prevalence of excessive GWG, coupled with the increasing prevalence of obesity and maternal obesity outlined above, and that GWG – unlike pregnancy start BMI – is modifiable, this thesis will focus on excessive GWG.

#### **1.3.1 Excessive gestational weight gain and associated pregnancy complications and health implications**

Research has indicated that regardless of pregnancy start weight, excessive GWG (i.e. outside of the IoM's (2009) recommendations) is associated with an increased risk of adverse maternal and infant outcomes. During pregnancy this includes an increased risk of developing gestational diabetes, pre-eclampsia and hypertension for the woman (Brunner et al., 2015; Thorsdottir et al., 2002); for the unborn baby it includes adverse neonatal outcomes, large for gestational age babies, and macrosomia (Goldstein et al., 2017; Jain et al., 2007; Stotland et al, 2006). There is also an increased risk of delivery complications, caesarean delivery, and post-operative complications with a longer stay in hospital post-birth for the woman (Goldstein, 2017; Jain et al., 2007; Mamun et al., 2011; Thorsdottir et al., 2002). Furthermore, there are long term health implications of gaining excessive weight during pregnancy. For the unborn baby this includes the increased likelihood of

childhood obesity and insulin resistance; and for the woman, they are more likely to retain weight gain post-partum and throughout life, thus contributing to the development of long term obesity and the associated co-morbidities (Amorim, 2007; Fraser et al., 2011; Linne, 2004; Mamun et al., 2014; Rooney & Schauberger, 2002).

Independent of pregnancy start BMI, excessive weight gain during pregnancy is the biggest predictor of post-partum and long-term weight retention (Mamun et al., 2010). Longitudinal studies following women 10-15 years after pregnancy found those who had excessive GWG had a significantly higher weight 6 months following birth, and at 10-15 years follow up; and retained the weight into subsequent pregnancies (Amorim et al., 2007; Linné et al., 2004; Linné & Rössner, 2003; Rooney & Schauberger, 2002). Furthermore, those who retained weight into subsequent pregnancies were more likely to also gain excess weight during that pregnancy, and retain the excess weight after that pregnancy, thus resulting in long term weight gain and retention (Linné & Rössner, 2003).

Recent research has indicated that women who begin their pregnancy with a normal BMI in particular, could be more likely to retain excessive GWG after pregnancy, than those who begin pregnancy with a raised BMI (Bogaerts et al., 2017; Hollis et al., 2017). Therefore, it is important that women of all pregnancy start BMI gain an appropriate amount of weight during pregnancy, in order to prevent the associated pregnancy and health implications, post-partum weight retention and subsequent weight gain and retention.

### **1.3.2 The development of gestational weight gain recommendations**

#### **United Kingdom**

The monitoring of GWG, including routine weighings of women, was implemented in the UK from 1941 to detect small for gestational age babies and to monitor maternal nutrition (Allen-Walker et al., 2015). This was primarily led by the high prevalence of malnutrition associated with rationing during the second World War. Monitoring of weight gain and routine weighings to detect the weight of the unborn baby continued after the war. However, in the 1980s, criticism of routine weighings began to increase. Research indicated that routine weighings were ineffective at measuring the unborn baby's weight, and that the routine weighing of women could have an adverse impact on their emotional well-being (Dawes & Grudzinskas, 1991; Dawes, Green & Ashurst, 1992). As a result, the monitoring of GWG and routine gestational weighings were ceased in the 1990s, and remain absent from standard maternity care today (Allen-Walker et al., 2015). One routine weighing is currently carried out at the first formal

antenatal appointment to identify women's BMI and weight-related risk factors which would require referral to other specific pathways.

### Outside of the United Kingdom

The Institute of Medicine (IoM) initially developed GWG recommendations in 1990, in response to the high prevalence of babies born with a low birth weight. The focus of these guidelines was similar to those in the UK; to reduce the risk of low birthweight babies by providing a 'target weight' for women to gain during pregnancy (IoM, 1990). Research into the effectiveness of the recommendations suggested that adherence to these guidelines was associated with the best possible pregnancy outcomes for women and babies (Abrams, Altman & Pickett, 2000; Hamad, Cohen & Rehkopf 2016). In 2009 these recommendations were revisited and updated. The update was primarily due to the increasing prevalence of women beginning their pregnancy with a raised BMI and gaining excessive amounts of weight (IoM, 2009). Subsequently, the current IoM (2009) guidelines now take into account women's pregnancy start weight and provides a range of GWG that women are recommended to gain within. See Table. 1.2 below for the recommendations. Revisiting and adapting the initial gestational guidelines to now focus on the prevention of excessive weight gain indicate a shift of antenatal healthcare focus; from low weight and malnutrition, to obesity management.

Table 1.2 Current IoM recommendations for total GWG based on pregnancy start BMI

Pregnancy start BMI	Recommended total GWG range (kg)
Underweight (<18.5kg/m <sup>2</sup> )	12.5 – 18.0
Normal weight (18.5 – 24.9 5kg/m <sup>2</sup> )	11.5 – 16.0
Overweight (25.0 – 29.9 kg/m <sup>2</sup> )	7.0 – 11.5
Obese (≥30.05kg/m <sup>2</sup> )	5.0 – 9.0

To support women in gaining weight within these recommendations, the IoM (2009) guidance suggests the implementation of routine weighings during pregnancy, enabling comparison against the recommended target (IoM, 2009). These guidelines have been widely adopted in America and in other high economic countries such as Canada and Australia, and across Europe including Italy, Finland and Switzerland; but not in the UK (Alavi et al., 2012; Scott et al., 2014). Recent reviews have found inconsistent application of the IOM guidelines with women often receiving inaccurate

information from healthcare professionals which is not consistent with the guidelines. It is also suggested that the frequent communication of inaccurate information means there is limited evidence of women's compliance with the guidelines, and the efficacy of compliance with the guidelines (Whitaker et al., 2020).

### **1.3.3 Current gestational weight gain recommendations in the UK**

The UK have neither adopted the IoM (2009) guidelines nor developed their own GWG recommendations. This makes the UK different to most other developed economic countries, as even those who do not adopt the IoM's guidelines, typically have their own GWG recommendations (Alavi et al., 2012; Scott et al., 2014). The National Institute of Clinical Excellence (NICE) does provide guidance for the UK on "weight management before during and after pregnancy" (NICE, 2010). This offers guidance to "help all women who have a baby to achieve and maintain a healthy weight by adopting a balanced diet and being physically active" (NICE, 2010, p 5). However, in this guidance NICE do not provide information on the optimum amount of GWG, and explicitly state they do not apply the IoM (2009) guidelines in the UK. This is because the IoM guidelines (2009) are based on observational data on an American population and may not be appropriate outside of that context (NICE, 2010; Allen-Walker, 2015). In light of research highlighting the increasing prevalence and associated health implications of maternal obesity and excessive GWG, there is a growing debate around the introduction of GWG recommendations and monitoring in the UK (Allen-Walker et al., 2020; Daley et al., 2015; Fealy et al., 2020). This debate has recently attracted media attention (Pregnancy weight gain going unmeasured, 2018), highlighting the relevance of the topic.

Rather than identifying specific weight gain recommendations, the antenatal weight management guidelines in the UK (NICE, 2010) recommend gaining a 'healthy' amount of weight during pregnancy, and identify particular health behaviours which are thought to have potential to prevent excessive GWG. These are split into physical activity and dietary health behaviours. The health behaviours included in this guidance have been extracted from other non-pregnancy specific guidelines: "Obesity prevention" (NICE, 2006); and "Physical activity in the workplace" (NICE, 2008) guidelines. The inclusion of behaviours from a non-pregnancy context, raises questions towards the appropriateness and relevance of these health behaviours to women and their weight gain during pregnancy.

Physical activity guidelines have recently been updated in the UK, and for the first time they include specific guidance on physical activity during pregnancy (Department of Health and Social Care, 2019). This guidance includes an infographic which recommends women engage in at least 150 minutes of moderate intensity activity per

week whilst pregnant. It identifies the benefits of engaging in physical activity during pregnancy; that there is no evidence of harm and the importance of maintaining pre-pregnancy activity levels. This guidance was developed to support healthcare professionals in communicating health messages around the health and pregnancy benefits of women engaging in physical activity and weight management during pregnancy (Smith, et al., 2018). However, it is unlikely these guidelines will be adopted in pregnancy, as pregnancy specific NICE guidelines such as guidance on antenatal care for uncomplicated pregnancies (NICE, 2008) primarily inform antenatal practice instead (Mills et al., 2020). Furthermore, the (NICE) guidance on antenatal care for uncomplicated pregnancies (NICE, 2008) is due to be updated in December 2020, but NICE have reduced the scope of these guidelines to no longer include physical activity (Mills et al., 2020). In spite of recent physical activity guidance emphasising the importance of physical activity information during pregnancy, the updated NICE (2008) guidance increases the likelihood that women will not receive evidence-based physical activity advice from their midwife (Mills et al., 2020)

Public health promotion messages around obesity, weight management and health behaviours during pregnancy are increasing additions to the role of the midwife (Biro, 2011; Sanders, Hunter & Warren, 2016). The 'Making every contact count' (Health Education England, 2016) policy identifies how every contact with healthcare professionals should be utilised to address lifestyle changes, including those relating to weight management. With pregnancy being considered a time of increased contact with healthcare professionals this is seen as an opportunity to discuss weight management and the associated health behaviours (McLellan et al., 2019).

## **1.4 Managing gestational weight gain**

It is widely accepted that weight gain within the optimum range (IoM, 2009) is associated with the best pregnancy and health outcomes for mother and baby, however, most women continue to gain weight outside of these recommendations (Abrams, Altman & Pickett, 2000; Hamad, Cohen & Rehkopf 2016). GWG is an outcome which is influenced, and can be managed by, women's engagement in weight-related health behaviours (Gardner, Wardle, Poston, Croker, 2011).

### **1.4.1 Weight-related health behaviours**

Health behaviours have developed as a concept since the 1950s, when 'health practices', such as cigarette smoking, were found to be associated with mortality (French et al., 2014). Since then, research has identified links between health outcomes and 'health practices' such as dietary intake, alcohol consumption and physical activity. It is widely recognised that 'health practices', now known as 'health

behaviours' can be linked to numerous health outcomes including mortality, illness, and quality of life (French et al., 2014).

Research has identified many health behaviours which contribute to GWG. Diet and physical activity are often components of an individual's lifestyle which are reported to have an impact on weight (Skouteris et al., 2010). However, similar to weight gain, 'diet' and 'physical activity' are not themselves health behaviours; they are umbrella terms which encompass different health behaviours. In order to understand the specific health behaviours which contribute to GWG, these umbrella terms must be further examined. Any behaviours that have the potential to impact on a woman's weight during pregnancy, including those that are not necessarily engaged in with that aim, are defined as 'WRHBs' in this study. The foundations of this definition are underpinned by the principles outlined in French et al., (2014) (See Chapter 3 for a more detailed outline of the definition process.)

Total energy intake and women's engagement in walking and vigorous activity; are examples of health behaviours which are associated with GWG (NICE, 2010; Obinna, Martins, Ifeanyichukwu, Chidubem, et al., 2019; Stuebe et al., 2009; Streuling et al., 2010; Nascimento, Surita, & Cecatti., 2012; Tielemans et al., 2016). In addition to their impact on GWG, WRHBs such as dietary intake and engagement in physical activity are also thought to have an impact on a woman's health, pregnancy and the development of the unborn baby. Research has indicated an association between gestational dietary intake and gestational hypertension, the development of gestational diabetes, and the growth and development of the unborn baby (Gresham, Collins, Mishra, Byles, & Hure, 2016; Moore et al., 2004; Knudsen, Orozova-Bekkevold, Mikkelsen, Wolff, & Olsen, 2008; Rasmussen, Poulsen, Kampmann, Smedegaard, et al., 2020). Engagement in physical activity during pregnancy is associated with improved cardiovascular function, decreased muscular discomfort and pain, improved mental health and well-being for the mother, reduced incidence of caesarean sections, management of gestational diabetes, and for the unborn baby, appropriate size for gestational age (Hinman et al., 2015; Melzer, Schutz, Boulvain, & Kayser, 2010; Nascimento et al., 2012; Poudevigne and O'Connor, 2006). Therefore, by focussing on women's WRHBs during pregnancy there is the potential to improve health and pregnancy outcomes for mother and unborn baby, in addition to those associated with GWG.

Pregnancy is a time where women's engagement in WRHBs are likely to change; this can have an impact on their GWG (Bijlholt et al., 2020; Clarke & Ogden, 1999; Swift et al., 2017). A systematic review of women's dietary changes before and during pregnancy identified an increase in the women's total energy intake during pregnancy



compared to before pregnancy (Hillier & Olander, 2017). Additionally, women's engagement in physical activity is likely to significantly reduce during pregnancy, which is in turn associated with excessive GWG (da Silva, Ricardo, Evenson, & Hallal, 2017; Borodulin, Evenson, Wen, Herring, & Benson, 2008; Melzer, Schutz, Boulvain, & Kayser, 2010). There is general consensus across the literature that targeting women's engagement in physical activity and dietary health behaviours during pregnancy has the potential to reduce excessive GWG (DiPietro, Evenson, Bloodgood, Sprow, et al., 2019; Gardner et al., 2011).

Research exploring WRHBs are often quantitative, or carry out surveys with women to identify instances of changes to physical activity and dietary health behaviours during pregnancy and the relationship with excessive GWG (Swift et al., 2017). More recent research has qualitatively explored factors which influence women's diet and physical activity during pregnancy (Findley et al., 2020; O'Brien et al., 2017), however, they do not identify individual WRHBs or why or how women engage in these behaviours, so there remains limited insight into the underlying processes of how or why these changes happen (Hillier & Olander, 2017). There has subsequently been a call for research to investigate why some women change their behaviours and others do not (Olander, Smith & Darwin, 2018).

#### **1.4.2 Pregnancy as a 'teachable moment'**

Pregnancy is considered an opportune time to intervene and implement WRHB behaviour change interventions due to its status as a 'teachable moment' in a woman's life (Phelan, 2010). A 'teachable moment' is a natural occurrence, such as a period of transition or health event in an individual's life, which increases their receptiveness to behaviour change (McBride et al., 2003; Phelan, 2010). Pregnancy as a 'teachable moment' is primarily founded on the women's increased motivation due to emotional response and awareness of risk towards their unborn baby, and their re-defined social role as a 'mother' (McBride et al., 2003; Phelan, 2010). Recent research has challenged the 'blanket' approach to pregnancy as a teachable moment (Dinsdale et al., 2016; Olander et al., 2016), and expanded on the teachable moment concept of pregnancy by utilising the COM-B model (Michie et al., 2011) of behaviour (Olander et al., 2016).

The COM-B model of behaviour is a 'system' which comprises three components that act together or independently to generate behaviour: Capability (psychological and physical); Opportunity (physical and social); and Motivation (reflective and automatic) (Michie et al., 2011) (see Table 1.4 below for the definitions of the different COM-B components). For a behaviour to occur, capability and opportunity must be present and the motivation to engage in this behaviour over another stronger. The COM-B

model was developed as the core of the 'behaviour change wheel' (BCW) (Michie et al., 2011). The BCW is a framework to aid the development of behaviour change interventions which are underpinned by theory. The COM-B model is the core of this framework as a way to directly link intervention development to a behavioural system (Michie et al., 2011). Aside from its role in the BCW, the COM-B model can be utilised to understand behaviour by identifying which component(s) are driving, or inhibiting, behaviour.

It is argued that the 'teachable moment' concept relies heavily on the concept of motivation, without considering the capability and opportunity of women to engage in these behaviours (Olander et al., 2016). Furthermore, the 'teachable moment' perspective can be criticised for treating pregnancy as 'a' teachable moment, suggesting it is a static period in a woman's life. However, pregnancy as a time of transition, could offer many different 'moments' which could be utilised in different ways to change behaviour (Olander et al., 2016). In particular, utilising the COM-B model, the components of capability, opportunity and or motivation could fluctuate across pregnancy, thus impacting on women's engagement in WRHBs (Olander et al., 2018). There is limited understanding around opportunities for behaviour change at different stages of pregnancy due to antenatal research predominantly focussing on one timepoint in pregnancy, or breaking down maternal research into 'before', 'during' or 'after' pregnancy, as identified in the review (Chapter 2). Psychological theory, such as the COM-B model, could be applied to holistically understand the determinants of behaviour across pregnancy (Olander, Smith & Darwin, 2018).

A plethora of behaviour change theories that can be integrated into research lacked clarity around which were the most appropriate or effective (Michie et al., 2004); with many interventions considered as 'theory-inspired' more so than 'theory-based' (Michie et al., 2004). In an attempt to increase the systematic integration of theory into research and intervention development, Michie et al., (2005) developed the theoretical domains framework (TDF). Existing psychological theories of behaviour were collated to identify theoretical constructs of behaviour which could be applied to intervention development. This resulted in the TDF as an integrative framework which can support the application of theoretical approaches to interventions aimed at behaviour change (Michie et al., 2005; Phillips et al., 2015). The development of the TDF involved the contribution of professionals such as health psychologists and healthcare service researchers, who collated 33 theories of behaviour, and identified 128 theoretical constructs relating to understanding or changing behaviour. These theoretical constructs of behaviour were grouped into 12 'domains' (Michie et al., 2005) (see Table 1.4 below for the definitions of the domains). Whilst the TDF identifies the theoretical constructs of behaviour, it does not identify the underlying causal

processes that link theoretical constructs to behavioural regulation or behavioural change (Michie et al., 2005).

The COM-B model of behaviour can be used in combination with the TDF to provide a detailed understanding of behaviour and its underlying theoretical constructs (Cane et al., 2012). Since its development, the TDF has been widely adopted, validated and further developed (Cane et al., 2012); there are now currently 14 domains in the TDF (Cane et al., 2012). These 14 TDF domains have also been mapped onto the COM-B components, with specific TDF domains corresponding with specific COM-B components. The TDF domains mapped to the COM-B components provides a coherent explanation of the link between theoretical constructs and behaviour. These COM-B components and TDF domains can be used in unison to carry out a 'behavioural diagnosis' to understand behaviour and identify opportunities for behaviour change. This has further aided the systematic application of theory in understanding and changing behaviours (Michie et al., 2014).

Table 1.4 Definition of each COM-B component mapped to theoretical domains framework

<b>COM-B component</b>	<b>Definition</b>	<b>TDF domain<sup>1</sup></b>
<b>Capability</b> Psychological	– Psychological factors which impact on the individuals capacity to engage, such as knowledge and beliefs	Knowledge Skills Memory, attention and decision processes Behavioural Regulation
<b>Capability</b> Physical	– Physical factors which impact on the individuals capacity to engage, such as the necessary skills	Skills
<b>Opportunity</b> Social	– External factors such as the social environment which influences the individual's behaviour	Social influences
<b>Opportunity</b> Physical	– External factors such as the physical environment which influences the individual's behaviour	Environmental context and resources
<b>Motivation</b> Reflective	– Conscious reflective brain processes involving self-conscious analytical planning to direct behaviour	Social/Professional Role and Identity Beliefs about Capabilities Optimism Beliefs about Consequences Intentions Goals
<b>Motivation</b> Automatic	– Unconscious brain processes such as emotional or impulsive responses or habits	Social/professional role and identity Optimism Reinforcement Emotion

Michie et al's work around the COM-B model, BCW and TDF work has been widely adopted in the development of interventions, (Connor & Norman, 2017), primarily outside of antenatal care. The inclusion of theory in behaviour change interventions is

<sup>1</sup> TDF domain mapped to COM-B component as identified in Cane et al., (2012)

thought to increase the effectiveness of interventions (Hardeman, 2000; Glans & Bishop, 2010; Webb et al, 2010). However, in spite of established research around frameworks for the application of theoretical input (Atkins et al., 2017; French et al., 2012), it is reported that many interventions continue not to fully apply the underlying theory (Prestwich, Webb & Connor, 2015). Behaviour change interventions frequently report the use of theory, however, there is a lack of consistency and transparency in how this is carried out. A lack of the systematic application of theory has, in part, been attributed to the mixed effectiveness of behaviour change interventions across various populations (Connor & Norman, 2017; Hardeman et al., 2002; Michie et al., 2004).

To date, the application of psychological theory to antenatal research has been minimal (Ayers & Olander, 2013). However, the value of including psychological theory in antenatal research has been identified and has featured as a focal point in recent discussion articles (Ayers & Olander, 2013; Olander et al., 2016). Whilst the integration of psychological theory into GWG interventions has recently increased, there remains a lack of clarity around the effectiveness of specific intervention components and WRHBs to reduce excessive GWG (Thangaratinam, Rogozinska, Jolly et al., 2012; Soltani et al., 2016). Reviews which investigate the application of BCTs in dietary and/or physical activity behaviour change interventions during pregnancy found that the same BCTs were present in both effective and ineffective interventions (Gardner, Wardle, Poston, Croker, 2011; Soltani, et al., 2016). Current recommendations to improve effectiveness of WRHB behaviour change interventions is for future research to identify the components and WRHBs that are associated with improved success (Phillips & Higgins, 2017), in particular from the women's perspectives (Heslehurst et al., 2013; Olander, Smith & Darwin, 2018).

### **1.4.3 Antenatal weight-related behaviour change interventions**

There are numerous behaviour change interventions which aim to manage GWG. Most of these interventions target diet and/or physical activity behaviours (Skouteris et al., 2010). There are mixed findings of the effectiveness of these behaviour change interventions. Some systematic reviews and meta-analyses indicate that 'diet' and 'exercise' interventions or those including a combination of both can significantly reduce the risk of women gaining excessive GWG (Duxbury, Soltani & Martin, 2014; Muktabhant, Lawrie, Lumbiganon & Laopaiboon, 2015; Shieh, Cullen, Pike & Pressler, 2018; Tanentsapf, Heitmann & Adegboye, 2011). Although previous evidence offers mixed findings towards the effectiveness of physical activity on improving many pregnancy outcomes, a recent review identified that, in normal pregnancies, engaging in physical activity is safe, and could potentially improve some outcomes (Hinman et al., 2015). Furthermore, 'lifestyle' interventions that do reduce excessive GWG can

also improve outcomes for the woman and unborn baby (Thangaratinam et al., 2012) and reduce the incidence of gestational diabetes (Bennett et al., 2018). Whilst these reviews suggest that diet and physical activity can be used to manage women's GWG and improve health outcomes, other research has found low engagement to weight-related interventions by women, indicating limited acceptability (Atkinson et al., 2013; Davis et al., 2012; Knight & Wyatt, 2010).

A review of 12 systematic reviews, which synthesised the findings from interventions targeting gestational weight management (Duxbury et al., 2014) identified that all the reviews included in their study reported that the existing evidence reporting effectiveness of interventions were of low quality due to low sample sizes; study design and standard of reporting (Duxbury et al., 2014). Similarly, variance between dietary and physical activity interventions to reduce GWG is an issue which has been widely reported in other reviews; specifically heterogeneity in the intervention studies' sample characteristics and aspects of intervention design, content, delivery and evaluation (Gardner, Wardle, Poston, Croker, 2011; Skouteris et al., 2010). In particular there is large variability in the intervention and behaviour change components between the interventions, which has led to inconsistent recommendations for which intervention components to target in order to reduce GWG (Skouteris et al., 2010). This has led to a lack of consensus towards which WRHBs should be targeted by behaviour change interventions and how (Guelinckx et al., 2008; Hill, Skouteris & Fuller-Tyszkiewicz, 2013). Subsequently, recent interventions targeting GWG through behaviour change of women's WRHBs continue to yield mixed findings (Hayes et al., 2015; Kunath et al., 2019; Olson et al., 2018).

A systematic review of behavioural interventions, including quantitative and qualitative data (Campbell et al., 2011), which found no significant difference in GWG between the intervention and control groups, also reviewed qualitative literature of healthcare professionals, women and their friends and family. This was to explore possible barriers to the dietary and physical activity interventions targeting GWG. Barriers such as women's dismissiveness towards weight related messages during pregnancy, inconsistent messages from healthcare professionals and a lack of professional training for midwives were identified. These findings indicate the limited understanding of weight management, and engagement in WRHBs from the women's perspectives. Other research has also discussed how the lack of psychological and behavioural insight into women's engagement in WRHBs during pregnancy, means there is limited understanding of the processes whereby behaviour change occurs (Gardner et al., 2011), and suggest the need for women's experience in combination to a theoretical understanding of WRHBs (Oteng-Ntim, 2008; Gardner et al., 2011).

## **1.5 Summary**

An increase in the prevalence of obesity initially drove the focus of weight-related antenatal research around maternal obesity, with women who began pregnancy with a raised BMI. This research has indicated the stigmatising and embarrassing nature of focussing on a woman's BMI and the topic of weight gain. With weight loss in pregnancy being advised against, maternal obesity is primarily managed by HPs, instead of behaviour change interventions. More recent research considers GWG, although uncertainties exist in the UK regarding the amounts that constitute excessive GWG, the appropriateness of measuring GWG, and the provision of information and support by midwives around GWG, diet and physical activity. GWG is relevant to all women, regardless of start weight. Excessive GWG can have long and short term health implications on both mother and unborn baby; including the development of obesity. Furthermore, in contrast to a woman's BMI at the beginning of pregnancy, GWG is modifiable through intervention, which can reduce these risks. Overall this suggests that preventing excessive GWG for all pregnant women may be a more appropriate focus in the reduction of long term obesity, than concentrating on women with a raised BMI at the beginning of pregnancy. Additionally, the design and evaluation of intervention has been limited by failing to adequately consider women's experiences, different behavioural components and psychological theory of behaviour change. A more in-depth insight into the women's experiences of WRHBs applying a psychological lens could provide key insight to inform the development and evaluation of future interventions.

## **1.6 Overarching study aim**

This PhD project aims to understand gestational weight gain and management, and its contributing factors (such as WRHBs) across pregnancy. This will be explored from the women's perspectives and through the application of existing psychological theory.

### **1.6.1 Study objectives**

- To explore women's understanding of weight change during pregnancy and its contributing factors
- To identify women's existing WRHBs across pregnancy
- To identify the psychological drivers of existing WRHBs across pregnancy
- To explore any changes or similarities of existing WRHBs and their drivers across the duration of pregnancy

## **1.7 Thesis outline**

The main study of this PhD programme of research is a qualitative longitudinal (QL) study, utilising serial interviews with women across their pregnancy. A systematic review of existing qualitative literature around women's experiences of GWG informed the primary research. The data collected during the QL research will be analysed in two stages: first, inductively to explore the women's experience of WRHBs and identify WRHBs which are personally relevant to women; and secondly WRHBs will be deductively mapped onto existing psychological theory (COM-B model and TDF) See Figure 1.1 below for an illustration of the project. An outline of the individual chapters is outlined below.



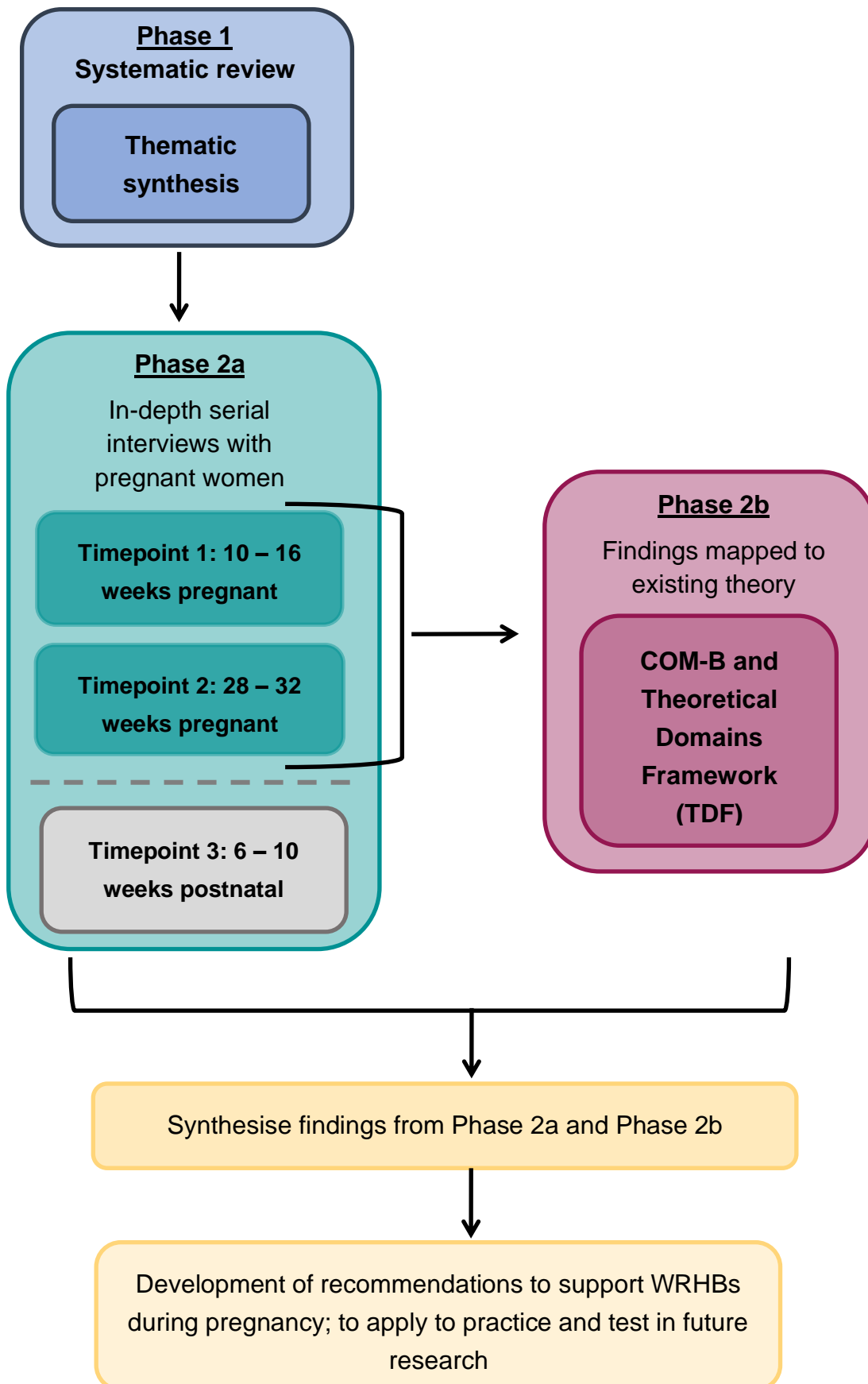


Figure 1.1 Outline of the PhD study

## **Chapter 2: Systematic Review**

This chapter will systematically identify and review existing qualitative literature investigating women's experiences of GWG during pregnancy. It will provide a comprehensive evaluation of the current literature exploring women's experiences of GWG during pregnancy and identify knowledge gaps, to inform the research to be undertaken for the main study.

## **Chapter 3: Methodology**

This chapter will identify and describe the methodologies and approaches taken to answer the research question of this study, and address the underlying assumptions associated with the different approaches considered. It will begin with an ontological and epistemology considerations; it will then introduce the different available qualitative methodologies, give consideration to the implications of choosing particular methodologies, and provide a clear rationale for the methodologies utilised.

## **Chapter 4: Methods**

This chapter will outline the methods and procedures used to carry out the research in the study. It will first outline the sampling and recruitment methods used, and provide a summary of the sample characteristics. Next the data collection and analysis methods will be detailed for each timepoint, separately, followed by the theoretical mapping procedure, and ethical and governance processes which were undertaken prior to beginning the research. Finally, reflections are made on the research processes.

## **Chapter 5: Findings at Timepoint One (approximately 10-16 weeks gestation)**

This chapter will present the overall findings of the framework analysis for both timepoints, and provide comprehensive description of the findings at this timepoint, themes. This includes detailed illustration of the themes and sub-themes with supporting illustrative quotes.

## **Chapter 6: Findings at Timepoint Two (approximately 28-32 weeks gestation)**

This chapter will present the findings from the framework analysis of the data collected at the second timepoint. It will build on the framework developed at timepoint one and will outline the narratives identified for both timepoints, and present the themes and sub-themes of the framework at this timepoint in detail, alongside supporting illustrative quotes. It was also juxtapose the findings from both timepoints to look temporally across pregnancy.

**Chapter 7: Findings: Weight-related health behaviours and psychological theory**

This chapter will present the weight-related health behaviours identified from the thematic framework presented in Chapters 5 and 6. Each WRHB is then explored using psychological theory at each timepoint. Finally, the findings at each timepoint will also be juxtaposed to explore comparisons between the timepoints.

**Chapter 8: Discussion**

This chapter integrates the findings from all three findings chapters and the literature review, to provide an in-depth understanding of women's engagement in WRHBs during pregnancy. It next identifies the implications for research and practice; considers the strengths and limitations of the study; concluding with key messages.

## **Chapter 2 Systematic review and thematic synthesis**

### **Women's experiences of weight gain during pregnancy in the UK: A systematic review and thematic synthesis of qualitative research**

#### **2.1 Introduction**

The first stage of this PhD project was to conduct a systematic review which systematically searched, identified and thematically synthesised existing qualitative literature exploring women's experiences and perceptions of gestational weight gain (GWG). This was to identify current understanding and gaps in knowledge, to subsequently inform and refine the research questions and aims for the main study. For this, search terms were developed and used to systematically search scientific databases for relevant literature. Identified studies were screened, critically appraised, and data were extracted and synthesised thematically. This chapter will present the methods, procedures and findings of the systematic review; in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Liberati et al., 2009), and enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) statement (Tong et al., 2012). The findings of this review informed the primary research aims for the PhD study.

#### **2.2 Review rationale and aim**

Reflecting on the evidence discussed in the previous chapter (Chapter 1), many women gain excessive weight during pregnancy which is associated with pregnancy complications (Goldstein, 2017; Mamun et al., 2011), and short and long term health implications (Amorim et al., 2007; Linne, 2004). Avoiding excessive GWG is relevant to all women, regardless of BMI, to reduce the risks of pregnancy complications and health implications associated with excessive GWG. Weight-related antenatal care and interventions often have mixed effectiveness (Campbell et al., 2011; Gardner et al., 2011; Duxbury, et al., 2014); do not meet the needs of women (Campbell et al., 2011; Heslehurst et al., 2015; Olander et al., 2015; Oteng-Ntim et al., 2010), and have low engagement (Atkinson et al., 2013). The focus of previous antenatal weight-related research has predominantly been around maternal obesity and with women who begin their pregnancy with a raised BMI. This has provided evidence of the negative experiences women who begin pregnancy with a raised BMI have during pregnancy and/or during obesity-related care (Smith & Lavender, 2011). There remains, however, a limited understanding of women's experiences about GWG

(Campbell et al., 2011). A more woman centred approach has been advocated to improve weight-related antenatal care and interventions in order to meet women's needs (Heslehurst et al., 2015; Olander et al., 2015; Oteng-Ntim et al., 2010).

### **2.2.1 Existing reviews**

There are a few existing reviews that have synthesised qualitative research around weight gain and management during pregnancy (Campbell et al., 2011; Johnson et al., 2013; Smith & Lavender, 2011; Vanstone et al., 2016). These reviews addressed different research questions and provided different insights than the current review. Two of these reviews were focussed around the effectiveness and acceptability of weight-related interventions (Campbell et al., 2011; Johnson et al., 2013); one was focussed on the pregnancy experiences of women with a raised BMI (Smith & Lavender, 2011); and one was focussed on women's perspectives towards healthy GWG (Vanstone et al., 2016).

Vanstone and colleagues' (2016) review could be considered the one most similar to the current review. It focussed on women's perspectives towards what constituted healthy GWG, the barriers to GWG and acceptable strategies for achieving a 'healthy' GWG. This was different to the current review, which took a more exploratory approach to understanding women's experiences of GWG during their pregnancy. Additionally, Vanstone et al., (2016) utilised a broad approach, and included 42 studies from a range of high income countries (Canada, United States, Sweden, Norway, Denmark, Australia and the UK). All of these countries, apart from the UK, endorse the Institute of Medicine's (2009) GWG guidelines (Vanstone et al., 2016). The current review applied a more focussed approach by limiting the studies to include women's experiences in the UK only. The decision to only include UK studies was made to focus on women's experiences within the context of UK antenatal care only, due to the considerable differences to GWG guidelines and care in other high income countries (as described in the previous chapter). Previous research exploring women's views towards weight management in the UK has identified how women discussed their perspectives towards it with considerable nuance (Swift et al., 2017). By including a large number of studies from a wide range of contexts (i.e. different countries), women's 'nuanced' perspectives which are specific to the UK context (i.e. the lack of GWG guidelines) could have been more likely to be overlooked than if UK specific experiences were synthesised.

## **2.2.2 Aim of the review**

This review aims to synthesise existing qualitative research which focusses on women's experiences of and views towards GWG in the UK.

This will identify existing knowledge and research gaps to inform the aims and development of the main study in this PhD programme of studies. The review will have a UK focus due to the differences in GWG and weight-related antenatal care (such as routine weighing and monitoring), compared to other high income countries which primarily implement the IoM (2009) guidelines (Alavi et al., 2012; NICE, 2010; Scott et al., 2014) (as discussed in the previous chapter).

## **2.3 Methods**

### **2.3.1 Search strategy**

Confidence in the literature search is vital for any systematic review, to ensure all key papers have been identified. The terms used to search for studies should be comprehensive and identify all relevant articles, but also sensitive to limit the identification of non-relevant articles (Cooke et al., 2012; Cooper, 1998). Developing search terms should be carried out in a systematic way, using a framework to guide the topic of the search terms. PICO is a framework which is often used during evidence-based and quantitative systematic reviews (Cooke et al., 2012; Schardt et al., 2007). PICO identifies four areas of search terms Participants, Intervention, Comparison and Outcome (Schardt et al., 2007). The appropriateness of using this tool to search for qualitative research has been challenged, as it is more likely to retrieve quantitative research, which in turn results in the identification of irrelevant hits (Cooke et al., 2012). Alternative frameworks for qualitative search term development have been developed and for this study, an alternative framework was utilised. The SPIDER tool (Cooke et al., 2012) was developed specifically to aid the search for qualitative research and was adopted in this study. SPIDER identifies five areas of search terms relevant for identifying qualitative research: Sample (replacing Population); Phenomenon of Interest (replacing Intervention); Design (replacing Comparison); Evaluation (replacing Outcomes); Research type.

A search strategy was developed using the SPIDER framework (Cooke et al., 2012), aided by the involvement of a literature searching service at the University of Leeds. Search terms included the key concepts of Sample (e.g. pregnant women); Phenomenon of Interest (e.g. weight management); Design (e.g. interview); Evaluation (e.g. experience); Research type (e.g. qualitative). The structure of the search i.e. the use of 'OR' and 'AND' was: [S AND PI] AND [D OR E OR R]. (see Appendix A for an example of the search and hits generated).

Once the search terms were identified, comprehensive systematic searches of four databases were conducted: MEDLINE, CINAHL, MIDIRS and PsycINFO. Each database has a slightly different specialism, therefore, searching more than one database is often employed in reviews to maximise the retrieval of relevant studies (Booth et al., 2016). MEDLINE (accessed via Ovid) is a database which includes scholarly journal publications relating to life-sciences such as medicine and nursing, with a concentration on bio-medical research. CINAHL (accessed via EBSCO) includes literature which is in nursing and allied health journals. MIDIRS (accessed via Ovid) is a database that can be used to search for articles relating to midwifery and maternal and infant care. This database contains journal articles, government reports and information in other maternity related websites. PsycINFO (accessed via Ovid) is a database produced by the American Psychological Association which includes literature in core psychological disciplines, such as behavioural and social sciences and mental health. These four databases were identified through consideration of the databases available which were likely to contain journal articles in the relevant disciplines for this review. Each database has different functions for searching headings and word truncations. Guidance for each database was incorporated by the researcher into the search strategy for each database, and they were adapted accordingly to ensure the functions for each database were performed correctly (Booth et al., 2016). Limits were applied due to the inclusion and exclusion criteria.

### **2.3.2 Study selection**

Papers identified through the database searching were exported to Endnote, de-duplicated and screened for inclusion using pre-defined eligibility criteria. Inclusion criteria were:

Inclusion criteria

- Primary research
- Qualitative or mixed methods including qualitative
- Carried out in the UK
- Published in English
- Published in 1992 – present (August 2020)
- Pregnant or postnatal women reporting experiences from pregnancy
- Experiences or views related to gestational weight gain or management; perceptions towards contributors to weight gain; gestational weight gain related care; weight-related health behaviours
- Women of any weight/ BMI

### Exclusion criteria

- Healthcare professionals' experiences
- Studies when the topic of weight gain in pregnancy was not sufficiently prominent to merit mention in the title or abstract
- Studies investigating the acceptability and feasibility of weight management interventions that were received in the context of a research study were excluded
- Focussed on weight-related health implications/ pregnancy complications e.g. gestational diabetes but not focussed around weight gain
- Focussed on the experiences of having raised BMI during pregnancy e.g. the perceived risks associated with a raised BMI during pregnancy but not focussed around weight gain
- Conference proceedings with no publication reporting the research identified

Studies were included if they were published between 1992 – present (August 2020) and carried out in the UK. These limits were applied due to the cessation of routine weighings as part of standard antenatal care in the UK occurring in 1992 (Dawes, Green & Ashurst, 1992); and the UK specific gestational weight guidance which is different to guidance implemented in other developed countries (Scott et al., 2014) (as discussed in Chapter 1 Introduction).

All identified titles were screened systematically. If it was not clear from the title whether to include or exclude the article, the abstract was retrieved and screened. If it was still not clear whether to include or exclude the articles the full text was retrieved and screened. To complement the database searches, an additional strategy of back chaining was employed to identify relevant literature. This involved looking at studies referenced in the included studies and screening them against the inclusion criteria (listed above). Due to limited resources all included studies were screened against the screening criteria by the researcher only, without the involvement of a second reviewer. A total of 2449 were screened, producing 11 for inclusion. See Figure 2.1 below for a flow chart of study selection process.

### **2.3.3 Data extraction**

Data were systematically extracted from each study into a data extraction form (see Appendix B). This was a table which was used to record the study details, methodological underpinnings and procedures, participant recruitment, data collection and analysis, sample details, raw data and author's findings and conclusions and the reviewers comments and conclusions. All text which was under the heading of 'findings' was extracted as data to be synthesised for this



study, including participant quotes and author's text. For mixed methods studies this only applied to areas of the findings relating to the qualitative data. Due to limited resources data extraction was completed by the researcher only, without the involvement of a second reviewer. Any queries were discussed within the supervisory team until a consensus was reached.

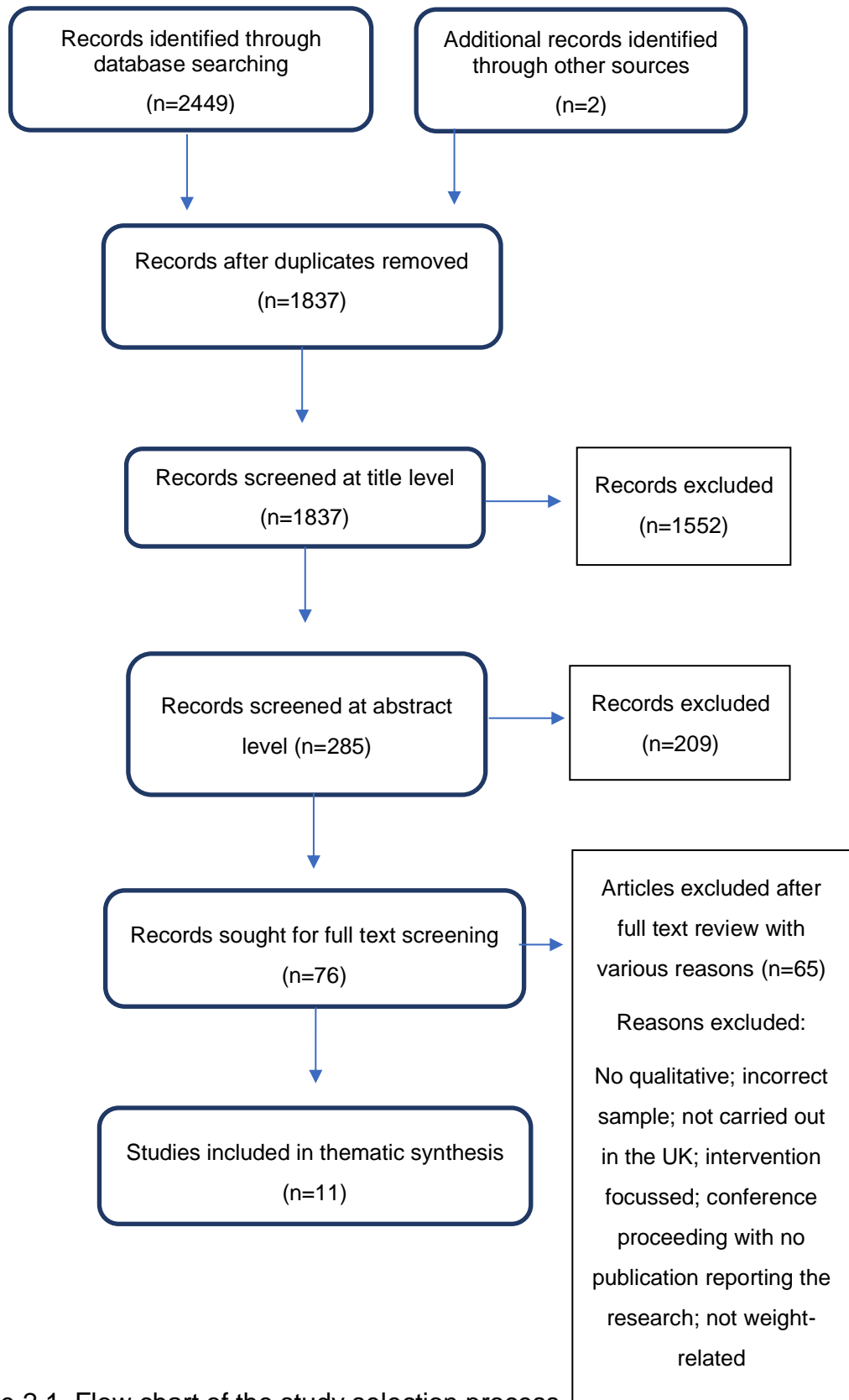


Figure 2.1. Flow chart of the study selection process

### **2.3.4 Quality appraisal**

Quality appraisal did not form part of the eligibility criteria, but was necessary to identify the quality of the studies included in the review. The decision not to exclude qualitative research on the basis of quality, is commonly applied in qualitative reviews and is an ongoing debate (Dixon-Woods et al., 2007). It is widely recognised that procedural details are often under-reported in qualitative studies due to word constraints (Melia, 2010; Seers & Toye, 2012), which makes it difficult to appraise the methodological processes and procedures. Therefore, whilst quality appraisal can attempt to identify the overall rigour of qualitative studies, their inclusion in qualitative syntheses is not commonly determined by their 'quality'. Study rigour was appraised in this study using the qualitative CASP checklist (Critical Appraisal Skills Programme, 2018). The CASP tool prompts for yes/ no/ can't tell, answers to ten key questions about the research; there is also an area for any reviewer's comments for each question. These questions cover the broad areas of the methodological approach, study design, ethical considerations, participant recruitment, data collection, data analysis, researcher influence and value of the findings. The answers to the questions were used as overall indicators of the quality of studies included in this review (see Appendix C for an example of a complete CASP form)

Studies were categorised into low, medium or high quality based on the answers to the 10 questions in the CASP checklist. Generally, if studies had at least nine 'Yes' answers they were rated high; at least seven 'Yes' answers, with no more than one 'No' answers they were rated as medium; two or more 'No' answers were rated as low. To complement the yes/ no/ can't tell answer for each question, the researcher's comments were recorded with details of the rationale for the overall indicators. The researcher comments were also taken into account in the rating, particularly for the 'can't tell' answers. This was to provide a detailed appraisal of the studies by considering the key methodological issues, and ensure the CASP tool was not applied as a rudimentary 'checklist' for key terms, which is a common pitfall of its checkbox design (Long et al, 2020). The researcher comments were particularly insightful in identifying whether key issues had been considered by the authors of the paper, or if key words were provided without demonstration of them.

### **2.3.5 Data synthesis**

The findings of the studies were thematically synthesised following guidance by Thomas and Harden (2008), who recommend a three stage process: 1) coding text; 2) developing descriptive themes; 3) generating analytical themes. This inductive approach firstly involved line-by-line coding of the 'findings' sections of

each paper, including both participant quotes and author interpretations, through annotating hard copies. The papers were uploaded onto NVivo and the codes were organised into descriptive themes. Finally, the descriptive themes were developed into analytic themes which went beyond the surface meaning of the findings reported in the original studies. Developing descriptive themes into analytical themes allows the data presented in individual research studies which aim to answer different research questions, to answer the (different) research question of the current review (Thomas & Harden, 2008). During development of the analytic themes, the original studies and their findings were referred to, to ensure the thematic development remained inductive and grounded in the findings of the papers. The analysis did not necessarily follow the three steps (Thomas & Harden, 2008) sequentially, as it was an iterative process. The themes were discussed within the supervisory team during their development and refinement, with alternative perspectives and arranging of themes put forward and discussed.

## **2.4 Findings**

### **2.4.1 Overview of included studies**

Ten of the 11 included studies were qualitative, implementing individual interviews or focus groups with women (Abayomi et al, 2020; Allen-Walker et al, 2017; Cunningham et al, 2018; Denison et al, 2015; Furness et al, 2011; Olander et al, 2011; Olander et al 2013; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998). One was mixed methods, and involved surveys with open and closed questions (Brown & Avery, 2012). All but one of the studies (Wiles et al., 1998) carried out one-off data collection with the women. Wiles et al., (1998) carried two interviews with each participant: one during pregnancy and a second after the birth of the baby. All the included studies presented their findings in themes.

Six studies included antenatal women only (Brown & Avery, 2012; Cunningham et al, 2018; Denison et al, 2015; Furness et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010); one study included only postnatal women (Allen-Walker et al, 2017); and four included antenatal and postnatal women; (Abayomi et al, 2020; Olander et al, 2011; Olander et al 2013; Wiles et al., 1998). Time after birth was not reported by three studies (Allen-Walker, 2017; Olander et al, 2011; Olander et al., 2013), one study collected data from women approximately six weeks after birth (Wiles et al., 1998), and one interviewed women up to 12 months after the birth (Abayomi et al, 2010). Within studies including pregnant participants, the reporting of the gestation was inconsistent, with some studies not specifying the gestation of the women included (Furness et al., 2011; Olander et al., 2011). The eight studies including antenatal women who reported the stage of gestation,

included women who were in their second and/or third trimester (Abayomi et al, 2020; Brown & Avery, 2012; Cunningham et al, 2018; Denison et al., 2015; Olander et al., 2013; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998).

Six studies included BMI as an eligibility criterion (Cunningham et al, 2018; Denison et al 2015; Furness et al, 2011; Olander et al, 2013; Weir et al, 2010; Wiles et al, 1998): two recruited women who had a pregnancy start BMI  $\geq 25$  kg/m<sup>2</sup> (Weir et al, 2010; Wiles et al, 1998); three included those who were  $\geq 30$  kg/m<sup>2</sup> (Cunningham et al, 2018; Furness et al., 2011; Olander et al, 2013); and one included women who were  $\geq 40$  kg/m<sup>2</sup> (Denison et al., 2015). The other five did not recruit based on BMI, and reported a range of BMIs. The samples of most studies lacked diversity, with most studies reporting the majority of participants were white British (Cunningham et al., 2018; Furness et al., 2011; Olander et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al., 1998), one study reported a diverse sample which reflected the local demographics (Olander, 2013), and others did not report ethnicity (Abayomi et al., 2020; Allen-Walker et al., 2017; Brown & Avery, 2012; Denison et al., 2011). See Table 2.1 below for study details of each included study.

Table 2.1 Characteristics of included studies

Author, year	Aims	Design and recruitment	Sample details	Method of data collection and analysis	Themes	Main findings	Quality rating (CASP)
Abayomi et al, 2020	To conduct PPI investigations with pregnant/postpartum women to gain insight into their experience of healthy eating/weight management advice during pregnancy.	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive</li> <li>- Recruited from community venues</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=32</li> <li>- Antenatal (n=10: 9 third trimester; 1 n/r) and postnatal (n=22: &lt;12 months)</li> <li>- Age=n/r<sup>1</sup></li> <li>- Parity=n/r</li> <li>- BMI=n/r</li> <li>- Ethnicity=n/r</li> </ul>	<ul style="list-style-type: none"> <li>- Four Focus groups; one interview</li> <li>- Thematic analysis of fieldnotes: inductive identification of codes and themes</li> </ul>	<ol style="list-style-type: none"> <li>1. Weight gain is inevitable in pregnancy</li> <li>2. Healthy eating advice is important but currently lacks consistency and depth and</li> <li>3. Expectations regarding the type of knowledge/support.</li> </ol>	Pregnant women think weight gain is inevitable and want positive health messages, with a focus on what they can/should do, rather than what they should not do.	Medium
Allen-Walker et al, 2017	To explore routine weighing in antenatal care and weight management in pregnancy with women who have been weighed during pregnancy.	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Opportunistic</li> <li>- Recruited from final follow up study visit of bigger study</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=10</li> <li>- Postnatal (months n/r)</li> <li>- Average age=34.5 years</li> <li>- Parity n/r</li> <li>- Average BMI=24.2 kg/m<sup>2</sup> (8=healthy range;</li> </ul>	<ul style="list-style-type: none"> <li>- Semi-structured telephone interviews</li> <li>- Thematic analysis of transcripts: familiarisation; coded; theme development; theme refinement</li> </ul>	<ol style="list-style-type: none"> <li>1. Routine weighing should be offered and is beneficial to all women</li> <li>2. Health professionals have a part to play in weight management and pregnancy</li> </ol>	Women were supportive of monitoring gestational weight gain through routine weighings	Medium

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<sup>1</sup> n/r: not recorded

			2=overweight range) – Ethnicity=n/r		3. The influence of knowledge and experience on gestational weight gain and healthy lifestyle behaviours		
Brown & Avery, 2012	To explore the information and advice women of different pre-pregnancy BMI classifications are currently receiving about managing their weight during pregnancy.	– Mixed methods – Purposive – Recruited through National Childbirth Trust	– Total n=59 – Antenatal (14 second trimester; 45 third trimester) – Age $m=32.7$ years (SD=3.9) – No previous pregnancies=71.2%; one previous pregnancy=25.4% – BMI<18.5=11.9%; BMI18.5–24.9=55.9%; BMI 25–29.9=25.4%; BMI>30=6.8% – Ethnicity n/r	– Questionnaire online or paper copy (containing 13 quantitative and 6 qualitative questions) – Thematic analysis	1. Weight gain advice wanted 2. Diet and exercise advice wanted 3. Lack of advice and support 4. Anxiety	Advice received on weight gain, diet and exercise was brief and generally not related to weight management. Women want clearer, more detailed and personalised advice to aid weight management	Medium
Cunningham et al, 2018	To explore the experiences of pregnant women with a raised BMI to investigate	– Qualitative – Purposive	– Total n=11 – Antenatal (third trimester)	– Individual interview (n=9); group interview (n=2)	1. 'Feeling judged' 2. 'Knowledge gap'	Pregnant women with a raised body mass index (BMI) feel judged in their communications with	Medium

	if their pregnancies were affected by their interactions with midwives and other health professionals	<ul style="list-style-type: none"> <li>- Recruited from antenatal appointment</li> </ul>	<ul style="list-style-type: none"> <li>- Age range=19–38 years</li> <li>- Primiparous=3; multiparous=8</li> <li>- BMI range=31.2–47.3 kg/m<sup>2</sup></li> <li>- Ethnicity=100% white</li> </ul>	<ul style="list-style-type: none"> <li>- Thematic analysis</li> </ul>	3. 'Doing your best'	midwives and other health professionals. They received insufficient information about weight gain during pregnancy	
Denison et al, 2015	To explore the barriers and facilitators to physical activity and lifestyle interventions in pregnant women with Class III obesity (body mass index >40 kg/m <sup>2</sup> ).	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive</li> <li>- Recruited from antenatal clinic specialising in care to women with BMI ≥ 40kg/m<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Total n=13</li> <li>- Antenatal (range: 17–37 weeks)</li> <li>- 'Majority' age range=25-34 years</li> <li>- Nulliparous=6</li> <li>- BMI≥40=100%</li> <li>- Ethnicity n/r</li> </ul>	<ul style="list-style-type: none"> <li>- In-depth semi structured interviews framed by the theory of planned behaviour</li> <li>- Framework analysis framed by the theory of planned behaviour</li> </ul>	<ol style="list-style-type: none"> <li>1. Healthy lifestyle Awareness</li> <li>2. Complex barriers to lifestyle changes</li> <li>3. Personalised solutions to promote healthy lifestyle</li> </ol>	Obese women have a good awareness of the importance and benefits of being physically active in pregnancy, but they also encounter several personal, societal and support barriers to physical activity participation.	High
Furness et al, 2011	To explore women's experiences of managing weight in pregnancy and the perceptions of women, midwives and obstetricians of services to support obese pregnant women	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive sample</li> <li>- Recruited from a maternity obesity service</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=6</li> <li>- No demographic data formally collected. Researchers observations:</li> <li>- Antenatal (weeks n/r)</li> </ul>	<ul style="list-style-type: none"> <li>- Focus groups (n=1)</li> <li>- Inductive thematic analysis</li> </ul>	<ol style="list-style-type: none"> <li>1. Explanations for obesity and weight management</li> <li>2. Best care for overweight women</li> </ol>	Obese women need unambiguous advice regarding healthy lifestyles, diet and exercise  in pregnancy to address a lack of knowledge and a tendency towards unhelpful self-talk messages.	High



	in managing their weight.		<ul style="list-style-type: none"> <li>- Age range=18-40 years</li> <li>- Parity range=1-4 pregnancies experienced</li> <li>- BMI <math>\geq</math> 30 kg/m<sup>2</sup>=100%</li> <li>- White=100% white</li> </ul>				
Olander et al, 2011	"To explore the views of pre- and post-natal women and health professionals regarding gestational weight gain."	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive?</li> <li>- Recruited from antenatal and postnatal classes in the community</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=29</li> <li>- No demographic data formally collected. Researchers observations and fieldnotes:</li> <li>- Antenatal n=9; postnatal women n=14</li> <li>- Age range=18 - 30 years</li> <li>- Differing parity</li> <li>- BMI range 18 - <math>\geq</math>30 kg/m<sup>2</sup></li> <li>- Mostly white British</li> </ul>	<ul style="list-style-type: none"> <li>- Focus groups (n=4: 2 antenatal; 2 postnatal)</li> <li>- Inductive thematic analysis</li> </ul>	<ol style="list-style-type: none"> <li>1. Lack of concern regarding gestational weight gain</li> <li>2. Lack of advice and information regarding gestational weight gain</li> <li>3. Reluctance to monitor gestational weight gain</li> <li>4. Difficulty in losing weight postnatally.</li> </ol>	The women expressed a lack of concern regarding their weight in pregnancy. They reported not monitoring their weight during pregnancy and commonly assumed they would lose weight postnatally	Medium
Olander et al, 2013	"To extend existing research using	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=16</li> <li>- Antenatal (n=12: 12</li> </ul>	<ul style="list-style-type: none"> <li>- Semi-structured telephone interview</li> </ul>	<ol style="list-style-type: none"> <li>1. Pragmatic issues (broken down into</li> </ol>	Pragmatic issues and lack of motivation prevented women from	Medium

	qualitative methods to elicit and explore obese pregnant women's views on the barriers they face concerning participation in weight management services during pregnancy."	<ul style="list-style-type: none"> <li>- Recruited from an antenatal weight management service</li> </ul>	<p>second or third trimester) and postnatal (n=4: months n/r)</p> <ul style="list-style-type: none"> <li>- Age range=19-38</li> <li>- Primiparous=6</li> <li>- BMI <math>\geq</math> 30 kg/m<sup>2</sup>=100%</li> <li>- White British=8; British Asian=5; mixed=2; No information available=1</li> </ul>	<ul style="list-style-type: none"> <li>- Thematic analysis</li> </ul>	<p>generic and pregnancy specific)</p> <p>2. Motivation</p>	engaging in a weight management service during pregnancy	
Padmanabhan et al, 2015	To examine pregnant women's weight-related attitudes and beliefs	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Purposive</li> <li>- Recruited from a prospective quantitative longitudinal study exploring diet and physical activity behaviours</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=19</li> <li>- Third trimester (weeks n/r)</li> <li>- Age range=19-38</li> <li>- Parity range=0-5</li> <li>- BMI range 18.5 - <math>\geq</math>30 kg/m<sup>2</sup></li> <li>- White=18</li> </ul>	<ul style="list-style-type: none"> <li>- Face-to-face semi-structured interviews</li> <li>- Thematic content analysis</li> </ul>	<ol style="list-style-type: none"> <li>1. Fragmentation</li> <li>2. Legitimising behaviours</li> <li>3. Body and behaviour surveillance</li> </ol>	Women perceived their bodies as fragmented into 'my pregnancy' (the bump) and 'me' (rest of my body). This fragmentation was the key driver of their weight-related attitudes and beliefs and influenced their dietary and physical activity behaviours.	High
Weir et al, et al 2010	To: (i) explore the views and experiences of overweight and obese pregnant women; and (ii)	<ul style="list-style-type: none"> <li>- Qualitative</li> <li>- Stratified purposive sampling, based on</li> </ul>	<ul style="list-style-type: none"> <li>- Total n=14</li> <li>- 'Late pregnancy'</li> <li>- Age range 20-37</li> </ul>	<ul style="list-style-type: none"> <li>- Semi structured in-depth interviews</li> <li>- Framework analysis</li> </ul>	<ol style="list-style-type: none"> <li>1. Behavioural beliefs and attitudes</li> <li>2. Control beliefs</li> </ol>	Healthy eating was often viewed as being of greater importance for the health of mother and baby than participation in	High

	inform interventions which could promote the adoption of physical activity during pregnancy.	booking BMI and parity – Recruited from a feasibility study of physical activity measurement methods	– Primiparous=8 – BMI>30 kg/m <sup>2</sup> =8 – White=13		3. Normative beliefs.	physical activity. A commonly cited motivator for maintaining physical activity during pregnancy is an aid to reducing pregnancy-related weight gain.	
Wiles et al, 1998	To examine the beliefs of women of above average weight about appropriate levels of weight gain in pregnancy	– Qualitative with repeated multiple timepoints – Purposive – Recruited towards the end of another bigger study	– Total n=37 – Interview 1=30-40 weeks antenatal, interview 2=6 weeks postnatal – Age range=16-35 – Parity range=0 - 3 – BMI pre-pregnancy $m=32$ kg/m <sup>2</sup> – 100% white	– In-depth interviews (Two in-depth interviews were carried out with each participant: 1 antenatal; 1 postnatal) – No specific approach/ method identified, but an interpretive qualitative methodology based on the grounded theory approach to data collection and analysis was explicitly reported.  Findings were then grouped	1. Related to issues of control over weight gain 2. Issues relating to the needs of their unborn baby	Women were concerned not to weigh more after pregnancy than before. Their perceived ability to control weight gain during pregnancy was varied. In the perceived absence of specific advice from health professionals, they constructed their own views about appropriate levels of weight gain. These were informed by their desire to minimise weight gain and to provide adequate nourishment for the growth and development of their baby.	Medium

				into themes and presented thematically			
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### 2.4.2 Critical appraisal of the included studies

Of the 11 included studies, seven were categorised as medium quality (Abayomi et al, 2020; Allen-Walker et al, 2017; Brown & Avery, 2012; Cunningham et al, 2018; Olander et al, 2011; Olander et al, 2013; Wiles et al, 1998) and four were high (Denison et al, 2015; Furness et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010). The methodological design of all studies was considered appropriate to meet their aims. There were common key issues across the included studies identified during the critical appraisal (using the CASP tool) which often prevented them from being rated as high quality. Key considerations are discussed below.

All but one study carried out one-off interviews (Wiles et al., 1998). Some studies did not report the gestation (Furness et al., 2011; Olander et al., 2011), or time after birth of their participants (Allen-Walker, 2017; Olander et al, 2011; Olander et al., 2013). Of the studies that reported gestation, all collected data from participants who were in their second and/or third trimester (Abayomi et al., 2020; Cunningham et al, 2018; Denison et al., 2015; Padmanabhan et al, 2015; Weir, 2010; Wiles et al., 1998). This indicates a lack of research exploring women's experiences at the beginning of pregnancy. One study carrying out data collection in the third trimester (Padmanabhan et al., 2015) identified the timings of the interviews as a strength of the research as they claimed it could be utilised to reflect on the women's entire pregnancy. However, considering the amount of change women experience across pregnancy, it is questionable how effective this would have been to collect women's experiences from early pregnancy (Read, 2018).

All but one of the studies (Abayomi et al, 2020) received ethical approval from a University or NHS ethics committee, which indicates consideration of ethical issues. Key considerations, such as around participant consent were also often identified in the papers. Abayomi et al.(2020) had not required ethical approvals for the research, due to it being a patient and public involvement study. There was minimal discussion around ethical considerations; participant consent was identified, but there was no consideration towards any other ethical issues such as participant confidentiality or data storage.

All studies had little to no information around the influence of the researcher on the research, including the question development, recruitment, data collection, data analysis and the conclusions drawn. Most studies instead, made a general reference to avoiding researcher 'bias' or 'power imbalance' and listed the use of an independent researcher during analysis and the thematic development as quality assurance to over-come this. However, there was limited reflexivity, which was study specific, (i.e. how the researchers' epistemological and/or ontological

approach could have impacted on the research present in any of the papers). Acknowledging the relationship between researcher and the participants and any underlying assumptions held by the researcher is an essential element of demonstrating quality in qualitative research. (Noble & Smith, 2015; Rohleder & Lyons, 2014.)

Studies that were rated medium quality (Abayomi et al, 2020; Allen-Walker et al, 2017; Brown & Avery, 2012; Cunningham et al, 2018; Olander et al, 2011; Olander et al, 2013; Wiles et al, 1998) often reported key terms such as ‘data saturation’ or listed procedures such as the steps of analysis, without demonstrating how they were achieved. This led to uncertainty in their application and prevented many studies from being categorised as high quality. In contrast, studies which were categorised as high quality (Denison et al, 2015; Furness et al, 2011; Padmanabhan et al, 2015; Weir et al, et al 2010) provided more details and effectively demonstrated when or how key terms such as data saturation or rigorous analysis was achieved.

### 2.4.3 Themes

Two themes, each consisting of sub-themes, were identified from the thematic synthesis. The two themes were Theme 1. Making sense of weight gain as part of pregnancy; and Theme 2. How diet and physical activity can impact the unborn baby.

Theme	Sub-themes
1. Making sense of weight gain as part of pregnancy	1a. Some weight gain is expected as part of pregnancy 1b. Acceptance vs. management of gestational weight gain 1c. The absence of weight gain information from healthcare professionals
2. The roles of diet and physical activity on the unborn baby	2a. Eating for two; exercising for one 2b. Women independently seek and navigate weight-related information

### 2.4.4 Theme 1. Making sense of weight gain as part of pregnancy

This theme comprised of three sub-themes: 1a. Some weight gain is expected as part of pregnancy; 1b. Acceptance vs. management of gestational weight gain; 1c. The absence of weight gain information from healthcare professionals. They

identified how women viewed and interpreted GWG and its importance to their own pregnancy. This was different to outside of pregnancy. Women anticipated weight gain, but did not want to gain ‘too much’. There was conflict between the women towards whether or not they wanted to, or thought it was appropriate to, manage their weight gain, or whether they should attempt to prevent it from being excessive. Although there were mixed findings towards whether women should manage or accept their GWG, pregnancy was not perceived as a time for women to gain excessive amounts of weight. Women’s views and experiences of GWG were directly and indirectly informed by their interactions with healthcare professionals.

#### **2.4.4.1 Sub-theme 1a. Some weight gain is expected as part of pregnancy**

Weight gain during pregnancy was expected by the women; to a certain extent (Abayomi et al, 2020; Cunningham et al, 2018; Denison et al, 2015; Olander et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998). Some weight gain was considered inevitable, uncontrollable and necessary to support the growth of their unborn baby (Abayomi et al, 2020; Cunningham et al, 2018; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998).

“It wasn’t a worry. I suppose it was in the sense that sometimes if I hadn’t gained weight within a few weeks of being pregnant I thought ‘oh gosh, is there something wrong?’” (Allen-Walker et al, 2017).

One study identified that none of the women were aware there were no GWG guidelines in the UK, but that absence of guidelines did not prevent the women from ‘speculating’ what they perceived to be ‘excessive’ GWG (Abayomi et al, 2020). Women in some of the other studies also thought they could gain ‘too much’ weight, which was thought to be as a result of dietary intake and limited physical activity (Brown & Avery, 2012; Denison et al, 2015; Furness et al, 2011; Olander et al, 2011; Padmanabhan et al, 2015; Wiles et al, 1998).

“I think if I put on like five stone on quickly or something ridiculous, then I would have known that I never stopped eating rubbish, then I would feel that was not baby weight but me being greedy” (Padmanabhan et al, 2015)

Women expected their bodies would change during pregnancy, but were unsure of how to attribute those changes to the different weight gain (Allen-Walker et al, 2017). There was limited understanding towards what aspects of their weight gain were due to the pregnancy, and what was ‘excessive’ and as a result of dietary intake and physical activity levels (Allen-Walker et al, 2017; Brown 2012, Denison et al, 2015; Padmanabhan et al, 2015; Wiles et al, 1998).

“I would like to know how weight gain is distributed between me and my baby.” (Brown & Avery, 2012)

“I thought I had last time [gained too much weight] but then I had a nine pound baby, so it was all baby” (Olander et al, 2011)

One of the studies suggested that women used the location of the weight gain on the body, to gauge the acceptability of the weight gain (Padmanabhan et al, 2015).

“... I’ve put weight on obviously on your breast I mean because of your breast milk and tummy because of the baby, but other than that I’ve not really put much on in other areas and still have a waist.” (Padmanabhan et al, 2015)

#### **2.4.4.2 Sub-theme 1b. Acceptance vs. management of gestational weight gain**

The inevitability of GWG raised questions as to whether the women perceived they could control their weight gain (Abayomi et al, 2020; Denison et al, 2015; Olander et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010; Wiles. 1998). Limited ability to control weight gain compounded with inevitability meant the women indicated a low level of concern towards managing or ‘worrying’ about their weight gain during pregnancy (Abayomi et al, 2020; Denison et al, 2015; Olander et al, 2011; Olander et al, 2013; Weir et al, 2010)

“You can only control your weight up to a certain point in pregnancy [laughing] because it’s gonna happen anyway.” (Denison et al, 2015)

“Obviously your body is going to get bigger anyway so you don’t want to worry about it” (Olander et al, 2013)

On the whole, this meant that women were accepting of weight gain during pregnancy. However, it was apparent that some women wanted to attempt to balance weight gain appropriately: to be sufficient to support the pregnancy, but to avoid gaining excessive weight, by keeping their weight gain to a ‘minimum’ (Wiles et al, 1998) (Brown & Avery, 2012; Denison et al, 2015; Padmanabhan et al, 2015; Wiles et al, 1998).

“I asked him [her GP] about calories, like how many should I have through the day so that I didn’t have any less than I should but at the same time that I didn’t put on too much weight” (Wiles et al, 1998)

There was limited understanding of the health implications of gaining too much weight during pregnancy (Allen-Walker et al, 2017; Denison et al, 2015; Weir et al, 2010; Wiles et al, 1998). Additionally, pregnancy was considered a short-term



period in life where 'normal life', including weight management, was put on hold, and resumed after the pregnancy (Allan-Walker, 2017; Cunningham et al, 2018; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998). Women drew on these beliefs as part of accepting GWG. By accepting weight gain as a part of pregnancy, there was an underlying assumption that women would subsequently 'worry' about their weight postnatally (Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998).

"You can lose it afterwards, that's my motto." (Olander et al, 2011)

Although most women identified weight loss during the postnatal period as an alternative to managing their weight gain during pregnancy, some women perceived that excessive weight gain during pregnancy could result in excessive weight and weight retention after pregnancy (Allen-Walker et al, 2017). Additionally, women who had experienced a previous pregnancy were more aware of the impact GWG could have on their weight after the pregnancy and the 'struggle' of losing it after the birth (Allen-Walker et al, 2017; Cunningham et al, 2018; Olander et al, 2011). These women indicated more consideration towards preventing excessive weight gain during pregnancy.

"I didn't worry about it [weight gain] last time, I've worried about it more this time. Because it's harder, to get off afterwards." (Olander et al, 2011)

"This time I have been a lot more sensible. I think I have kind of realised that I don't want to put the weight on again, because it's harder as you get older to actually to get rid of the weight, so I think I have been a bit more sensible this time." (Cunningham et al, 2018)

One study identified how women did not monitor their weight gain during pregnancy, such as weighing themselves (Olander, 2011). A few of the more recent studies explored views towards introducing the monitoring of GWG through routine weighings at antenatal appointments. Overall, these studies found women were generally supportive of routine weighings, as long as they did not feel like they were "weight-watching" (Abayomi et al, 2020; Allen-Walker et al, 2017). Women thought routine weighings could be utilised as a tool to discuss weight gain and the associated behaviours (Allen-Walker et al, 2017).

However, routine weighings during pregnancy were considered to have the potential to evoke negative emotions in others (Allen-Walker et al, 2017; Cunningham et al, 2018). Negative perceptions towards regular weighings during pregnancy as a form of weight monitoring prompted a negative response from women who began their pregnancy with a raised BMI, and already felt their

antenatal care was dominated by their weight status and judgement by healthcare professionals (Cunningham et al, 2018).

“One woman (Participant 10) had anticipated being weighed and explained she was worried about attending the antenatal clinic for this reason. As a result, she had delayed contacting her midwife.” (Cunningham et al, 2018)

Diet and physical activity were often perceived as being linked to weight management (Denison et al, 2015; Furness et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010). Women held underlying assumptions towards weight management that by managing their weight through dietary and/or physical activity behaviours they may hinder their baby’s growth (Olander et al, 2011; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998). In light of this, women prioritised their baby’s development by not attempted to manage their weight. Additionally, managing weight during pregnancy was thought to detract from the enjoyable experience of pregnancy (Olander et al, 2013).

“I’d rather get big myself and have a healthy baby rather than stay slim and end up having a little six pounder who wasn’t as healthy. So I tend to push all my feelings aside about my weight because I know that I’m going to end up having a healthy child because of it.” (Padmanabhan et al, 2015)

“I just thought I didn’t want to, I wanted to enjoy being pregnant rather than having to worry about all them things” (Olander et al, 2013).

#### **2.4.4.3 Sub-theme 1c. The absence of weight gain information from healthcare professionals**

Health professionals played an important role in shaping women’s interpretations of weight gain and its importance to their pregnancy. Midwives were identified as the professional best placed to provide such information and support (Abayomi et al, 2020; Allen-Walker et al, 2017; Brown & Avery, 2012; Cunningham et al, 2018; Denison et al, 2015; Furness et al, 2011; Olander et al, 2011). Women held an expectation that information which was highly relevant and important would be discussed by their midwife. However, women often reported insufficient, or no information on GWG (Abayomi et al, 2020; Allen-Walker et al, 2017; Brown & Avery, 2012; Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011; Weir et al, 2010). For women who began their pregnancy with a raised BMI this was considered particularly surprising due to their weight status (Cunningham et al, 2018). Some women reported attempting to raise the topic with midwives but experienced a lack of responsiveness from midwives (Brown & Avery, 2012; Furness et al, 2011).

“It would have been helpful to me if more information had been given to me about the different patterns of weight gain that women might encounter. Simply being dismissed as worrying about something that is inevitable has not helped”. (Brown & Avery, 2012)

‘There has not been any discussion. There has been no discussion at all about my weight, um, whether being overweight, or you know, the amount of weight I have put on in pregnancy there hasn’t been any, no discussion about it at all.’ (Cunningham et al, 2018)

The absence of information around weight management and dismissal by midwives, was perceived by the women to mean midwives had limited knowledge of GWG and/or did not believe it was of importance during pregnancy (Allen-Walker et al, 2017; Brown & Avery, 2012; Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011). This led women to believe that weight gain or weight management was not an important consideration for them during their pregnancy (Brown & Avery, 2012; Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011).

“My midwife wasn’t concerned, she said it wasn’t something she was going to check, so in my opinion it’s not something that is that important if my midwife doesn’t need to check it, ‘cos she checks the important things.” (Olander et al, 2011)

Women with a raised BMI during pregnancy reported negative interactions with health professionals, because of their weight status (Cunningham et al, 2018; Denison et al, 2015; Furness et al, 2011; Weir et al, 2010; Wiles et al, 1998). They perceived healthcare professionals used their weight or BMI as a proxy measure for their overall health status. As a consequence, they felt their health behaviours such as diet and levels of physical activity were judged and stereotyped as unhealthy.

“Everybody thinks doctors, and people like you are judging us anyway...you're looking at me thinking I must eat chips all the time...it's just what you think” (Denison et al, 2015)

“I think the stigma is that if you’re over a certain BMI that you don’t exercise isn’t it? (General agreement) That’s what people think. I mean if you’re slim and you’ve got a low BMI then they automatically think that you exercise, if you’re not then they think you don’t” Furness et al, 2011

## **2.4.5 Theme 2. The roles of diet and physical activity on the unborn baby**

Although women perceived their diet and physical activity had the potential to impact on their weight during pregnancy, weight management through the engagement of these behaviours was considered inappropriate during pregnancy (as discussed above). Instead, diet and physical activity behaviours were primarily seen as having a role in supporting the development of the unborn baby and protecting them from harm. Diet and physical activity played different roles in supporting the unborn baby, which women actively sought to understand. These are reflected in the two sub-themes identified in this themes: 2a. Eating for two; exercising for one; 2b. Women independently seek and navigate weight-related information. They indicate that

### **2.4.5.1 Sub-theme 2a. Eating for two; exercising for one**

Women considered the impact of diet and physical activity on the health of the pregnancy, and the potential benefits and risks for the unborn baby. The nutritional content of the women's diet was believed to be essential in supporting the baby's growth and development. Women perceived a direct link between the food they consumed and the nutrition provided to the baby (Brown & Avery, 2012; Denison et al, 2015; Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998).

“Obviously anything you're taking in can sort of make its way to the baby and will have an effect on the growth of baby and things like that.” (Weir et al, 2010)

Whilst most women perceived their diet as important, they questioned the appropriateness of physical activity in pregnancy. Physical activity was acknowledged as having some benefits; mainly for the emotional well-being of the woman and the birth (Denison et al, 2015; Padmanabhan et al, 2015 Weir et al, 2010).

“The fitter you are throughout your pregnancy, the more supple you are. And you're supposed to have an easier time giving birth.” (Weir et al, 2010)

However, it was also perceived as being potentially harmful for the health of the unborn baby (Brown & Avery, 2012; Denison et al, 2015; Padmanabhan et al, 2015; Weir et al, 2010). The possible benefits associated with physical activity did not outweigh the perceived risk of harm it could have on the unborn baby, and subsequently, most women reported the avoidance of physical activity.

“I probably would have liked to have done some more activity, if the truth be known, ... probably thinking I didn't want to harm the baby which is

completely stupid and I should have just got on with it, but I think... if I don't do any exercise for 9 months, nothing can harm the baby" (Padmanabhan et al, 2015)

Types of physical activity which were considered acceptable during pregnancy were often orientated around avoiding inactivity i.e. minimising sedentary behaviour, rather than engaging with exercise (Denison et al, 2015; Padmanabhan et al, 2015).

"Well just out and about, walking, getting your housework done, that's all quite physical...getting off your backside and doing anything, basically... keep you moving and keep going I would say" (Denison et al, 2015)

Diet and physical activity were also affected by the physiological symptoms of pregnancy. When women reported experiencing pregnancy symptoms, this had an impact on what dietary and physical behaviours they felt like they had the ability to engage in (Abayomi et al, 2020; Denison et al, 2015; Olander et al, 2011; Padmanabhan et al, 2015 Weir et al, 2010).

"I think at the beginning as well it depends how your sickness is, because with me I just had to eat loads of toast, to make sure that I didn't feel sick" (Olander et al, 2011)

The women wanted to ensure they were doing their best to support the growth and development of the unborn baby and protect it from harm. Diet and physical activity were important factors in achieving this (Padmanabhan et al, 2015; Weir et al, 2010; Wiles et al, 1998). This desire to be healthy for the sake of their unborn baby prompted women to actively consider changes to their diet and physical activities (Denison et al, 2015; Weir et al, 2010).

"I would like to think that I have done everything possible to make sure that the baby is healthy and when it is born, has a healthy weight and is not being deprived of anything" (Padmanabhan et al, 2015)

Despite this, the women reported not necessarily changing their engagement in behaviours. A lack of motivation or 'laziness' were reported by the women as barriers (Denison et al, 2015; Furness et al, 2011; Weir et al, 2010).

"It's just, for me, I've got no willpower. I will just end up with the bar of chocolate in front of the TV, rather than going out" (Furness et al, 2011)

#### **2.4.5.2 Sub-theme 2b. Women independently seek and navigate weight-related information**

Women expressed an interest in wanting to receive information regarding weight gain, diet and physical activity during pregnancy. To supplement the lack of

relevant information received from health professionals, they independently sought information (Allen-Walker et al, 2017; Brown & Avery, 2012; Weir et al, 2010; Wiles et al, 1998). This was through various sources such as the internet, books and advice from others. However, an abundance of different information from, what was perceived as, non-reputable sources meant women received contradictory messages which they did not know how to process and caused more confusion (Allen-Walker et al, 2017; Weir et al, 2010).

“You read so much or you get so much off the internet or whatever that it can be quite overwhelming. And the information is conflicting...” (Weir et al, 2010)

Furthermore, women also received contradicting or conflicting information from different health professionals, and from resources provided by health professionals and the health professionals themselves, which resulted in further confusion and uncertainty (Abayomi et al, 2020; Brown & Avery, 2012; Denison et al, 2015; Padmanabhan et al, 2015; Wiles et al, 1998).

“... and less conflicting advice. It’s all very well to tell people not to eat more than before pregnancy when they suddenly start feeling starving all the time. So you eat anyway, and then feel bad about it.” (Brown & Avery).

Although women reported receiving insufficient and sometimes contradicting advice from health professionals, women continued to view them as a trustworthy and welcome source of information (Denison et al, 2015; Furness et al, 2011). However, they discussed how messages were mainly framed ‘what not to do’, which were considered impractical to the women (Abayomi et al, 2020; Denison et al, 2015; Padmanabhan et al, 2015; Wiles et al, 1998). The women highlighted the need for more positive, directional information which they could follow.

“Nobody has actually said ‘we would advise you to maybe do this, or do like a 15 minute walk everyday’ or ‘this is what you should be doing because this is the benefits of it’. Nobody's said that.” (Denison et al, 2015)

“Classes for nutrition maybe with cooking to show you what you can make when you are pregnant would be good.” (Abayomi et al, 2015)

## **2.5 Discussion**

In this systematic review, 11 qualitative studies were thematically synthesised, exploring women’s experiences of GWG in the UK. All but one of the studies carried out data collection at one timepoint in. Most of the studies included women in the antenatal period, and carried out data collection in mid or late pregnancy. Two themes with sub-themes were identified from women’s experiences, which indicated how women portrayed GWG and the associated health behaviours

during pregnancy. Weight gain was considered inevitable during pregnancy, with mixed views about the level of interest towards managing GWG or waiting until after the pregnancy to engage in weight loss. Dietary and physical activity behaviours were considered as having an impact on weight during pregnancy, however, dietary behaviours such as foods consumed and levels of physical activity were also thought to have the potential to impact on the unborn baby. Women indicated that engaging in WRHBs due to their potential impact on the unborn baby were perceived as more important than for weight management purposes during pregnancy, but exploration of the women's engagement in WRHBs were limited across the studies. These findings have demonstrated how women made sense of GWG, and how they managed the conflict between managing or accepting GWG. GWG was also associated with diet and physical activity, however, women were more focussed on how these weight-related health behaviours (WRHBs) can impact the unborn baby more so than weight gain. The methods utilised, and findings presented in the included studies have identified current understanding and gaps in knowledge, to inform and refine the research questions and aims for the main study.

Women's views towards weight gain were complex. Some weight gain was considered necessary for the pregnancy and was accepted as inevitable; weight gain not thought to be pregnancy related was categorised as excessive. There are no guidelines in the UK which define excessive weight gain, although it is advised to gain a 'healthy' amount of GWG (NICE, 2010). This was reflected in the women's perspectives as they were unsure how exactly to categorise weight gain as appropriate or excessive. The women's experiences in the included studies indicated a lack of weight-related information from midwives. This is in line with previous research which has identified difficulties around the communication of weight-related information through both the women's and midwives experiences (Duthie, Drew & Flynn, 2013; Foster & Hirst, 2014; Furness et al., 2015; Heslehurst et al., 2011; Johnson et al., 2013).

One study included in this review demonstrated how an absence of guidance which identified excessive GWG did not stop women forming their own beliefs towards excessive GWG (Abayomi et al, 2020). Some women independently sought information through resources such as the internet, and one study indicated how women may use visual cues to aid the categorisation of weight gain (Padmanabhan et al, 2015) i.e. on 'the bump' or 'themselves'. This one study provided interesting insight into the categorisation of weight gain and how it informed the acceptability of weight gain during pregnancy. Although women were interested in categorising and making sense of their GWG, there were mixed findings towards the management of GWG. Some women wanted to avoid

gaining excessive GWG during pregnancy, whilst others took a 'hiatus' from managing weight during pregnancy and accepted the weight gain; with the view to addressing their weight postnatally. Women's experiences of and perspectives towards GWG have often been described as complex, with contradicting views towards its relevance in pregnancy (Johnson et al., 2012; Swift et al., 2017; Vanstone et al., 2016). This review provides insight into the subtle differences between pregnancy related GWG and 'excessive' GWG from the women's perspectives, which could contribute to the complexity around weight gain and management in pregnancy. Further research exploring women's experiences of weight gain could increase understanding and enable clearer conclusions to be drawn about the appropriateness of weight management during pregnancy.

Limited weight-related information and guidance from healthcare professionals such as midwives was evident in this review. This lack of information led women to want more information from healthcare professionals. Although a need for more information was identified in this review, the information women did want was not established. In the absence of information from healthcare professionals, women independently searched for information themselves. Previous literature has identified how independent information seeking around GWG is likely to expose women to inaccurate information from non-clinical, unreliable sources (Wilcox et al., 2015), which further supports the need for the provision of weight-related information. A previous systematic review of behavioural interventions targeting GWG (Campbell et al., 2011), identified that interventions addressed a lack of information by providing consistent information in a variety of formats. However, this had no effect on the interventions. More recent research has investigated what information women should be provided and by who. A recent review (Stockton & Nield, 2020) identified a 'wishlist' identifying the relevant weight-related information to be provided to women, from their midwife. This identified a need for more specific, tailored information around weight management, 'healthy' foods and the safety of exercise. The current review supports the view that current provision of information is deemed unsatisfactory by women, and further research to establish the implementation of this 'wishlist'.

In addition to information seeking behaviours, this review also found an indirect impact the lack of information had on the women. The women held assumptions that their midwife would address important information with them; therefore, the absence of weight-related information led women to believe that weight gain and management was not an important aspect of their pregnancy. This adds to the literature around what information to provide to women around GWG (Stockton et al., 2020). Aside from the specific information to be provided, by just raising the topic of weight in pregnancy, midwives could influence women's views



towards the importance of it. These findings also have wider implications towards how the topics of information raised by midwives can inadvertently inform women's views towards what they perceive as important during pregnancy. Furthermore, the findings from this review are particularly pertinent to women in the UK, as there are currently no GWG guidelines available (NICE, 2010). This is in contrast to other highly developed countries (Alavi et al., 2012; Scott et al., 2014). An international systematic review exploring women's perceptions of health GWG indicated that women considered achieving healthy GWG as important (Vanstone et al., 2016). The findings from the current review indicates how antenatal care in the UK, devoid of GWG guidance, may indirectly reduce the perceived importance of GWG by women.

This study found weight management was perceived by the women to be related to WRHBs. However, WRHBs were also perceived as having the potential to impact on the health of the unborn baby, in addition to weight management. This review indicated that women thought engaging in these WRHBs with the purpose of supporting the unborn baby was more important than engaging in them for weight management purposes. These findings are in line with previous research which suggests women are motivated by the well-being of their unborn baby during pregnancy (Gardner et al., 2012; O'Brien et al., 2017; Phelan, 2010; Sui et al., 2013). Only limited conclusions can be drawn towards the women's experiences of WRHBs, as studies included in this review focussed on GWG not WRHBs; and exploration of women's experiences of WRHBs in the wider literature are underexplored.

All but one of the studies (Wiles et al., 1998) included in this review carried out data collection at one timepoint in pregnancy or after the birth (as discussed in the quality appraisal). This only provides a snapshot for that particular point in time (Read, 2018). Most of the studies included in this review carried out their data collection in the third trimester; meaning that the findings from this review relate predominantly to women's experience in mid to late pregnancy only. This is consistent with the wider literature, where there is also an absence of research exploring UK women's experiences of GWG in early pregnancy. A recent cross-sectional study has identified early pregnancy as a time of behaviour change for diet and physical activity (Swift et al., 2017). This is different to women's experiences identified later in pregnancy, who reported experiencing barriers to behaviour change in this review (Denison et al, 2015; Furness et al, 2011; Weir et al, 2010). Additionally, existing literature has quantitatively identified that women's WRHBs may change during pregnancy (Crozier et al., 2010). The studies in the current review inconsistently reported the gestation of the women at data collection, with some studies not reporting it at all. The above suggestion

of changes across pregnancy (Crozier et al., 2010; Swift et al., 2017) indicate the importance of comprehensively reporting the gestation of participants; to indicate when exactly during pregnancy the findings are relevant to.

This review synthesised the views from women in the UK only, due to the implementation of antenatal weight-related guidelines which are different to many other developed countries (Alavi et al., 2012; Scott et al., 2014). Pregnant women in the UK are currently routinely weighed once at the beginning of pregnancy as a way to measure their BMI to place them on the necessary maternity care pathway. They may be weighed again towards the end of pregnancy for the anaesthetic calculations, however, they are not subsequently weighed or advised on GWG. This is different to some other developed countries who apply the IoM guidelines (2009) and monitor GWG through routine weighings (Scott et al., 2014). There is current debate in the UK investigating the re-introduction of monitoring GWG through routine weighings (Allen-Walker et al, 2015; Daley et al., 2015; Fealy et al., 2020). The current review has synthesised women's views towards the monitoring of weight gain during pregnancy. It has identified that although women do not necessarily monitor their own GWG, they may be supportive of being weighed and discussing their GWG with their midwife, thus indicating that routine weighings could be acceptable to carry out during pregnancy (Allen-Walker et al, 2017). Although very few studies included in the current review explored routine weighings (Abayomi et al, 2020; Allen-Walker et al, 2017) these are more recent papers, indicating growing interest in this area. The more recent studies included in this review which explored routine weighings. However, these early findings should be taken with caution, as research with women who began pregnancy with a raised BMI suggest it could evoke negative emotions (Cunningham et al., 2018).

### **2.5.1 Strengths and limitations**

A strength of this study is that it provides a detailed synthesis of women's experiences within the context of UK antenatal care. UK weight-related antenatal care is unique to most other high-income countries in that it does not implement any GWG guidelines (as discussed in Chapter 1) (NICE, et al., 2010; Scott et al., 2014). Whilst it means the findings of this study may not be generalisable to other countries outside of the UK, it has provided a detailed synthesis which has unpicked some of the UK context specific complexities around GWG. The quality appraisal of the included studies, using the CASP tool, identified most studies as medium quality with few high-quality studies. However, none of the studies were categorised as low, with all studies adopting the appropriate methodologies to meet the aims of the research.

The samples of the included studies ranged in size, and were comprised predominantly of white women. This lack of diversity further reduces the transferability of the findings, and could have resulted in cultural factors associated with women's experiences of GWG being overlooked. Further limitations to the transferability of the findings could also be present, be due to studies not written in English being excluded. The researcher could not personally translate any non-English papers, and a translator was not viable due to lack of funds. Grey literature was not included in the current study, which could have introduced publication bias (Hopewell et al., 2005). However, grey literature is not considered as methodologically rigorous as published research (Hopewell et al., 2005). Additionally, locating grey literature in a comprehensive manner is associated with challenges, including significant time and effort (Higgins & Green, 2011) which were not feasible within the scope of this study. Finally, although the development of the review included involvement from three other researchers (the supervisory team), only one reviewer carried out the systematic searches, study screening, quality appraisal and analysis. The inclusion of a second reviewer to check 10% of the studies for screening and data extraction purposes would increase the robustness of this review.

### **2.5.2 Summary and implications for PhD study**

From the background information (Chapter 1) and the synthesis of the 11 included studies reviewed in this study, it can be understood that women's views towards GWG and management through engagement in WRHBs are complex. The synthesis of qualitative studies about GWG has provided insight into the women's expectations of GWG and the appropriateness of managing GWG with WRHBs. Weight gain was considered inevitable during pregnancy, with mixed views about the level of interest towards managing GWG or waiting until after the pregnancy to engage in weight loss. Dietary and physical activity behaviours were considered as having an impact on weight during pregnancy, however, dietary behaviours such as foods consumed and levels of physical activity were also thought to have the potential to impact on the unborn baby. Women's experiences of and views towards GWG and management are interconnected with their experiences of and views towards the associated WRHBs. Women indicated that engaging in WRHBs due to their potential impact on the unborn baby were perceived as more important than for weight management purposes during pregnancy, but exploration of the women's engagement in WRHBs were limited in existing research. The findings from the current review are from studies which collected data at one timepoint, primarily towards the end of pregnancy or with postnatal women.

## **2.6 Research aims and objectives of main study**

From the background information (Chapter 1) and the systematic review, it can be understood that women's experiences of GWG and the associated WRHBs are under explored across pregnancy. Most of the existing research investigating women's experiences of GWG is carried out at one timepoint, primarily towards the end of pregnancy or with postnatal women. A qualitative longitudinal approach could be fruitful in exploring women's experiences of WRHBs across pregnancy. Additionally, existing psychological theory is inadequately utilised in antenatal research, and may be pertinent in aiding understanding of women's experiences of WRHBs across pregnancy.

The study aim is:

- To understand women's experiences of and engagement with WRHBs across pregnancy

The objectives are:

- To explore women's experiences of WRHBs across pregnancy
- To use existing psychological theory to aid understanding of the women's experiences of WRHBs

## Chapter 3 Methodology

### 3.1 Introduction

A robust study requires extensive, systematic planning in three key areas: to define a clear research question; identify the best methods of recruitment and data collection to address the research question and generate meaningful and relevant data; and determine how that data will be analysed and disseminated (Ritchie et al., 2013). Research methodology is a way to systematically identify how to best address the research question. It facilitates the identification of the most relevant research methods and tools to answer the research question (Kothari, 2004). Furthermore, it also acknowledges the underlying assumptions associated with each research method. This allows researchers the scope to consider the implications of applying the potential research methods to the research itself, and to develop a clear rationale for selecting the specific methods (Kothari, 2004). This process improves the quality of research, and subsequently the integrity of the findings and contribution (Ritchie et al., 2013).

Qualitative longitudinal (QL) research methods were chosen for the current study, with existing psychological theory integrated with the findings of the QL research to aid further understanding of the qualitative findings and meet the aims of the study (See Figure 1.1 for a diagram of the PhD project, and Chapter 2 for the aims and objectives of the main study). This chapter will first discuss the ontological and epistemological stances taken to the research; with consideration of any influence this could have on the study. Next considerations towards the different qualitative research methodologies will be discussed, with justification of the QL approach taken and the associated sampling, data collection and data analysis methods; finally leading to the consideration and justification of the integration with existing psychological theory. It will focus on the concepts and theories underpinning the most appropriate methods.

### 3.2 Ontological and epistemological considerations

Ontology and epistemology are philosophical standpoints which underpin research and the methodological approaches taken. Ontology questions the nature of the world and the reality being investigated, and epistemology questions how researchers can learn about that world's reality (Ritchie et al., 2013; Willis et al., 2007). The ontological and epistemological standpoint of the researcher, both intentionally and unintentionally, shapes their research from the development of the research question and study design, to data collection and analysis (Crotty, 1998). Interpretation by the researcher is an integral part of qualitative research; therefore, it is essential for qualitative researchers to identify their ontological and

epistemological standpoint and reflect on how this may have impacted on their interpretations and subsequently the conclusions drawn.

### **3.2.1 Different ontological and epistemological standpoints**

There are various contrasting standpoints that can be applied to research. The origins of research are orientated around the stance of positivism, which places an emphasis on scientific and researcher objectivity in the search for the 'truth' (Ritchie et al., 2013; Willis et al., 2007). Whilst this provides, mainly numerical, information on the cause(s) of a phenomenon to be applied to the wider population, it offers limited insight into the underlying processes, reasons or context of the phenomenon (Creswell, 2014; Green & Thorogood, 2004).

Conversely, critical realism situates itself as a scientific alternative to positivism which takes into account human experiences. It assumes that knowledge, which is accessible through individuals' experiences and perceptions, captures only a small part of the wider 'reality' which exists (Fletcher, 2017). It considers that small part as something which is entirely subjective and constructed through social, political and cultural structures which are specific to the individual (Saunders, Lewis & Thornhill, 2019). The construction, or cause, of an individual's sense of 'reality' through social structures is the focal point of interest for those taking a critical realist stance. It is this element of 'cause and effect' which allows this stance to align itself as a 'scientific' approach (Fletcher, 2017).

Interpretivism focusses on the understanding of human experience. It is traditionally considered as an opposing view to positivism, with early developments of qualitative research aligning with the interpretivist standpoint (Ritchie et al., 2013). Interpretivism considers 'understanding' to be knowledge (Goldkuhl, 2012). It is essentially interested in creating richer understanding and interpretations of social worlds. This is achieved through exploring the individual's interpretation of their experience, or reality, from their perspective and the meaning they place on reality; more so than the experience itself (Ritchie et al., 2013; Green & Thorogood, 2004).

Pragmatism is a flexible approach which considers knowledge as constructive, and can be determined through practical contribution and action (Creswell, 2013; Goldkuhl, 2013). It is fundamentally interested in understanding experiences to obtain knowledge that is useful, or constructive, and can contribute to solving practical problems (Saunders, Lewis & Thornhill, 2019). Research which is undertaken from the pragmatic standpoint aims to inform future practice by contributing practical solutions to current problems (Saunders, Lewis & Thornhill, 2019). It situates the research question as central to the research design, and allows methods from various disciplines to be drawn on in order to best meet the

research aims; rather than trying to fit the research question and aims to a particular philosophical stance (Ritchie et al., 2013). The flexible nature of pragmatism advocates a pluralist approach to allow the incorporation of different methodologies and approaches to best answer the research question (Goldkuhl, 2012). It is an increasingly common approach adopted in applied research due to its action orientated nature.

### **3.2.2 Subjective position and reflexivity**

My interest in individuals' engagement in health behaviours originated during my undergraduate degree in psychology. This interest was grounded in anecdotal experiences of family and friends, who frequently engaged in health behaviours which were discordant to their motivations and intentions. I was eager to apply my psychological learning to understand 'why' they engaged in the behaviours they did. My engagement with the psychological and applied health literature throughout my undergraduate and master's degrees broadened my perspective and consolidated and focussed my research interests. It was evident that obesity was a growing health concern globally. Although 'obesity' is widely considered the subject of concern, obesity is the outcome of the underlying health behaviours engaged in; which is where my interests originated from. Additionally, pregnancy is a time of a transition in a woman's life which is also an interesting time psychologically in regards to women's engagement in behaviours and behaviour change.

Although my background is in psychology, I have consistently adopted an applied health approach, by applying my psychological lens to understanding health related problems. Furthermore, being based within the School of Healthcare surrounded by healthcare professionals during my PhD, has reinforced my view towards the importance of applied research as action orientated research which can have a real impact on clinical practice. This has also facilitated the identification of my own personal approach to applied health research through a psychological lens. I have consistently reflected on my personal approach and background, and how that may differ to others' carrying out applied health research, for example my peers within the School of Healthcare who are healthcare professionals and may have approached this research project differently. I have actively sought opportunities for discussions with my peers of different disciplines towards the different assumptions we may hold towards this research project, for example towards the maternity and healthcare context where this study is situated, which has facilitated my own reflexivity.

My personal drive for completing a PhD and aspirations for an academic research career, is to carry out research which contributes practical solutions and

implications for practice. Throughout the course of my PhD I have reflected on my approach to research and, whilst my perspectives have widened and developed as an independent researcher throughout the course of my PhD, I have consistently identified my personal positioning to research as a pragmatic stance. I am not tied to any particular theory in my thinking and consider each individual to experience their own reality (i.e. there is no single reality), and have an action focussed drive to research. I have not experienced 'being pregnant' and therefore do not have my own experiences of pregnancy to draw on when listening to others'. I have been responsive to this research project, for example towards the data that have been collected, and have drawn on a range of methods in order to meet the aims and objectives of the research project. My pragmatic approach to research in general, will have undoubtedly influenced the standpoint adopted in this study. However, through reflexivity and considerations towards my own personal standpoint and the assumptions I bring to research, I am aware I would not necessarily utilise the same methodologies and approaches for other research questions as I have here; as my personal approach is one which foregrounds the research question and aims, and my standpoint may shift in response to the foundations of a different research question.

### **3.2.3 Position adopted in this study**

The aims of this study are to create understanding which can contribute to solving practical problems by informing clinical practice and future intervention development. At its conception, this study had a purely pragmatic stance. The data collection was structured in a way to generate rich data, that would ensure constructive knowledge was generated which answered the research aims and objectives and contribute to problem solving; which is indicative of a pragmatist approach. The women's experiences, and reality, were understood from their own perspectives, and as the study progressed, the QL nature of the research obtained rich, in-depth data. I was responsive to the rich data collected, which merited an interpretivist approach to develop a rich understanding (which is presented in Chapter 5. and Chapter 6). This understanding was then integrated with theory, to provide further understanding of the women's experiences of WHRBs, which was used to develop the overall findings and conclusions drawn which can be used to contribute to solving practical problems. This study takes a predominantly pragmatic stance, which includes elements of the interpretivist approach to allow in-depth understanding to be instrumental in informing practical solutions.

The flexible nature of pragmatism supports a pluralist approach which allows the incorporation of different methodologies and approaches to best answer the



research question (Goldkuhl, 2012). Pragmatism and interpretivism are two approaches which can be combined, however when doing so, one stance should remain dominant with the other acting in an instrumental capacity (Goldkuhl, 2012). In this instance, with the overall aims, objectives and outcomes of the study being grounded in pragmatism it is this which provides the base of the research, with interpretivism acting as a supportive component, to allow a richer understanding in addition to the practical solutions offered through the pragmatist approach. Adopting an approach which foregrounds the study aims and objectives in favour of adhering to a theoretical standpoint can increase the credibility of qualitative research and its findings due to its closeness to the data, however, reflexivity and transparency of the research process is fundamental in maintaining credibility of the research and its findings (Smith, Bekker & Cheater, 2011).

### **3.2.4 Defining weight-related health behaviours during pregnancy**

Defining individual health behaviours is multifaceted. In general, there are two types of health behaviours: 1. those that increase risk; 2. those that promote health (French et al., 2010). Definitions for each of these types are everchanging and developing. For example, early research defined health promotion health behaviours as “any activity undertaken by a person believing himself to be healthy for the purpose of preventing disease or detecting it at an asymptomatic stage” (Kasl and Cobb, 1966, p. 246). This definition dictates that a health behaviour must be carried out consciously for the purpose of health promotion or prevention. However, it is now accepted that individuals do not necessarily engage in health behaviours for health purposes; for example, they may engage in physical activity or avoid foods high in fat for aesthetic reasons. Therefore, more up to date definitions avoid stipulating the motivation underlying health behaviours and encourage the definition of health behaviours to encompass the broader context in which they are situated (French et al., 2010).

The pragmatic interpretivist stance adopted in this study understands the women’s experiences, or reality, from the women’s perspectives. Furthermore, the systematic review (Chapter 2) identified how previous qualitative research exploring WRHBs often pre-determine the WRHBs, which restricts the opportunity for the women to discuss WRHBs from their own perspective. Therefore, in this study the WRHBs of interest were broadly defined and not pre-determined in this study. The term ‘weight-related health behaviours’ itself was deliberately kept broad to allow exploration of any health behaviours that the women perceived had the potential to have an impact on their weight. To allow the inclusion of the broader context of pregnancy from the women’s perspective, in the context of this study a WRHB is defined as:

Any behaviour which has the potential to have an impact on a woman's gestational weight, which may not necessarily be engaged in with that goal.

This includes, but is not limited to, physical activity and dietary health behaviours such as: engaging in physical activity, levels of rest; limiting 'unhealthy' foods; avoidance of 'risky' foods. It is acknowledged that WRHBs could be defined differently using an alternative approach, such as being more specific in the behaviours or taking an alternative ontological and epistemological position. However, in adherence with the pragmatic interpretivist stance and taking into account the aims of this descriptive study, a broad definition was determined to be most appropriate in guiding the research.

### **3.3 Qualitative research**

Defining qualitative research is complex, as it encompasses a wide range of approaches and methods and is not aligned with any particular theory or paradigm (Denzin and Lincoln, 2011). Subsequently, various definitions of qualitative research have emerged throughout the years. However, there is consensus towards the aims of qualitative research; to discover and describe people's experiences of life, through interpretative inquiry which is grounded in the accounts of the participants (Al-Busaidi, 2008; Denzin and Lincoln, 2011; Ritchie et al., 2013; Willig, 2013). Creswell (2000, p.15) encompasses these aims in the definition below:

*“Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting.”*

Historically, the fields of applied health and psychology research have favoured the use of quantitative research over qualitative inquiry (Coates, 2004; Murray and Chamberlain, 1999; Rahman and Majumder, 2013). Whilst the value of quantitative research remains dominant, the acceptability and application of qualitative research has increased (Green & Thorogood, 2018; Mays & Pope, 2020). As the popularity of qualitative research methods has grown, a vast array of designs have emerged, and the ways in which they are applied have changed (Al-Busaidi, 2008). As the field of qualitative research methods has become increasingly diverse, debate around how to critically appraise the quality of qualitative research has also increased.

### 3.3.1 Quality in qualitative research

The ability to critically appraise research is imperative in determining the integrity of the findings and conclusions drawn (Noble & Smith, 2015). As the popularity and diversification of qualitative methods have grown, how to measure quality in qualitative research has been widely debated (Rohleder & Lyons, 2014; Yardley, 2000). The principles used to assess the quality of quantitative research are well established. Early qualitative inquiry was often critiqued against the quality criteria for quantitative research; for example validity, reliability and objectivity (Morrow, 2005; Yardley, 2000). It is now, however, widely recognised that the quantitative quality criteria cannot be directly applied to qualitative research due to their different theoretical underpinnings; although they do provide the foundations of the principles that are applied to qualitative research (Lincoln & Guba, 1985; Lincoln & Guba, 2000; Morrow, 2005; Noble & Smith, 2015). Alternative criteria of quality in qualitative research have been suggested (Creswell & Miller, 2000; Lincoln & Guba, 1985; Lincoln, 1995). The primary goal of the qualitative quality criteria is to assess the 'trustworthiness' of the research. This is achieved by assessing four key components of the research: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

Credibility is arguably the most important aspect of trustworthiness (Morrow, 2005). This refers to whether or not the findings deduced are consistent with the experience of the participants, and really reflect the 'truth' (Lincoln & Guba, 1985). This can be achieved through prolonged involvement with participants and member checking, to directly investigate whether participants perceive the findings to corresponded with their perception of the experience (Lincoln & Guba, 1985; Morrow, 2005). The researcher can also carry out reflexive techniques during the analysis process to increase credibility, such as keeping an audit trail of the analysis process to ensure the findings are grounded in the data and identify any personal assumptions influencing the process, and generate rich descriptions which are supported by participant quotes (Lincoln & Guba, 1985; Sandelowski, 1986).

Transferability relates to the extent of which the findings of the study could be transferred to an alternative context (Lincoln & Guba, 1985). This can only be assessed if there is a sufficient amount of information provided regarding the sampling, research context, and participant characteristics (Lincoln and Guba, 2000). Researcher reflexivity of their own assumptions which may have been central to the research and factors such as their relationship with the participants is also important when assessing transferability (Morrow, 2005).

Dependability refers to the consistency of how the study was carried out over time. Although the findings of qualitative research are not regarded as replicable

due to their subjective nature, the procedures utilised to generate the findings should be sufficiently clear that they are replicable (Lincoln & Guba, 1985; Morrow, 2005). Dependability can be demonstrated through detailed recording of the analytical process and audit trails of decision making through the research and analysis process (Morrow, 2005).

Confirmability is the exploration of any bias which may have shaped the findings from the researcher's perspective; this could be intentionally through misplaced personal motivation, or unintentionally through underlying assumptions or beliefs (Guba & Lincoln, 1985; Morrow, 2005). Qualitative research acknowledges it cannot be void of researcher subjectivity, and attempting to deny or ignore the impact of research subjectivity reduces the trustworthiness of the findings (Bryman, 2015). The researcher must demonstrate the findings are grounded in the data and have been generated from the thorough application of the appropriate research methodologies, and not primarily their own subjectivity (Morrow, 2005). This can be demonstrated through detailed audit trails of the procedures carried out. Overall, transparency in reporting qualitative research is key in the endeavour to demonstrate the trustworthiness of a study (Green & Thorogood, 2004; Rohleder & Lyons, 2014).

Overall, in the critical appraisal of qualitative research, transparency is considered a comprehensive, overarching way to demonstrate quality in qualitative research (Rohleder & Lyons, 2014). Each of the criteria outlined above rely on transparent reporting of the research at each stage of the research; this is necessary to demonstrate the appropriateness of the methods selected and how the conclusions have been deduced (Ritchie et al., 2013). Being able to assess this is imperative for integrity of the findings (Noble & Smith, 2015). Reflexivity is a way of demonstrating philosophical and personal transparency, by explicitly considering how the researcher themselves and their epistemological and ontological approach could have impacted on the research and its findings (Rohleder & Lyons, 2014).

A common drawback of developing criteria for critical appraisal, is that it can be utilised by others as a prescriptive 'checklist' (Smith, 2003). This can lead to rudimentary critical appraisal of qualitative research, which identifies "technical fixes", such as identifying specific sampling or key words (Barbour, 2001); which can consequently undermine the application of key principles of qualitative research, and reduce the quality of research (Barbour, 2001). This study has not prescriptively followed this criteria, and instead employs a transparent approach throughout the thesis. In particular, this chapter and the following Methods chapter (Chapter 4) will comprehensively demonstrate the trustworthiness of this study by providing transparency of the decisions made at each stage of the

research project, their rationale, any philosophical or subjective influences, and clear outlines of the research procedures.

### **3.3.2 Different qualitative approaches**

The growth of qualitative research has resulted in diversification of approaches available (Ritchie et al., 2013). Different qualitative methods provide a different methodological toolkit for addressing research questions. As discussed above, thorough consideration of the different approaches, and how they would address the research question differently, and how they align with epistemological and ontological positioning of the study, is important to facilitate the identification of the most appropriate methodology and ensure a robust study (Ritchie et al., 2013). There are several established approaches which were considered during the design stage of this study which are discussed below. The pragmatic interpretivist stance of this research foregrounded the research aims and objectives in guiding the identification of the appropriate research methodologies, more so than being theoretically tied to any particular approach.

A qualitative longitudinal (QL) methodology (Neale, 2018) was identified as the most appropriate approach to meet the study aims for this study. QL research follows the lived journey of individuals through time, involving multiple 'waves' of data collection, typically with the same individuals (Giele & Elder, 1998; Neale, 2018). This approach and study design will be discussed in more detail after an overview of the alternative methodologies considered.

Ethnography is a qualitative research method which investigates shared patterns of social life within a community, to understand the cultural experience of the participants (Atkinson & Hammersley, 2007; Denzin & Lincoln 2011; Goodson & Vassar, 2011). This is typically done through researchers immersing themselves overtly or covertly, within people's daily lives (Ritchie et al., 2013; Denzin & Lincoln, 2011). Data are typically collected through observations or interviews (Ritchie et al., 2013; Atkinson & Hammersley, 2007). Data analysis involves interpretation of the cultural experiences of participants, which can be facilitated by prolonged involvement with the studied community. This approach is best suited to explore hard to reach populations and sensitive topic areas that are likely to require extensive observations and immersion, which can be time consuming and costly (LeCompte & Schensul, 2010). The findings of ethnographic research are particularly specific to the sample, topic and local context and is not considered to be generalisable beyond that (Goodson & Vassar, 2011; Savage, 2007). Due to the pragmatic stance taken in this research, the aims of the study were to create knowledge which would contribute practical solutions; this would not be possible with the lack of generalisability associated

with ethnographic research. Additionally, the nature of the research topic, sample and research aims did not require deep researcher immersion in order to answer the research question.

Phenomenology is a wide-ranging approach, with various different schools within it (Dowling & Cooney, 2012). It aims to not only explore the experiences of participants, but to also understand what that means to them and how they make sense of it (Ritchie et al., 2013). The most commonly utilised phenomenological approach is interpretative phenomenological analysis (IPA) (Pringle et al., 2011; Smith, Larkin & Flowers., 2009). IPA is often carried out with a small number of participants, to gain in-depth insight into the meaning each participant places on their experience of a phenomenon. IPA involves a two-stage process where the researcher attempts to interpret the participant's 'sense-making' of the experience in addition to their experience itself (Pringle et al., 2011). If the current study had adopted a purely interpretivist approach, without the basis of pragmatism, it could have lent itself to an IPA methodology in order to create rich understanding of the women's experiences and interpretation of WRHBs across their pregnancy. However, this study is predominantly a pragmatist approach with action orientated aims, which has incorporated elements of interpretivism to allow a deeper understanding of the women's experiences in addition to constructive knowledge; this requires a more applied approach.

Grounded theory uses participant experiences to generate the development of new theories which explain social processes (Strauss & Corbin, 1994). Although it could be argued this seems similar to the aims of the current study, the aims of this study are not to generate new theories; but to integrate existing psychological theory to aid understanding of the qualitative findings. Therefore, grounded theory was not appropriate.

Narrative research is a qualitative approach which treats stories as data, and analyses story data using narrative analysis (Frost & Ouellette, 2011). Stories can be told verbally or written, but must include a 'plot' i.e. a beginning, middle and end with interlinking phenomena (Ollerenshaw & Creswell, 2002). The focus of narrative research is to identify the basic story being told, the meaning of the story and the way it is constructed (Ritchie et al., 2013). The narrative approach is often associated with a temporal lens, which looks forward and backward across the story of the narrative (Holloway & Freshwater, 2007; Ollerenshaw & Creswell, 2002). However, in this instance, the temporality is related to the chronological construction of events in the narrative itself, more so than a longitudinal approach for example (Ollerenshaw & Creswell, 2002). The narrative approach usually adopts an unstructured methodology, with the participant leading the topics of discussion through the creation of their narrative (Holloway

& Freshwater, 2007). Some have questioned the use of narrative stories to understand experiences as “stories about your life are not the same as the life you live” (Squire et al., 2014 pg. 110). The specific and action orientated research aims of the current study required a more structured approach which would explore the experiences of women directly, rather than through the construction of narratives.

### **3.3.3 The approach taken in this study: Qualitative Longitudinal (QL) research**

QL research is an “evolving methodology for exploring the dynamic nature of people’s lives” (Neale, 2018 p 1). QL research, commonly utilises serial interviews at multiple timepoints, unlike most alternative qualitative approaches that predominantly rely on one-off retrospective accounts (Calman, Brunton & Molassiotis, 2013; McLeod & Thomson, 2009). ‘Walking alongside’ individuals through multiple waves of data collection provides a temporal picture which in turn contributes a deeper understanding of experiences and underlying psychological and social process, in comparison to the ‘screenshot’ offered through a single interview (McLeod & Thomson, 2009). As suggested by Vogl et al., (2018 p. 178) QL research can “detect changes over time, explore the processes associated with change or stability as well as interpret the perspective of the person experiencing that change.” This means a QL approach is well suited to exploring complex processes of change on an individual level. The scope of this research methodology to create constructive knowledge of women’s engagement in WRHBs and also allow interpretation of experience to develop understanding is suited to the epistemological and ontological interpretivist pragmatist stance taken with this research.

The recent growth of QL research has mainly been based on life-course research and social change (Neale, 2018). Subsequently, literature offering insight and guidance into QL research is often orientated around the “interconnectedness of the various eras of the life course” (Giele & Elder, 1998 pg. viii). There is a dearth of QL research in applied health settings, however, it is becoming increasingly popular (Calman et al., 2013; Vogl et al., 2018). There is no distinct time period to define a longitudinal study, instead there is consensus that it should be a sufficient period to allow change to have occurred in between each wave of data collection (Neale, 2018; Vogl et al., 2018). This research project follows women longitudinally from their first midwife appointment, to after the birth of their baby.

### 3.3.3.1 The different timepoints

QL research is not determined by a fixed time length, but by a sufficient amount of change (Neale, 2018). Whilst the period of pregnancy is only nine months in duration, it is considered a transitional period of change within a woman's life; and as such, it is argued here that this presents sufficient change to accommodate a QL study. Approximately 10 – 16 weeks pregnant was considered the earliest appropriate time to interview women, as it meant recruitment could occur at the booking appointment, which typically occurs by 10 weeks of pregnancy. Recruiting earlier than this would have made the women hard to reach as they may not have had contact with healthcare professionals. Additionally, up to 12 weeks presents the highest chance of perinatal loss (Giakoumelou et al., 2016). Therefore, 10 weeks was identified as the earliest women could be interviewed in an attempt to reduce the risk of attrition and causing any additional negative emotions for women who did experience loss. Approximately 28 – 32 weeks pregnant was considered sufficiently late in pregnancy to ensure there was adequate amount of change since the first timepoint; whilst not being too close to the birth that women may have been lost to follow up by having an early birth. As the two different timepoints during the antenatal period were in different trimesters, they were identified as having sufficient amount of change within them. These two timepoints were considered the most feasible timepoints which would reduce the chance of attrition, whilst also providing in-depth data of change across pregnancy.

### 3.3.3.2 Sampling

Unlike quantitative research, qualitative research does not aim to achieve a sample which is statistically representative of the general population (Holloway & Wheeler, 2010; Patton 2002; Ritchie et al., 2013). However, as discussed in Section 1.4.1 above, transferability is a key indicator of the trustworthiness of the study which is influenced by the study sampling methods (Lincoln and Guba, 2000; Morrow, 2005). Identifying the appropriate sampling methodology for the research to meet the aims and objectives is a way to increase the transferability. The precision and rigour of qualitative sampling is achieved through its representativeness of the characteristics of the people whose views it aims to reflect, rather than attempting to be representative of all women (Ritchie et al., 2013). Purposive sampling was used to identify cases where the most could be learnt in relation to the research aims by considering socio-demographic characteristics (Bryman, 2012; Ritchie et al., 2013). Previous research in a similar topic area has commonly adopted selective sampling strategies such as BMI > 30kg/m<sup>2</sup> and/or first time mothers only (as discussed in Chapter 1 and Chapter 2. Due to the selectiveness of samples in previous literature, a diverse



heterogeneous sample of women was sought in this study (Bryman, 2012). This required identification and consideration of key demographics. Although sampling was not stratified by demographics, key demographics were identified and strategies were employed in an attempt to maximise the variation of these demographics within the sample. Procedural detail of the strategies to maximise variation is outlined in Chapter 4 Methods.

Firstly, as identified in the review (Chapter 2), there is an abundance of literature within the field of weight management, diet and physical activity which focusses exclusively on women who begin their pregnancy with a raised BMI. This study did not aim to focus on women with a particular BMI, instead, it sought a range of pregnancy start BMIs to provide a more inclusive and holistic understanding from different perspectives. Socio-economic status is a factor which is thought to be associated with an individual's BMI due to health inequalities (Health Survey for England, 2018). Additionally, a common criticism of research is that samples are often limited by being typically, middle class, white, educated individuals; which fails to reflect the diversity of views of individuals of different backgrounds (Nielsen et al., 2017). Therefore, this study sought diversity in relation to socio-economic status. Parity (the amount of children a woman has had i.e. whether women were first time mothers or in subsequent pregnancies) was identified as having the potential to impact on the findings and the transferability of the findings. It is understood in the literature that parity can have an impact on women's BMI and weight gain during pregnancy, and experiences of pregnancy (Fraser et al., 2011). Consequently, a range of parity was sought. Women were not screened for these demographics in the recruitment process and instead, for both time and resource reasons, women were recruited from two contrasting sites across Leeds with varying levels of deprivation, to maximise the likelihood of reaching women with differing characteristics. See Chapter 4. Methods for more detail on the identification of sites and the recruitment process.

Consideration towards the target sample size for this study was comprehensive, considering the methodological approaches of the research. There are mixed recommendations of the optimum sample size in qualitative research, with numbers ranging between 6 – 50 participants (Guest et al, 2006; Marshall, 1996; Morse, 2000). Whilst there is no formal calculation or number of how many participants should be recruited into a qualitative longitudinal study, there are varying aspects of the research which inform the size of the sample (Flick, 2008; Morse, 2000). Data saturation is a key determinant of sample size in qualitative studies. Data saturation refers to the iterative process of recruitment, data collection and analysis, and suggests that recruitment should only cease once no new themes are identified from the data collected (Byrne 2001; Morse 1995;

Sandelowski 1995). It is suggested that data saturation is likely to occur from around 12 interviews (Guest et al., 2006). It is widely acknowledged that participant attrition is likely to occur in QL research, and should be factored in to the study design, such as sample size (Davis, Broome & Cox, 2002; Murray et al., 2009). Over-recruitment at the beginning of the study, is a strategy to increase the likelihood of data saturation at the final interview (Calman, Brunton & Molassiotis, 2013). Additionally, the heterogenous study sample sought also required an increased sample size, to fully explore the wide range of views that are likely to be identified (Morse, 2000; Ritchie et al., 2013). In contrast, the in-depth QL study design is anticipated to generate a large amount of data. Qualitative research which generates large amounts of data requires a smaller sample size, as saturation is likely to occur earlier and the data set must remain manageable to allow rigorous analysis (Morse, 2000; Ritchie et al., 2013).

The above factors were comprehensively discussed within the research team and with colleagues external to the project who are experienced in maternity research, and a target sample size of 20 participants was decided on. It was expected that this would account for the scope of the research, the sample diversity, amount of data collected and attrition.

### **3.3.3.3 Data collection**

The aim of QL is not to gather snapshots across different timepoints, but “to ground the interviews in an exploration of processes and changes which look both backwards and forwards in time” (Neale & Flowerdew, 2003). This was considered when considering the data collection technique. Serial semi-structured interviews were identified as the most appropriate data collection method to meet the aims of the project. This involves a set of pre-determined areas of questions for the interview which can be amended and re-ordered to meet the demands of the interview.

Interviews are one of the most commonly used data collection methods in QL research as they generate meaningful in-depth data (Britten, 1995; Calman et al., 2013). Interviews can be unstructured, semi-structured, or structured. The semi-structured interviewing technique involves a general set of open-ended questions that directs the interview towards addressing the research question, whilst also including prompts and probes to further investigate answers (Galletta, 2013). Whilst there is structure to the interview, the order of questions and level of questioning can be amended during the interview to further explore responses. This allows a rich understanding of the participants’ experiences from their perspectives, and facilitates the interview by maintaining a flow of conversation (Bryman, 2015; Galletta, 2013). The application of a QL perspective positioned

the interviews to not only provide a snapshot, but also looking forwards and backwards to explore processes and change is evident in the interview topic guide development. See Chapter 4 for more detail on the development of the topic guide which contains the interview questions, prompts and probes.

In contrast, structured interviews employ a specific set of questions in a set order. It prevents deviation from the pre-determined questions, which limits the ability to develop a deep understanding of participants' experiences by restricting the ability to follow up any interesting responses made by the participants (Bryman, 2015; Galletta, 2013). Unstructured interviews typically begin with a broad area of questioning and places limited structure on the interview and allows the participant to lead the discussion. This approach can be useful for providing a broad view of a topic area; however, it is considered an inefficient way to collect relevant data for a specific research question (Galletta, 2013). In line with the pragmatic interpretivist approach of the study the application of a semi-structured interview approach was favoured over unstructured and structured techniques so a deep understanding could be developed, and knowledge created was constructive and directly contributed to the aims of the study.

Focus groups are a data collection method which involve group discussion. It is the interaction between the participants when discussing a topic which is of interest to those carrying out focus groups. The role of the researcher is to facilitate interaction between participants, rather than asking for individual responses from each participant like in an interview (Kitzinger, 1994). Focus groups are useful to understand the views, beliefs and attitudes of individuals and how they are portrayed during interaction with others, more so than understanding an in-depth personal experience (Ritchie et al., 2013). Semi-structured individual interviews were chosen over focus groups to allow the opportunity to generate in-depth accounts of each participant's experience across their pregnancy, which could then be inductively analysed.

### **3.3.4 Data analysis**

#### **3.3.4.1 Framework analysis**

Qualitative data analysis is an inductive process which typically moves from summative, to descriptive, and finally to interpretative accounts of individuals' experiences, to provide understanding of underlying processes (Saldana, 2003). QL analysis is aligned with this, with the addition of a temporal lens; to explore changes over time (Neale, 2018). The aims of data analysis in QL research is not to present snapshots of different timepoints, but to explore change and the underlying processes across time (Calman et al., 2013;). This means that QL

analysis is a cumulative process, which grows over the duration of a study at each timepoint (Neale, 2018). During this process, 'snap-shot' accounts that are situated within a point in time, grow into 'processual' accounts which look forward and backwards over time (Neale & Flowerdew, 2003). This requires the researcher to move between cases, themes and time to develop an understanding of the interconnectedness during the analysis.

Within the field of QL research methodology, data analysis is considered the most complex and least established area (Neale, 2018). Whilst there are established underlying principles such as the endeavour of a temporal understanding as described above, strategies of data analysis vary between studies and may even evolve within a project (Hendersen et al., 2012; Neale, 2018). Subsequently, it is recommended to utilise existing research analysis techniques such as framework analysis (Ritchie & Spencer, 1994) or thematic analysis (Braun & Clarke, 2006) which lend themselves to temporal enquiry (Neale, 2018). IPA (Smith et al, 2009) is also an approach which can and has been utilised by some, although, it is not explicitly advocated by QL researchers (Neale, 2018).

Framework analysis is not aligned with any particular theoretical positioning and is subsequently considered a widely applicable and pragmatic approach to analysis (Ritchie et al., 2013). It's approach to analysis is inductive with the findings being grounded in the original data rather than being theoretically derived; thus providing the opportunity for theory to be integrated on completion of the analysis. This method of analysis allows the scope for in-depth analysis involving within- and between-case and timepoint analysis, to generate an in-depth understanding. It's ability to create a 'framework' from these findings also lends itself to a more pragmatic approach, as constructive knowledge can be identified from the in-depth understanding created, to provide practical solutions to problems, all of which are in line with pragmatic interpretivist approach to this research. Additionally, the development of a 'framework' acts as a data management tool making framework analysis particularly appropriate for studies with large complex datasets, such as QL research (Gale et al., 2013; Ritchie et al., 2013). The specific steps and procedures carried out during the framework analysis of this study are presented in Chapter 4, and the findings are presented in Chapter 5 and Chapter 6.

### **3.3.5 Identifying weight-related health behaviours and their determinants in the thematic framework**

The findings generated through the framework analysis were further explored through the application of existing psychological theory: the COM-B model of behaviour (Michie et al., 2011) and the Theoretical Domains Framework (TDF)

(Michie et al., 2005; Cane et al., 2012). This is a novel approach and provides an inductive and theoretical understanding of women's WRHBs across pregnancy. In line with the pragmatic interpretivist approach taken in this study, existing theory did not guide the data collection or framework analysis, and was only integrated with the qualitative findings as a final stage. This allowed the generation of a rich understanding foregrounding the women's experiences, which were subsequently integrated with theory to provide further understanding and pragmatic recommendations for intervention development. The purpose of including theory was to aid understanding of the framework findings underpinned by theory to inform opportunities for behaviour change. This aligns with the pragmatic interpretivist approach to this study, of generating understanding whilst also contributing practical solutions and knowledge.

Behaviour change interventions are more effective if they are based on evidence-based principles of behaviour change, involving a theoretical understanding of behaviour (Abraham et al., 2009; Craig et al., 2008; Michie, Atkins & West, 2014) (as discussed in Chapter 1). Qualitative research is considered key to understanding behaviour from the individual's perspective; whilst mapping the findings to theory provides understanding of the complex systems in which behaviour occurs, and how it can be changed (Bentley et al., 2019). The integration of both qualitative and theoretical understanding is a novel approach provides a holistic understanding of women's WRHBs across their pregnancy and opportunities for change.

The COM-B model (Michie et al., 2011) is a system of behaviour, which identifies capability, opportunity and motivation as determinants of behaviour (as described in Chapter 1). The TDF (Cane et al., 2012; Michie et al., 2005) is a composite of 33 theories of behaviour, which identifies theoretical constructs of behaviour. The TDF was utilised in favour of alternative theories of behaviour as it is a composite of various psychological theories, and is therefore considered to be the most comprehensive framework of behaviour (Cane et al., 2012). Whilst the TDF identifies the theoretical constructs of behaviour, it does not identify the underlying causal processes that link theoretical constructs to behavioural regulation or behavioural change (Michie et al., 2005). The COM-B model was subsequently chosen to complement the TDF in the current study. The COM-B model, which is a system of behaviour, can be used in conjunction with the TDF to provide a detailed understanding of the underlying causal processes of behaviour, and link them to theoretical constructs (Cane et al., 2012). The ability to utilise both the COM-B model and TDF cohesively meant they were the most appropriate psychological theories to aid the theoretical understanding of women's WRHBs across pregnancy. (See chapter 1 for more information on the

COM-B model and TDF). The COM-B model and TDF has been criticised by some due its deductive nature which can overlook individual differences, such as previous experiences and beliefs (Ogden, 2016). This can result in findings being restricted and over-systemised to the COM-B components and TDF domains only (Ogden, 2016). By having findings which are restricted to the COM-B and TDF, research around behaviour change could become stagnant in that particular paradigm. The combination of the COM-B model and TDF with in-depth qualitative data and analysis in the current study, is anticipated to capture such variance.

The overall findings of this study, which are grounded in participants' experiences and theory, will contribute practical knowledge in the form of evidence based clinical and intervention recommendations. The pragmatic interpretivist approach taken in this study treats knowledge as constructive, which can contribute to solving practical problems. This study considers constructive knowledge in the form of clinical recommendations for practice and intervention development. Mapping the qualitative findings, which are rich and in-depth, to existing psychological theory will facilitate the development of evidence based clinical and intervention recommendations, i.e. practical knowledge. Together, the inductive, in-depth framework analysis of women's experiences and the mapping of those findings to existing psychological theory is in line with the epistemological and ontological stance of this research and meets the aims of the study.

### **3.4 Chapter summary**

This chapter has identified the approach taken to this study as qualitative longitudinal, which is integrated with existing theory. It takes a pragmatic interpretivist stance towards reality and knowledge, and aims to understanding WRHBs across pregnancy from the women's perspective. The design of this study was rigorous with careful consideration of alternative methodologies, which have been reported in a transparent manner to promote the quality of the study. Next, the implementation of these chosen methodologies and approaches will be described through the procedures of the research.

## Chapter 4 Methods

### 4.1 Introduction

Having chosen a qualitative longitudinal (QL) design, and given the rationale (Chapter 3. Methodology), this chapter will outline the procedures utilised to carry out the research. This will include transparent reporting of the decisions made at each stage of the research project, their rationale, any philosophical or subjective influences, and clear outline of the research procedures. It will begin with the sampling and recruitment strategy, followed by data collection and analysis for each timepoint, how theory was integrated concluding with ethical considerations and researcher reflexivity.

### 4.2 Sampling

Purposive sampling (Ritchie et al., 2013) of pregnant women was utilised. Purposive sampling involves the inclusion of participants who have experienced the phenomenon of interest and can therefore provide a rich account of their experiences (Creswell & Plano Clarke, 2011; Patton, 2002). For this study that meant pregnant. This study sought a heterogeneous sample (as discussed in Chapter 3), which included different characteristics; specifically, a range of start BMIs, socio-economic status and parity. This meant the inclusion and exclusion criteria were simply:

#### Inclusion criteria

- Women 10 – 16 weeks pregnant attending their booking appointment at the study site
- Aged 18 years or over
- Women who can speak and understand English fluently

#### Exclusion criteria

- Women aged under 18 years
- Women who do not have the capacity to or are not sufficiently fluent in English to provide informed consent or participate fully
- Women with a history of gestational diabetes or pre-existing diabetes

Women were excluded from the study if they were under 18 years of age as they would not have the capacity to consent to the study. Although there are alternative consensual processes for those under 18, it would have required considerable time and effort to develop the relevant additional procedures and

materials to seek approvals (Coyne, 2010). Those under the age of 18 can be classed as 'young parents' and often experience additional pathways of antenatal care, which is a field of research in its own right. Pursuing the views of those under 18 years was not considered to offer sufficient contribution to the aims of the study to warrant the additional processes it would have involved. Women could not take part in the study if they could not speak and/or understand English sufficiently to consent into the study and/or to participate fully, as the study did not have the funding or scope to provide an interpreter to support them. Women with a history of gestational diabetes or existing diabetes were not included in this study for a number of reasons. Firstly, the views of women during their pregnancy towards weight-related health behaviours (WRHBs) were being explored. For women who have a history of gestational diabetes or existing diabetes they will likely have experienced alternative pathways of care during their pregnancy, which are focussed on WRHBs such as diet and physical activity, such as being referred to a dietician and receiving a diet plan. This means these women's experiences of WRHBs would typically be very different to those who had only experienced standard antenatal care. Whilst this could provide interesting insight into WRHBs for women with diabetes, it was thought to deviate too far from the aims of this research. Secondly, existing diabetes and gestational diabetes are associated with increased risk of pregnancy complications (Yogev & Visser, 2009), and therefore would have increased the risk of attrition for this longitudinal study. If women were to develop pregnancy complications, for example gestational diabetes during the study timeframe, they would be provided with the opportunity to continue participating in the research (see section 4.6.2 Interview procedures for more information on how this was managed and the protocols for dealing with instances of pregnancy complications or perinatal loss once women were recruited into the study).

### **4.3 Recruitment**

Participant recruitment was carried out by the researcher, with the support of midwives, over a period of four months (April – July 2018) in two different communities in Leeds. Eligible women were recruited at their antenatal appointment with a midwife. As none of the research team were clinical midwives, a clinical advisor was sought to advise on practical aspects of the research, such as recruitment. The Matron of community antenatal midwives in Leeds joined the



team as an advisor at the beginning of the study, and informed the protocol for recruitment and facilitated access to community antenatal teams.

### **4.3.1 Overview of local context**

Eligible women were recruited at their antenatal appointments held by midwives. Antenatal appointments in Leeds typically occur in the community, such as GP surgeries, hospitals and community centres; with community midwives typically working in teams within their local 'ward'. Support from community midwives was essential in accessing antenatal appointments and the women attending them. Discussions with the advisor and other midwifery staff indicated that due to the midwives' caseload, the most practical way for recruitment to be supported by midwives in community teams, would be for the researcher to liaise with a few key midwives. Additionally, due to seeking a diverse sample (as discussed in Chapter 3. Methodology), it was decided to recruit from two demographically contrasting communities (wards). In light of this, two community teams were identified based on clinical knowledge of the midwife advisor (such as capacity to support research and perceived levels of deprivation) and the Index of Multiple Deprivation (IMD) (Leeds Observatory, 2019). The IMD is the official measure of deprivation in England, using data collected by government departments and agencies, such as the Office of National Statistics. An area's deprivation score is calculated from 7 domains: income, employment, education, health, crime, barriers to housing and services, living environment (Leeds Observatory, 2019). A high score reflects a high level of deprivation, whilst a low score would reflect a low level of deprivation. The broad domains which contribute to the deprivation score means that it is expected that individuals from areas with different levels of deprivation will differ in the domains. Therefore, by recruiting women from areas with differing IMD scores it was anticipated that women with differing key demographics (as identified and discussed in Chapter 3. Methodology) would be reached.

Two separate community midwife teams, with contrasting IMD scores which were served by the same inner city hospital were identified to support the recruitment of participants. One community was an inner city community in the highest IMD quintile (site one); the second community was in a city suburb which had a diverse IMD score, ranging from the least to highest index of multiple deprivation quintile (site two), but was predominantly in the lowest two quintiles (Leeds Observatory, 2019). Once the sites were identified, the clinical advisor facilitated contact with the team leaders of each community team. The team leaders subsequently identified key midwives in their team, who provided support during recruitment in their community. Support from community midwives was essential in accessing antenatal appointments.

### 4.3.2 Recruitment procedures

The midwives acted as the clinical gatekeeper and provided the women with the participant information sheet (PIS) (Appendix D) as the initial introduction to the research. The PIS contained information on the study; the inclusion and exclusion criteria and the contact details of the researcher. Service users, one of which who was not a native English speaking woman, were involved in the development of the PIS by providing feedback on the proposed text. Patient and public involvement in the development of study materials is useful to check the appropriateness of the materials from the perspectives of potential participants, especially in 'harder to reach' populations (Morgan et al, 2016).

Midwives were informed of the inclusion and exclusion criteria; however, it was indicated that the midwives did not have the capacity to screen the women. Midwives therefore approached the women about the study by providing the PIS. By providing the inclusion and exclusion criteria on the PIS, women could self-select themselves. Although the midwives did not screen the women, they used their professional discretion regarding who to approach, such as their awareness of personal circumstances that could reduce the women's willingness or capacity to take part. Antenatal appointments (initially only booking appointments) were attended by the researcher when possible. Throughout the recruitment period, contact with the midwives who were supporting recruitment was frequent. The midwives' booking appointments for the following days or weeks were made available, so a plan could be developed to maximise attendance of the researcher.

When the researcher was present, midwives signposted the women who were interested in the research to the researcher; this provided an opportunity for the pregnant women to ask any questions about the research (see Figure 4.1 below for the recruitment process). Those who were interested in taking part in the research were asked to provide their contact details using a standardised form (see Appendix E). Women were assured that by providing their contact details they were not consenting to participate in the research. Women were contacted on their provided details no earlier than 24 hours subsequent to the initial contact, to ensure sufficient time for women to read and process the study information. The women were provided with the opportunity to any questions about the research and their participation during the contact. Interviews were arranged with those who wished to take part in the study. They were required to provide informed consent through means of reading and signing a consent form (Appendix F) before taking part in the interview. In instances where antenatal appointments could not be attended by the researcher, the midwives continued

to provide the PIS to participants, and highlighted that they could contact the researcher on the details provided.

### **4.3.3 Recruitment uptake**

Recruitment began at site two (the less deprived community), as these midwives were first to provide information on the booking appointments which could be attended by the researcher. This meant attendance was initially focussed on appointments at this site. Uptake at this site was rapid, and half of the total desired sample size was promptly recruited. The focus of attendance to booking appointments then shifted to site one. Whilst the researcher's focus of attending booking appointments shifted to site one, the midwives at site two continued to provide the PIS to women. Uptake at site one was significantly slower than site two. The schedule of antenatal appointments did not block booking appointments together, as initially thought, and they were often interspersed with other antenatal appointments, such as the 16 week (second antenatal) appointment. In an attempt to access more women at site two and promote variation in demographic characteristics of the sample, an amendment to the ethics application was secured to recruit women who had not been approached at their booking appointment, from their 16 week (second antenatal) appointment. Despite increased access to women, recruitment at site one remained low. Due to time constraints and the importance of achieving the desired sample size, the focus of attending appointments shifted back to site two. Midwives at site one continued to distribute the PIS to women at their booking and 16 week appointment in the absence of the researcher.

A total of 90 antenatal appointments were attended by the researcher; 41 at site one and 49 at site two. Of those, seven women did not attend their appointment (all at site one). Of the 83 who attended, this resulted in face to face interactions with 51 women (13 at site one; 38 at site two), two of these women were excluded from the study as they did not meet the inclusion criteria (both from site two, one of which had diabetes and one could not speak or understand English); 47 women provided contact details (11 at site one; 36 at site two); and interviews being booked with 23 women (six from site one; 17 from site two). Of these 23 women, five were not interviewed (three from site one; two from site two): two did not complete the consent form; two did not respond to contact on the day of the interview; one miscarried before the interview. Therefore, 17 women were recruited into the study (five from site one; 12 from site two) and took part in the interview after attendance to appointments.

Only two women (1 from each site) contacted the researcher when they were provided with the PIS from their midwife in the absence of the researcher. This

resulted in one additional woman being recruited into the study and interviewed. Therefore, a total of 18 women were recruited into the study and subsequently participated in the timepoint one interview. It was evident from the recruitment uptake that the researcher's presence in the clinic considerably increased recruitment, compared to women initiating contact using details provided on the PIS. The midwives supporting recruitment remained engaged in the process throughout. They reported providing the PIS to most women if the researcher was not able to attend the antenatal appointment, however numbers were not reported.

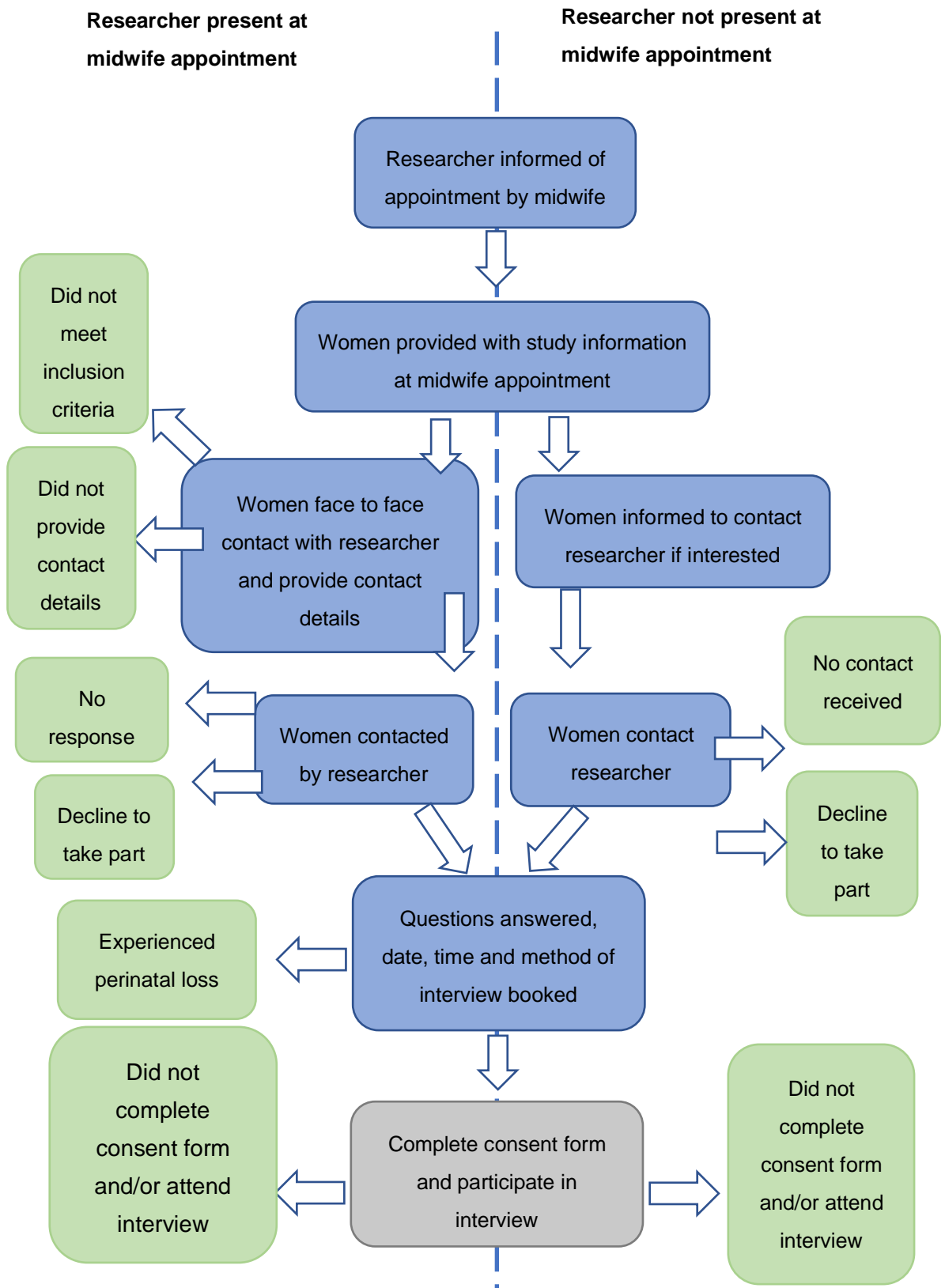


Figure 4.1 The recruitment strategy utilised

## 4.4 Data Collection

Serial semi-structured interviews were utilised to longitudinally explore the women's experiences across their pregnancy (as discussed in Chapter 3). Serial interviews involved three separate interviews with the same women Timepoint One (TP1): Approximately 10 – 16 weeks pregnant; Timepoint Two (TP2): Approximately 28 – 32 weeks pregnant; Timepoint Three: Approximately 6 – 10 weeks postnatal (TP3) (see Figure 4.2 below).

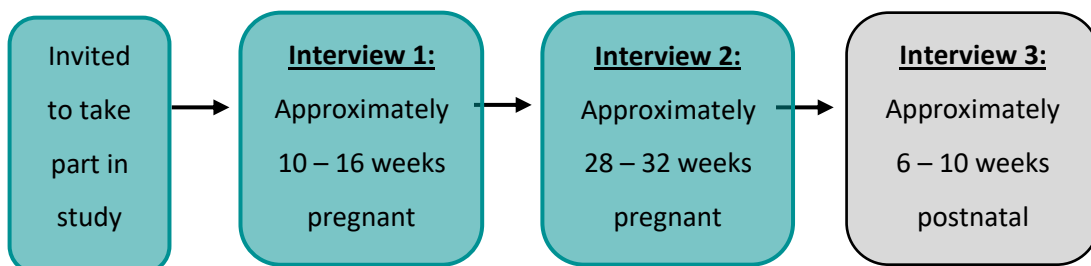


Figure 4.2. Timing of serial interviews

For the purpose of this PhD, the focus is on the two antenatal data collection points, providing a rich understanding of WRHBs during pregnancy. Preliminary analysis of the third interview indicated it would not significantly contribute to the understanding of the antenatal period or the study aims, with participants predominantly discussing postnatal WRHBs rather than WRHBs for the final stages of pregnancy (i.e. between TP2 and TP3). The third interview will be analysed and written into academic papers to contribute understanding of WRHBs after the birth of the baby. However, to retain the focus of the story of this PhD to the pregnancy period, it is not included in this thesis.

## 4.5 Timepoint One

Data collection of TP1 was carried out between May – September 2018, with 18 participants; (see sample characteristics in Table 5.1 below.) The importance of temporality in QL research requires participants' accounts to be built upon at each data collection timepoint (Neale, 2018). This means it was important for the interview at TP1 of this study to comprehensively explore all key areas; which would provide sufficient foundations to build upon at TP2. Achieving this would allow the interviews to look forwards and backwards across the different timepoints. Thorough development of the topic guide, detailed interviewer techniques were imperative for a comprehensive interview to generate sufficient data.

### **4.5.1 Topic guide development**

The topic guide was informed by the findings of the review, through discussion with the supervisory team and clinical midwife advisor. Areas of questioning in the topic guide at TP1 included: Expectations for weight change; understanding of gestation weight gain, management; relevance of WRHBs to pregnancy; changes to WRHBs; expectations for WRHBs further along in this pregnancy (see Appendix G for the timepoint one topic guide; Appendix J for timepoint two topic guide). The framing of the questions was informed by the temporal lens of looking forward and backwards across, prior to and beyond the pregnancy. This meant that core areas of questioning remained the same across the timepoints, with the addition of specific probes at each timepoint.

Before the first interview, the topic guide was piloted with pregnant women who were not involved with the research and transcribed. This provided insight into participant responses to the questions and their wording. Minor changes were made to the wording of some of the questions and the additions of probes to the topic guide. For example avoiding calling the birth the 'delivery', adding probes to explore vague statements about weight gain, such as asking participants to define 'too much' weight, and what exactly they thought had an impact on their weight during pregnancy. The pilot interview also provided the opportunity to appraise the data generated, and identify any points that were raised which had not been considered. Reflexive notes were recorded following the pilot interview regarding the topics raised, future considerations for the interviews and any suggested amendments for the topic guide (see Appendix H for an example of the reflexive notes recorded). This facilitated preparation for the interviews and anticipations of the discussions which could occur.

### **4.5.2 Interview procedures**

Semi-structured interviews were carried out with the women (as discussed in Chapter 3. Methodology). Interviews were carried out either at the women's house or over the telephone, according to participant preference. Face to face interviews were preferred by the researcher as visual cues add depth to the conversation and facilitates rapport building (Robson, 1999). This was considered important in this study to reduce the risk of attrition in-between interviews. However, telephone interviews were offered as an alternative in an attempt to increase convenience and reduce burden of participation. Telephone interviews are considered an acceptable alternative to face to face interviews as they are thought to yield similar quality data (Carr & Worth, 2001; Patton, 1990). Whilst telephone interviews are void of the visual cues that can add depth to interviews, they allow the interviewer to write unobtrusive notes throughout the

interview which can aid the successful probing of answers; thus facilitating a deep understanding of participants responses (Carr & Worth, 2001; Novick, 2008).

Interviews were arranged at a date and time which was mutually convenient for the participant and researcher. The researcher obtained a 'research mobile' enabling more flexibility of contact (i.e. through text message). When collecting contact details from the participants at recruitment, the preferred method of contact was established (from the options of phone call, text message or email). Most women requested a phone call or text message; subsequently the majority of interviews were organised through phone call or text message. A risk assessment and lone working procedure were completed prior to interviews being attended in person (see Appendix I for a copy of the researcher check in procedure).

Participants were requested to complete three consent forms before the interview began: one for the researcher; one for the participant to keep; one to be stored in their handheld maternity notes. All interviews were audio recorded using a Dictaphone (which the women consented to). Once the consent forms were completed, the interviews began with a brief introduction of the study and researcher, the participants' involvement and the structure of the interview (see Appendix G for the topic guide, which includes the introductory points). All women were assured of their confidentiality and right to pause or withdraw from the interview and/or study at any time, there was an opportunity for women to ask any further questions, followed by verbal confirmation of consent. The topic guide was used as the underpinning structure of the interview, however, the order in which the questions were asked were guided by the participants' responses and how the conversation flowed. The discussion was in-depth with frequent probing of participant responses, to gain a rich understanding of their experience.

The topic guide was refined throughout the interview process. The first few interviews were immediately transcribed and circulated amongst the supervisory to provide feedback on interviewer technique and the data generated. To ensure data saturation, additional probes and prompts were added to interviews to ensure full exploration of relevant topics that were raised by participants. The duration of the interviews last from 40 minutes to 100 minutes, which reflected the depth of the questioning. Data collection and the interview techniques used were consistent with the pragmatic interpretivist approach taken to this study (as discussed in the Chapter 3). It allowed the generation of rich data from the participants' perspectives through probing of participant accounts, whilst also providing a structure to create knowledge which was constructive to the aims of the study. On completion of the interview the women were reminded of the approximate date of their next interview and provided verbal consent for the



researcher to contact them closer to the time. All women were aware of the fact they had consented to participate in more than one interview and willingly agreed to being contacted for the second interview and provided their preferred method of contact.

The audio recordings of the interviews were immediately uploaded onto the University of Leeds secure server and stored whilst they were being transcribed. The audio recordings were immediately deleted from the Dictaphone. Audio recordings were transcribed verbatim into transcripts. Interviews were transcribed by the researcher and a University of Leeds approved transcription service. Transcripts were stored in password protected documents, with any identifying information removed, and stored on the University of Leeds server, in adherence with the data management procedures.

### **4.5.3 Framework Analysis**

The data generated were analysed using framework analysis (Ritchie & Spencer, 1994) (as discussed in Chapter 3). Framework analysis is considered a type of thematic analysis, that has built on the thematic process by including additional steps (Ritchie et al., 2013). Thematic analysis is an analytical technique in its own right, it involves inductively identifying patterns of meaning, or themes, in the data (Braun & Clarke, 2006).

*“A theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set”* (Braun & Clarke, 2006 pg. 82).

Themes are identified through the systematic analysis of all data; ‘line by line coding’ (Braun & Clarke, 2006; Ritchie et al., 2013). Themes essentially provide a summary of the patterns amongst the data set. A richer understanding of the data and themes can then be achieved through further interpretation of the themes and relationships between them (Green & Thorogood, 2004). Whilst thematic analysis does require an element of interpretation, it is considered as a ‘basic’ approach to qualitative research which provides surface description of the data (Ritchie et al., 2013; Green & Thorogood, 2004). The additional steps of framework analysis which build on this thematic approach, are thought to create a richer understanding by going beyond the surface description that is generated by thematic analysis (Ritchie & Spencer, 2013).

QL data sets are typically complex and large, which require effective data management techniques during analysis; that synonymously ensure the findings remain grounded in the original data (Gale et al., 2013). This requires the condensing of large amounts of data, and the re-configuration of synthesised data to allow the data set to be seen as a whole, to provide the opportunity for the data

to be read in different ways across time (Neale, 2018; Read, 2018). The additional stage of data summarising in framework analysis supports data management, and makes framework analysis particularly appropriate for studies with large complex datasets, such as QL research (Gale et al., 2013; Ritchie et al., 2013).

Framework analysis is a substantive approach, which means it is concerned with capturing meanings in the data, i.e. “what the text says” in relation to the research questions and aims (Ritchie et al., 2013 pg. 272). This is achieved by identifying themes grounded in the data, similar to thematic analysis, which are then taken one step further by being summarised for each participant and presented in a matrix (Ritchie and Spencer, 1994; Ritchie et al., 2013). The development of the matrix requires the descriptive themes to be interpreted into analytical themes to portray the data and its meaning to be for each participant, theme and timepoint. This in turn facilitates within- and between-case and timepoint analysis, and the development of a thematic framework. This technique allows the scope for in-depth analysis to generate a rich understanding of the data, whilst also providing the structure to create constructive knowledge which meet the research aims (Ritchie et al., 2013); which is in line with pragmatic interpretivist approach to this research.

In-depth, rigorous analysis of time TP1 was paramount, as it was anticipated that data analysis at subsequent timepoints would build on the thematic framework identified at TP1. The five stages as described by Ritchie and Spencer (1994) were used to guide the analysis process:

1. Familiarisation
2. Identify an initial thematic framework
3. Indexing
4. Charting
5. Synthesizing data by mapping and interpreting

The analysis was an iterative process, and was carried out in parallel with data collection. Although these steps were used to guide the analysis, they were not necessarily followed sequentially.

#### **4.5.3.1 Familiarisation**

The first stage of the analysis was to acquire an overview and understanding of the data. As suggested by Gale et al., (2013) this was achieved through familiarisation of the data, through carrying out the interviews, listening to the audio recordings, transcribing the interviews and/or reading the transcripts. The researcher carried out all interviews and transcribed eight out of the 18 interviews, strengthening the familiarisation process. A transcription service was employed for the remaining interviews, due to the high number of interviews carried out and

the time consuming nature of transcription. Of the interviews outsourced to the transcription service, familiarisation with these interviews was achieved through quality checking the transcripts. This was done by listening to the audio file whilst reading the transcript and amending any errors, anonymising the transcripts and/or inputting any “inaudible” text.

Familiarisation continued throughout the whole analysis process, as the researcher was immersed in the data and constantly moving between participant data.

#### **4.5.3.2 Identifying an initial thematic framework**

Once an overview of the data was achieved, identification of descriptive themes could begin. To develop an initial thematic framework, the transcripts were read, line by line, and categorised into themes to identify the recurring topics discussed by the participant. As suggested by Ritchie and Spencer (1994), this began with a small sample of transcripts with varying demographics, to capture the range of views presented. Anonymised transcripts of four demographically diverse participants were printed out and annotated, capture the recurring themes.

The initial themes were firstly categorised using a ‘splitting’ approach (Saldana, 2015). This involved numerous small codes which split up the data to provide a detailed picture (Saldana, 2015). However, this resulted in a high number of nuanced codes which were overwhelming and unmanageable. It was at this point that feedback was sought from the research team, and it was suggested a more “broad-brush” approach (Bazeley & Jackson, 2013; Saldana, 2015), should be employed at this early stage. A broad brush approach, or ‘lumping’ the data meant that data were coded in large chunks to maintain context, and indicate the essence of the data (Saldana, 2015). For the purpose of the initial descriptive themes to outline the recurring topics discussed, the broad brush approach was more appropriate than splitting. However, only employing a broad brush approach to analysis can result in ‘superficial’ analysis, which does not go beyond surface description (Saldana, 2015). For this stage of the analysis it was considered appropriate as it was anticipated more specific, interpretative analysis would be carried out further along the analysis process.

Once the initial descriptive themes are identified in a small number of participants, an initial thematic framework can be built (Ritchie & Spencer, 1994; Ritchie et al., 2013). It was expected that this working framework would continuously change and adapt. To build the framework, the descriptive themes were written onto paper and manually moved around to group and re-order. Descriptions of each theme and sub-theme were written, and constantly revised, to support the defining of the themes and the organisation and development of the framework.

Initial thoughts and ideas towards the themes, which inevitably developed during the analysis, were recorded in a specifically designated 'analysis' journal. This captured initial thoughts and ideas developing during the analysis, which were unsuitable to ascribe to the thematic framework at this early stage, but should not have been ignored or forgotten as they could inform the analysis at a later stage (Ritchie et al., 2013).

#### **4.5.3.3 Indexing**

Once the initial thematic framework was developed from the small sample of participants, this was then applied during the analysis of subsequent transcripts as a way of developing the framework (Ritchie & Spencer, 1994; Ritchie et al., 2013). It is essential that the thematic framework is not imposed onto the data, but that it remains flexible and open to incorporate new and different data (Bazeley & Jackson, 2013). It was at this point of the analysis that the use of computer assisted qualitative data analysis software was utilised (NVivo). NVivo is not an analytical tool, but rather a data management tool. It facilitates the grouping of data into themes, creating a link between the coded data and themes, meaning data coded at a theme are easily identifiable for each participant. NVivo was used at this stage rather than continuing on paper copies, to ensure that the large amount of data could easily be tracked and re-ordered within the framework accordingly.

The initial thematic framework was entered into NVivo with the sample transcripts, and the remaining transcripts were then uploaded and indexed on the software. Through this, the initial framework was constantly refined to ensure the stories of the participants were grounded in the data. Thoughts and ideas recorded in the 'analysis journal' were also constantly referred to and built upon. Once the data from all participants had been indexed into the initial thematic framework, it was discussed amongst the supervisory team. Supervisors independently read a sample of interview transcripts before discussing the framework. Discussions with the team offered alternative perspectives into the organisation of the themes in the framework, which were incorporated into the framework development. This increased the credibility, dependability and confirmability of the findings, by ensuring they were consistent with the participants' experiences by being grounded in the data.

#### **4.5.3.4 Charting**

Preliminary charting began early in the analysis process when developing the themes, as a way to understand the story within them. This facilitated development of the theme description during the earlier analysis stages; this was an iterative process. Once amendments were made to the initial thematic

framework, after receiving feedback from the research team. Charting consisted of creating a table for each theme; the columns of the table being the sub-themes, and the rows being the participants. Each box contained a summary of that sub-theme, for that participant, with the sub-themes across the top row and participants listed down the left hand column. The role of charting is to reduce the data from each participants at each theme and sub-theme into a summary to make it more manageable, whilst still maintaining the voices of the participants (Gale et al, 2013). This required interpretation of the data to provide a summary of the participants' voices; thus facilitating interpretation of the data, and data management.

For this study, data for each theme were firstly charted horizontally across the chart row, i.e. by participant. This was to ensure the data and voice of each participant were reflected throughout the whole theme, where relevant. The data were then examined down each row (which included the account of each participant for that particular sub-theme) to identify the interpretative story for that sub-theme. Charting drove constant refinement of the thematic framework. In line with the thematic refinement; descriptions for each theme and sub-theme were also constantly refined. This in turn facilitated the charting and theme organisation, as it aided clarification of the meaning of each sub-theme, and ensured data were coded accordingly.

Once charting for all participants across one theme was complete, the chart summaries were printed off and re-read. These were then checked against the description for each sub-theme to ensure the description accurately reflected the summary. Secondly, the raw data were checked against the sub-theme description, to ensure the description was grounded in the data and accurately represented the participants' voice. The descriptions of the themes were utilised to aid the writing up of the findings into a thesis. The findings from TP1 informed the data collection and analysis of TP2 interview.

#### **4.6 Timepoint Two**

Data collection for TP2 was carried out with women between October – December 2018. 17 women were interviewed at this timepoint. This timepoint aimed to build on the understanding created at TP1. The analysis of the interviews from TP1 was underway alongside data collection of this timepoint, but were not yet complete.

### **4.6.1 Topic guide development**

It was discussed amongst the supervisory team how best to structure the interview, to ensure the exploration of the same topic areas as TP1, which build upon the participant accounts; without leading the interview and inadvertently restricting the women's responses and areas of discussion of their experiences at this timepoint. The core areas of questioning remained the same across the timepoints (as discussed earlier), with the addition of specific probes for this timepoint. These probes were personalised to individual participants. Prior to a TP2 interview the transcript from TP1 was read and notes of key relevant points, such as anticipations, motivations or expectations for later along the pregnancy were made. These then informed specific areas to follow up and probes for the TP2 interview. These notes were added as additional text at the end of the topic guide to ensure the questioning remained general, whilst also acting as a reminder to ensure that specific follow up topics for each participants were covered in the interview. Some specific probes were also integrated into the questions (see Appendix G for TP1 topic guide; Appendix J for a personalised TP2 topic guide).

The topic guide was piloted through a similar process to that at TP1, using the same volunteer. This was useful to explore the feasibility of the personalised structure. Additionally, similar to TP1, the first couple of interviews were immediately transcribed and circulated round the supervisory team for feedback on the interview technique and appropriateness of the topic guide.

### **4.6.2 Interview procedures**

Before the researcher contacted participants to arrange their TP2 interview, their midwives were contacted. Midwives were asked to alert the researcher to any change of circumstances in a participant's pregnancy that may have an impact on their capacity or ability to continue participation (i.e. complication or perinatal loss). The midwife also confirmed the women's anticipated due date for the purpose of arranging the interviews within the specified gestation. Women who were deemed suitable to continue, were subsequently contacted to arrange their second interview, similar to TP1. After ethical considerations of carrying out a longitudinal study across pregnancy, procedures were put in place for instances where it was not considered appropriate for women to continue with the study (see Appendix K for a copy of the letter to be sent in cases of perinatal loss; see Appendix L for a copy of the letter to be sent in cases of a pregnancy complication such as a foetal anomaly or woman develops a condition).

Participants were contacted approximately one week before they were 28 weeks pregnant. Women could choose whether to take part in the interview in person or

over the telephone. All women chose the same interview method as at TP1. Procedures at the beginning of the interview were similar to those at TP1 (see Appendix G for the topic guide which includes procedures at the beginning of the interview). There was no need for introductions at the beginning of TP2 due to the familiarity between the women and the researcher. As this interview aimed to build on the women's accounts from TP1, the aims of the project were reiterated, the topics discussed at TP1 were recapped, to remind the women of the nature of the discussion and the aims of this interview: to understand their experience now, their journey since the last interview and looking ahead (researcher reflections of how this impacted on the data collection for both timepoints is below).

Similar to the interviews at TP1 the topic guide provided a general structure to the interview, and the participants' responses were probed with further questioning. On completion of the interview, the women were reminded of the approximate date of their next interview.

### **4.6.3 Framework analysis**

Although the TP2 interviews aimed to build on the findings from TP1, the analysis remained inductive, to ensure the findings were grounded in and reflected the women's experiences. Similar to TP1 analysis, the stages of framework analysis (Ritchie & Spencer, 1994) were followed, with an additional layer of longitudinal analysis incorporated into the procedure. The analysis of the interviews from TP1 were underway alongside data collection of this timepoint, but were not yet complete. This meant analysis of the timepoints was an iterative process, which allowed the analysis to look forwards and backwards across time.

#### **4.6.3.1 Familiarisation**

Familiarisation was achieved through conducting the interviews, transcribing the audio recorded interviews (7/17), quality checking the transcripts which were transcribed by a professional service (10/17), and re-reading interviews for the purpose of developing the topic guide for subsequent data collection.

#### **4.6.3.2 Identifying an initial thematic framework**

Similar to analysis at TP1, a sample of transcripts of four participants were printed out and read line by line. The data were coded inductively to categorise the topics discussed by the participant. The themes identified were then collated into an initial thematic framework. Similar themes to TP1 were identified, but with different underlying meaning in the themes. It was unclear at this point whether the findings from TP2 would generate their own thematic framework, or be integrated within the existing framework developed at TP1. Notes were made in

the designated 'analysis journal' to capture initial thoughts about certain aspects which built upon or linked with the thematic framework developed through the analysis at TP1. Whilst there was consideration to the existing framework from TP1, at this stage the analysis was not deductively led by the existing framework.

#### **4.6.3.3 Indexing**

Once the initial framework was developed from the four sample transcripts, it was uploaded onto NVivo, and a further two transcripts were indexed using the thematic framework from this timepoint. The thematic framework developed at TP2 was then mapped against the existing framework from TP1. It was at this point the supervisory team were consulted regarding the integration of the thematic framework. One member of the supervisory team (DS) independently read the same sample of six transcripts from TP2, which the framework at TP2 was generated from, to independently identify themes and map onto the TP1 thematic framework. This was then discussed with the team to explore alternative explanations and interpretations of the data. This increased the credibility, dependability and confirmability of the findings, by ensuring they were consistent with the participants' experiences at this timepoint, and the researcher had been deductively led by the findings from TP1. It was agreed that the descriptive themes of TP2 discussed similar topics to those in the existing thematic framework developed at TP1. Although on the surface the themes looked similar, the researcher noted that the 'story' of the participants' experiences were different at TP2 to TP1. At this stage of the analysis this could not be unpacked, but it was anticipated this would be explored during the charting.

#### **4.6.3.4 Charting**

Charting was carried out as an iterative process throughout the analysis, similar to TP1, using the same chart and procedure of summarising by participants, and then by sub-theme. This interpretative process identified the meaning behind the topics discussed. It was evident that the thematic framework for TP2 could be integrated with the framework developed at TP1 as similar recurrent themes were identified at both timepoints. However, the underlying meaning of the themes were different. Capturing this difference between the timepoints was imperative to recognise the temporality of the research.

#### **4.6.3.5 Integration of TP1 and TP2 frameworks**

The thematic frameworks for TP1 and TP2 had been developed independently in the same NVivo project. This meant that the themes and data were linked in NVivo. This allowed the themes of the TP2 framework to be integrated with the existing TP1 framework and the data could be re-organised whilst staying linked



to the original data. The integration of the framework was an iterative process with charting, as the charts were constantly re-visited and refined during the integration. The charting also aided the integration by ensuring the themes were grounded in the participants' experience, which was reflected in the themes

The integration of the TP2 framework with the TP1 framework, provided a foundation for exploring the longitudinal aspects of the data across the pregnancy period. It identified specific areas of the thematic framework which had built upon at TP2; what aspects were less present, and what was new at that timepoint. What the charting and thematic framework alone could not capture, was the essence of the 'story' for each timepoint, to capture the temporal differences between the timepoints and provide a rich understanding of change across time. Summary descriptions were subsequently written which reflected the 'story' of the underlying meaning of the framework at each timepoints. This was identified as the 'narrative' of the timepoint, due to the story-like nature of it; it bears no relation to narrative analysis.

The temporal lens that QL research and analysis encompasses has guided the presentation of the QL findings within this thesis. Each timepoint comprises novel findings for that timepoint with its own 'narrative'; and are subsequently presented as separate chapters (Chapter 5 and Chapter 6). However, as discussed in the previous section, the purpose of QL research is not to present 'screen shots' of data at each timepoint, but to illustrate how they grow and evolve over time (Neale, 2018). Therefore, the accounts of the women are presented in a processual manner in each chapter, which looks backwards and forwards from and between the timepoints. The findings at Timepoint Two build on the findings at Timepoint One demonstrating the processual journey. Additionally, the narratives for each timepoint are presented and juxtaposed at the end of the Timepoint Two findings chapter (Chapter 6) which looks across the timepoints with a temporal lens in-depth; highlighting the women's temporal journeys and changes across their pregnancies.

#### **4.7 Identifying weight-related health behaviours and mapping to psychological theory**

Once the findings of the framework analysis were complete and written up into the findings chapters, the individual WRHBs present in each theme, at each timepoint were identified. This was to aid understanding of women's accounts of individual WRHBs and identify opportunities for change at each timepoint and across pregnancy. The individual WRHBs present in the qualitative themes of each timepoint were inductively identified, and subsequently mapped to the COM-B model and TDF domains to identify their determinants. This process did

not begin until the thematic framework had been developed, to prevent it influencing the development of the framework, thus ensuring it remained inductively grounded in the women's experiences.

#### **4.7.1 Identifying weight-related health behaviours**

Individual WRHBs were inductively identified from the women's experiences presented in the thematic framework findings (Chapter 5 and Chapter 6). The themes presented in the findings chapters (Chapter 5 and Chapter 6) were read line by line, including the researcher's text and the supporting quotes; to identify existing WRHBs present in the women's accounts. The core premise of a 'health behaviour' is an 'action' or 'activity' undertaken by an individual (French et al., 2010; Kasl and Cobb, 1966). As outlined previously, WRHBs were defined as any behaviour which has the potential to have an impact on a woman's gestational weight, which may not necessarily be engaged in with that goal. Therefore, any action or activity discussed by the women that related to the WRHB definition was identified as a WRHB. Only WRHBs discussed by the women as having been experienced or engaged with up to that point in time or previously, were included. Future expectations for engaging in WRHBs during the antenatal period or after the birth were excluded, as this was not considered 'engagement' or equivalent to action.

To carry out this process, each of the findings chapters were printed and each theme was read line by line and annotated. The TP1 findings were read first, followed by the TP2 findings. By first carrying this out on paper, notes could be made to facilitate the consistent identification of WRHBs, and identify factors in the text which influenced them. The chapter text and corresponding WRHBs were copied into a table; along with the explanatory researcher's comments about the WRHBs and their influencing factors (see Appendix M for an example). Once the WRHBs were identified, the influencing factors were explored.

#### **4.7.2 Mapping weight-related health behaviours to existing psychological theory**

The determinants of each WRHB were identified by exploring the factors which influenced the WRHBs (Chapter 5 and Chapter 6). Factors which impacted on each WRHB were deductively mapped to the COM-B model of behaviour and TDF domains. The findings chapter text, which corresponded to each individual WRHB was read to understand what was impacting on the WRHB; these were then deductively mapped to the COM-B components and TDF domains in an attempt to understand them. Notes were added to the 'researcher's comments' in the table (Appendix M) to provide further description of the ways in which the

COM-B components and TDF domains drove behaviour. The order of identifying the COM-B component or TDF component differed; it was an iterative process and the identification of one, informed the identification of the other. Table 4.3 below was developed as a tool to guide the mapping and ensure the relevant COM-B component and TDF domains were consistently identified.

One member of the supervisory team (DS) independently read a sample of text from themes as stated in the chapters and identified WRHBs and mapped the COM-B components and TDF domains. The defining of the WRHBs and the mapping of the COM-B components and TDF domains driving the behaviours were discussed in detail between the researcher and DS, before being discussed amongst the supervisory team. Any disagreement between the researcher and DS was discussed within the whole supervisory team until a consensus was achieved. These discussions improved the credibility, dependability and confirmability of mapping process, for example, Table 4.3 below which guided the mapping was constantly refined throughout the process as a result of on-going discussions amongst the supervisory team.

Table 4.3 Definitions of COM-B components, with the corresponding TDF domains and study specific example

<b>COM-B component</b>	<b>Definition</b>	<b>TDF domain</b>	<b>Study example</b>
<b>Capability – Psychological</b>	Psychological factors which impact on the individuals capacity to engage, such as knowledge and beliefs	Knowledge Skills Memory, attention and decision processes Behavioural Regulation	Women’s knowledge of how to engage in weight-related health behaviours that are appropriate for pregnancy
<b>Capability – Physical</b>	Physical factors which impact on the individuals capacity to engage, such as the necessary skills	Skills	Women feeling physically able to engage in weight-related health behaviours that they would like to
<b>Opportunity – Social</b>	External factors such as the social environment which influences the individual’s behaviour	Social influences	Perceived and/or actual support from other people that help or hinder women’s engagement in weight-related health behaviours
<b>Opportunity – Physical</b>	External factors such as the physical environment which influences the individual’s behaviour	Environmental context and resources	Perceived and/or actual external factors such as food availability which support or hinder women’s engagement in weight-related health behaviours
<b>Motivation – Reflective</b>	Conscious reflective brain processes involving self-conscious analytical planning to direct behaviour	Social/Professional Role and Identity Beliefs about Capabilities	Women’s beliefs towards how weight-related health behaviours could impact on the unborn baby

COM-B component	Definition	TDF domain	Study example
		Optimism Beliefs about Consequences Intentions Goals	
<b>Motivation – Automatic</b>	Unconscious brain processes such as emotional or impulsive responses or habits	Social/professional role and identity Optimism Reinforcement Emotion	Women engaging in weight-related health behaviours as an emotional response such as fear of harm to the unborn baby

The approach of mapping the findings chapters (in favour of mapping the raw data) was taken as it provided the context of the WRHBs, which were important when considering the 'system' of behaviours they sat within, and the factors impacting on the behaviours (i.e. the COM-B component and TDF domain). An alternative approach of mapping only the raw data which had been coded during the framework analysis (i.e. raw data coded in NVivo) was initially attempted. However, it was evident that this approach did not build on the findings from the framework analysis as the raw data provided a lack of interpretative context around the women's WRHBs and the influencing factors. This was discussed with the supervisory team in deciding the most suitable approach, and it was decided that mapping the written findings of the thematic framework would be the most appropriate. Furthermore, coding the 'findings' themselves, also acted as a form of data management tool, by only including data relevant to the aims of this project, rather than the entire dataset.

By mapping the thematic framework for each timepoint, the WRHBs and determinants of behaviour (i.e. COM-B components and TDF domains) present in each theme at each timepoint were identified. These build on the findings presented in Chapter 5 and Chapter 6, and are therefore presented in the third findings chapter (Chapter 7).

## **4.8 Ethical considerations**

This study was considered low risk with no deception involved. The QL design of this doctoral research project involves interviewing pregnant women at multiple time points, which raised specific ethical considerations.

### **4.8.1 Ethics and research governance approval**

NHS ethics and Health Research Association (HRA) governance approvals were required as the participants in this study were pregnant women receiving antenatal care from an NHS trust, and were recruited whilst accessing NHS antenatal care. The application was reviewed by and received approval from the Chelsea London NRES committee (17/LO/2144). On receiving ethics approval, HRA and local approvals from the teaching hospitals trust were also received. A research passport involving DBS clearance, occupational health clearance, qualification checks, an up to date curriculum vitae and approval of a lay summary of the research, was provided by the researcher to allow NHS site access. Due to slow recruitment uptake, an amendment to the ethics approvals was secured to allow the researcher to be present at additional antenatal appointments (as discussed above).

The scope of the thesis allows for little reflection on the arduous process of the ethics and governance process. Instead, the researcher and a colleague published a peer reviewed methodological research article which utilised their ethics and governance applications as a worked example of the process, to offer guidance to others who are developing and submitting an NHS and/or HRA application (Hartley & Bolton, 2018).

#### **4.8.2 Key ethical considerations**

The QL nature of this study through utilisation of serial interviews required the follow up of women throughout different stages and after their pregnancy (over a total of approximately 10 months). It was important that the extent and duration of the women's involvement was clear during recruitment to reduce attrition. It was strongly emphasised to the women that this study was a longitudinal study which would involve their participation in more than one interview; with the anticipated frequency and duration of contact discussed before consent was sought. On giving consent women confirmed they understand the longitudinal nature of the research. Women were also informed that they could withdraw themselves and their data at any point, during or between interviews. Strategies were put in place in the event of this happening, although no women requested to withdraw so these strategies were not put into action: see Appendix D for the PIS which informs women of their right to withdraw. Additionally, there were significant periods of time between interviews where there was no contact with the women. During periods with no recent contact, the women's named midwife was first contacted to check if there had been a change in circumstances for the woman. Procedures were in place for perinatal loss (see Appendix K), and in instances of a pregnancy complication (e.g. foetal anomaly, woman developed a condition (see Appendix L). If for any woman, the viability of the pregnancy was threatened or the baby died before birth, there was no expectation that the woman would continue with the research; and any participant could choose not to continue with participation for any reason. Procedures were in place for if women explicitly withdrew from the study and the storage or destruction of their data.

Although there was no serious distress anticipated, pregnancy is often considered as an emotively intense time and weight is considered a sensitive issue. Therefore, extra care and consideration was taken whilst interviewing women. If women provided any verbal or non-verbal cues suggesting they were upset or distressed in any way, they were asked if they would like to pause the interview and take a break or to stop the interview. Women were free to stop or pause the interview at any point. At the end of each interview women were given the opportunity to ask the researcher any questions around the research.

Participants were signposted to their midwife and GP if they wanted to discuss anything that had arisen from the interviews. Procedures were in place for if a participant disclosed anything that may indicate risk of harm to herself or anyone else. The management and storage of all data complied with the University of Leeds Research Data Management Policy set by the University (<https://library.leeds.ac.uk/research-data-policies>).

## **4.9 Researcher reflexivity**

Reflexivity of the procedures carried by the researcher, and transparent reporting of the research, improves the credibility, dependability and confirmability of the study. Below are reflections of the recruitment, data collection and data analysis processes presented from the researcher's perspective; in the first person.

### **4.9.1 Reflections on recruitment**

I anticipated that recruitment may be slower at the more deprived site, as indicated in existing literature (Macleod et al., 2013; van der Waerden et al., 2010). I could have put strategies in place at the beginning of recruitment to support recruitment at the more deprived site, such as starting recruitment at that site to allow a longer time to focus on recruitment at that site. Another factor I identified to have an impact on recruitment, was the different clinical care teams that were supporting recruitment. Both teams supported the research and reaching women, however the team dynamics, workload and individual midwife approach inadvertently impacted on recruitment. Specific midwives engaged participants in the research more than others. It was not clear why or how this occurred, as all midwives portrayed enthusiasm and were supportive of the study. This is hard to factor into the study design, however, it was important I was responsive to these factors influencing recruitment, such as building strong professional relationships with the midwives, and being understanding of their working relationships across the midwifery team.

Due to the longitudinal nature of the study, I had to ensure the completion of recruitment by a specific date to allow sufficient time for the follow up interviews. The ethics amendment I secured, to recruit women from more antenatal appointments had limited impact on the rate of recruitment. The most important factor of recruiting women was indicated to be my attendance, however, my attendance across the sites was at capacity. As the recruitment deadline approached, I discussed recruitment rates with the supervisory team; research ideals and the logistics of recruiting sufficient participants and data to constitute a PhD was explicitly discussed. I decided that the my attendance would be better suited to the less deprived site as it had higher recruitment than the other site. I



acknowledged that this could reduce the diversity of the sample, but that recruiting sufficient participants to achieve the sample size took precedence over this.

#### **4.9.2 Reflections on data collection**

I have carried out semi-structured interviews in previous roles (undergraduate and masters projects, research assistant job roles). However, I have never carried out serial interviews. I experienced familiarity with participants at TP2, which facilitated the ease of the interview. It meant that before the interview began the participants were eager to 'catch up' with the me, which involved informing me of their pregnancy progress, any interesting experiences since the last interview and questions towards how my PhD was progressing. It was soon evident that the Dictaphone should be switched on earlier than at TP1 as some women began discussing their experiences in natural conversation, rather than after the more formal interview introduction. When this happened, I asked the participant if they consented to the Dictaphone being switched on, and outlined the introductory section of the topic guide (e.g. right to withdraw, aims of the study) after the participant had finished talking. Whilst familiarity mainly facilitated the interview, I also found the interview being harder to regulate, as women were more likely to speak off topic such as recounting entertaining stories that were less relevant to the study, in a more chatty fashion. There were also more shared assumptions between the myself and participant, as we had previously discussed the women's pregnancy, history and expectations in detail at TP1. Some women also disclosed information they did not in the first interview; demonstrating the value of multiple interviews and rapport building.

At the TP2 interviews, I had re-read the participants' transcripts from TP1 multiple times, as part of the TP1 analysis and as part of the TP2 preparation. This meant I had clear areas of follow up based on what had been discussed at the TP1 interview. However, it was evident that process meant I 'remembered' the participants' accounts from TP1, more so than the women themselves. I initially attempted to follow up previous points made by the women at TP1, however, it was evident that the women did not necessarily remember their responses to the first interview in such detail. This was indicated when I piloted the TP2 topic guide. The piloting of the interview was an important process in ensuring the topic guide generated the appropriate data, and at developing interview technique for the TP2 interview, to ensure I was effectively able to look forwards and backwards over time.

I have been transparent regarding my personal positioning towards the research (see Chapter 3), and have constantly reflected on this throughout the project and

decision making. During the data collection interviews and analysis it was evident I held different assumptions towards pregnancy than others (such as the supervisory team and PhD peers) I had discussed the research with. I have never experienced being pregnant and do not know many people who have; so my experience of pregnancy is limited. This meant I had limited pre-conceptions as to what the women interviewed would experience and how pregnancy may impact on them. This meant I was able to frequently probe in-depth during the interview to clarify general statements or assumptions women made in their accounts, as I did not have the shared assumptions towards pregnancy that other women who have experienced pregnancy may have. This was also applied when I analysed the data inductively through the framework analysis; as I analysed the women's experiences in-depth from their own perspective, without have a personal experience to refer to or guide the analysis. This meant there was little confirmability guiding the exploration of pregnancy, based on my own previous experiences. This may also have contributed to the strong rapport built with the women across the interviews; as I had a genuine interest in the women's experiences, in the absence of my own. A strong rapport between the participants and myself was indicated by the high retention rate at TP2.

#### **4.9.3 Reflections on analysis**

I found the analysis to be a complex iterative process as the data generated were rich and in-depth. Initially, I took a purely pragmatic approach to this research project, in order to provide constructive knowledge to contribute practical solutions. However, the data I generated through in-depth probing during the interviews were rich, which provided the potential to create a rich understanding of women's experiences of WRHBs across their pregnancy. I was responsive to the data and adopted a more interpretive approach during analysis, which led to the combination of interpretivism with pragmatism (as discussed in Chapter 3).

The initial detailed splitting approach to analysis, of coding data to many codes, became overwhelming to manage, particularly as a more interpretivist approach was also taken to the analysis. I had also underestimated the volume of data collected, which added to the overwhelm. After discussions with the supervisory team, I amended the analytical approach to a 'chunking' strategy, of coding larger 'chunks' of data to capture the essence of the chunk, which resulted in a more manageable in-depth analysis. The charting process I carried out as part of the framework analysis also aided data management. I summarised the data into manageable chunks, whilst also ensuring I was confident that I was accurately reflecting the participants' voices and perspectives.

#### **4.10 Chapter summary**

This chapter has outlined the procedures taken to recruit participants, generate data and analyse data during this QL project. The methods utilised in this research has ensured the aims of the research have been met. The way in which the research has been conducted and transparently reported for every stage of the project is indicative of a high quality study. The findings from the research will next be presented in three chapters. The first chapter (Chapter 5) presents the thematic framework at TP1; the second (Chapter 6) presents the thematic framework at TP2 and juxtaposes the narratives of both timepoints to bring the longitudinal understanding together across pregnancy; the third (Chapter 7) present the findings from the theoretical mapping of the thematic framework at the two timepoints.

## Chapter 5 Findings: Timepoint One

### 5.1 Introduction

This chapter is the first of three which will present the findings of this study. It will present an overview of the thematic framework for both timepoints, focussing on the findings of Timepoint One (TP1). An overview of the thematic framework in its entirety for both timepoints will first be outlined, the thematic framework for TP1 will be presented in detail. The succeeding chapter (Chapter 6 Findings: Timepoint Two) will present the findings from Timepoint Two (TP2) and juxtapose those findings with the findings from TP1 through a temporal lens. Together, these two chapters will provide an in-depth illustration of the women's experiences of weight-related health behaviours (WRHBs) at the different timepoints of pregnancy. Following on from these two chapters which present the findings from the framework analysis, will be a third findings chapter (Chapter 7 Findings: Weight-related health behaviours and psychological theory), which will identify individual WRHBs present in the thematic framework, and map them to existing psychological theory to identify their determinants (see Chapter 4 for the procedure).

Next, this chapter will present the demographic details of the sample, followed by an outline of the findings across both timepoints, and subsequently a detailed description of the findings from TP1. The four themes will then be presented. The sub-themes within each theme, will be used to structure the findings as sub-headings. Relevant quotes will be provided alongside text to illustrate how the findings are grounded in the data. Key characteristics of age, BMI category (as per the classifications presented in Table 1.1) and parity for the participant providing the quote will be presented alongside the quotes.

### 5.2 Sample

A total of 18 women were recruited into this study and took part in the interview at TP1. There was a high retention rate of women at TP2, with all 17 women who were eligible to be interviewed taking part. One woman (Freya) was lost to follow up due to perinatal loss after the TP1 interview. Most women (14) were interviewed in their home, whilst some women (4) chose to be interviewed by telephone at TP1. The women chose the same interview method at TP2 which meant 14 were interviewed in their own home, and four by telephone. The TP1 interviews lasted between 38 – 103 minutes;  $m = 65$  ( $SD=2.25$ ); and at TP2 lasted between 34 – 84 minutes;  $m = 54$  ( $SD=18.23$ ). Women ranged from being 10 – 20;  $m = 14$  ( $SD=2.19$ ) weeks pregnant at TP1 interview, and 28 – 32 at TP2 interview  $m = 31$  ( $SD=1.18$ ).

The recruitment strategy attempted to increase the likelihood of a varied sample (as discussed above in Chapter 3); the sample in this study was subsequently varied. The age range of included women was from 24 – 50 years;  $m = 32$  ( $SD=6.6$ ). Most women (13; 72%) were up to 35 years old, with five women 35 or older; including one aged 50. Eight women (44%) were first time mothers; six were in their second pregnancy. Four women had experienced previous perinatal loss. The women's pregnancy start BMI ranged from 19 – 42  $\text{kg/m}^2$ ;  $m = 25.4$   $\text{kg/m}^2$  ( $SD=6.2$ ). Eleven women had a healthy BMI; three had a BMI over 25  $\text{kg/m}^2$  (overweight); four had a BMI over 30  $\text{kg/m}^2$  (obese); one of which had a BMI over 40  $\text{kg/m}^2$ . Most women were white British (13 / 72%); the remaining five (28%) were African (2), Caribbean (1), Middle Eastern (1) and Indian British (1). Most women (14; 78%) worked full time, two (11%) were working part time and two (11%) were unemployed. Most women (11; 61%) had at least an undergraduate degree; of which, four had also obtained postgraduate qualifications. The remaining seven women either had vocational qualifications (5); GCSE/O level (1) or AS/A level (1). See Table 5.1 below for more detail of the participant characteristics.

Table 5.1 Characteristics of participants

<b>Pseudonym</b>	<b>Age</b>	<b>Ethnic group</b>	<b>BMI</b>	<b>Marital status</b>	<b>Occupation</b>	<b>Highest qualification</b>	<b>Previous births</b>	<b>Gestation at Timepoint 1 (weeks)</b>	<b>Gestation at Timepoint 2 (weeks)</b>
Alice	29	White British	24.4	Married	Full time	Undergraduate	0	10	30
Ava	29	Indian British	20.8	Married	Full time	Postgraduate	1	13	32
Charlotte	35	White British	30	Married	Full time	GCSE/O Level	2	14	30
Ella	39	White British	20.5	Partner - living together	Full time	Vocational	1	12	30
Florence	24	White British	31.3	Partner - living together	Unemployed	Vocational	1	17	31
Freya	34	White British	18.9	Married	Part time	Undergraduate	1	13	N/A
Isla	30	African	24	Married	Full time	Postgraduate	1	14	31
Leigh	31	Caribbean	20	Married	Full time	Postgraduate	0	14	30
Lily	40	White British	22.5	Married	Full time	Undergraduate	0	15	29
Louise	24	White British	24	Partner - living apart	Full time	Vocational	0	15	28
Martha	50	White British	25	Married	Full time	A/AS Level	0	14	32

Pseudonym	Age	Ethnic group	BMI	Marital status	Occupation	Highest qualification	Previous births	Gestation at Timepoint 1 (weeks)	Gestation at Timepoint 2 (weeks)
Mia	29	White British	36	Married	Full time	Undergraduate	1	12	29
Milly	26	White British	19.4	Married	Full time	Undergraduate	0	14	31
Olivia	26	Middle Eastern	21	Married	Part time	Undergraduate	2	12	30
Poppy	30	White British	24.3	Separated - partner living apart	Part time	Vocational	3	13	31
Violet	28	White British	26.1	Partner - living together	Full time	Postgraduate	0	14	31
Willow	39	White British	42	Married	Unemployed	Vocational	6	16	32
Zoe	33	African	28.5	Married	Full time	Medical degree	0	20	32

### **5.3 Overview of the findings across both timepoints**

Using the procedure of framework analysis, (as described in Chapter 4) data from TP1 were analysed and four themes were identified, each consisting of multiple sub-themes. These four themes were also evident at TP2 (as discussed in Chapter 4 Methods). See Table 5.2 below for an overview of the themes and sub-themes identified at both timepoints. The four themes identified at both timepoints provide the thematic framework. Although the same four themes were found at both timepoints, the narrative accompanying the themes differed at the timepoints. The narrative behind the women's experiences of TP1 was 'Disruption and Adaption' and at TP2 the narrative was 'Passivity', see Figure 5.1 below for an illustration of the four themes and narratives for both timepoints. The findings from the two different timepoints are presented in two separate chapters, to illustrate the two different narratives. The narrative of TP1 will be presented in the following chapter when integrating the findings across both timepoints.



Table 5.2. Thematic framework including themes and sub-themes for both timepoints

Themes	Sub-themes at Timepoint 1 (approximately 10 – 16 weeks pregnant)	Sub-themes at Timepoint 2 (approximately 28 – 32 weeks pregnant)
1. What is healthy for us?	a. Dietary nutrition: <i>“Obviously what I eat the baby gets”</i>	a. Dietary nutrition: <i>“Baby’s gaining weight, obviously I must be doing something right”</i>
	b. Appropriateness of exercise: <i>“The baby’s more important than exercise”</i>	b. Appropriateness of exercise: <i>“I don’t want to end up a complete couch potato”</i>
	c. Weight gain expectations: <i>“I’m hoping... that it will be concentrated into a nice little bump”</i>	c. Weight gain status: <i>“I’ve definitely got a lot bigger”</i>
2. Listening and responding to my body	a. Interpreting and responding to physical cues: <i>“If my body wants that, it’s going to ask for it and it’ll get it”</i>	a. Interpreting and responding to physical cues: <i>“I’ve just tried to do whatever it is that my body asks or wants me to do”</i>
	b. Reacting to symptoms: <i>“I feel like I’m eating to get by”</i>	b. Reacting to symptoms: <i>“I can eat what I fancy”</i>
3. After I have the baby...	a. Postnatal body expectations: <i>“You don’t look the same anymore ”</i>	a. Postnatal weight: <i>“I need to get back into shape”</i>
	b. Anticipations for weight loss: <i>“I want to obviously lose weight after I’ve had the baby”</i>	b. Plans for after the birth: <i>“Once I’ve let my body recover I’m going to...”</i>
4. I’m the kind of person who...	a. Healthy self-identity: <i>“As a person, health’s important to me”</i>	a. Healthy self-identity: <i>“That’s really out of character for me”</i>
	b. Relationship with weight: <i>“I’ve always struggled with me weight”</i>	b. Relationship with weight: <i>“I don’t lose weight easily”</i>

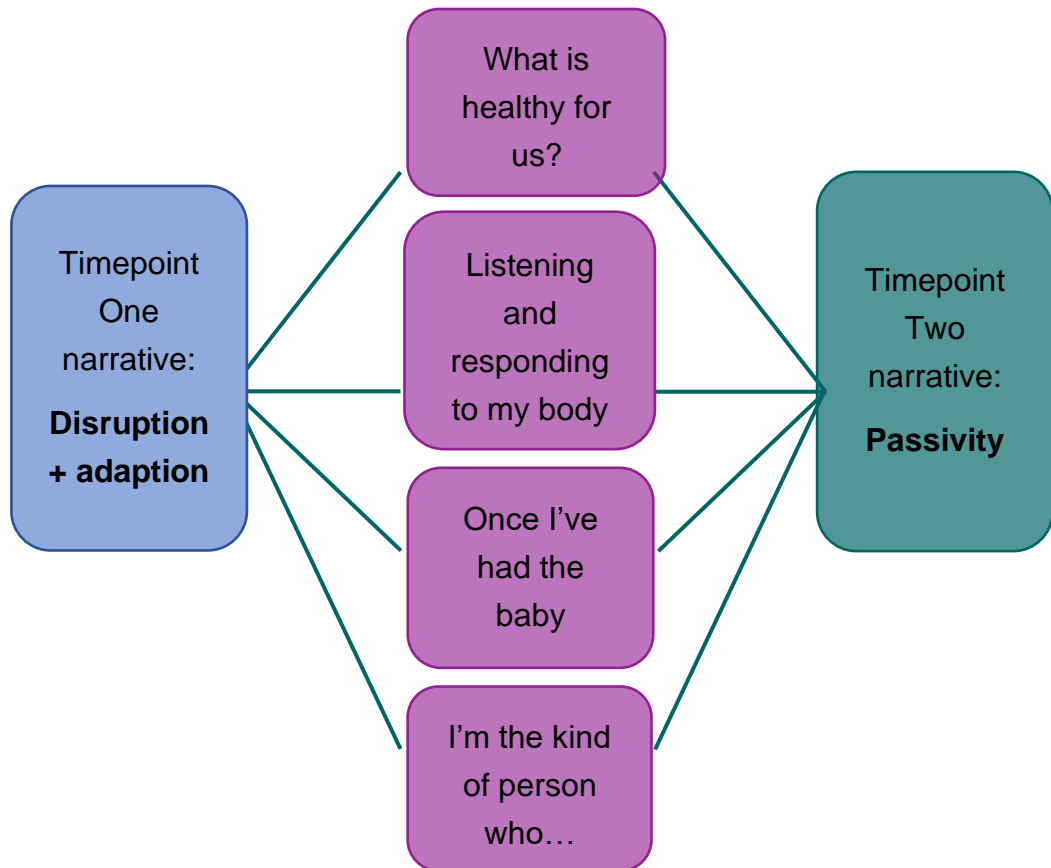


Figure 5.1. Diagram of the thematic framework for both timepoints, including the narrative for each timepoint

The themes found at TP1 will next be presented.

#### 5.4 Theme One: What is healthy for us?

This theme included three sub-themes: a. Dietary nutrition; b. Appropriateness of exercise; c. Weight gain expectations. At this early stage of pregnancy (approximately 10 – 16 weeks), many of the women discussed the importance of engaging in ‘healthy’ behaviours, which were thought to support the development of the unborn baby and their body’s ability to support the pregnancy. ‘Being healthy’ during pregnancy was mainly associated with dietary health behaviours and engaging in *some* physical activity. These were thought to have the potential to directly impact the growth and development of the unborn baby, and the ability of the women’s body to support the pregnancy. Women’s perceptions towards the appropriateness of engaging in WRHBs were complex during pregnancy. Women did perceive WRHBs to have the potential to impact on their weight gain

during pregnancy, however, the primary role of the behaviours was perceived as supporting the pregnancy; not managing the women's weight. Women expected to gain weight as part of a healthy pregnancy, but only in certain areas. At this timepoint, women reported feeling 'bigger', but that they were not yet noticeably pregnant with a 'bump'. There was a level of anxiety in the women towards the growth and development of the unborn baby, due to limited indicators of the unborn baby's development, such as the lack of a 'bump' and minimal feedback from healthcare professionals. This uncertainty contributed to women's intentions to be 'healthy' for the unborn baby.

#### 5.4.1 Dietary nutrition: “*Obviously what I eat the baby gets*”

The women considered their diet to be a direct source of nutrition to the unborn baby, providing them with the nutrition needed to grow and develop. This meant the women “wanted to eat as healthy as they could” (Ava), by consuming 'healthy' foods, which were perceived to benefit the growth and development of the unborn baby.

*“I generally just want to be a healthier person, I guess, being pregnant you do worry about, you know, what you are giving your baby nutritionally”.*  
(Ava, 29, healthy weight, second child)

*“Obviously what I eat the baby gets, so I'd want to try and eat as healthily as I can, and give that baby good development and a good start.”* (Ella, 39, healthy weight, second child)

A 'healthy' diet was usually viewed by the women as being 'varied and balanced' to provide maximum nutrition to the unborn baby. A 'varied, balanced diet', was thought by women to encompass the 'different food groups' with a high fruit and vegetable content. Furthermore, they were concerned that not consuming enough nutrients could potentially hinder the unborn baby's growth and development. This meant women were largely concerned with achieving a nutritionally varied and rich diet during their pregnancy.

*“Making sure I'm getting all my food groups in there. In my tea, for example, I've got my protein and natural fat with my salmon, carbs and potatoes, fat and protein again with the eggs, and then getting some vegetables and fibre with the broccoli. [...] I feel like it will give the baby the nutrients it needs to help it develop and give it the best chance of developing in line with where it should and being healthy.”* (Milly, 26, healthy weight, first child)

*“Baby can't take what's not there, so, if I've missed out like an important food group, baby can't get something that I haven't had, I want to minimise*

*that risk and I want to make sure that I am eating healthily and do as much as I possibly can, to keep baby all ok.” (Violet, 28, overweight, first child)*

The idea of achieving a nutritionally ‘balanced’ diet was considered more important than increasing calorie consumption. Some women reported being encouraged to increase their calorie consumption by others because they were “eating for two”. However, the women often refuted this, and discussed how they did not think it was necessary to increase their calorie consumption. On the whole, the need to increase their calorie consumption because they were “eating for two” was describe as a ‘myth’ by the women. They considered the nutritional quality of their diet as more important in supporting the growth and development of the unborn baby, than the calorie quantity.

*“There used to be a saying of eating for two, and people still say it to you now, but really you’re not. [...] I think you’ve just got to maintain a healthy balanced diet.” (Alice, 29, healthy weight, first child)*

*“I think things from the past like eating for two and things are not true, I don’t think you have to do that, I think you just have to make sure you’re getting like well-balanced food.” (Ava, 29, healthy weight, second child)*

In addition to their food intake, for the women to feel assured they were consuming a sufficient amount of nutrients, they often took pregnancy specific supplements. Women perceived these did not replace the nutrition present in foods, but believed they ‘topped up’ their dietary consumption to the sufficient levels needed to support the growth and development of the unborn baby. Supplements were also perceived to support their own nutrition levels, to ensure their body was supported in carrying a pregnancy.

*“I take pregnancy supplements and have done since I found out I was pregnant and possibly, I think I even took them before, like trying for a baby, vitamins and stuff. I haven’t really thought about it, I just try to get nutrition in me so I’ve got the energy to keep cooking it.” (Freya, 34, healthy weight, second child)*

*“From the point of view of the vitamins and things, I mean, I take double the folic acid purely because, I take it in the multivitamin and I take a separate tablet of it as well because nobody’s told me it’s an issue you know [...] I take a vitamin D supplement as well, because that’s an important vitamin as well. But yeah, I mean you never really know what your body’s doing [...] You don’t know whether you’re getting the right vitamins and minerals to support a pregnancy I suppose do you” (Martha, 50, overweight, first child)*

Whilst 'healthy' foods were thought to positively contribute to the unborn baby's growth and development, 'unhealthy' foods were perceived as having the possibility of detrimentally impacting on the unborn baby. Women's perception of the risk of 'unhealthy' foods negatively impacting the unborn baby were orientated around prolonged excessive consumption of 'unhealthy' foods. Subsequently, women often tried to 'limit' their consumption of 'unhealthy' foods, and substituted 'unhealthy' foods with 'healthy' ones. There were also foods women avoided altogether, due to the perceived risk of immediate harm to the unborn baby and the viability of the pregnancy. These foods were treated differently to 'unhealthy' foods. Whilst there was a level of 'balance' associated with consuming 'healthy' and 'unhealthy' foods, foods which were associated with immediate harm to the unborn were completely avoided.

*"You can make your baby diabetic I believe if you have too much sugar when you're pregnant so, it kind of is something that I know you need to control." (Martha, 50, overweight, first child)*

*"I would never eat anything that would put at risk my pregnancy so, I don't eat liver or pate or raw anything. But, then if I want something a bit more sugary or a bit more salty or something that I fancy I will eat it, I am not going to feel guilty for eating something I fancy when I know that the majority of things I eat are okay." (Freya, 34, healthy weight, second child)*

The women were uncertain about how their unborn baby was growing at this stage of pregnancy due to limited indicators, such as limited contact with healthcare professionals and a visible 'bump'. This led to anxiety and a perceived lack of control over ensuring the baby was developing appropriately. However, dietary consumption was something which was thought to have an impact on the unborn baby's development, and something they had an element of control over, to increase the likelihood that the baby was growing and developing sufficiently. This meant that engaging in 'healthy' dietary behaviours was thought to support the growth and development of the unborn baby. Furthermore, it also acted as reassurance to the women that they were doing 'all they can' in their role as a mother, at this stage of pregnancy to support the well-being of their unborn baby.

*"I want to try and eat as healthily as I can, and give that baby good development and a good start, and a good, being able to grow and develop as best as I can inside me. Obviously, I don't have any control of how that's happening or what's going on in there, but I do want to try my best and think that I've done all I can for my baby's development inside." (Ella, 39, healthy weight, second child)*

*“It’s one of the few things you have control over really, because you don’t know, you don’t know how, whether your baby’s going to be healthy, you hope it is, but one thing you can control is eating a good diet and things like that. So, I suppose it gives you a sense of being able to help your child before it’s born, so in that sense it’s really important”* (Alice, 29, healthy weight, first child)

#### **5.4.2 Appropriateness of exercise: “*The baby’s more important than exercise*”**

Outside of pregnancy, physical activity and exercise was considered an aspect of a ‘healthy’ lifestyle, in association with a healthy diet. However, the role and appropriateness of physical activity in the context of pregnancy was more complex. Women perceived the benefits of engaging in physical activity during pregnancy as primarily related to them; such as supporting the birth, weight management, mental health and well-being and improving sleep. Unlike dietary health behaviours, physical activity was not considered essential in supporting the growth and development of the unborn baby and there was uncertainty towards the benefits it could have for the unborn baby.

*“I really don’t think there’s a difference or there’s much of a benefit to the baby, I think it benefits the woman having the pregnancy because it helps with mood and things like that”* (Isla, 30, healthy weight, second child)

*“The more exercise you do if you do exercise while you’re pregnant, it’s preparing your body for labour, and it’ll be an easier baby then for both me and baby”* (Violet, 28, overweight, first child)

When considering the appropriateness of engaging in physical activity during pregnancy, the women held the view that there was an element of risk with being physically active during pregnancy. This included risk of injury to the women, and a risk of harming the development of the unborn baby. The views of the potential risk physical activity could have on the unborn baby ranged from a small element of risk, to extreme views of possible harm to the unborn baby.

*“I don’t know if being physically active would have an impact on the baby, I guess, it can’t do it any harm, unless I was to be too vigorous with my exercise”* (Milly, 26, healthy weight, first child)

*“I think it could be quite harmful. That’s just my thoughts. I’ve not read up about it, but it’s just my head that tells me that. You’ve got placenta, you’ve got a baby, jumping up and down, I just think you could...I don’t know, when the baby’s born it could come out like a hyperactive child”* (Charlotte, 35, obese (Class I), third child)

*“I mean you see people like doing exercises and stuff when they’re pregnant now if that’s for you that’s for you, if it’s not for you then, it’s never been for me. I’ve always been scared that if I did too much I’d might have lost the baby”.* (Willow, 39, obese (Class III), seventh child)

The risks associated with engaging in physical activity during pregnancy were often related to the women doing ‘too much’. Women referred to ‘physical activity’ and ‘exercise’ interchangeably, with both of the terms being used to discuss being engaged in physical activity which was considered to be outside the remit of their usual activity levels. This meant the focus around the acceptability of engaging in ‘physical activity’ or ‘exercise’ was mainly around the levels of exertion, with women wanting to avoid over exertion.

*“You have to make sure that you understand your body and you’re not going to push yourself too much because at the end of the day you are carrying a baby and that should be the biggest priority”* (Ava, 29, healthy weight, second child)

*“If you’re used to, I don’t know, going on long walks or going swimming, it should be fine with that during the pregnancy and if it’s not and if it does become too much then it’s just a case of stop and have a rest”* (Violet, 28, overweight, first child)

For women who reported regularly engaging in physical activity prior to pregnancy, they were mainly continuing to engage in it at this timepoint of pregnancy. They were mindful to adapt the type and intensity of physical activity to ensure they did not do ‘too much’. This often meant changing their goals from improvement to maintenance of fitness.

*“I just reduced the distance when we go out biking and then just taking it a little bit easier at the gym, not getting out of breath too much and just watching the heat as well that I don’t get too hot.”* (Lily, 40, healthy weight, first child)

*“It’s a different focus I think, it’s not trying to get faster or stronger, it’s just trying to maintain healthy fitness levels”* (Alice, 29, healthy weight, first child)

However, adapting physical activity to reduce risk was not always simple due to the uncertainty around risk. The perceived risk of harm to the unborn baby often meant women who were engaged in and planned to remain engaged in physical activity, sometimes had an internal battle around their continued engagement, and how to manage it safely. Some women took a cautious approach and ceased engagement in physical activity completely. Protecting the baby from risk of harm

associated with physical activity took precedence over any of the perceived benefits.

*“I don’t know, I don’t think I’d feel comfortable, especially when I’m further along and have more of a bump, if I was to be sprinting, I’d feel like the baby would be, I don’t know, getting stirred around a bit in my belly, I think it wouldn’t be settled, which might be a bit bonkers. I don’t know, I feel like I should keep active, but less high impact stuff on my body, and stuff that isn’t going to put it into too much shock, so do more swimming versus sprinting, if that makes sense.”* (Milly, 26, healthy weight, first child)

*“I didn’t know how much I could do at the gym. Like how heavy the weights that I should have been lifting like. Obviously, I didn’t want to pull anything or do anything wrong and so yeah, I just stopped it.”* (Louise, 24, healthy weight, first child)

For some women in particular, cultural beliefs around the importance of rest and reducing physical activity during pregnancy heavily influenced their engagement in physical activity; even if those views were not held by the women themselves. However, due to the perception that physical activity involves an element of risk for the unborn baby, there was a level of accountability experienced by the women when choosing whether or not to engage in physical activity.

*“My husband, in like Indian tradition when you’re pregnant, it’s like he doesn’t even want me to walk up the stairs you know. If he hears me like slightly going into a run on the stairs he’s like shouting “what are you doing” [...] If it all goes wrong then I kind of worry a little bit that he’s going to say ‘well it’s because you did that int it’ you know, ‘you shouldn’t have been doing too much and you shouldn’t have done this’. So, I almost a little bit feel like if anything goes wrong I’m going to get the blame”* (Martha, 50, overweight, first child)

*“I come from like a big Indian family and they’re all pretty like, ‘you can’t do anything when you’re pregnant, you have to sit down and put your feet up’, so I think I got into my head that I just can’t do anything because it’s really risky”* (Ava, 29, healthy weight, second child)

For those who intended on engaging in physical activity during pregnancy, there was an expectation that reduced mobility would eventually restrict their ability to engage with physical activity. However, they anticipated they would maintain engagement until they experienced that, and would then adapt to manage the impact of limited mobility.



*“I imagine you can’t do as much because your mobility isn’t going to be as good. [...] So there’ll probably be some things I can do but I imagine it will change. But my plan is to just keep going with what I’m doing now, as long as I’m enjoying it and feeling well and if I feel like I can’t do it, then I won’t worry about it too much, I’ll just do something else or cut it out”* (Alice, 29, healthy weight, first child)

#### **5.4.3 Weight gain expectations: “I’m hoping... that it will be concentrated into a nice little bump”**

Weight gain, to a certain extent, was an expected aspect of being pregnant. Women’s understanding of expected weight gain was thought to be related to the growing baby and other pregnancy-specific aspects which support the growth and development of the unborn baby. This expected weight gain was accepted by the women with an element of sacrifice, which was necessary to support the unborn baby.

*“A big part of it is the baby but, I feel like my body is sending more fat to my middle area. So, I guess, it’s about that, ensuring that you’ve got enough padding and fat on you, to carry and nurture the thing that you’re growing inside you. I guess, it’s a combination of increased fat percentage, and probably increased water weight, as well, and then the baby”.* (Milly, 26, healthy weight, first child)

*“In a way it’s sad, because I don’t think any woman wants to get bigger, but, then again, it’s for a good reason and at the end of it we’re getting a baby”* (Violet, 28, overweight, first child)

Women were largely unsure of the numerical value of the expected weight gain. A small number of the women had accessed information around numerical weight gain recommendations online, but without recommendations to compare their weight gain to, numerically monitoring their weight gain was considered redundant. They instead assessed its perceived necessity in supporting the pregnancy. This was done by visually assessing the location of the weight gain on their body. Only specific areas of the women’s body were expected to change due to pregnancy specific weight gain. Weight gain that was perceived to be on areas of the body which were not related to supporting the pregnancy was considered ‘unhealthy’. ‘Unhealthy’ weight gain on areas of the body which were not associated with supporting the pregnancy were associated with WRHBs.

*“You can tell it is sometimes it’s pregnancy related, but sometimes you know it isn’t, like at the moment I’ve got bit of a chin and I know that’s nowt to do with baby, that’s to do with what I need to sort out myself. But, like,*

*boobs wise I know that's nowt to do with me, I know that is to do with the pregnancy"* (Mia, 29, obese (Class II), second child)

*"When you're pregnant using that as an excuse and like reducing your exercise and then eating more and using pregnancy as like a reason to not exercise and eat whatever you like would then give you that unhealthy weight gain"* (Olivia, 26, healthy weight, third child)

As gestational weight gain was perceived to be linked to supporting the growth and development of the unborn baby, it was important to the women that their weight gain during pregnancy was sufficient to support the pregnancy; but not too much for it to be deemed as 'unhealthy'.

*"I don't want to gain any unnecessary weight, I want to gain the weight I have to, to grow the baby, I don't want to gain unnecessary greedy weight."* (Milly, 26, healthy weight, first child)

For some women, cultural beliefs of family members around their weight, went against the norms of their expected weight gain. Whilst for the women the focus was primarily on not gaining an excessive amount of weight, in some cultures insufficient weight gain was considered more negatively than excessive weight gain.

*"My father in law like always takes the piss out of me because he thinks I'm too skinny and says like 'you look like you've come from like the refugee camps or something'.* (Olivia, 26, healthy weight, third child)

At this early stage of pregnancy, women often reported feeling 'bigger', 'heavier' and 'podgier', with the absence of a noticeable 'bump'. The lack of bump, combined with perceived weight gain on other parts of the body, meant women were unsure of how to attribute their weight gain at this stage; as being necessary for the pregnancy or 'unhealthy' weight gain which was due to factors outside of the pregnancy. Weight gain on areas of the body which were not considered the necessary areas for pregnancy specific weight gain were perceived negatively by the women.

*"I went through a stage probably when I was about eight weeks pregnant, so it was quite early, of feeling, like, is this me putting on weight? Is this about the baby? Is this water retention? I didn't quite know what it was and I didn't know what sort of a bigger I was feeling."* (Leigh, 31, healthy weight, first child)

*"It's gone on more around my thighs and hips and around my bum rather than actually on my tummy which is a little bit disappointing. So yes, I'm still waiting for the bump to show, actually, even at 15 and a half weeks*

*[...] I just would have quite liked to have seen a bump, I suppose, rather than it all going down there. I don't know, I just didn't expect it. [...] I just feel quite unhealthy when it's like that, whereas I suppose if it's just triggered in the areas that you expect it to I just see that's quite a normal thing. Whereas when it's going everywhere I just feel fat.*" (Lily, 40, healthy weight, first child)

The women thought they could manage the unnecessary weight gain to a certain extent, by engaging in 'healthy' dietary and physical activity health behaviours. However there was a perception that engaging in these behaviours for weight management purposes would require dietary restriction, which could potentially deprive the unborn baby of nutrition and limit its development and growth.

*"Exercising and eating healthily, like your lifestyle is definitely going to have an impact. Like yeah you're pregnant and yeah you're going to put on weight, but, if you're going to eat loads of things that are unhealthy, like, you have to understand that you can't just eat everything and anything, because you are going to put on weight. And then potentially you need to do a little bit of exercise and even if that's just walking or whatever."* (Ava, 29, healthy weight, second child)

*"Yeah some people are conscious with their weight, but you're supposed to put on weight because that baby's growing as well [...] You can't be too conscious with eating and doing exercises because that baby's there because you want it to grow. Now if you're going to not eat properly [dieting] and if you're going to exercise then that baby's not going to grow properly"* (Willow, 39, obese (Class III), seventh child)

## **5.5 Theme Two: Listening and responding to my body**

This theme comprised of two sub-themes: a. Interpreting and responding to physical cues; b. Reacting to symptoms. In addition to women's perceptions of what was considered healthy for them and the unborn baby, they were attentive to their body and any physical signals during pregnancy. They had an awareness that their bodies felt different, and had different requirements than when they were not pregnant; because of the additional needs of the unborn baby. They were particularly receptive to bodily cues, which were perceived to be signals alerting them to their unborn baby's needs. The cues were not necessarily different to cues they experience outside of pregnancy i.e. hunger and/or tiredness, but the way in which these cues were interpreted and responded to were different in early pregnancy than outside of pregnancy. Many women also experienced "symptoms" of pregnancy, such as sickness and lethargy; likening

the feeling to having a “hangover”. Symptoms were different to cues, as they were associated with being pregnant, but were not necessarily interpreted as being associated with the unborn baby’s needs. Symptoms experienced were largely unpleasant, and there was a necessity to manage them, just to “get by”. The management of these symptoms were mainly through dietary and physical activity behaviours. These symptoms, in addition to responding to cues from their body, largely dictated the women’s perceptions towards and engagement in dietary and physical activity health behaviours in early pregnancy. This meant the women often felt prevented in engaging in the ‘healthy’ weight-related health behaviours they were motivated to (as discussed in Theme One). Women anticipated these symptoms would change throughout the pregnancy, particularly, that they would decrease during the second trimester. Women discussed how a decrease in symptoms in the second trimester could be a time where they would be able to regain control of their dietary consumption and engagement in physical activity.

### **5.5.1 Interpreting and responding to physical cues: “If my body wants that, it’s going to ask for it and it’ll get it”**

Being alert and responsive to physical cues around physical activity and dietary behaviours was considered as an integral part of being pregnant and in supporting the pregnancy. The different cues experienced by the women are discussed below, and are organised into ‘dietary-related cues’ and ‘physical activity-related cues’. The women considered physical cues as indications of their unborn baby’s needs, which they thought was imperative that they responded to them appropriately. Although the physical cues themselves were often not different to cues they experiences outside of pregnancy, the way in which they interpreted and responded to them was expected to be different by the women. This meant they had a heightened receptiveness to them, which was demonstrated by ‘listening to their body’. Women expected these cues would change throughout the pregnancy. There were no fixed plans of how women would manage the change, they were mindful towards re-evaluating the meaning of the cues and taking it “one day at a time”.

*“You have to listen to your body [...], there are going to be differences in how you manage those things in pregnancy and not being pregnant” (Ava, 29, healthy weight, second child)*

*“I just presumed that the baby needed energy [...] I guess somehow it’s just telling you what it needs. So, I don’t know what’d happened if I didn’t give into those” (Lily, 40, healthy weight, first child)*

As discussed in Theme 1, at this early stage of pregnancy women were anxious and unsure of the unborn baby's well-being, due to limited indicators of the baby's development. In addition to meeting the unborn baby's needs, responding to cues which were thought to be linked to the unborn baby's well-being reassured the women that they were supporting the viability of the pregnancy to the best of their ability.

*"I think at this early stage it's a bit harder because obviously you can't feel baby and you haven't got a clue what's going on, I think that's why I were more worried [...] I think if I'm doing what my body's telling me to do, that must help the inside."* (Poppy, 30, healthy weight, fourth child)

### **Dietary-related cues**

Cues associated with dietary consumption were particularly important to women; as described in Theme 1, there was the perception that their dietary consumption was directly linked to the unborn baby's development.

Women reported increased levels of hunger at the beginning of pregnancy. The cue of hunger was not necessarily different to that experienced outside of pregnancy, but the way in which the women interpreted and responded to it was different. They evaluated the feeling of hunger and why they thought they were experiencing it. Hunger was perceived to be linked to the increased energy required to support the growth and development of the unborn baby. This meant that women responded to hunger more readily at this stage of pregnancy than prior to pregnancy.

*"Now I just think, well if I'm hungry, I'm going to eat. There's somebody else in there that's making me hungry. Whereas before, I would question it, am I hungry or am I just bored? But now I know I'm definitely hungry, so I will eat".* (Louise, 24, healthy weight, first child)

*"Maybe I just need more because there's a lot of energy going into creating this little person. I think your body does need more than what it normally does when you're pregnant. Not too much more, but I definitely feel more hungry."* (Charlotte, 35, obese (Class I), third child)

Responding to hunger more readily than prior to pregnancy meant that some women thought that they had increased their dietary consumption. This was perceived as having the potential to being linked to weight gain during pregnancy. Some of the women were mindful of the impact it could have on their weight gain. They continued to respond to hunger cues, but considered the types of foods they consumed. Whilst this was, in part, to reduce excessive weight gain, they did not want to be seen to be 'dieting' or focussing on their weight in pregnancy.

Responding to hunger cues took precedence over ignoring them for weight purposes.

*“That’s more than I usually would eat, normally I wouldn’t have any snacks at work, so I’m eating more, so obviously that’s going to contribute to the weight gain.”* (Violet, 28, overweight, first child)

*“Like if I feel hungry I will eat. I’m not going to be on diets, but I will choose to eat something that’s healthy. [...] If my body’s saying that it’s hungry then I’ll eat something. Just make sure I eat the right thing really. So I do expect to feel a little bit more hungry, but it’s just making sure I choose the right foods. I would never not eat. I wouldn’t be obsessed with my weight or anything.”* (Charlotte, 35, obese (Class I), third child)

The importance of responding to, rather than ignoring cues around consuming food, were particularly concerning for women who had engaged in weight loss prior to becoming pregnant. Responding to dietary cues more readily than prior to pregnancy led to a perceived loss of control by some women, and concern towards possible weight gain.

*“When I’ve got the urge I’ve just kind of bought it and eaten it. I wasn’t doing that since I’ve had the operation [gastric sleeve] I wasn’t eating foods like that, so, that’s been a little bit worrying that I’ve just kind of seemed to have lost that control a little bit.”* (Martha, 50, overweight, first child)

In addition to increased hunger, women also experienced cues to consume certain foods. These foods were sometimes different to what they would usually consume. Similar to hunger cues, women evaluated why they were experiencing these cues and interpreted it as being linked to the unborn baby’s nutritional requirements and/or their body’s needs to support the pregnancy.

*“Say with the fruit it seemed to me like it was my body saying get something good and nutritious down you. And then with the carbs it was like my body was saying you need some energy.”* (Florence, 24, obese (Class I), second child)

As discussed in Theme 1, women wanted to consume ‘healthy’ foods to support the growth and development of the unborn baby. For some women, dietary cues such as cravings sometimes contradicted this, by indicating the need for ‘unhealthy’ foods. Some women were therefore concerned about the impact of consuming these ‘unhealthy’ foods on their and their unborn baby’s health. This resulted in women re-evaluating which was more important to them: responding to cues, or consuming foods they typically categorised as ‘healthy’, leading to an internal battle of knowing what to do ‘for the best’.

*“I know the kind of food I should be eating to kind of make me be healthy and happy and make the baby healthy [...] even though I’m craving foods [chips]... I shouldn’t eat them, but every time I’m able to suppress the cravings they’re unbearable... So because the awareness was there, some days, I would actually suppress the cravings, some days I wasn’t to be fair, I’d just kind of go for it.”* (Isla, 30, healthy weight, second child)

*“My body would try and tell me that I need more sugar. But obviously educational wise I know that’s wrong, so I would have to tell myself. So I think you do have to be careful”* (Charlotte, 35, obese (Class I), third child)

The bodily cues were often interpreted as the dominant indicator of the unborn baby’s needs, and were subsequently responded to, even if they contradicted the women’s beliefs of ‘healthy’ food and were associated with pregnancy complications.

*“It just came out of nowhere and I just couldn’t get enough sugar, sweets [...] I remember mentioning when I went for my seven week scan to the midwife, is this normal, because I think, oh my God, all this sugar, I’m going to end up with gestational diabetes or something. [...] I don’t know if it was just energy that my body was needing or what but yes, that was odd”* (Lily, 40, healthy weight, first child)

*“If my body wants that, it’s going to ask for it and it’ll get it. I think that’s the best way really to be instead of just looking at a book and saying this is what I should eat and shouldn’t eat.”* (Poppy, 30, healthy weight, fourth child)

### **Physical activity-related cues**

Women also received cues which had an impact on their physical activity levels. As discussed in Theme 1, the women perceived physical activity as having an element of risk towards the unborn baby, which was often associated with doing “too much”. This view was held by all women, regardless of their engagement in physical activity. Therefore, the women were particularly attentive to cues which indicated a need to ‘slow down’ in order to prevent doing ‘too much’.

Fluctuating energy levels were experienced by the women. Low energy levels were interpreted as a result of the increased energy requirements to support the growth and development of the unborn baby.

*“I think my energy levels during this pregnancy are low, that’s because obviously something else is growing inside of you and you feel more tired”.* (Isla, 30, healthy weight, second child)

This meant that women interpreted tiredness as a cue to conserve their energy expenditure by resting. Similar to responding to hunger, this cue was responded to differently than if they were not pregnant, due to the perceived link to the unborn baby's development. Women discussed how they were more likely to 'rest' when they were pregnant, compared to when they were not pregnant.

*"Your body's telling you to slow it down, whereas, when you're not pregnant you keep doing it whether you're tired or not, you'll just carry on, you think 'oh tomorrow's another day I'll just rest tomorrow', but when you're pregnant you think, well wait a minute, my body's saying slow down, you need to slow down."* (Willow, 39, obese (Class III), seventh child)

'Resting' was seen as something which could have a positive impact on supporting the viability on the pregnancy in early pregnancy; particularly for women who had previously experienced perinatal loss.

*"I mean I took these two weeks off because I knew it was kind of a vital time in pregnancy, because when I've had miscarriages in the past they've been kind of, either before or during this sort of stage. So, I kind of thought I'm going to have a rest."* (Martha, 50, overweight, first child)

For those who remained engaged in physical activity at this point in their pregnancy, tiredness also had an impact on their engagement. Some women reduced their frequency and intensity of engagement in physical activity in response to tiredness. Women drew on their changes in motivation of engaging in physical activity from improvement to maintenance, as discussed in Theme 1., to support the reduction in physical activity.

*"I've reduced the number of days a week I go to the gym by one or two. I've put less pressure on myself to get there, if I'm feeling shattered or if I'm aching from days previous, whereas, prior to being pregnant I might have forced myself to go anyway, I'm much more lenient on myself. And, if I don't feel like it because I'm tired, then I won't go, because I don't think that's good for the baby."* (Milly, 26, healthy weight, first child)

*"I don't, to be honest I don't think I really have a goal when I'm pregnant, It's more the fact that I just want to keep as active as I can, I want to keep as fit as I can, just for me now, during labour and after, and then once I'm okay and I'm fine and everything's okay and I'm back into a bit more of a routine, and it's safe for me to do more, then I will probably push myself that little bit more."* (Ella, 39, healthy weight, second child)

Women identified cues such as breathlessness, over-heating and discomfort as indicators of doing "too much". Prior to pregnancy the women would have ignored



these indicators and 'pushed through', however, at this stage of pregnancy women were particularly receptive to these indicators and discussed the importance of 'listening to their body' when engaging in physical activity. They often attempted to prevent cues from occurring, and if they did experience any of them, they immediately adapted their behaviour; usually by reducing the intensity of the activity.

*"I'd just get quite out of breath and just really overheat because before I just used to push through that and because I used to get like really stupidly hot anyway. So, I just watched that and just had it on lower levels so that I wasn't getting really, really hot, pretty much"* (Lily, 40, healthy weight, first child)

*"I'm still going running, but when I get out of breath I'll walk for a few paces until I get my breath back, whereas before I'd think, no you're not stopping, now I'll just walk for a bit"* (Alice, 29, healthy weight, first child)

Tiredness was expected to continue fluctuating throughout the pregnancy, with women anticipating an increase in energy during the second trimester, which would provide them with the opportunity to be more active; followed by a decrease in the third trimester. Some of the women interviewed were just entering their second trimester and reported feeling 'better'. Some women were planning on engaging in more physical activity during their second trimester once they experienced an increase in their energy levels.

*"I'm already starting to feel a little better as I'm coming into my second trimester now. So I am a lot more positive about using this second trimester to like do as much as I can, because I think as soon as I hit the third, I'm going to start losing energy"* (Ava, 29, healthy weight, second child)

### **5.5.2 Reacting to symptoms: "I feel like I'm eating to get by"**

In addition to the cues described above, women also experienced 'symptoms' of pregnancy. These symptoms were generally unpleasant and associated with feeling 'poorly' or 'hungover'. Different to the cues discussed above, women did not attempt to interpret and understand them, but reacted to them in an attempt to manage or prevent them for their own well-being during pregnancy; they were not necessarily perceived as being linked to the health of the unborn baby. There was variation to the extent of the symptoms experienced and their impact. Physical activity and dietary health behaviours impacted on symptoms and were often used to manage these symptoms.

*“You can actually make yourself really uncomfortable with food, or you can make things better with food.”* (Zoe, 33, overweight, first child)

Sickness was one of the main symptoms discussed by the women, with all of the women experiencing some nausea at some point. Feeling nauseous in early pregnancy was accepted as a part of pregnancy. Regardless of whether women were physically sick or only felt nauseous; it became a priority for women to manage. The nausea experienced by women was often associated with a “hungry sick feeling”. Consuming food was reported to suppress it, and women often used food as a tool to manage nausea.

*“I’ve been waking up and feeling sick, so I’ve needed to have something. I’d even be late for work. I’ve literally been late for work because I’ve thought I’m not going to work driving feeling like this. If I’ve not factored it into my time to have a quick slice of toast I’ll put in my time and I’ll be a few minutes late.”* (Charlotte, 35, obese (Class I), third child)

Women reacted immediately to the onset of nausea. For most women the nutritional content of the food consumed was not important; as long as they were eating, the nausea was reduced. This meant women consumed foods which were convenient in that moment. Furthermore, managing nausea by consuming food overrode the women’s desire to be healthy for the sake of the unborn baby, in contrast to their views discussed in Theme 1.

*“Earlier this morning I did feel a bit sick, and I just went in my desk and, well it was actually a bag of sweets I went for, so that wasn’t very good was it. But it was the only thing I had in my desk and I thought do you know what it’ll do.”* (Violet, 28, overweight, first child)

*“You’d do anything to stop feeling sick and you’ll go and eat stuff to stop it from feeling sickly, even if you’ve got to eat bad stuff to make it go away, you will do.”* (Mia, 29, obese (Class II), second child)

Consuming big meals was often thought to initiate nausea. Changing their frequency of eating food to “little and often” was reported as one of the most effective ways of preventing and managing sickness by the women.

*“Just to try and subside the sickie feeling. So I’d just try and have obviously smaller amounts a bit more often just to try and make sure I feel okay throughout the whole day. Rather than having three big meals kind of thing.”* (Florence, 24, obese (Class I), second child)

*“I will probably still keep eating little and often probably for the fear that if I get over full then I end up being sick, I don’t want to be sick anymore. So,*

*I'm just trying to be cautious of how much I eat at once to stop myself being sick a little bit.*" (Freya, 34, healthy weight, second child)

Strong smells of cooking also often initiated nausea, which led to food aversions for some women. Women subsequently attempted to avoid strong smelling foods and limited the cooking of foods. This drove them to consume more ready-to-eat convenience foods, and enlist the help of their partner to cook. Most of these women were previously the 'cook of the house' and had been in control of meal times and the foods cooked. Their partner cooking meals meant that women had less control over what and when they ate, which subsequently led to women consuming different foods and at different times.

*"It's because of the smells of certain foods. I literally just go for cold food because you can't smell it. I think that's why I eat the sausage rolls. Yeah, literally just colder foods that you can't smell because when you cook something it has a stronger smell. Doesn't it? So I just go for simple foods, so I can't smell it and then it doesn't put me off. Then I can still eat something."* (Poppy, 30, healthy weight, fourth child)

*"My husband's had to do a bit more. I've not been able to cook some meals, just because of the smells and stuff. It's funny, [...] I've just not been able to bring myself round to making it, just because the smells and stuff just makes me feel funny. So it has affected what I've been eating or the times that we've been eating, because my husband's been putting tea on when he's got in."* (Charlotte, 35, obese (Class I), third child)

Consuming foods primarily to manage sickness meant that the women felt their dietary choices were restricted and 'different to normal' at this timepoint of pregnancy. Women classed the foods that they were consuming to manage their nausea, as mainly 'unhealthy junk foods'. They perceived these foods as having a detrimental impact on their energy levels and felt like they were in a 'lose lose' situation.

*"The worse food I'm going to eat, it's going to make me more tired and I won't be able to do as much, which it does actually. The more rubbish you eat, the more rubbish you feel."* (Louise, 24, healthy weight, first child)

However, there was an expectation that these symptoms would decrease during pregnancy, specifically in the second trimester. For some women, the expectation of a less restricted diet meant a perceived opportunity for change to their dietary health behaviours. Women anticipated that they would be capable of engaging in the dietary health behaviours they wanted to, as discussed in Theme 1. Women drew on this to accept managing the short-term symptoms, and developing intentions for engaging in the 'healthy' dietary behaviours later in the pregnancy.

*“I know from experience that second trimester tends to be better because you have your energy back, the phase of the morning sickness has gone, so, I’m expecting my diet to be top notch.”* (Isla, 30, healthy weight, second child)

*“Once I start to feel better, then I’ll start to eat a little bit more healthier, because I know I’m doing it for me and I’m doing it for baby, whereas at the moment, I feel like I’m eating to get by, if that makes sense”* (Mia, 29, obese (Class II), second child)

For some women, engaging in physical activity helped to alleviate symptoms such as sickness and tiredness as it served as a distraction. Others thought that engaging in physical activity could heighten these unpleasant symptoms, and subsequently stopped engaging, or did not consider engaging.

*“I think it’s really helped with feeling, getting rid of the morning sickness and things like that see when I’ve been feeling sick I’ve just tried do something and it seems to alleviate it”* (Alice, 29, healthy weight, first child)

*“It’s tiring being pregnant, so I just don’t need to make myself more tired than I already am. So yeah, I’m not too bothered about going [to the gym] anymore at the minute.”* (Louise, 24, healthy weight, first child)

## **5.6 Theme Three: After I have the baby...**

This theme had two sub-themes: a. Postnatal body expectations; b. Impact of pregnancy weight gain. Although this timepoint is early in pregnancy, women were mindful of how their body may be different after the birth of their baby. There was an underlying assumption that they would lose ‘baby weight’ immediately after the birth, but that some residual weight would remain. This meant that for women to return to their pre-pregnancy body weight, they would need to engage in WRHBs to lose the residual weight after the birth. The amount of weight they would need to lose to return to their pre-pregnancy body was thought to be influenced by how much weight they gained during pregnancy. They thought their capability of engaging in WRHBs after the pregnancy would rely heavily on the birth and their recovery.

### **5.6.1 Postnatal body expectations: “You don’t look the same anymore ”**

Whilst at this point of the pregnancy the women thought the birth was ‘far away’, they discussed their expectations towards their body after the birth of the baby. The women expected that their body would be different after the birth of the baby, and that they would want to return to their body pre-pregnancy. There was a belief

that 'baby weight', would be lost immediately after the birth; but that some weight would remain. The women had the desire to return to their pre-pregnancy body and believed they would need to engage in WRHBs in order to lose the remaining pregnancy weight and return to their pre-pregnancy body.

*"I'm expecting to be bigger than I was before I found out I was pregnant. I don't know how much but I know there'll be some so it's just, I'd like to get back to where I was before I was pregnant, if it will be possible which I'm sure it would be. I don't see what not but yeah, that's what I'd aim to do, get back to where I was."* (Louise, 24, healthy weight, first child)

*"When you have the baby you immediately lose half a stone, because that's how much babies weight on average, right, seven pounds. Then, you've got a stone and a half, I guess, maybe another half a stone of that might be water, and all sorts of other stuff which you might drop off quite quickly. But, there will still be residual weight where my body had held onto fat to support the baby, that I will need to lose. And, I'd love to lose it all, but it's probably not realistic that I would quickly."* (Milly, 26, healthy weight, first child)

Whilst the women thought the 'baby weight' would be lost immediately after the birth, they thought that to lose the remaining weight would take longer. On the whole, the women refuted the idea that postnatal weight loss would happen quickly. They often referred to celebrity postnatal weight loss displayed on social media, expressing disbelief towards 'quick fix' postnatal weight loss. However, the media presence seemed to reinforce the women's intentions of 'snapping back' to their body pre-pregnancy.

*"I know like the celebrities seem to do it like, instantly, and I know it won't be that quick, but hopefully with exercise and running round after a new baby, and eating healthily and everything."* (Violet, 28, overweight, first child)

*"In the age of Instagram and all the things, you sort of get to see a lot of people that have had babies, so you see pictures of pregnancy at term, and then you see three weeks post-partum, and they have flat stomachs, and they look good and everything like that. So, of course, that's the snap back. You sort of hear all the propaganda about it, and yeah, you want to be fit, you want to lose weight after you've had your baby, you want to have a flat stomach hopefully, like you had a flat stomach before you got pregnant, but yeah, you can hope, you can dream."* (Zoe, 33, overweight, first child)

Women discussed uncertainty and lack of control around the birth of their baby and their body's recovery following the birth. They were therefore mindful towards their body's recovery from the birth, and how this could impact on their ability to engage in physical activity. Most women discussed how they would wait until after they had been 'signed off' at their six week check, before considering engaging in physical activity.

*"Nobody knows what's going to happen during labour, nobody's going to know if it's going to be caesarean or whatever, and obviously you've got to go by the rules, and follow what advice you're being given by the midwife nursing staff and all that kind of thing. So, I do obviously wait six weeks and, if not longer, and just see really how things align." (Ella, 39, healthy weight, second child)*

*"So afterwards...I mean, I still don't know if, how your labour's going to be, do you? So, I don't know when I'll be able to go back and what I'll be able to do but hopefully I'll go back and do little bits and build myself up again. That's what I intend to do but we will see" (Louise, 24, healthy weight, first child)*

Some women also discussed how their body may be fundamentally different after carrying a baby for nine months. Some of which was beyond their control to change with WRHBs.

*"It's one of the down sides of having children I suppose, that you put weight on and don't look the same anymore" (Alice, 29, healthy weight, first child)*

*"I've got a perception that my body shape might change, that maybe my lower tummy will struggle to lose fat after I've had the baby, it will be more of a stubborn area to lose from. Especially if you stretch it, you can get stretch marks and things and have excess skin, I know that that, obviously, is going to be more difficult to control" (Milly, 26, healthy weight, first child)*

### **5.6.2 Anticipations for weight loss: *"I want to obviously lose weight after I've had the baby"***

The women anticipated that they would be required to engage in WRHBs after the pregnancy in order to lose the weight retained after pregnancy. Postnatal weight loss was considered an opportunity to engage in WRHBs such as more intense physical activity and restrictive dietary intake, which were not considered appropriate during pregnancy. This was mostly relevant to the women who were already engaging in those WRHBs prior to pregnancy and would be returning to them; rather than women seeing it as an opportunity for change.

*“Once I’ve had the baby I can go back to being stricter with myself and having more of a high protein diet.” (Milly, 26, healthy weight, first child)*

*“Then once I’m okay and I’m fine and everything’s okay and I’m back into a bit more of a routine, and it’s safe for me to do more, then I will probably push myself that little bit more.” (Ella, 39, healthy weight, second child)*

Engaging in WRHBs to achieve weight loss, was perceived as being linked to supporting the women’s health and their responsibilities as a new mother. When discussing weight loss, women wanted to make clear that this was not solely for appearance purposes, but to benefit their health and as part of their role as a mother.

*“It’s not just about looks, it’s about your health as well, and managing your weight as best as you can in terms of exercise and diet, is going to have positive implications to your health, as well as your body and the way that you look.” (Ava, 29, healthy weight, second child)*

*“I want to obviously lose weight after I’ve had the baby and be as fit as I can possibly be [...] I just want to be healthy, like have energy to do stuff, and I don’t want to be out of breath, when I’m chasing my child around, be able to run around, I want to be able to keep up.” (Zoe, 33, overweight, first child)*

Women who had had routinely engaged in physical activity prior to pregnancy discussed how their physical activity routines may be different after the birth of the baby. They anticipated that it would be harder to engage regularly in physical activity after the baby’s birth due to various new barriers. They discussed these perceived barriers and how they could overcome them to support their continued engagement in physical activity.

*“I know I’m going to have pram time to spend exercising and doing everything I want to do. I just won’t be able to go to the gym whenever I want, so my expectation is that it would be more difficult”. (Alice, 29, healthy weight, first child)*

*“I suppose it’ll just be getting the arrangements in place to allow me to do that. I totally intend to just get a sling and then go on walks and things like that and just try and, probably just be a different type of exercise perhaps that I’m doing more rather than just being able to nip off to the gym whenever I like, you know. It’s things like that will just take a bit of adjustment. I’ll be setting things up at home and in the garage, with some machines, and things like that so I’ll just be able to nip on. So yes, it will*

*be important for me to just get back in shape pretty quickly afterwards. That's the plan."* (Lily, 40, healthy weight, first child)

Women thought that the amount of weight they gained during their pregnancy would have an impact on how much excess weight they would have to lose after the birth of the baby. The perceived need for engaging in weight loss after the pregnancy sometimes meant women were particularly mindful towards weight gain during pregnancy. They subsequently discussed how they would like to keep weight gain to a 'minimum' during pregnancy, so they would have 'less to lose' after the pregnancy.

*"I would like to kind of just keep it fairly simple in terms of my weight, because I know, if I pile on the weight now during the pregnancy I will have to kind of shed it off when the baby comes. So the less weight I have, the less work I have to do in terms of postnatal work outs and things like that"* (Isla, 30, healthy weight, second child)

*"In an ideal world I'd weigh 63kg plus two and a half, possibly a bit more or less, for placentas and water retention. But, for it not to be much more, much bigger than that. Just because, I don't know how I'd lose it to be honest because, I don't like exercise that much."* (Freya, 34, healthy weight, second child)

## **5.7 Theme Four: "I'm the kind of person who..."**

This theme included two sub-themes: a. Healthy self-identity; b. Relationship with weight. The women discussed their previous engagement in WRHBs prior to pregnancy, their previous experiences with weight gain and loss, how 'healthy' they perceived their lifestyle to be, and how important engaging in 'healthy' lifestyle was to them. This all formed part of the 'kind of person' they perceived themselves to be. This subsequently informed the WRHBs women engaged in and anticipated in engaging during pregnancy. There was diversity between the participants regarding how 'healthy' they perceived themselves to be and how important this was to them. Regardless of how 'healthy' they perceived their lifestyle to be, and how important engaging in 'healthy' lifestyle was to them, this still constituted the women's 'healthy self-identity'.

### **5.7.1 Healthy self-identity: "As a person, health's (not) important to me"**

The women frequently discussed their engagement in physical activity and dietary health behaviours prior to pregnancy and reflected on how 'healthy' they thought they were. This was often done as a precursor to discussing their



engagement in or expectations towards their engagement in physical activity and dietary health behaviours during pregnancy. When the women discussed their engagement in different WRHBs, they began to construct a self-identity of how 'healthy' they thought they were, and what this meant to them and their life.

*I would exercise, I'm vegetarian/vegan, so I try my hardest to eat quite a good diet [...] So I try my hardest to live a lifestyle that I feel is healthy. And as a result of that, I generally feel quite good within myself, I feel quite fit, I don't get ill very often, I don't really go to the doctors very often, don't have any, like, medical conditions and, for me, that feels like quite a healthy lifestyle" (Leigh, 31, healthy weight, first child)*

*"I've never gone to a gym. I think I've been once and it's not for me. Not for me at all. I don't do much exercise unless it's just running around with a football with the kids. That's about it. I'm a bit rubbish for exercise."* (Poppy, 30, healthy weight, fourth child)

When reflecting on how 'healthy' they thought their lifestyle was, some women indicated an internalised sense of a 'healthy self-identity'. It was evident that for these women, engaging in 'healthy' dietary and physical activity health behaviours was considered an important aspect of their life, and was an established part of 'who they were'.

*"I am a very active person anyway, I do lots of exercise. I eat really healthily, we do lots of walking we do lots of family outdoor things. And, I just feel it's really important for me, within my personal wellbeing."* (Ella, 39, healthy weight, second child)

*"I've always been very sort of health conscious"* (Alice, 29, healthy weight, first child)

Those who reported engaging in a 'healthy' lifestyle often discussed how they were supported by their partner and/or families in doing so, and discussed how their 'healthy lifestyle' was a joint venture.

*"We're quite an active family and we go out on a weekend. [...] We're very outdoors people. It's just the way that we are"* (Charlotte, 35, obese (Class I), third child)

*"I think, if you live with someone who is a couch potato then it's much harder to want to exercise yourself. I mean we like going and doing activities, we like walking together, and we like to go out on our bikes and we want to do all those things with our children too so, it's a lifestyle isn't it, more than anything."* (Alice, 29, healthy weight, first child)

In contrast, other women discussed how they were not particularly driven to engage in a healthy lifestyle. It was evident for these women that engaging in 'healthy' WRHBs was not particularly important to their lives. However, these women also constructed a 'healthy self-identity', as the fact that they were 'not into health' also formed an established part of 'who they were'.

*"I'm just not like a health person"* (Mia, 29, obese (Class II), second child)

*"I'm not really into sports or gym or exercise or anything like that [...] I'm not a naturally sort of like sporty person"* (Martha, 50, overweight, first child)

Women who considered their diet as 'not the healthiest', indicated pregnancy as an opportunity to make changes to their dietary intake to be 'healthier' during pregnancy; mainly through a more nutritionally varied diet. This was to ensure they were supporting the growth and development of the unborn baby, which relates to the dietary nutrition sub-theme discussed in Theme One.

*"I try and eat a bit more healthier when I'm pregnant"* (Willow, 39, obese (Class III), seventh child)

*"I mean I'm as guilty as anyone else for slobbering out in front of the tele with a pizza but now I'm kind of thinking well, no let's not do this and it's kind of been the kick I've needed to get me into trying to eat healthily"* (Violet, 28, overweight, first child)

Those who considered their diet as 'healthy' and 'balanced' prior to pregnancy did not consider it necessary to engage in 'healthier' dietary behaviours because they were pregnant. This was because their current diet was perceived sufficient to support the development of the unborn baby. These women therefore planned to maintain their dietary behaviours.

*"We do lots of fresh cooking and lots of...we don't eat, well hardly ever get any processed things and stuff. And, that's something that I've always done and that's something that will always carry on regardless of whether I'm pregnant or not."* (Ella, 39, healthy weight, second child)

Women often reflected on the origin of their views towards and engagement in 'healthy' health behaviours. For most women this related back to upbringing or family experiences and had influenced their engagement in WRHBs throughout their life. This indicates that this 'healthy self-identity' has been stable and long standing over time.

*"I suppose it's my outlook on life, is that, you look after your diet, you look after yourself and therefore you're, you're better in your day to day life really. I was brought up to eat proper meals, my mum's always cooked*

*even though she worked full time, she always, her or my dad would cook tea when we got home so, I guess it's your upbringing" (Alice, 29, healthy weight, first child)*

In addition to family experiences, family health history also contributed to the women's perceived 'healthy self-identity'. Some of the women were aware of health conditions linked to their ethnicity and/or other family history. As a result of this, these women considered themselves at higher risk of developing these health conditions and something they felt they could mitigate by engaging in healthy WRHBs.

*"In like my family I've got you know literally all of my dad's side has got diabetes, everybody, they've all got high blood pressure, like you know, and they're all massive eaters and I just think like I definitely don't want to go down that route. It's difficult for all of them like, my dad now has to be really careful with what he eats and you can see he really struggles because he really enjoys his food. And I just think well actually, if you just had a more balanced diet to begin with potentially you wouldn't even have been in this situation, so, I think all of those things make me think that I generally just want to be a healthier person" (Ava, 29, healthy weight, second child)*

*"My brother and my dad were both diagnosed with hypertension before they were 30. [...] My mum had hypertension in pregnancy with my youngest sisters [...] and then soon after, we found out that she was diabetic [...] It's not something that is a faraway concept, it's not something in a textbook, it's not something you see from far away, I've actually seen from when the diet is good, right there in my family, when the diet is good and when the diet is bad [...] But, if you already have a loaded gun, in a sense that you have a strong family history, don't pull the trigger, just give yourself the chance to not be poorly. Because, if you do nothing, you might be poorly, but if you do everything right, you reduce your chances, and you should be able to fight for that chance. So, don't make it worse." (Zoe, 33, overweight, first child)*

### **5.7.2 Relationship with weight: "*I've always (never) struggled with me weight*"**

Most of the women, regardless of their pregnancy start weight, discussed their weight prior to the pregnancy. There was an element of perceived stability to their weight, which was often attributed to innate traits and something the women did not necessarily think they could change.

*"I've always been a big, not a big big lass but, never been skinny and I don't think I ever will be skinny."* (Willow, 39, obese (Class III), seventh child)

*"I've just always been naturally slim because my dad's very slim and quite athletic build so I've always had that."* (Lily, 40, healthy weight, first child)

Some of the women had previous experience of engaging in weight loss. They often reflected on this when discussing their weight status and the impact it has had on their life prior to pregnancy. These experiences also contributed to the 'kind of person' the women perceived themselves as being, in relation to weight.

*"I just think in my life I have constantly been taunted about weight since being young, so it's always stuck with me about thinking about weight. Even before being pregnant."* (Florence, 24, obese (Class I), second child)

*"I'm one of those people who have gone through various cycles of being fit and unfit, so I sort of have something coming up, or maybe I've got a bit chubby, and then one of my patients mistakes me for being pregnant. And then I'm like, oh my God, I've really gained weight, and then I lose weight, and then after a while I'm like, okay, this diet is boring. And then I go back to eating my chocolates, five or six times a day, or things like that, and then I gain weight again"* (Zoe, 33, overweight, first child)

A lot of the women who had previously engaged in weight loss, utilised services such as Slimming World. For those who had engaged in Slimming World, it continued to inform their food choices throughout pregnancy, even though they may not have currently been following Slimming World.

*"Even though I'm not sticking to the Slimming World plan exactly, I'm still making sure I get my vegetables in with my meals. Making sure I substitute white bread for wholemeal, so I have all wholemeal things like that. If I have margarine on my toast, it'll be light. If I have cheese it'll be like 50 per cent less fat. If I do fancy crisps, I'll go for the low calorie options"* (Florence, 24, obese (Class I), second child)

*"I knew how to cook, but I didn't cook proper, like proper meals, whereas now I do. Like I'll be doing you know, spaghetti bolognese, I'll do cottage pie, and I'll do it from scratch, lasagne, I do it from scratch, I don't buy the Dolmio sauce, I do everything myself and I learned that through Slimming World."* (Mia, 29, obese (Class II), second child)

Those who had previously engaged in weight loss were particularly concerned towards the impact of gestational weight gain on their weight after the pregnancy, and if they would have the capacity to engage in weight loss after the birth.

However, those who reported being 'naturally slim' or not previously engaging in weight loss, were not particularly concerned about their weight and were accepting of weight gain during pregnancy.

*"Not being able to lose it easily again. I mean I've obviously had the operation, but, I'm at the point now where my weight is stable, so I don't lose weight easily, it's not like falling off anymore, it's just plateaued at that weight, and it's staying at that weight now. Whereas if I put on a big chunk of weight, I'm not sure if I've got the capacity to lose weight, because I never really had it much in the past"* (Martha, 50, overweight, first child)

*"I imagine there is going to be a weight gain, and I'm not bothered about the weight gain in the slightest, I know it's going to happen and I know why it's happening and things, so that's alright."* (Ella, 39, healthy weight, second child)

In addition to experiences around weight outside of pregnancy, previous experiences of postnatal weight loss were also drawn upon to inform views towards weight gain during this pregnancy. Those who had previous experiences of 'easy' or 'natural' postnatal weight loss were less concerned towards gestational weight gain during this pregnancy due to its temporary nature.

*"I always put loads of weight on. Huge amounts of weight, it's ridiculous. As soon as I have the baby I seem to just lose it, so I don't mind [...] It doesn't bother me that I put weight on.[...] I don't try and do anything to lose the weight. It's maybe how I am I suppose."* (Poppy, 30, healthy weight, fourth child)

More often than not, women in subsequent pregnancies discussed previous experiences of their 'struggle' to lose weight postnatally, and weight gain in between pregnancies. They were concerned about the impact of weight gain during this pregnancy on their weight status after the pregnancy and their capability of losing weight after the birth.

*"Because of what size I went to with [daughter], I don't want to go back to that because I think the numbers start to go up on the scales it is going to start to panic me a bit because it'll be like 'what number is it going to stop at?' Because obviously the more weight I put on the harder it's going to be to lose after I've had her, and I just don't want to be this big mum, I really really don't"* (Mia, 29, obese (Class II), second child)

*"So it were a case of 'yes I can eat I can do what I want, weight's not going to bother me', and then when you actually have the child you think 'oh my God look at how much weight I've actually put on', and, you think it's all*

*because you're pregnant, but it's not, it's because of what you've eaten not because you've had the baby"* (Willow, 39, obese (Class III), seventh child)

Women who were already mothers discussed how, in their first pregnancy, they were less concerned about gestational weight gain, and more focussed on postnatal weight loss; and had previously 'underestimated' the difficulty of postnatal weight loss. They felt they held more realistic expectations during this pregnancy towards how 'difficult' postnatal weight loss would be and were subsequently more mindful towards gestational weight gain during this pregnancy.

*"In my first pregnancy, yeah, I just didn't know what to expect. I'd never been pregnant before, so I thought it was okay to have a treat. And as everybody says, it's your excuse to eat what you want, but really it's not. And then obviously I ended up putting on quite a bit of weight and it made me feel not great afterwards. So obviously I don't want that this time. I'm very conscious of it, to try and monitor it, especially now I know what to expect this time."* (Florence, 24, obese (Class I), second child)

*"Now I know what to expect this time and what to do this time because I really don't want to go to what I was at before, it's such an effort to lose all that weight,"* (Mia, 29, obese (Class II), second child)

## **5.8 Summary of findings at Timepoint One**

Women's experiences of WRHBs across pregnancy indicated that they were motivated to engage in WRHBs which were perceived to positively impact the growth and development of the unborn baby, and avoid behaviour which are thought to have the potential to cause harm to the unborn baby. The ways in which dietary and physical activity behaviours were believed to impact on the unborn baby were different; with dietary behaviours such as the consumption of healthy foods believed to be essential for the unborn baby's development, but physical activity, in particular 'vigorous' physical activity having the potential to cause harm.

Although women associated GWG to be associated with WRHBs, they did not engage in them with that purpose. Managing their GWG through WRHBs was not considered as being related to 'health', and more for aesthetic purposes. Additionally, engaging in WRHBs to manage weight gain during pregnancy were believed by women to have the potential of causing harm to the unborn baby by limiting the development, through dietary deprivation. Weight management and

loss were only discussed for after the pregnancy. With women being mindful of weight gain during pregnancy, but not actively managing it.

Although women were motivated at this timepoint, their experiences of pregnancy symptoms and changing bodily cues also drove their engagement in WRHBs, which often contradicted their motivations to engage in 'healthy' WRHBs. This resulted in cognitive dissonance in the women, who attributed attention to evaluate which WRHBs to engage in. Engaging in WRHBs driven by bodily cues, by being intuitive and receptive to their body took precedence over typically 'healthy' WRHBs as cues were linked directly to the unborn baby and managing symptoms had an immediate impact on the women's well-being. Women anticipated these symptoms and cues would change and reduce as the pregnancy progressed, which they would adapt to.

Women often discussed their 'lifestyle' prior to pregnancy and other factors which formed part of 'who they were'. This 'healthy self-identity' informed their beliefs towards WRHBs and the relevance of them to their pregnancy. Additionally previous experiences of weight management and loss, particularly after pregnancy influenced how they felt towards GWG and weight loss after the pregnancy.

## **5.9 Chapter Summary**

This chapter has presented in detail, the women's experiences of WRHBs at TP1: approximately 10 – 16 weeks pregnant. This has provided insight into the importance of the context of pregnancy; women's engagement in WRHBs at the beginning of pregnancy and their expectations towards their engagement in WRHBs for the remainder of their pregnancy. The next chapter will present the findings from TP2: 28 – 32 weeks pregnant. It will build on the findings presented in this chapter to longitudinally explore and understand the women's experiences across their pregnancy and how the experiences at this timepoint develop through to later pregnancy.

## **Chapter 6 Findings: Timepoint Two**

### **6.1 Introduction**

This is the second of two chapters which will present the findings of the framework analysis. This chapter will build on the findings from Timepoint One (TP1), when the women were approximately 10 – 16 weeks pregnant (Chapter 5 Findings: Timepoint One), by presenting the findings from Timepoint Two (TP2), approximately 28 – 32 weeks pregnant. The interviews for this timepoint sought to gain an understanding of women's experiences of weight-related health behaviours (WRHBs) since their first interview, their current experiences, and their expectations for the remainder of their pregnancy and beyond. This meant the interviews revisited areas of discussion from TP1. Together, this and the previous chapter provide an in-depth understanding of the women's WRHBs, over the course of their pregnancy. Following this chapter will be a third findings chapter (Chapter 7 Findings: Weight-related health behaviours and psychological theory), which will present the individual WRHBs and their determinants, which were inductively identified from the thematic framework. Chapter 7 will provide insight into how the women's experiences presented in Chapter 5 and 6 are explained by theory.

This chapter will next identify any changes to the participants since TP1, and present the thematic findings in a similar structure to TP1: in themes and sub-themes with illustrative quotes. After the themes have been presented for this timepoint, the narratives for each timepoint will be presented. They will then be juxtaposed, utilising a temporal lens to look forwards and backwards across pregnancy and comparisons drawn across time.

#### **6.1.1 Changes to participants**

Seventeen out of the 18 participants interviewed at TP1 were interviewed at this timepoint. One woman experienced a miscarriage and therefore did not continue in the study. Of the 17 remaining women in the study, there were no complications reported, one had developed gestational diabetes which was diagnosed between TP1 and TP2.

### **6.2 Structure of findings**

The same four themes which provide the thematic framework were evident at both TP1 and TP2 (as outlined in Chapter 5), however, the narratives accompanying the themes at each timepoint were different. The narrative at this timepoint centred around 'Passivity', in contrast to the narrative at TP1 which was



'Disruption and Adaption'. See Figure 5.1 (Chapter 5) for a diagram of the four themes and narratives for both timepoints. This chapter will next present the findings from TP2 in the same structure to TP1. Finally, the narratives for both timepoints will be discussed and juxtaposed at the end of this chapter to summarise the findings of TP1 and TP2 across the pregnancy.

### **6.3 Theme One: What is healthy for us?**

This theme included three sub-themes: a. Dietary nutrition; b. Appropriateness of exercise; c. Weight gain status. At TP2, this theme had become less prominent and ceased to be the main driver for the women's engagement with WRHBs. Women continued to believe their engagement in physical activity and dietary health behaviours had the potential to impact on their unborn baby. However, their views towards 'what is healthy for us' had shifted and included different considerations at this point in pregnancy. Their motivations and intentions towards engaging in WRHBs also changed. Women had now seen visual indicators of the unborn baby's development during the pregnancy, such as during scans and fundal measurements, which gave reassurance that their unborn baby was growing and developing sufficiently. This decreased anxiety and uncertainty around the unborn baby's growth, which led women to believe that their current engagement in WRHBs was sufficient in supporting the unborn baby. This meant women were accepting of the WRHBs they were engaging in at this timepoint and since TP1, and did not indicate any intentions to change their current WRHBs to be 'healthier'.

#### **6.3.1 Dietary nutrition: "Baby's gaining weight, I must be doing something right"**

At TP2, the women continued to believe there was a direct link between their dietary consumption and their unborn baby. This continued to inform the avoidance of foods which were perceived as having an immediate risk to the unborn baby or viability of the pregnancy. Avoiding foods which were considered as posing an immediate threat to the unborn baby was strictly adhered to throughout the pregnancy. Women often held views towards what were and were not 'safe' foods, and were cautious to avoid any foods they believed to be associated with any sort of immediate risk to the unborn baby.

*"I've literally cut out pâté and offal because they've got vitamin A in, which is bad, can be damaging for the foetus, particularly in early pregnancy. So I took that as a like 'don't do that'. And like soft cheese as well like brie because that's got a high moisture content and I forget the reason why the*

*high moisture content is bad, but it's got something in which can literally harm the baby.” (Milly, 26, healthy weight, first child)*

*“So like tuna, you're only allowed two tins a week, and prawns you can't have, well you've got to be careful with prawns, you can't have pâté, you can't have certain fish. So, I wouldn't risk his life, I stay away from stuff like that.” (Mia, 29, obese (Class II), second child)*

Although the women continued to believe their dietary intake could directly impact on the unborn baby, the benefits of consuming a 'healthy' diet on the unborn baby at this stage were seldom discussed; particularly compared to its dominance at TP1. However when they were, there was a clear shift from the impact on the unborn baby's fundamental development, to their onward growth and readiness for after the birth, such as taste preferences.

*“Everything I eat the baby's going to get, so I want to try and get him used to different tastes of food and all of those kind of things, because they develop their taste buds, so I want to try and start that off on a good footing and trying to be healthy while he's inside me and then establish that again through feeding after he's born.” (Ella, 39, healthy weight, second child)*

At this timepoint there was limited reference to the intentions women had formed at TP1 around engaging in 'healthy' dietary health behaviours and whether the women had attempted to engage in them. Since TP1, the women had developed a 'bump', which was perceived by the women as an indicator of the unborn baby's growth. Holding the belief that their unborn baby was growing and developing sufficiently, regardless of what dietary health behaviours they were engaging in and had engaged in since TP1, meant they considered them sufficient in supporting the growth of the unborn baby. This led to an acceptance around the WRHBs they had engaged in since early pregnancy, and, for the women who discussed not engaging in 'healthy' dietary behaviours since TP1, reduced the importance of consuming a 'healthy' diet for the remainder of the pregnancy.

*“The baby's above average [...] So, I'm quite proud that he's still gaining the weight. Obviously I must be doing something right, even though I just eat rubbish. I don't think I've ate a veg since I've been pregnant [...] He's still getting obviously, all his goodness, 'cause he's gaining the weight that he should really.” (Poppy, 30, healthy weight, fourth child)*

Knowing that their unborn baby was growing and developing sufficiently meant that there was less importance placed on consuming 'healthy' foods, which women perceived at TP1 as being essential for supporting the development of the unborn baby. Similar to TP1, women avoided foods which were associated with an element of immediate risk to the unborn baby. However, at TP2, avoiding

foods which were associated with risk was more dominant than engaging in foods which were 'healthy', or avoiding 'unhealthy' foods that presented no immediate element of risk.

*"As long as I don't eat what you're not supposed to eat then it's never really bothered me. I've got a fear of liver. I think that's because I had a miscarriage and I, I wasn't eating liver at the time but I was eating like a liver gravy. Other than that it's never, I've never been bothered about what I actually eat."* (Willow, 39, obese (Class III), seventh child)

Very few women reported introducing dietary changes since the previous interview. Of those who did make changes to their diet, this was mainly achieved by substituting 'unhealthier' foods for 'healthier' foods, to increase the nutritional quality of their diet.

*"I've tried to make sure any snacks are healthy. Instead of like having a biscuit, we've been buying protein bars because obviously that's good for baby's development so, give it some protein so it can do whatever it needs to do [...] So they're still like a sweet treat, but obviously they're better health wise than a biscuit or a bag of crisps or something like that"* (Violet, 28, overweight, first child)

The most considerable reported dietary change was for Charlotte, who developed gestational diabetes between the first and second interview. Changes to Charlotte's diet were specifically around reducing her sugar and carbohydrate intake. These changes were primarily informed by information from a dietician; and driven by the link between diet, gestational diabetes and the potential for poorer outcomes for her and her unborn baby.

*"I've been told how important it is to keep these blood sugars down because they've told me all sorts about premature labour and stillbirths and it's frightening. It is the placenta. It's not harming me, the blood sugars, it's going through to the baby so I wouldn't have it [biscuits] anyway."* (Charlotte, 35, obese (Class I), third child)

There was a belief that whilst the unborn baby's fundamental development was advanced at this point of the pregnancy, the unborn baby now had an increased 'growth rate'. For some women they thought this required an increase to their calorie consumption, and subsequently increased their calorie intake. For others, they thought their dietary intake was already sufficient and did not intentionally increase their calorie consumption.

*“You know that you need the extra amount. [...] I know that you need a little bit extra in the third trimester because the baby’s prioritising itself for his weight gain and things like that.”* (Zoe, 33, overweight, first child)

*“I don’t do anything different, ‘cause I think what I eat is more than enough anyway. I just know that, around this stage, they say you need about 200 calories more a day, but to be honest, I think what I eat is enough anyway, so as far as that’s concerned.”* (Mia, 29, obese (Class II), second child)

Although the women were not as concerned towards consuming a ‘nutritionally rich’ diet compared to TP1, those who reported taking pregnancy vitamin supplements at TP1 continued to take them at this timepoint. Supplements were perceived as something which helped to ensure they met the nutritional needs of the unborn baby and their own nutritional needs to support the pregnancy and required minimal effort. These women intended to continue taking supplements throughout the pregnancy.

*“I just always stuck to Pregnacare throughout my pregnancies and just took them every night. I get the pregnancy ones and take them every single day [...] if it benefits baby and me how I’m feeling during pregnancy, it’s a no brainer really.”* (Florence, 24, obese (Class I), second child)

### **6.3.2 Appropriateness of exercise: “I don’t want to end up a complete couch potato”**

Similar to TP1, women perceived engaging in ‘physical activity’ or ‘exercise’ as anything which required an increased level of exertion to their usual levels. Beliefs held by the women towards physical activity involving an element of risk towards the unborn baby, remained similar across the timepoints. Women continued to perceive the element of risk towards engaging in physical activity as associated with over exertion.

*“You have got to be a bit more careful because if you over exert yourself, there is a risk of miscarriage, so obviously you wouldn’t want to do anything to jeopardise your health or the baby’s health.”* (Alice, 29, healthy weight, first child)

*“It’s quite dangerous for the baby if you overheat quite regularly.”* (Lily, 40, healthy weight, first child)

Views towards the benefits of being physically active at this point in pregnancy had shifted. They were now mainly orientated around its impact on the birth and the women’s recovery after the birth.

*“It's just like keeping fit or preparing yourself even for labour, I feel like that's something that you want to get your body ready for.” (Ava, 29, healthy weight, second child)*

*“Things like your cardiovascular fitness, I know the midwife spoke to me about it helping with labour and it helping with recovery after labour, after birth. So I wanted to do it for those reasons.” (Leigh, 31, healthy weight, first child)*

The women who were engaged in vigorous physical activity prior to pregnancy and had remained engaged at TP1 mainly continued their engagement up to this point in the pregnancy. They had adapted their engagement by reducing the intensity and/or frequency so it was more pregnancy appropriate; with the focus still being on ‘maintenance’ rather than ‘improvement’ in an attempt to avoid over exertion.

*“I carried on, even though I felt rough at times, I carried on doing that, and I've kept that up pretty much. I usually do four times a week, about 20 minutes to half an hour on my lunch break. Yeah. And I just kept doing it. I don't overdo it. I don't...I try and keep it slow, so if I'm doing cardiac exercise, I'd still be able to talk and...if I've got a bit of a sweat up and I'm not like trying to get round to my cardio red zone or anything like that. And then, weight, I do lift some resistance from weight training, and I scaled back on that, so rather than trying to lift heavier weights I would just do ones that...I could do more repetitions for a lighter weight. It's just trying to be sensible really. But also keep going [...] Now I'm 31 weeks on Sunday and I've still been to the gym today, so I'm still doing it.” (Alice, 29, healthy weight, first child)*

Some of the women who had remained engaged in vigorous physical activity experienced unsolicited comments from others about the appropriateness of their engagement. Women received these comments from family, friends and strangers. The women were aware of stigma surrounding physical activity and pregnancy, and that others were likely to hold beliefs different to their own towards the appropriateness of being physically active during pregnancy. They perceived the comments they received as being based on others' beliefs towards the appropriateness of physical activity in pregnancy. Experiencing these comments from others resulted in negative emotions in the women, but they were also confident in responding to comments and defended their decision of engaging in physical activity.

*“I've had a few funny reactions when I've said to people that I'm still getting out on my bike and people have been like ‘ooh, really? Be careful’, you*

*know, so I don't know if there's this sort of stigma around if you're pregnant you just have to sit down and do nothing."* (Lily, 40, healthy weight, first child)

Although these women felt knowledgeable enough to make the decision to engage in physical activity and defend their actions when questioned by others; receiving comments from others led them to question their engagement. So much so, that one woman considered ceasing their engagement in physical activity when reflecting on the experience of receiving comments from others.

*"I went to the gym, this was a few weeks ago when I was not as big as I am now, and I was on the cross trainer. And there was a woman on the running machine just down from me, and she said, 'excuse me, have you taken medical advice to be doing that?' And so I looked around and I said, 'yes', and I just carried on and didn't engage with her. And then she's still talking to me, 'well, when I was pregnant, they said I couldn't do that'. And I'm like, 'well that's not the advice I've had. I've been told as long as it's something I normally do I'm alright to keep doing it, and it's not unsafe, so I'm carrying it on'. She's like, 'oh well, it is a long time since I've had children. I'll mind my own business then'. And I just said nothing. I just carried on, and I thought, yeah, you do that. [...] I was looking in the mirror, and I was thinking, should I be stopping now?"* (Alice, 29, healthy weight, first child)

At TP1, some women intended to engage in more physical activity later on in their pregnancy, such as 'walking more' or activities in 'the gym'. At TP2, these women usually had not engaged in the intended physical activities. They briefly discussed the barriers to engagement, which were mainly orientated around a lack of motivation. A couple of women referred to their earlier views and intentions towards engaging in physical activity later in their pregnancy as being "overly optimistic" (Ava) and "ambitious" (Milly). The women were accepting of their limited engagement in physical activity at this stage, and did not indicate any intentions to increase their engagement for the remainder of the pregnancy. Instead, they indicated they would 'wait until after the pregnancy' to engage in more physical activity.

*"Me and my husband had joined a gym and we still pay us membership, I thought there would be a possibility of us going on a night, even if it were just a fast paced walk on the treadmill. You know just doing some moderate exercise, I thought that would be fine but, no, just seem to be I don't know, not motivated myself really."* (Charlotte, 35, obese (Class I), third child)

*“Not exercising. Well I don’t really do owt anymore, other than walk around work all day, that’s it. But as soon as I found out I were pregnant I were really tired all the time so I just stopped going to the gym, stopped doing all sorts really [...] I did want to, but then I just thought, you get limited don’t you to what you can do [...] I just thought ‘I can’t be bothered today I’ll go tomorrow’, and then tomorrow’s like ‘I can’t be bothered’, so I thought I’ll just leave it til after.”* (Louise, 24, healthy weight, first child)

Whilst women were accepting towards their limited engagement in physical activity and not increasing their engagement, they did want to avoid being sedentary and being considered a “couch potato”. Being sedentary was perceived in a negative way by the women and associated with laziness. Different to engaging in physical activity, which was considered to require engaging in activities which increased levels of exertion beyond their usual remit during everyday activities, women considered the avoidance of being sedentary as engaging in everyday activities such as walking, household chores or activities with other children.

*“I don’t want to be sat down the whole time just watching TV.”* (Martha, 50, overweight, first child)

*“I will try and take, even if it’s like taking [son] for a walk around, I’ll do that. We’ll probably walk quite a bit on the weekend. And when I say quite a bit, like, you know, even if it’s just going to the park or whatever”* (Ava, 29, healthy weight, second child)

### **6.3.3 Weight gain status: “I’ve definitely got a lot bigger”**

The women discussed their weight gain at this point of their pregnancy in differing ways. A few women had numerically measured their weight and knew a quantity of their weight gain. Some of these women discussed how *“the numbers keep getting bigger on the scales”* (Louise), without discussing a specific amount of weight gain. Knowledge of current weight gain was used to predict how much more weight they expected to gain during the remainder of their pregnancy. Some of these women had discussed their weight gain with friends and family, and drew comparison to others’ weight gain. Those who were in subsequent pregnancies compared their weight gain from previous pregnancies to gauge the acceptability.

*“I weighed myself yesterday at my friend’s house and I was like 72 kg which is, only about, I think when I gave birth to [first child] I was probably about, got up to like 73 74 [kg], and I’m thinking I’ve still got quite a way to go so like how have I put on so much weight? [...] We were just discussing*

*that and she just weighed herself and I weighed myself with her just comparing notes” (Olivia, 26, healthy weight, third child)*

For some women who had previously engaged in weight loss prior to pregnancy, numerical weighing during pregnancy was considered negatively as something which could increase anxiety. For these women, pregnancy was considered as a time in their life where they did not want to focus on their weight. This was related to the fact women did not think it was appropriate for them to manage their weight; therefore they did not want to monitor it.

*“I haven’t been weighing myself because to be honest, because of the weight loss previously I had been a little bit obsessed with weight, and I thought it wasn’t healthy in a way to be so obsessed when I was expecting, because I didn’t want to diet as such.” (Martha, 50, overweight, first child)*

Women mostly assessed and discussed changes to their weight based on visual bodily changes and a sense of feeling ‘bigger’; rather than numerically monitoring their weight gain. Most of the women were particularly opposed to monitoring their weight gain through weighings, with weight gain and other changes to their body largely accepted at this stage of pregnancy. The type and acceptability of the weight gain was scrutinised less so than at TP1, with women generally accepting weight gain as an inevitable part of pregnancy and something they would not attempt to manage for the remainder of the pregnancy.

*“In the way of weighing more I’m not sure because I’ve not been on the scales so I don’t know what I am. Obviously I feel bigger, I look bigger and I’m sure there is some weight gain there.” (Ella, 39, healthy weight, second child)*

*“Yes, I’ve definitely put on weight. But I wouldn’t be able to tell you how heavy I was then and how I am now, because I haven’t weighed myself and I haven’t been weighed by anybody. And I’ve not really wanted to be weighed, I’ve just not thought about it. But obviously, if I look at myself in the mirror, like in terms of not just the bump but everywhere else, I have definitely put on some weight” (Ava, 29, healthy weight, second child)*

Some women, however, did acknowledge the location of the weight gain when discussing how they felt towards it. They used visual cues to assess the location of the weight gain and its acceptability. Weight gain attributed to pregnancy specific areas of the body such as the ‘bump’ and ‘boobs’ were considered more acceptable than areas such as arms and legs, which were not considered to be associated with being pregnant. Weight gain perceived to be only on the bump or related to pregnancy was deemed acceptable ‘pregnancy weight gain’, similar to TP1. Women who perceived their weight gain to be primarily attributed to their



'bump' and other pregnancy specific areas of their body were particularly positive towards their weight gain.

*"I seem to sort of carry, carry a lot of the weight in my tummy and my busts so it doesn't feel like I'm just gaining weight everywhere as it were, I can still wear my trousers, my pre pregnancy trousers providing I don't close the zipper. Some of my tops I can still wear but they are just really tight around the bust and then it stops halfway up my stomach. So I know that as it were, I've not really gained weight elsewhere, it's more been pregnancy weight gain."* (Zoe, 33, overweight, first child)

*"I have felt pretty good when I've gone into work because I work a lot at home, and people have said to me 'oooh you've got more of a bump with this pregnancy', you know, 'you look more baby', I think I must have put weight on in other places before. So I do feel good about that."* (Charlotte, 35, obese (Class I), third child)

The development of their 'bump' was seen positively, particularly compared to the lack of a noticeable bump as discussed at TP1; when the women felt more "flabby". The bump was also considered by the women to be a primary indicator of the unborn baby's growth and development. This visible indicator of the unborn baby's development appeared to allay women's anxiety about the development of the unborn baby. The women reported how their 'bump' had been measured and discussed by their midwife at antenatal appointments. Furthermore, the women had also had at least one scan. The women interpreted this feedback, in addition to the absence of any concern by the midwife, as assurance of the unborn baby's sufficient growth and development. There was an underlying assumption by most women, that the bigger the bump, the bigger the baby, and the better that was.

*"The last appointment I went to they measure your bump, so that's like the key indicator now of whether the baby is growing as it should and everything like that, so we discussed that [...] in relation to centimetres of your tummy, and then they chart it on a graph; so as long as that's going okay, I think they're happy really."* (Alice, 29, healthy weight, first child)

*"It feels quite nice and it feels quite exciting, it feels quite positive. And I think especially now where I very much look pregnant. I think in the earlier stages when I was starting to look pregnant but it was ambiguous and I was a bit like oh, I don't think I look that pregnant, and then people would say oh, you've gained loads of weight. I think then I was more sensitive to it and I attributed it more to me as opposed to the pregnancy. Whereas now I feel pretty comfortable in it."* (Leigh, 31, healthy weight, first child)

One woman reported unintentionally losing weight and one other was concerned that her weight gain had been inadequate at a particular stage of the pregnancy. Weight loss or limited weight gain during pregnancy was initially considered alarming by these women. This was because the women believed inadequate weight gain may not be capable of supporting the growth and development of the unborn baby. However, it was considered acceptable once the women were reassured the unborn baby was growing and developing adequately, and their weight gain increased.

*“I haven’t actually measured myself as frequently as I did around that period because then, I guess because I was vomiting a lot I was keeping an eye on it and was kind of worried that I wasn’t gaining enough weight to be able to sustain baby. But since I slowed down with the vomiting, my weight has gone up so I haven’t monitored it as frequently as previously”* (Zoe, 33, overweight, first child)

*“I do go for measurements with my midwife for how big my bump is and things and she did say I was measuring small at my last appointment so I did go for a growth scan but everything’s fine, the baby’s fine.”* (Ella, 39, healthy weight, second child)

Whilst women wanted to avoid inadequate weight gain, there was also a belief by some women that excessive weight gain was associated with health implications such as gestational diabetes, which they wanted to avoid. These women also acknowledged having limited knowledge of the condition, and little desire to understand it further if they had not tested positive for it during the glucose tolerance test. There was a lack of control indicated by the women towards their own and their unborn baby’s weight gain to prevent gestational diabetes. It was only unless they were diagnosed with gestational diabetes, that they thought they could engage in health behaviours to manage it.

*“Well, I can’t control his weight, I can’t control my body at this stage, in terms of what’s happening in there. So, don’t let it worry you. What’s the point? If, for example, I had diabetes, if I had the diabetes, then there’s things you can do to control it. But, I don’t have that, so I don’t know. I’ve not thought about it.”* (Mia, 29, obese (Class II), second child)

#### **6.4 Theme Two: Listening and responding to the body**

This theme encompassed two sub-themes: a. Interpreting and responding to physical cues; b. Reacting to symptoms. Listening and responding to their body remained important to the women throughout their pregnancy. The women continued to experience bodily signals which were interpreted as cues indicating

the unborn baby's, and their own body's needs. These cues and their intensity varied throughout the pregnancy, and women continued to respond to them. As the women had anticipated at TP1, dietary restriction experienced in early pregnancy as a result of pregnancy symptoms reduced; however this resulted in different changes to their WRHBs than was anticipated by the women at TP1.

#### **6.4.1 Interpreting and responding to cues: *"I've just tried to do whatever it is that my body asks or wants me to do"***

Cues were not consistent throughout pregnancy. The women reported cues such as hunger, food preferences and tiredness to fluctuate on a daily basis. Changing cues were thought to be associated with the changing needs of the unborn baby. The constant fluctuation of cues required women to remain receptive to them. The women constantly evaluated the reason behind cues and why they had changed, to inform their decision on how to respond to them.

*"I've never stuck with one food. Each week, or each month, something changes. [...] That's where I think, when my food changes in the month, that may be where my body's asking for more iron or something. So, that's why I've just been plodding along, and just eating as and when I feel like it really, and what I want."* (Poppy, 30, healthy weight, fourth child)

#### **Dietary related cues**

Hunger remained a cue which was considered important to respond to by the women, as it was linked with sustaining the development and growth of the unborn baby. Beliefs towards the sufficient growth and development of the unborn baby reinforced the importance of listening to and responding to the body, as women perceived responding to cues had played an essential role in supporting it up to this point in their pregnancy. The women seemed to put an element of trust in their body to 'know and tell them' of dietary needs which would benefit the pregnancy. By allowing these cues to guide their dietary behaviours, the women believed that they were eating foods their body, and the unborn baby 'need', instead of consuming foods 'for the sake of it'.

*"I've had days where I've not wanted food as such, [...] But then other days I've just wanted to eat everything in sight, and when I've wanted to eat I've eaten, and when I haven't wanted to eat then I've not eaten so much. So I've just tried to stick with that and basically do what your body tells you, because I think if you're needing food then you'll know about it, and you're just being fanciful just wanting something for the sake of it."* (Violet, 28, overweight, first child)

'Cravings' for particular foods were considered cues which indicated something the unborn baby 'needed', by the women. There was variability of how the women perceived 'cravings'. A commonality in women identifying a 'craving' was that they did not feel they could ignore 'cravings', and believed 'cravings' would persist until they were responded to.

*"The craving for fizzy pop like lemonade, I can't get rid of it [...] It's like if you've got an itch, you've got that itch and you need to itch it but you just leave it and leave it. In the end you do have to itch, it's just exactly the same as a craving, you do need to have that, what it's asking you to have."*  
(Willow, 39, obese (Class III), seventh child)

Cravings were experienced by women at different times of their pregnancy with varying longevity. For some women, cravings began later in the pregnancy for a short period, for others they were present in early pregnancy and remained present at TP2. Women often acknowledged that their cravings were for 'unhealthy' foods. Although the women usually responded to cravings, they discussed how they did not want to 'take advantage' of the cue to consume 'unhealthy' foods. This meant that some women also demonstrated an element of management towards the quantity of the foods consumed when responding to a 'craving'. They responded to the cues in a way which was considered sufficient to meet the perceived needs of the unborn baby, but not considered excessive and 'for the sake of it'.

*"Even at work, like in the middle of the day, I will literally just go and get a chocolate bar because I just feel like nothing else and that's all that I want. So I do give in to the cravings but I try to limit myself where I can. But it's so hard."* (Ava, 29, healthy weight, second child)

*"But what I just didn't do, I didn't just throw caution to the wind and went round eating sweet things just because of the cravings I had."* (Isla, 30, healthy weight, second child)

The women had experienced fluctuating levels of tiredness since TP1. All of the women interviewed at this timepoint were in their third trimester and discussed how their tiredness was beginning and/or anticipated to increase. Tiredness was interpreted as being a result of the increased growth rate of the unborn baby believed to be taking place at this point of the pregnancy. As discussed in Theme 1a., the women believed that they needed to increase their calorie intake to support the increased growth rate of the unborn baby. Tiredness was considered a cue which indicated they were not consuming sufficient calories. Different to TP1, the quality of the calories women consumed to increase the calorie content

of their diet were not considered important, and it was the quantity which was the focus.

*“My energy levels fluctuate so much, that’s what I mean by eating what I need to survive, because my energy levels fluctuate so much I just feel like I need a source of energy and I really don’t care what it is”* (Milly, 26, healthy weight, first child)

### **Physical activity related cues**

In addition to acting as a dietary cue, tiredness was also considered a cue to ‘rest’. This was due to the women’s perceived link, as described above, between tiredness and the unborn baby’s energy requirements. When tiredness was experienced it was interpreted as a cue which indicated the women needed to conserve energy. Women responded to this cue and reported resting more; which in turn resulted in lower levels of physical activity in the women. Overall lower levels of physical activity and increased ‘resting’ were accepted by the women as it was considered necessary in supporting the increased growth rate of the unborn baby at this stage of pregnancy. Although tiredness was a cue which was also experienced outside of pregnancy, it was responded to differently, with ‘rest’ being more acceptable during pregnancy due to the perceived link with unborn baby’s growth and development.

*“I think before I was the type of person that was quite stoic. I’d probably just soldier on even if I was feeling rubbish. Whereas now I think because I’m prioritising not just myself but the baby, I think it’s made me more likely to say actually, I do need to have a break.”* (Leigh, 31, healthy weight, first child)

*“Before, I walked a bit more, did more around the house. Now I’m like nah, I just want to sleep now.”* (Zoe, 33, overweight, first child)

Pain or discomfort were also perceived as cues to ‘rest’. This was linked to the perceived element of risk associated with ‘over exertion’ by the women, as described in Theme 1b. Pain or discomfort were perceived as an indicator by the women that they were over exerting themselves, which could have a negative impact on the unborn baby. Therefore, they responded to this cue by ‘resting’. ‘Rest’ included taking a short or long break; or the cessation of certain activities which were thought to initiate the pain or discomfort. Regardless of whether the activity the women were engaging in was perceived as ‘healthy’ by the women and potentially beneficial to the women, the need to respond to the cue took precedence and women ceased their engagement.

*“The more I did, the more hurtful it was. It was just an achy feeling, but I don’t know it just felt like something weren’t right when I were walking. So I’d just rest.”* (Willow, 39, obese (Class III), seventh child)

*“I was trying to walk regularly because I thought that would be beneficial and then it was just really uncomfortable and I thought actually no, as much as this is just walking I feel like I’m pushing myself to do something that I feel is good for me, but physically it doesn’t feel good for me, so I had to stop that.”* (Leigh, 31, healthy weight, first child)

Responding to cues of ‘resting’, meant that women’s engagement in physical activity decreased. As discussed in Theme 1b., women were aware of this decrease in physical activity, and wanted to avoid being sedentary during their pregnancy. Particularly for women who had remained engaged in regular physical activity since TP1, they wanted to manage their response to the cues by reducing engagement in physical activity; but by also avoiding being sedentary. This was done by continuing or increasing engagement in behaviours which were considered as less strenuous as an alternative from the activities they were ‘resting’ from. In line with the behaviours identified as being perceived to reduce being sedentary in Theme 1b., these were mainly around every day activities such as walking, household chores

*“I’ve kind of thought that sometimes I’ll think ‘ooh I’m too tired, I don’t want to get up’, and I’ll think ‘come on, you can it’s only 20 25 minutes [workout] and when you’ve done it you’ll feel so much better’, and I kind of listen to that bit of a voice in my head and get up and do it. But then there is some mornings when it’s really dark and you think ‘hmmm I won’t do it, but I’ll walk to school’, and then I’ll walk to school and then that’s kind of my exercise for the day and I feel like I’ve done something”* (Ella, 39, healthy weight, second child)

*“I try and be more generally active now I’m not going to the gym [...] Going on a nice long walk with my dog or on a Saturday or I would clean the house”* (Milly, 26, healthy weight, first child)

#### **6.4.2 Reacting to symptoms: “I can eat what I fancy”**

Symptoms which were present at TP1 such as sickness and food aversions were reported to fluctuate at different times. By TP2, new symptoms such as heartburn had developed. However, overall, symptoms experienced by the women lessened considerably throughout the pregnancy, as expected at TP1. This meant that, different to TP1, symptoms did not dictate the health behaviours that women felt they were capable of engaging in, at this timepoint. As anticipated by

the women at TP1, the reduction of symptoms meant the women's diet was less restricted at TP2 than in early pregnancy. The women therefore felt they were able to engage in dietary health behaviours without being concerned of their impact on pregnancy symptoms such as sickness.

*"I think last time I saw you as well my diet was quite...I think it was just coming out of being restricted but it went through a stage of me eating loads of toast and bread and really plain, bland food, whereas now I can eat probably most things and it doesn't make me feel sick or the idea of it doesn't make me feel sick."* (Leigh, 31, healthy weight, first child)

*"The only thing that's getting me at the minute is heartburn, so if it is like Indian food or something that's a bit spicy or whatever, I get heartburn. And that's the only reason why I can't eat it. But if it was just normal like bland-ish food, yeah, I can eat like a good size portion and probably more"* (Ava, 29, healthy weight, second child)

At TP1 women had discussed intentions to engage in 'healthy' WRHBs once symptoms had reduced; with a drive to be 'healthier' for the sake of the unborn baby. Not having to engage in dietary behaviours to manage symptoms at this stage of pregnancy meant that the women felt they had regained control over what dietary behaviours they could engage in. Although the women perceived greater control over which WRHBs they engaged at this timepoint, most of the women had not engaged in the previously intended 'healthy' behaviours. For some women, their diet "returned to normal", which was primarily their pre-pregnancy diet. Women were accepting of their diet returning to normal and no longer intended to make any changes to their dietary consumption to be 'healthier'.

*"I've just gone back to normal."* (Lily, 40, healthy weight, first child)

*"I was going to try my best to be as healthy as possible, even healthier than that, than what we were doing before. Especially coming into my second trimester. I'm feeling a bit better and got my appetite and stuff back. But I think you just forget that, like life is so busy that actually sometimes you just want to eat something that's quick and easy, and that isn't necessarily healthy. So that's what I mean about being healthy, like sometimes we'll just turn to fast food or let's order something, or we've got a pizza in the oven...or in the freezer, so let's put that in the oven. Because it is just so much quicker."* (Ava, 29, healthy weight, second child)

One of the major barriers to women engaging in 'healthy' dietary behaviours now symptoms had eased, was the changing perception towards the relevance of these behaviours to the women. As discussed in Theme 1, the focus of engaging

in dietary behaviours which were considered 'healthy' which was dominant at TP1 had shifted by TP2; women now discussed pregnancy as a time of leniency and relaxing restrictive dietary behaviours they engaged in prior to pregnancy. This belief became progressively more prominent further along the pregnancy. Particularly for those who had experienced a 'tough' first and/or second trimester of 'feeling rubbish', there was an element of self-care with women now feeling they were able to 'treat' themselves through their engagement in dietary health behaviours. Similar to views towards avoiding in over-indulging in 'unhealthy' foods present in other themes, women did not necessarily perceive pregnancy as an opportunity to increase the consumption of 'unhealthy' foods; but that they could be more 'relaxed' towards their food choices and consume more 'treats' without the feeling of guilt they would have experienced if they had consumed the same foods outside of pregnancy. It was this belief in particular which informed women's passivity towards engaging in 'healthy' WRHBs for the remainder of the pregnancy and increased women's engagement in 'unhealthy' dietary behaviours during this stage of pregnancy.

*"I think when I'm pregnant, I thought, I don't need to have sweeteners in my tea, do you know what I mean? I felt like I could relax a little bit more. And it may be because I'm relaxed, I'm like, oh my God, I can actually eat that and not feel guilty."* (Mia, 29, obese (Class II), second child)

*"I've got a more like 'eff it' mentality now the further it goes along. [...] I'd say I still have three really nutritious healthy meals a day. But the snacking around that is like a lot of chocolate and stuff. I can't remember the last day I didn't have chocolate. Which compared to early pregnancy and certainly pre-pregnancy is like unheard of."* (Milly, 26, healthy weight, first child)

### **6.5 Theme Three: After I've had the baby**

This theme had two sub-themes: a. Expectations for body afterwards; b. Plans for after the birth. At TP1, the women anticipated residual weight gain would remain after the birth of the baby, which would require their active engagement in weight loss to lose. At this timepoint, that belief remained, with women discussing their intentions in more detail of how they would lose that residual weight. As discussed throughout the previous themes, women did not intend to engage in managing their weight or change their engagement in WRHBs at this point of pregnancy. During this later stage of pregnancy in particular, women indicated acceptance towards their weight gain and engagement in WRHBs. Instead, addressing weight or bodily concerns through engaging in WRHBs after the birth of the baby was considered more relevant to the women. The women



openly made and discussed their plans for engaging in WRHBs after the pregnancy in an attempt to lose weight.

### **6.5.1 Expectations for body afterwards: “*I need to get back into shape*”**

Similar to TP1 there was an underlying assumption that a certain amount of gestational weight would be lost immediately after the birth, but that some residual gestational weight would remain. Whilst it was considered inevitable that there would be residual weight immediately after the birth, the retention of this residual weight was not considered acceptable by women. Most of the women discussed the desire to ‘snapback’ to their pre-pregnancy body by engaging in weight loss after the birth of their baby. It was thought that weight loss of residual gestational weight gain would be achieved primarily through engaging in physical activity and dietary health behaviours.

*“I need to get back into shape, I need to get back to my pre-pregnancy weight after I’ve had this baby, which was what I had in mind and what I had planned before anyway. But it just kind of reinforces that, that sense of determination if you know what I mean, in terms of ok, I’m 78 [kg] now, yes the baby is part of it but then you still have gotten bigger than what you used to be.”* (Isla, 30, healthy weight, second child)

*“Well you immediately lose the weight of the baby and the placenta and all that sort of stuff, but I don’t foresee my tummy going down straight away. [...] But then I’ve gained fat everywhere else, so I’d be left with some of that weight to lose, but I wouldn’t foresee that being something that I couldn’t correct with my diet and exercise”* (Milly, 26, healthy weight, first child)

Although women considered residual weight and the need for weight loss after the pregnancy as inevitable and were accepting of it, women who were in subsequent pregnancies reflected on previous postnatal experiences towards their weight. Some of the women had previously experienced negative feelings towards their body after the birth of the baby due to the residual weight gain. These women highlighted how they felt more prepared for dealing with their weight changes after the birth, with previous experiences to reflect on and guide them.

*“Obviously with your first baby it is a bit different, you’ve never been through that before and you don’t know what to expect, you don’t know how the hormones are going to hit you straight after. Whereas this time, I’m prepared so I kind of know my hormones will be in full swing. There*

*might be a day where I look at my body and think I'm not happy, but then I know what I can do this time. Whereas last time it was bit of a battle because I were like 'what can I do to get all this baby weight off, I don't know how I'm going to get rid of it'.*" (Florence, 24, obese (Class I), second child)

Breastfeeding was often discussed by the women as something which would support weight loss after the birth of the unborn baby. This was thought to be beneficial for the women, particularly at a time when their engagement in other WRHBs to aid weight loss was restricted. This was not the primary reason for women to consider breast feeding, however, it was discussed as something which would benefit the women. Women were not directly asked about breast feeding, however, discussions around breastfeeding facilitating weight loss were mainly initiated by the women when discussing postnatal weight loss. Some women, however, were concerned that engaging in increased levels of physical activity and restrictive dietary consumption for the purpose of postnatal weight loss could have a negative impact on their milk production and quality. Furthermore, some women were also concerned at their ability to leave their baby when breastfeeding, which acted as a barrier to the women's expectations of being able to engage in physical activity outside of the home.

*"I know that breastfeeding actually helps you to lose weight because obviously you're actually burning some calories in breast feeding. So for me, that's my first point of call, before I even get the postnatal check. So I know that I'll probably burn a few calories, just from breast feeding alone [...] I'm not going to do the kind of workouts that's going to kind of impact on me, my health or the baby. So like the kind of workout exercise you do, if you do too much vigorous exercise it can actually impact on the milk production. So that's why I said for me it's about taking it very easy and slowly"* (Isla, 30, healthy weight, second child)

*"I will probably breastfeed, I'm really hoping it will take bottle as well because whereas with my others I just purely breast fed and I'm like no this can have, straight from day one, like a bottle in its night feed so at least I know it's had enough and if I do want to go out during the day for like the gym and stuff I'm not restricted"* (Olivia, 26, healthy weight, third child)

### 6.5.2 Plans for after the birth: “Once I’ve let my body recover I’m going to...”

At TP1, the women discussed how managing their weight gain throughout the pregnancy could reduce the amount of residual weight after the pregnancy. However, since TP1 the women had not engaged in managing their gestational weight gain, and nor did they intend to manage their weight for the remainder of pregnancy as a way to limit the anticipated residual weight. Women at this timepoint primarily accepted their weight gain and that their body would look different after the birth, with women identifying it as a sacrifice of being pregnant and supporting the growth and development of a baby. However, they also discussed how they may feel differently towards their body after the birth of the baby and focussed on the prospect of weight loss after the pregnancy. Gestational weight gain at this stage of pregnancy was considered inevitable and something women could not manage. It was also considered as temporary, due to the expectation of weight loss after the pregnancy. Women drew on this belief when accepting their gestational weight gain at this point of pregnancy, whilst also planning on addressing it after the pregnancy.

*“I don’t mind to be honest because it’s not forever so, I can change it afterwards” (Louise, 24, healthy weight, first child)*

*“It’s fine, I’m pregnant. I guess, it might change, how I might feel about it might change once I’ve had my baby. But right now it’s just fine [...] Maybe if I had the baby and then I felt I was still fat everywhere, then, I probably would feel differently I’d be like oh my God I need to lose weight, I need to lose weight [...] I’m pretty much like, we’re trying to make a person here, so, things are going to happen to your body. Have the person and then you can like take stock and say ok, what is left and then fix it, but if it’s not fixable don’t kill yourself.” (Zoe, 33, overweight, first child)*

When discussing their intentions for weight loss after the pregnancy, the women indicated uncertainty towards the birth and their recovery from it. It was thought the birth and recovery would impact on the women’s body and their capability to engage in weight loss after the birth. However, the women were uncertain of ‘how the birth would go’, and subsequently wanted to ‘wait and see how they felt’ before engaging in weight loss. The women were clear about not ‘rushing’ into weight loss and did not want to ‘pressure’ themselves into engaging in weight loss quickly. This was because they wanted to ensure the adequate recovery of their body after the birth so it would be physically capable of engaging in the WRHBs for weight loss. The six week check with a midwife was often referred to as the minimum amount of time to wait. The women anticipated they would be

'signed off' by the midwife and subsequently be fit enough to begin engaging in WRHBs for weight loss. It was anticipated that having a caesarean section would require longer recovery time.

*"I'd probably say, once I'm comfortable. When I say, once I'm comfortable, I mean as in, maybe six to ten weeks. [...] I'm going to take my time, I'm not rushing myself, in terms of that I'm doing what I need to, what's best for me."* (Mia, 29, obese (Class II), second child)

*"Obviously you've got to wait six weeks until they've done the six week check and they tell you not to do anything before then which is fine. So I'll wait for my body to recover and make sure that I am well and recovered before I do start doing physical exercise again."* (Ella, 39, healthy weight, second child)

Some women planned to return to their pre-pregnancy dietary and physical activity routines after the birth of the baby. For some women this meant re-engaging in behaviours they had to ceased engagement in during the pregnancy. These were mainly the women who considered themselves as regularly engaging in physical activity and/or 'healthy' dietary behaviours prior to pregnancy. There was an underlying assumption that by returning to pre-pregnancy behaviours, they would return to their pre-pregnancy weight. However, there was acknowledgement that returning to pre-pregnancy behaviours could be difficult due to the presence and additional needs of the baby. Women discussed ways in which they could overcome these barriers and how their engagement and routines may differ to take into account the new circumstances of having a baby. Whilst women anticipated and planned to overcome barriers, not putting 'pressure' on themselves to engage in WRHBs if it was not appropriate was important to the women.

*"I can't wait to get back to the gym. [...] I want to go back as soon as I can [...] Just to lose all the weight I've put on really."* (Louise, 24, healthy weight, first child)

*"I'm hoping to get a sling and get out and about walking. Just get back into things as soon as I can. Obviously it won't be as easy and it'll depend on if people can look after the baby and things like that, but yeah. So we hopefully just intend to carry on as normal. I might have to do things earlier in the day I suppose or adjust to the baby's needs. One of us might just have to go one at a time I guess that could be one of the biggest changes."* (Lily, 40, healthy weight, first child)

Other women intended to engage in new WRHBs to facilitate weight loss. They explicitly discussed possible behaviours they could engage in and considered the

barriers and facilitators. Some 'mum and baby' specific activities were discussed; however, these were considered to be more related to the women's and their baby's well-being through social opportunities than weight loss.

*"It's probably unlikely that I'll go to the gym, because I won't be able to afford it, I've got to be realistic. So, I'll probably do things which don't cost as much. [Husband] does this Insanity thing. So, he does that, and there's no reason why I can't go with him, or walk to the park more, do activities with [daughter], she likes football and stuff like that now."* (Mia, 29, obese (Class II), second child)

*"There's quite a few activity classes in the area where you can bring your baby to. So you bring your baby a long and there's you know, you can just break off to see to your baby if need's be and meet other mums."* (Violet, 28, overweight, first child)

## **6.6 Theme Four: "I'm the kind of person who..."**

This theme comprised of two sub-themes: a. Healthy self-identity; b. Relationship with weight. The women continued to hold a perceived identity of the "*kind of person they were*" prior to the pregnancy and throughout the pregnancy, which remained largely unchanged since TP1. This theme was not as dominant at this timepoint as the women did not reflect on their pre-pregnancy behaviours as frequently as at TP1. However, women continued to draw on their previous experiences of weight gain, management and loss, and engagement in WRHBs when discussing current and anticipated experiences and engagement. Some of the women discussed how they had found themselves engaging in behaviours which were considered 'out of character' since TP1.

### **6.6.1 Healthy self-identity: "That's really out of character for me"**

Similar to TP1, the women referenced the WRHBs they engaged in prior to pregnancy; how healthy they perceived their lifestyle to be; how personally relevant engaging in 'healthy' behaviours was to them; their increased risk factors of particular health implications. These factors continued to constitute the women's perceived 'healthy self-identity', which remained stable and informed their engagement in WRHBs throughout the pregnancy.

*"I think the number one thing I've always kept in my mind is knowing that I need to stay healthy because I know my family, all my parents have hypertension, on my mum's side particularly, so it's something I've just always known, I have to keep on top of."* (Zoe, 33, overweight, first child)

*“It’s just something that we think is quite important and we really work on trying to make sure we have a balanced, healthy diet. And I think especially, as I said, we’re vegetarian/vegan so it’s just even more in the forefront of our minds.”* (Leigh, 31, healthy weight, first child)

Whilst the women’s healthy self-identity continued to inform their engagement in WRHBs, some women also discussed how they had engaged in WRHBs that they considered as ‘out of character’ such as consuming different foods to usual and changing their shopping habits. These were mainly as a result of pregnancy symptoms and cues. As discussed in Theme 2a. and at TP1, women responded to cues differently during pregnancy than outside of pregnancy, therefore, some of the health behaviours they engaged in were different to what they had engaged in prior to pregnancy. The way in which women accepted and positioned these behaviours as being temporary, pregnancy-specific behaviours which were ‘out of character’ suggested that they did not anticipate them to endure after the pregnancy and impact on their ‘healthy self-identity’.

*“I find myself craving a lot of sweet food, which was quite new to me because I wouldn’t consider myself a sweet tooth person in the last pregnancy. Besides I’m not one of those people, I would not routinely go shopping and you wouldn’t find things like ice cream or biscuits in my shopping basket because I’m not a sweet person, does that make sense? [...] But this pregnancy’s quite different. So I’ll find myself going to Morrisons just because I want to get chocolate.”* (Isla, 30, healthy weight, second child)

*“I was really craving sugar. I’ve never been, I am into sweets, but I’ve never been massively into chocolates or desserts at all and in my first trimester, if someone brought some cake or brownies or something into work, usually I wouldn’t be interested, whereas I was just straight in there, straight into the brownies.”* (Milly, 26, healthy weight, first child)

Women who reported to regularly engage in ‘healthy’ WRHBs, discussed how others in their household also engaged in these health behaviours. In particular, WRHBs such as cooking home-made meals and being physically active were largely considered a joint venture with their partner and constituted their ‘lifestyle’ which they both strived to engage in. Establishing these ‘healthy behaviours’ in their children was important for the women and their partner; with women either planning they could do this with their baby and/or actively doing it with other children. Most of these women had engaged in conversations with their partner towards continuing this ‘lifestyle’ as a family after the birth of the baby, and involving the new baby through things like weaning and family days out.

*“We’re having a baby we’ve been thinking about the type of diet we want the baby to have and how we want the baby to eat and the health values that we want to instil in this child, and I think that’s made us both much more conscious about what we eat as well.”* (Leigh, 31, healthy weight, first child)

### **6.6.2 Relationship with weight: “I (don’t) lose weight easily”**

Similar to TP1, the women reflected on their relationship with weight prior to, and during previous pregnancies. These experiences varied considerably amongst the women, but informed the way they dealt with their own weight during pregnancy. Women who reported having a stable weight over time were not particularly ‘conscious’ of their weight as it did not ‘bother’ them. These women subsequently accepted their gestational weight gain, with an underlying assumption that their weight gain would not be excessive and would be temporary, in association with the pregnancy. These women reported not monitoring their weight by weighings outside of pregnancy, and had also not numerically monitored their weight gain during pregnancy.

*“Weight’s never really bothered me. I don’t really move much out of my weight anyway, so I’m guessing I’m just going to be alright. [...] I haven’t got any plans after the baby’s born to go on a diet, or start going to the gym, ‘cause I never did it before, so there’s not going to be much point doing it after.”* (Poppy, 30, healthy weight, fourth child)

*“I just don’t tend to [weigh myself] really, in any, every day. I tend to go with measurements of how my clothes fit, how I’m feeling physically inside. I think you can get too obsessed with something like that, going on the scales and weighing yourself and seeing it obviously go up and then maybe get a little bit disappointed by that. But I’m not one that’s, to stand on the scales and measure myself anyway whether I was pregnant or not. So as long as my clothes fit and you know, I feel healthy and I look healthy then that’s all that matters.”* (Ella, 39, healthy weight, second child)

Those who had experienced weight loss prior to pregnancy, or after previous pregnancy reflected on those experiences when assessing the acceptability of their gestational weight gain and anticipations towards postnatal weight loss. Those who had lost weight prior to the pregnancy were concerned towards gaining weight during pregnancy and their ability to lose it after the birth of their baby. Success of weight loss after previous pregnancies informed how capable the women thought they were of losing weight after this pregnancy, which they used these to manage their expectations for after this pregnancy. Those who were already mothers highlighted how they felt more prepared for dealing with

their weight changes after the birth, with previous experiences to reflect on and guide them.

*“I do worry about putting on weight really after losing the weight. And because I’ve never been very good at losing weight. You know, I was born fat, I’ve always been a fatty. I was born like twice as big as my brother when he was born and you know, every single picture of me from being a baby is like with big chubby cheeks and you know, it’s, just something that I’d got used to being and then that sudden change [bariatric surgery]. It was hard to think that I was going to get big again and a little bit of a fear of well, will it go again afterwards.”* (Martha, 50, overweight, first child)

*“I went on slimming world and I did lose quite a bit so I do know I can do that again quite easily without all the distress of before”* (Florence, 24, obese (Class I), second child)

As discussed in Theme 3. the women thought it was necessary to engage in weight loss to return to their pre-pregnancy body weight after the birth of their baby. The women reflected on their feelings towards their body prior to the pregnancy. Regardless of whether these were positive or negative feelings, their body weight prior to pregnancy was linked with their body image, confidence and the ‘kind of person they were’. After ‘sacrificing’ their body to carry a pregnancy, the women wanted to return to their pre-pregnancy body and the ‘kind of person they were’. This was linked with retaining their pre-pregnancy identity.

*“I think just because of how I am, I was, I don’t really know how to put this, I didn’t really have any like body confidence issues beforehand. I wasn’t ever the skinniest person, but I was nowhere near the fattest and I was just quite happy being the size I was. And I think I would quite like to get back to that”* (Violet, 28, overweight, first child)

*“I wasn’t exactly normal anyway, I already had stretch marks from being fat all my life and you know, I wasn’t exactly a glamour puss, so, that side of the weight gain didn’t worry me because you know, I already had a lot of the problems that people have after they lose weight after having a baby anyway. But I think, I do, I have really enjoyed being slimmer you know for the only time in my life and it is something that I want to make sure I do afterwards.”* (Martha, 50, overweight, first child)

When discussing their pre-pregnancy weight and engagement in WRHBs some women reflected on the impact it could have on their health, and role as a mother. Some of the women who were already mothers believed that factors such as multiple pregnancies and age could impact on their body’s ability to cope with excessive weight gain. Concerns towards excessive weight gain being



associated with health implications and impacting on everyday activities such as playing with their children were strong drivers in intended weight loss after the pregnancy.

*“I just don’t want to put anymore weight on. I don’t want to. I feel like I can’t do as much, like, if we were on holiday and I’d get up to dance, I get a bit more hot because I am a bit more bigger. Whereas if I wasn’t that bigger then I wouldn’t get as hot I think. [...] It’s just silly stuff like that I think. I’ve never been bothered about my weight up until probably about three year ago. And it was running around after the kids. And also I’ve got to consider that I’m not young anymore like I used to be when I used to run after the first lot. (Willow, 39, obese (Class III), seventh child).*

*“Like I said that’s [weight] been something that I’ve never really thought about. And I’ve always eaten what I’ve wanted like I have like sugars in my tea and chocolate, I eat whatever I want whenever I want but it’s like, is it going to catch up to me, like is it catching up to me now? Like now I’ve had three kids and stuff. And like my age is going up like, I just turned 27 and it’s like ‘oh my God that’s like practically nearly 30’. Whether that’s like an issue so, but yeah I think it will, because even though it’s never been an issue it’s like is it like slowly creeping up on me and I’m not going to realise until I’m like actually a lot more overweight than I should be.” (Olivia, 26, healthy weight, third child)*

## **6.7 Summary of findings at Timepoint Two**

This chapter has presented women’s experiences of WRHBs since TP1 at approximately 10 – 16 weeks pregnant, up to at approximately 28 – 32 weeks pregnant, and their expectations for the remainder of their pregnancy and beyond. It has reflected on and built upon women’s experiences from TP1 to provide a novel insight into how these experiences have developed throughout the pregnancy and the importance of the different time periods during pregnancy. These findings have identified how the relevance of WRHBs to women shift from early pregnancy to later pregnancy. Changes between the timepoints will next be discussed through the juxtaposition of the findings from both timepoints.

## **6.8 The narratives across both timepoints**

As outlined in Chapter 5, the framework analysis identified different narratives behind the women’s experiences at each timepoint. These narratives provide a holistic picture of the story running through the themes at each timepoint. Whilst the themes and sub-themes in the thematic framework at each timepoint seem similar on the surface, the different narratives provide insight into how the

women's perspectives towards and experiences of WRHBs are different at each timepoint (see Figure 5.1 (Chapter 5) for a diagram of the themes and narratives). The narratives for both timepoints will next be outlined and juxtaposed.

### **6.8.1 Timepoint One narrative: Disruption and adaption**

The narrative at TP1 was Disruption and Adaption. This narrative is demonstrated across all four of the themes and includes how the women's motivations, views towards and engagement in WRHBs change as a result of being pregnant and are anticipated to change throughout the duration of pregnancy. Disruption and Adaption captures the importance of the context of pregnancy, how this changed the health priorities of the women compared to everyday life outside of pregnancy and how the women planned to adapt to this. In brief, this included the women's changing perceptions towards which WRHBs are 'healthy' for them and their unborn baby (Theme 1); bodily cues and pregnancy 'symptoms' they experience and how they respond to those (Theme 2); expectations towards how their body will be different after the pregnancy (Theme 3) and what will happen to the WRHBs they engaged in prior to pregnancy (Theme 4). The women anticipated that this disruption would continue throughout the pregnancy and they would continue to adapt throughout this transitional period. The women held various intentions to engage in WRHBs further down the pregnancy, that they felt they were prevented from engaging in at this timepoint.

### **6.8.2 Timepoint Two narrative: Passivity**

The narrative of the findings at TP2 was Passivity. Passivity can be defined as: "Acceptance of what happens, without active response or resistance" (Stevenson, 2010); which succinctly summarises the women's experiences of WRHBs at this later stage of their pregnancy. The women were largely accepting of their weight and their current engagement in physical activity or dietary behaviours; with limited desire to engage in any changes to their WRHBs throughout the remainder of their pregnancy. This was contrary to the intentions formed at TP1 to engage in WRHBs later in their pregnancy with the women made limited reference to these previous anticipations and intentions. They also discussed not wanting to make any changes to their WRHBs for the remainder of the pregnancy and instead focussed on waiting until 'after the pregnancy', to make changes to their engagement in WRHBs for weight loss purposes.

### **6.8.3 Juxtaposing the narratives**

At TP1 it was apparent that the context of pregnancy disrupted women's views towards and engagement in WRHBs compared to prior to the pregnancy. The

women were driven to engage in WRHBs which were considered 'healthy' for the unborn baby or themselves, and limit or avoid WRHBs which were considered 'harmful' or 'unhealthy' respectively; with a focus on supporting the unborn baby's growth and development. The women experienced limited indicators of the baby's growth and development at this early stage of pregnancy which meant they were uncertain of their growth and development. Engaging in 'healthy' WRHBs was thought to support the growth and development of the unborn baby, which also served the purpose of reassuring the women they were 'doing their best' in assuring the well-being of the unborn baby. Whilst the women were driven to engage in 'healthy' WRHBs such as consuming a nutritionally dense 'healthy' diet to support the growth and development of the unborn baby, they felt prevented in doing so at this stage of pregnancy due to the pregnancy symptoms and physical cues they were experiencing. Although the cues that women experienced were not necessarily different to physical bodily cues prior to their pregnancy, they were interpreted and responded to very differently in the context of pregnancy due to the perceived 'new role' as being indicators of the unborn baby's needs. Pregnancy symptoms were however specific to pregnancy, and the management of them were considered fundamental for the women's well-being. As a result, women often felt like their diet was restricted by cues and symptoms at this stage of pregnancy. However, the women anticipated the physical cues and symptoms would reduce later in their pregnancy which would allow them to engage in the WRHBs they wanted to. This resulted in the women forming intentions for behaviour change for later in their pregnancy.

At TP2, beliefs around 'what is healthy' for both mother and unborn baby during pregnancy remained similar to TP1, with women continuing to perceive that their dietary consumption could directly impact their unborn baby, and that there were risks associated with particular foods and physical activity. However, most women had not engaged in the WRHBs behaviours they had intended to. By TP2, there was a shift in the focus towards the role and relevance of WRHB behaviours, such as the benefits of physical activity and how dietary consumption could impact the unborn baby. The focus of consuming nutritionally 'healthy' foods to support the growth and development of the unborn baby which were present at TP1 became less relevant to the women, and shifted towards avoiding foods which were thought to have the potential to cause immediate harm to the unborn baby. Optimising their diet to be nutritionally dense no longer drove intentions for behaviour change during the pregnancy as they had done at TP1, as the women were less anxious about the growth and development of the unborn baby due to indicators of the unborn baby's growth and development such as 'the bump' and scans at antenatal appointments.

Reassurance about the growth and development of the unborn baby at TP2, regardless of the women's engagement in WRHB since TP1, strongly influenced the women's views towards and engagement in WRHBs at TP2 and for the remainder of their pregnancy. There was an acceptance around the WRHBs the women had engaged in up until this stage of the pregnancy, which was reinforced by the unborn baby's growth and development. The women anticipated their engagement in WRHBs would remain the same throughout the remainder of the pregnancy, unless they were impacted on by symptoms of the pregnancy such as increased tiredness. They instead intended to engage in different WRHBs after pregnancy for weight loss purposes; to lose residual gestational weight gain and return to their pre-pregnancy body. This meant that by TP2 the women's intentions had changed from engaging in 'healthy' WRHBs during the pregnancy to benefit the pregnancy, to utilising WRHBs after the pregnancy for weight loss purposes.

Although the women thought WRHBs were associated with certain aspects of weight gain during pregnancy at both timepoints, they were not motivated to engage in WRHBs for the purpose of managing their weight. At TP1, the women were clear they wanted to avoid gaining 'too much' weight during the pregnancy. However, weight gain was considered essential as part of a 'healthy' pregnancy, and they did not think it was beneficial for the health of the unborn baby to engage in WRHBs to limit their weight gain during pregnancy. The women instead 'hoped' their weight gain would be acceptable. The women did discuss associations between engaging in WRHBs and their own weight, however, the women's perspectives of the benefits of these health behaviours were clearly orientated around the possible impact on the unborn baby, as opposed to their own weight gain. Even at this early stage of pregnancy, the women were mindful of how their bodies may be different after the birth of their baby and considered the possible impact of weight gain during pregnancy, on their body after the birth. There was a belief that whilst they would lose some weight immediately after the birth of the baby, there would be some residual weight they would need to actively engage in WRHBs to lose. Those who were already mothers formed intentions to avoid 'over-indulging' in 'unhealthy' foods during pregnancy to reduce the amount of residual weight they would want to lose after the birth of their baby.

By TP2, contrary to women's earlier intentions of limiting the consumption of 'unhealthy' foods, there was an increased leniency towards the consumption of 'unhealthy' foods, with some of the women consuming more 'unhealthy' foods than in early pregnancy or before pregnancy. This was different to the consumption of foods which were considered as potentially harmful to the unborn baby, which women continued to avoid. Different to TP1, the women were

passive towards their weight gain at this stage of pregnancy and indicated little concern towards the impact their current WRHBs could have on their weight at this stage. The women more primarily focussed on engaging in WRHBs after the birth of their baby for the purpose of weight loss. Engaging in WRHBs for weight loss after the birth of their baby also allowed women to engage in WRHBs such as a restrictive diet and vigorous physical activity which were not considered appropriate to engage in during pregnancy.

Across both timepoints, the women's previous experiences of weight gain, weight loss and engagement in WRHBs prior to pregnancy, and inherent characteristics such as family health history and ethnicity informed the women's engagement in and intentions towards engaging in WRHBs. These factors constituted the 'kind of person' women thought they were, which identified the personal relevance of different WRHBs to the women. There was variation across the women with some perceiving 'health' and striving to be 'healthy' as an important aspect of their lives, with some others not particularly concerned with 'health'. Whether or not 'health' was considered to play an important part in the women's life, it formed an integral part of 'the kind of person they thought they were', which informed their views towards and engagement in WRHBs during pregnancy. It also identified women's engagement in WRHBs prior to pregnancy and how women's engagement in WRHBs were different during pregnancy; with some women maintaining, some adapting and some initiating and/or ceasing engagement. The 'kind of person' women perceived themselves to be was identified and discussed at TP1 and remained stable across the pregnancy to TP2; it was evident how this had an impact on the WRHBs the women had engaged in throughout their pregnancy. However, at TP2 the women also reported engaging in WRHBs which they considered 'out of character'. These behaviours were accepted as an aspect of pregnancy and the women did not intend to change them before the birth of the baby. Engaging in WRHBs which were considered 'out of character' were thought to be related to the pregnancy and there was an expectation by the women that their engagement in these behaviours would cease after the birth of the baby and their WRHBs would return to the same as pre-pregnancy. It was then that women intended to engage in WRHBs with the purpose of weight loss.

## **6.9 Summary of qualitative findings chapters**

The findings reported in the last two chapters were identified through the inductive process of framework analysis. By exploring the women's experiences throughout pregnancy, they have provided an in-depth description of their understandings of, beliefs towards and engagement in WRHBs during pregnancy. They have explored from the women's perspectives, the roles of

those behaviours during pregnancy. It is evident that although the women believe there is an association between physical activity, dietary behaviours with weight; in the context of pregnancy the potential impact of these behaviours on the unborn baby are considered more important to the women than their impact on their weight. This means that the relevance of these WRHBs and subsequently the women's engagement in them are different in pregnancy than they are outside of pregnancy; furthermore, this changes across the course of a pregnancy.

Whilst women consider both physical activity and dietary behaviours as being linked to weight gain, the way in which they are thought to support or harm the development of the unborn baby during pregnancy are very different. 'Healthy' dietary behaviours are considered essential in supporting the growth and development of the unborn baby, whereas physical activity is thought to mainly benefit the woman and carries a risk of harming the unborn baby. This impacts on the personal relevance of physical activity and dietary health behaviours in the context of pregnancy to the women. Furthermore, women's engagement in WRHBs prior to pregnancy and their perceptions towards their engagement prior to pregnancy play an important role in influencing the women's intentions towards and engagement in WRHBs throughout pregnancy.

## **6.10 Chapter summary**

Overall this chapter has presented findings from TP2 and juxtaposed the findings from both timepoints to explore women's experiences of WRHBs across pregnancy. The findings have provided insight into how the context of pregnancy adds an additional layer of complexity to women's engagement in WRHBs. Additionally, it has provided evidence of how women's experiences of and engagement in WRHBs change throughout pregnancy itself. This suggests that there are psychological changes which occur during pregnancy which impact on women's WRHBs. To further explore this and aid the understanding of the above themes, the next chapter will map these findings onto a psychological model of behaviour. This will provide a theoretical understanding of these psychological changes across pregnancy. The theoretical perspective in addition to the qualitative findings discussed in this and the previous chapter (Chapter 5) will provide a holistic, in-depth understanding of women's engagement in WRHBs throughout the course of a pregnancy underpinned by theory.

## **Chapter 7 Findings: Weight-related health behaviours and psychological theory**

### **7.1 Introduction**

This chapter will build on the thematic framework presented over the previous two chapters. The thematic framework developed through inductive line by line coding of the interview data at both timepoints has created a rich understanding of the women's experiences of weight-related health behaviours (WRHBs) in pregnancy (as discussed in the Chapter 5 and Chapter 6). Furthermore, these chapters have demonstrated that women's experiences of WRHBs change throughout pregnancy. This understanding will be further developed in two ways: first by inductively identifying the individual WRHBs present within each theme. Next, these WRHBs are deductively mapped onto the COM-B model of behaviour, and the theoretical domains framework (TDF) to identify the determinants of the WRHBs, as underpinned by theory (as described in Chapter 4). An overview of the identified WRHBs will be outlined, followed by presenting WRHBs and their determinants (COM-B components and TDF domains) according to the themes. Finally the findings of the two timepoints will be juxtaposed utilising a temporal lens to explore change and stability across pregnancy.

### **7.2 Overview of findings**

There was a total of 25 WRHBs identified from the women's experiences (i.e. within the themes): 13 WRHBs at TP1; 12 at TP2; eight of which were the same WRHBs. Many of the WRHBs mapped uniquely against one theme or sub-theme, however some also corresponded to multiple, reflecting connections between themes in relation to how WRHBs are experienced by women. Additionally, the WRHBs were found to be explained by all COM-B components and most TDF domains, but impacting on them in different ways (see Table 7.1 for the WRHBs and determinants at TP1; and Table 7.2 for the WRHBs and determinants for TP2). As identified in the qualitative findings, some WRHBs discussed by women at TP1 were no longer indicated at TP2. Mapping the WRHBs to the COM-B model and TDF domains provides insight into the underlying mechanisms of why that was, and identifies behaviour change opportunities.

### 7.3 Timepoint One

The determinants of each WRHB were identified by exploring the influences on each WRHB, as described in the text. These influences were mapped to the COM-B component and TDF domain they related to (see Chapter 4 Methods for details on this procedure). The WRHBs and their determinants in each theme are listed in the table below (see Table 7.1). There was a total of 13 WRHBs identified at TP1. As outlined previously, WRHBs were defined as any behaviour which has the potential to have an impact on a woman's gestational weight, which may not necessarily be in engaged in with that goal. Only WRHBs discussed by the women as having been experienced or engaged with up to that point in time or previously, were included. Future expectations for engaging in WRHBs during the antenatal period or after the birth were excluded, as this was not considered 'engagement' or equivalent to action.

No WRHBs were identified in Theme Three (After I have the baby) as the topics discussed were around expectations of weight (as an outcome) during the postnatal period. Theme 1c. (weight gain expectations) was also focussed around weight as an outcome and meant few WRHBs were identified. Individual WRHBs were difficult to identify in Theme Four as the women discussed their 'lifestyle' holistically, which made it less amenable to an analysis centred round breaking down individual WRHBs. WRHBs present in each theme will be described below, including an overview of how the corresponding COM-B components and TDF domains appeared to be determinants of the behaviours. The language used to provide this overview will adopt COM-B and TDF terminology, with the specific determinants identified in brackets, throughout the text.



Table 7.1 Weight-related health behaviours (WRHBs), COM-B components and TDF identified in each theme at TP1

Sub-theme	WRHBs	COM-B	TDF	
<b>Theme One: What is healthy for us?</b>				
<b>Sub-theme 1a.</b>	Consumption of 'healthy' foods	Capability – Psychological	Knowledge	
			Behavioural regulation	
		Motivation – Reflective	Beliefs about consequences	
				Social/Professional role and identity
		Motivation – Automatic	Emotion	
	Increasing calorie intake	Opportunity – Social	Social influences	
		Motivation – Reflective	Beliefs about consequences	
	Limiting of 'unhealthy' foods	Capability – Psychological	Knowledge	
			Behavioural Regulation	
		Motivation – Reflective	Beliefs about consequences	
Avoiding potentially harmful foods	Capability – Psychological	Knowledge		
	Motivation – Reflective	Beliefs about consequences		
	Motivation – Automatic	Emotion		
<b>Sub-theme 1b.</b>	Engaging in physical activity - general	Opportunity – Social	Social influences	
		Motivation – Reflective	Beliefs about consequences	
	Avoiding vigorous physical activity	Capability – Psychological	Behavioural regulation	
		Motivation – Reflective	Beliefs about consequences	
			Social/Professional role and identity	
		Motivation – Automatic	Emotion	
	Maintaining engagement in physical activity	Capability – Psychological	Behavioural regulation	
			Knowledge	
			Skills	
		Motivation – Reflective	Goals	
		Beliefs about consequences		
		Beliefs about capabilities		
<b>Sub-theme 1c.</b>	Restricting calorie intake	Motivation – Reflective	Beliefs about consequences	

Sub-theme	WRHBs	COM-B	TDF
	Engaging in physical activity - general	Motivation – Reflective	Beliefs about consequences
<b>Theme Two: Listening and responding to the body</b>			
<b>Sub-theme 2a.</b>	Responding to hunger	Capability – Psychological	Memory, attention and decision processes
			Behavioural regulation
		Motivation – Reflective	Beliefs about consequences
	Change in food preferences	Capability – Psychological	Memory, attention and decision processes
			Knowledge
		Motivation – Reflective	Beliefs about consequences
	Responding to tiredness	Capability – Psychological	Behavioural regulation
			Beliefs about consequences
	Maintaining engagement in physical activity	Capability – Psychological	Memory, attention and decision processes
			Behavioural regulation
	Capability – Physical	Knowledge	
<b>Sub-theme 2b.</b>	Consuming food to manage nausea	Capability – Psychological	Behavioural regulation
		Opportunity – Physical	Environmental context and resources
		Motivation – Reflective	Beliefs about consequences
		Motivation – Automatic	Emotion
	Avoidance of food smells	Capability – Psychological	Behavioural regulation
		Opportunity – Social	Social
		Motivation – Reflective	Beliefs about consequences
	Engaging in physical activity - general	Motivation – Reflective	Beliefs about consequences
<b>Theme Three: After I have the baby N/A</b>			
<b>Theme Four: I'm the kind of person who...</b>			
<b>Sub-theme 4a.</b>	Consumption of 'healthy' foods	Capability – Psychological	Behavioural regulation
		Motivation – Reflective	Social/Professional role and identity

<b>Sub-theme</b>	<b>WRHBs</b>	<b>COM-B</b>	<b>TDF</b>
	Engaging in physical activity - general	Opportunity – Social	Social influences
		Motivation – Reflective	Social/Professional role and identity
			Beliefs about consequences
<b>Sub-theme 4b.</b>	Consumption of 'healthy' foods	Capability – Psychological	Knowledge
		Capability – Physical	Skills

### 7.3.1 Theme One: What is healthy for us?

There were eight WRHBs identified in this theme:

1. Consumption of 'healthy' foods
2. Increasing calorie intake
3. Limiting of 'unhealthy' foods
4. Avoiding potentially harmful foods
5. Engaging in physical activity – general
6. Avoiding vigorous physical activity
7. Maintaining engagement in physical activity
8. Restricting calorie intake

WRHBs identified in this theme mapped predominantly onto the COM-B components of psychological capability (TDF: behavioural regulation); reflective motivation (TDF: beliefs about consequences) and automatic motivation (TDF: emotion). Each WRHB also had additional determinants (i.e. COM-B components and TDF domains) which interacted. Each WRHB will next be described, including the COM-B components and TDF domains, and how they interacted.

#### 1. Consumption of 'healthy' foods

Women were motivated to engage in consuming more 'healthy' foods as they believed that this could have a positive consequence on their unborn baby's growth and development (COM-B: motivation – reflective; TDF: beliefs about consequences). Engaging in a WRHB which was believed to positively impact their unborn baby's development was important to women at this stage of pregnancy as they experienced emotions, such as anxiety, towards the growth and development of the unborn baby (COM-B: motivation – automatic; TDF: emotion). The women also indicated the development of a maternal identity, which informed their motivation to support the unborn baby during pregnancy (COM-B: motivation – reflective; TDF: social/professional role and identity). They demonstrated knowledge of what foods they thought were 'healthy', which informed their decision towards what 'healthy' foods to consume (COM-B: capability – psychological; TDF: knowledge). Increasing their consumption of 'healthy' foods was achieved by the women through behavioural regulation of swapping 'unhealthy' foods for healthy ones and adding 'healthy' foods to their usual meals. (COM-B: capability – psychological; TDF: behavioural regulation)

#### 2. Increasing calorie intake

Women were socially influenced by others who encouraged them to increase their calorie intake (COM-B: opportunity – social; TDF: social influences). The women reflected on the consequences they believed this WRHB could have on

the unborn baby's growth and development, comparing it to the impact other WRHBs, such as the consumption of 'healthy' foods could have (COM-B: motivation – reflective; TDF: beliefs about consequences). Women were not motivated to engage in this WRHB as they believed that increased calories would not benefit the growth and development of the unborn baby, and favoured engaging in the consumption of 'healthy' foods to support the unborn baby's growth and development (COM-B: motivation – reflective; TDF: beliefs about consequences). Although the women in this study were not motivated to engage in this WRHB, they believed that other women would be.

### **3. Limiting of 'unhealthy' foods**

Women were motivated to limit, but not cease completely, their consumption of unhealthy foods (COM-B: capability – psychological; TDF: behavioural regulation) as they believed frequent consumption of 'unhealthy' foods could have a negative consequence on their unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). They demonstrated knowledge of what these 'unhealthy' foods were (COM-B: capability – psychological; TDF: knowledge) and employed behavioural regulation to limit the consumption of unhealthy foods, this was often achieved by substituting 'unhealthy' foods for 'healthy' foods (COM-B: capability – psychological; TDF: behavioural regulation).

### **4. Avoiding potentially 'harmful' foods**

Women were motivated to avoid any foods which were believed to have the potential to cause immediate harm to the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). The women's knowledge towards which foods were 'harmful' was inconsistent. Those who had limited knowledge of which foods were classed as 'harmful', or indicated a level of uncertainty towards the 'safeness' of foods took an overly cautious approach (COM-B: capability – psychological; TDF: knowledge). The women's beliefs about the negative consequences consuming 'harmful' foods could have on the unborn baby generated fear in the women. The emotion of fear drove women's motivation to avoid 'harmful' foods (COM-B: motivation – automatic; TDF: emotion).

### **5. Engaging in physical activity – general**

Women held mixed beliefs about the consequence of engaging in physical activity, which was beyond their usual levels of exertion, but not necessarily classed as 'vigorous'. They believed it could have a positive consequence on their own mental well-being and body's preparation for labour which informed their motivations for engaging (COM-B: motivation – reflective; TDF: beliefs about consequences). However, they also believed it would not benefit the unborn baby. Their beliefs towards the lack of positive consequences it could have on

the unborn baby were compounded by their beliefs of the possibly harmful consequences that 'vigorous' activity could have on the unborn baby (see 'avoiding vigorous physical activity') (COM-B: motivation – reflective; TDF: beliefs about consequences). Social influences from others such as cultural beliefs of friends and family which were around the potential harm engaging in physical activity could have on the unborn baby also influenced women's beliefs towards the negative consequences engaging in physical activity could have on the unborn baby and motivated women to not engage (COM-B: opportunity – social; TDF: social influences).

## **6. Avoiding vigorous physical activity**

Physical activity which was classed as 'vigorous' was believed by the women to possibly have a harmful consequence on the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). These views (similar to the avoidance of 'harmful' foods) generated fear in the women which drove their motivations to avoid vigorous activity (COM-B: motivation – automatic; TDF: emotion). The women adopted the role and identity of a mother who was motivated to protect their unborn baby from harm by avoiding possible harm, such as vigorous activity (COM-B: motivation – reflective; TDF: social/professional role and identity). Some women were motivated to maintain their participation in physical activity, but to do so, believed they needed to regulate their behaviour in order to prevent physical activity levels becoming 'vigorous' (COM-B: capability – psychological; TDF: behavioural regulation).

## **7. Maintaining engagement in physical activity**

Women who were engaged in physical activity prior to pregnancy were primarily engaging in physical activity which was considered 'too vigorous' for pregnancy. They maintained their engagement by regulating their behaviour to reduce the intensity (COM-B: capability – psychological; TDF: behavioural regulation). This was driven by the belief that vigorous activity could harm the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). The women shifted their goals (COM-B: motivation – reflective; TDF: goals) of engaging in physical activity to support their behavioural regulation (COM-B: capability – psychological; TDF: behavioural regulation). Women who did not have the skills or knowledge (COM-B: capability – psychological; TDF: knowledge and skills), or who did not believe they had the capability of how to adapt their engagement in physical activity for it to pregnancy appropriate (COM-B: motivation – reflective; TDF: beliefs about capabilities), did not maintain their engagement. This was because the beliefs around the potential harm that engaging in vigorous physical activity could have on the unborn baby drove their motivations and engagement,

which led women to avoid physical activity as a way to reduce the risk to the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences).

## **8. Restricting calorie intake**

Calorie intake was believed to have an impact on weight gain during pregnancy, and that restricting calorie intake could prevent excessive GWG (COM-B: motivation – reflective; TDF: beliefs about consequences). However, restricting calorie intake was also believed to have a negative consequence on the unborn baby by depriving the unborn baby of nutrition needed to grow and develop (COM-B: motivation – reflective; TDF: beliefs about consequences). These beliefs of the negative consequences mean women were not motivated, and did not, attempt to restrict their calorie intake for the purposes of weight management.

### **7.3.2 Theme Two: Listening and responding to my body**

This theme contained seven WRHBs:

1. Responding to hunger
2. Change in food preferences
3. Responding to tiredness
4. Maintaining engagement in physical activity
5. Consuming food to manage nausea
6. Avoidance of food smells
7. Engaging in physical activity – general

WRHBs identified in this theme mapped predominantly onto the COM-B components of reflective motivation (TDF: beliefs about consequences), psychological capability (TDF: behavioural regulation), but also had other determinants they interacted with.

#### **1. Responding to hunger**

Women were more motivated to respond to the feeling of hunger than prior to pregnancy. They assigned mental attention to interpret the source of hunger (COM-B: capability – psychological; TDF: memory, attention and decision processes), and interpreted it as a signal from the unborn baby that they required energy (COM-B: motivation – reflective; TDF: beliefs about consequences), and subsequently responding to it by consuming food. They believed that ignoring hunger could deprive the unborn baby of energy needed to grow and develop sufficiently (COM-B: motivation – reflective; TDF: beliefs about consequences). Responding to hunger meant that for some women they felt they had lost control of behavioural regulation they utilised prior to pregnancy for responding to hunger which could result in weight gain. Some women attempted to continue regulating their behaviour to prevent excessive weight gain by consuming 'healthy' low

calorie foods instead of 'unhealthy' high calorie foods when responding to hunger (COM-B: capability – psychological; TDF: behavioural regulation).

## **2. Change in food preferences**

Similar to responding to hunger, a change in food preferences was interpreted by the women to be a signal from the unborn baby that they required particular nutrients. Women believed the consequence of engaging in these food preferences would benefit the unborn baby's growth and development (COM-B: motivation – reflective; TDF: beliefs about consequences). Women subsequently responded to this WRHB by consuming the foods preferred (COM-B: capability – psychological; TDF: behavioural regulation). Women demonstrated knowledge towards foods they thought were 'healthy' for the unborn baby and were motivated to consume those foods (see consumption of 'healthy' foods) (COM-B: capability – psychological; TDF: knowledge), however, food preferences were sometimes for 'unhealthy' foods, which women were motivated to limit their consumption of (see limiting of 'unhealthy' foods). Women paid extra attention to cues for foods which contradicted their knowledge of 'healthy' foods to make a decision whether or not to respond to those cues, or to ignore them and consume 'healthy' foods (COM-B: capability – psychological; TDF: memory, attention and decision processes). Although the women believed consuming food preferences which were not 'healthy' could be linked to health complications, the link made between a change in food preferences as being a cue from the unborn baby and the perceived impact this could have on the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences), took precedence over consuming 'healthy' foods.

## **3. Responding to tiredness**

Similar to hunger (see responding to hunger) and food preferences (see change in food preferences) women were more motivated to respond to the feeling of tiredness than prior to pregnancy as it was interpreted as being a signal from the unborn baby that it needed more energy. Women believed that resting in response to tiredness, could have a positive consequence on the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). Women who were engaging in physical activity regulated their behaviour by reducing their engagement in physical activity when they experienced tiredness (COM-B: capability – psychological; TDF: behavioural regulation).

## **4. Maintaining engagement in physical activity**

In order to maintain engagement in physical activity, women consciously regulated their behaviour and intensity to avoid it becoming 'vigorous' (see avoiding vigorous physical activity and engaging in physical activity – general)



(COM-B: capability – psychological; TDF: behavioural regulation). Women also experienced physical cues when engaging in physical activity, which they believed reflected its intensity (COM-B: capability – physical; TDF: knowledge). They were receptive to bodily cues such as breathlessness (COM-B: capability – psychological; TDF: memory, attention and decision processes), which they interpreted as indicating their physical activity was becoming too vigorous and could possibly have a negative impact on the unborn baby (COM-B: capability – physical; TDF: knowledge), and that they should adapt or reduce their engagement (COM-B: capability – psychological; TDF: behavioural regulation).

### **5. Consuming food to manage nausea**

Women were motivated to consume food to manage the physiological symptom of nausea. They believed that the quantity and type of food consumed could have a positive or negative consequence on the nausea they experienced (COM-B: motivation – reflective; TDF: beliefs about consequences); these beliefs motivated the women to regulate their consumption of foods as a way to manage nausea (COM-B: capability – psychological; TDF: behavioural regulation). Engaging in this WRHB was often an immediate response to the physiological experience of nausea (COM-B: motivation – automatic; TDF: emotion), which meant foods that were convenient and readily available were consumed (COM-B: opportunity – physical; TDF: environmental context and resources).

### **6. Avoidance of food smells**

Women were motivated to avoid the smell of food, such as from cooking and strong smelling foods, as they believed it could initiate nausea (see consuming food to manage nausea) which could also trigger food aversions (COM-B: motivation – reflective; TDF: beliefs about consequences). Friends and family provided social support for the women by cooking more, which allowed the women to avoid cooking smells (COM-B: opportunity – social; TDF: social influences). Women also avoided the smell of foods by consuming foods that did not smell strongly, such as cold, bland, convenience foods (COM-B: capability – psychological; TDF: behavioural regulation).

### **7. Engaging in physical activity – general**

Women believed engaging in physical activity could have consequences on pregnancy symptoms, such as tiredness or sickness (COM-B: motivation – reflective; TDF: beliefs about consequences). These beliefs informed women's engagement. Some women were motivated to engage in physical activity as they believed it could lessen pregnancy symptoms. However, others were motivated not to engage in physical activity because they believed it could worsen symptoms (COM-B: motivation – reflective; TDF: beliefs about consequences).

### 7.3.3 Theme Four: “I’m the kind of person who...”

Two WRHBs were identified in this theme:

1. Consumption of ‘healthy’ foods
2. Engaging in physical activity -- general

WRHBs were difficult to map in this theme, as women discussed their ‘lifestyle’ prior to pregnancy holistically, however, this theme captures important insight into the drivers of WRHBs during pregnancy. This primarily mapped onto reflective motivation (TDF: social/professional role and identity) as it was part of the women’s pre-existing identity prior to the pregnancy.

#### 1. Consumption of ‘healthy’ foods

For women who identified their diet prior to pregnancy as ‘not the healthiest’, the WRHB of consumption of ‘healthy’ foods was initiated by the women through behavioural regulation by reducing their current consumption of ‘unhealthy’ foods, and increasing consumption of ‘healthy’ foods (COM-B: capability – psychological; TDF: behavioural regulation). Additionally, some women’s perceived identity as someone at increased risk of developing health complications due to family health history and/or their ethnicity motivated the women to manage that risk by engaging in this WRHB (COM-B: motivation – reflective; TDF: social/professional role and identity). This was further driven by their evolving role as a mother who was providing for their unborn baby (COM-B: motivation – reflective; TDF: social/professional role and identity). Engagement in this WRHBs was also driven by women’s psychological knowledge (COM-B: capability – psychological; TDF: knowledge) and physical skills of which foods to consume and how to cook them and incorporate them into their diet. (COM-B: capability – physical; TDF: skills). Previous experiences of weight loss and involvement in weight loss clubs such as slimming world informed the women’s knowledge and skills, which they continued to apply when engaging in this WRHB during pregnancy, even though they were not aiming to lose weight (COM-B: capability – psychological; TDF: knowledge and COM-B: capability – physical; TDF: skills).

#### 2. Engaging in physical activity – general

Social support from family was a driver of women’s engagement in physical activity. Women who engaged in physical activity were supported by their partners if they also engaged in physical activity (COM-B: opportunity – social; TDF: social influences). Women were less motivated to engage in this WRHB, if their partner did not engage in physical activity (COM-B: opportunity – social; TDF: social influences). The women’s previous engagement with physical activity

constituted their 'health' identity. This impacted on their motivations towards engaging in physical activity during pregnancy (COM-B: motivation – reflective; TDF: social/professional role and identity) and their beliefs towards the consequence of engaging in physical activity during pregnancy on themselves and the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences).

### **7.3.4 Summary of findings at Timepoint One**

Reflective motivation (TDF: beliefs about consequences) was the dominant determinant of WRHBs at this timepoint. Women were primarily motivated to engage in WRHBs which are perceived to positively impact the growth and development of the unborn baby, and avoid behaviour which were thought to have the potential to cause harm to the unborn baby. The women believed both diet and physical activity could impact the unborn baby in different ways. In order for women to engage in physical activity, which was considered appropriate for pregnancy, they required the psychological capability (TDF: knowledge and skills) to appropriately adapt the activities to reduce intensity and thus avoid harm to the unborn baby. Interestingly, engaging in WRHBs to manage weight gain during pregnancy were believed by women to have the potential of causing harm to the unborn baby by limiting the development, through dietary deprivation and the risks associate with physical activity.

Women utilised memory, attention and decision processes (TDF) (COM-B: psychological capability) when they experiences physiological cues, in order to interpret them and decide how to respond to them. Although the cues were often similar to those outside of pregnancy, women now attributed the cause of these cues to the unborn baby. This interacted with their beliefs about the consequences (COM-B: reflective motivation) of ignoring or responding to the cues could have on the unborn baby.

Although women felt knowledgeable (psychological capability) about what WRHBs were 'healthy', 'unhealthy' or 'harmful' for the unborn baby, which motivated (reflective motivation) them at this timepoint, their experiences of pregnancy symptoms and changing bodily cues (physical capability) also drove their engagement in WRHBs and sometimes conflicted with their knowledge. This resulted in cognitive dissonance in the women, who attributed attention to evaluate which WRHBs to engage in. Engaging in WRHBs driven by bodily cues, by being intuitive and receptive to their body took precedence over typically 'healthy' WRHBs as the women held the knowledge towards cues as being linked directly to the unborn baby and managing symptoms had an immediate impact on the women's well-being.

Women's perceptions towards their lifestyle prior to pregnancy, and how that lifestyle contributes to their identity also impacted on their WRHBs during pregnancy.

#### **7.4 Timepoint Two**

Twelve WRHBs were identified in the themes at this timepoint. Some of these WRHBs were similar to TP1 (eight); four were unique to this timepoint only. No WRHBs were identified in sub-theme 1c., Theme Three and sub-theme 4b. as the discussion was orientated around weight as an outcome, rather than the underlying WRHBs. Although the identified WRHBs look similar across the timepoints, the women's engagement in them and the underlying drivers and mechanisms of the behaviours were different. The WRHBs and their determinants in each theme are listed in the table below (see Table 7.2).

Table 7.2 Weight-related health behaviours (WRHBs), COM-B components and TDF identified in each theme at TP2

Sub-theme	Weight-related health behaviours	COM-B	TDF
<b>Theme One: What is healthy for us?</b>			
<b>Sub-theme 1a.</b>	Consumption of 'healthy' foods	Capability – Psychological	Behavioural regulation
		Motivation – Reflective	Beliefs about consequences
		Motivation – Automatic	Reinforcement
	Increasing calorie intake	Motivation – Reflective	Beliefs about consequences
	Limiting of 'unhealthy' foods	Capability – Psychological	Behavioural regulation
	Avoiding potentially harmful foods	Motivation – Reflective	Beliefs about consequences
		Motivation – Automatic	Reinforcement Emotional
	Reducing sugar and carbohydrate intake – GDM specific	Capability – Psychological	Knowledge
		Opportunity – Social	Social influences
		Motivation – Reflective	Beliefs about consequences
Motivation – Automatic		Emotion	
<b>Sub-theme 1b.</b>	Engaging in physical activity - general	Opportunity – Social	Social influences
		Motivation – Reflective	Beliefs about consequences
			Beliefs about capability
	Avoiding vigorous physical activity	Capability – Psychological	Behavioural regulation
		Motivation – Reflective	Beliefs about consequences
	Maintaining engagement in physical activity	Capability – Psychological	Behavioural regulation
			Knowledge
			Skills
		Opportunity – Social	Social influences
Avoidance of being sedentary	Motivation – Reflective	Belief about capabilities	
	Motivation – Automatic	Emotion	
<b>Sub-theme 1c.</b>	N/A		
<b>Theme Two: Listening and responding to the body</b>			
<b>Sub-theme 2a.</b>	Responding to hunger	Motivation – Reflective	Beliefs about consequences
		Motivation – Automatic	Reinforcement

<b>Sub-theme</b>	<b>Weight-related health behaviours</b>	<b>COM-B</b>	<b>TDF</b>
	Increasing calorie intake	Motivation – Reflective	Beliefs about consequences
	Responding to ‘cravings’	Capability – Psychological	Behavioural regulation
		Motivation – Reflective	Beliefs about consequences
		Motivation – Automatic	Emotion
	Increased rest	Capability – Psychological	Behavioural regulation
		Motivation – Reflective	Beliefs about consequences
Avoidance of being sedentary	Capability – Psychological	Behavioural regulation	
<b>Sub-theme 2b.</b>	Consumption of ‘healthy’ foods	Capability – Psychological	Memory, attention and decision processes
			Knowledge
		Motivation – Automatic	Emotion
<b>Theme Three: After I’ve had the baby: N/A</b>			
<b>Theme Four: I’m the kind of person who</b>			
<b>Sub-theme 4a.</b>	Responding to ‘cravings’	Motivation – Automatic	Social/Professional role and identity
	Consumption of ‘healthy’ foods	Opportunity – Social	Social influences
		Motivation – Reflective	Social/Professional role and identity
	Engaging in physical activity - general	Opportunity – Social	Social influences
		Motivation – Reflective	Social/Professional role and identity
<b>Sub-theme 4b.</b>	<b>N/A</b>		

### 7.4.1 Theme One: What is healthy for us?

These theme consisted of nine WRHBs:

1. Consumption of 'healthy' foods
2. Increasing calorie intake
3. Limiting of 'unhealthy' foods
4. Avoiding potentially harmful foods
5. Reducing sugar and carbohydrate intake – GDM specific
6. Engaging in physical activity - general
7. Avoiding vigorous physical activity
8. Maintaining engagement in physical activity
9. Avoidance of being sedentary

Some of the women's beliefs underlying the WRHBs at TP1, primarily the consequences they could have on the unborn baby, had shifted since TP1, meaning the determinants of some WRHBs changed. Determinants of WRHBs for this theme at this timepoint primarily mapped onto the reflective motivation and psychological capability COM-B components, which acted differently on WRHBs than TP1.

#### 1. Consumption of 'healthy' foods

This WRHB was discussed less frequently by the women at this timepoint. Similar to TP1 some women discussed their beliefs of the consequences this WRHB could have on the unborn baby. These beliefs had shifted for most women, and the consumption of 'healthy' foods were no longer thought to be essential for the unborn baby's development and growth. They were now thought to be related to benefits after the birth, such as taste preferences (COM-B: motivation – reflective; TDF: beliefs about consequences). The reduced importance of consuming 'healthy' foods meant these beliefs did not drive motivation to engage in this WRHB as they had done at TP1 (COM-B: motivation – reflective; TDF: beliefs about consequences). This reduction in reflective motivation meant that most women were not or had not engaged in this WRHB as they had discussed at TP1. Furthermore, women believed that their unborn baby was developing sufficiently through visual indicators such as their bump and ultrasound scans. Their unborn baby's growth and development, regardless of their consumption of healthy foods, reinforced their view that the consumption of healthy foods had minimal impact on the unborn baby's growth and development since TP1, which reduced their motivation (COM-B: motivation – automatic; TDF: reinforcement and beliefs about consequences). Women who had engaged in this WRHB since TP1 regulated their behaviour by replacing 'unhealthy' foods with more 'healthy' foods (see limiting unhealthy foods) (COM-B: capability – psychological; TDF:

behavioural regulation). These women continued to believe foods they consumed could impact on the unborn baby's development and consumed 'healthy' foods which were believed to have a positive consequence in the unborn baby's development (COM-B: motivation – reflective; TDF: beliefs about consequences).

## **2. Increasing calorie intake**

Different to TP1, women were motivated to increase their calorie intake at this stage of pregnancy as they believed the unborn baby had an increased growth rate, which would be benefitted by an increase in calories (COM-B: motivation – reflective; TDF: beliefs about consequences). Compared to TP1 the content of the calories was not as important to the women: this was driven by the shift in beliefs of the impact dietary intake could have on the unborn baby's growth and development (see consumption of 'healthy' foods) (COM-B: motivation – reflective; TDF: beliefs about consequences). Some women, were not motivated to increase their calories as they believed their calorie intake was sufficient to support the increased growth rate, and consuming more calories would not have further positive consequences on the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences).

## **3. Limiting of 'unhealthy' foods**

This WRHB was discussed less frequently by the women at this timepoint, with most women not discussing it at all. It was engaged in indirectly by women who engaged in the 'consumption of healthy foods' WRHB (see consumption of 'healthy' foods), when they substituted 'unhealthy' foods for 'healthy' foods through behavioural regulation (COM-B: capability – psychological; TDF: behavioural regulation).

## **4. Avoiding potentially harmful foods**

Women remained motivated to engage in this WRHB and had continue to engage in it since TP1 (COM-B: capability – psychological; TDF: behavioural regulation). Similar to TP1 the drivers of engagement remained around the women's beliefs of the consequences 'harmful' foods could have on the unborn baby and viability of the pregnancy (COM-B: motivation – reflective; TDF: beliefs about consequences). These beliefs continued to elicit fear towards the potential of harming their unborn baby (COM-B: motivation – automatic; TDF: emotion). Different to the consumption of 'healthy' foods, these beliefs remained prevalent throughout the pregnancy and continued engagement with this WRHB remained essential for the safety of the unborn baby (COM-B: motivation – automatic; TDF: beliefs about consequences and reinforcement).



## **5. Reducing sugar and carbohydrate intake – gestational diabetes specific**

This WRHB was relevant only for the participant who had been diagnosed with gestational diabetes. The WRHB was influenced by a number of factors. She had received social support from healthcare professionals (COM-B: opportunity – social; TDF: social influences), due to the extra care received on diagnosis. Information provided by the healthcare professionals increased the woman's knowledge towards the impact of sugar and carbohydrates on their pregnancy and the well-being of the unborn baby (COM-B: capability – psychological; TDF: knowledge). This informed the women's beliefs about the consequences of consuming these foods (COM-B: motivation – reflective; TDF: beliefs about consequences), and prompted fear towards consuming these foods and the potential consequences they could have, which drove her engagement in this WRHB since diagnosis (COM-B: motivation – automatic; TDF: emotion).

## **6. Engaging in physical activity – general**

Women who were not engaged in physical activity at TP1, but had discussed their motivation to engage in physical activity at some point during pregnancy had not engaged in physical activity by this timepoint. This was due to low self-efficacy and limited beliefs towards their capability, which reduced motivation (COM-B: motivation – reflective; TDF: beliefs about capabilities). An absence of partner support also acted as a barrier to women's engagement (COM-B: opportunity – social; TDF: social influences). Beliefs towards the benefits of engaging in physical activity had shifted from TP1 and were now only around aiding the birth (COM-B: motivation – reflective; TDF: beliefs about consequences). Discussion around the benefits of physical activity were minimal at this timepoint; and were predominantly discussed by the women who had maintained their engagement in physical activity.

## **7. Avoiding vigorous physical activity**

Women's beliefs about the negative consequences engaging in vigorous activity could have on the unborn baby (i.e. risk of harm) remained the same since TP1, and continued to drive their engagement in this WRHB (COM-B: motivation – reflective; TDF: beliefs about consequences). Women who maintained their engagement in physical activity (see below) regulated the intensity of their physical activity to prevent it from becoming vigorous (COM-B: capability – psychological; TDF: behavioural regulation).

## **8. Maintaining engagement in physical activity**

Most women who were engaged in physical activity at TP1 had maintained their engagement at TP2 (see maintaining engagement in physical activity). In order to maintain engagement, women required knowledge (COM-B: capability – psychological; TDF: knowledge) and skills (COM-B: capability – psychological; TDF: skills) for them to regulate their behaviour, so it did not become vigorous (COM-B: capability – psychological; TDF: behavioural regulation). Some women experienced judgement from others when engaging in this WRHB. They received unsolicited comments from others towards the appropriateness of engaging in physical activity during pregnancy, which had the potential to act as a barrier (COM-B: opportunity – social; TDF: social influences). Women reflected on these comments and evaluated their beliefs about capabilities of ensuring they were engaging in physical activity safely (COM-B: motivation – reflective; TDF: beliefs about capabilities).

## **9. Avoidance of being sedentary**

The avoidance of being sedentary did not require an increased level of exertion (unlike engaging in physical activity – general), but could be engaged in during every day activities. Women were motivated to avoid being sedentary, due to their own perceptions of negative connotations, such as laziness, associated with being sedentary which they sought to distance themselves from (COM-B: motivation – automatic; TDF: emotion).

### **7.4.2 Theme Two: Listening and responding to the body**

Six WRHBs were identified in this theme.

1. Responding to hunger
2. Increasing calorie intake
3. Responding to ‘cravings’
4. Increased rest
5. Avoidance of being sedentary
6. Consumption of ‘healthy’ foods

Women’s beliefs towards the origins of bodily cues remained linked to their unborn baby’s needs. This continued to drive motivation towards responding to these cues and engaging in these WRHBs. Compared to TP1, WRHBs associated with pregnancy symptoms, such as consuming food to manage nausea and avoidance of food smells were no longer present or engaged in due to the decline in symptoms. Determinants of WRHBs for this theme mapped onto the reflective (primary TDF: beliefs about consequences) and automatic

motivation (TDF: emotion), and psychological capability (TDF: behavioural regulation and memory, attention and decision processes) COM-B components.

### **1. Responding to hunger**

Women had continued to engage in this WRHB since TP1, as they continued to believe that responding to hunger would positively impact on the growth and development of the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences). This belief was reinforced throughout the pregnancy as the unborn baby had continued to grow and develop whilst the women were engaging in this WRHB (COM-B: motivation – automatic; TDF: reinforcement). Therefore women continued to be motivated to engage in this WRHB at this timepoint.

### **2. Increasing calorie intake**

Women were motivated to increase their calorie intake due to beliefs towards the unborn baby's increased growth rate, and how increased calorie intake could support that (as discussed in relation to this WRHB in Theme One) (COM-B: motivation – automatic; TDF: beliefs about consequences). An increase in tiredness was sometimes interpreted by the women as indicating their calorie intake was insufficient in meeting the unborn baby's needs, which drove their motivations to increase their calorie intake (COM-B: motivation – automatic; TDF: beliefs about consequences).

### **3. Responding to 'cravings'**

'Cravings' were presented by the women as a physiological cue (COM-B: motivation – automatic; TDF: emotion) which they believed was a signal from the unborn baby, that they needed nutrients from a particular food (COM-B: motivation – reflective; TDF: beliefs about consequences). These beliefs drove women's motivation to engage in this WRHB. Cravings were often for 'unhealthy' foods which women were motivated not to consume excessive amounts of. This led women to regulate their engagement in cravings by consuming the foods indicated in the cravings, but also manage their consumption to prevent it being excessive (COM-B: capability – psychological; TDF: behavioural regulation).

### **4. Increased rest**

Women were motivated to increase their levels of rest at this timepoint. 'Rest' was considered to be achieved through the cessation of, or reduced intensity of activities. Women believed that for the unborn baby to grow, energy was required. They therefore believed that by resting and conserving their own energy expenditure, this would positively impact on the unborn baby's growth (COM-B: motivation – reflective; TDF: beliefs about consequences). Tiredness was

interpreted by women as a cue to increase their rest and conserve their energy expenditure. Women who had maintained their engagement in physical activity (see maintaining engagement in physical activity), responded to increased levels of tiredness by reducing their engagement in physical activity, which indirectly increased their levels of rest. (COM-B: capability – psychological; TDF: behavioural regulation). Women also experienced other cues which were interpreted as a signal to rest, such as pain or discomfort. This was believed to indicate that women were over-exerting themselves, similar to avoiding vigorous physical activity discussed in Theme One, which could have a negative consequence on the unborn baby (COM-B: motivation – reflective; TDF: beliefs about consequences).

### **5. Avoidance of being sedentary**

Due to women engaging in increased rest (see WRHB above) levels of activity in the women declined. For the women who had maintained their engagement in physical activity, engaging in increased levels of rest and avoiding vigorous physical activity (see above) meant they were motivated to avoid being sedentary. This was often achieved through behavioural regulation to engage in activities which were pregnancy and energy appropriate (COM-B: capability – psychological; TDF: behavioural regulation).

### **6. Consumption of 'healthy' foods**

At TP1 pregnancy symptoms impacted on the foods women felt capable of consuming. At this timepoint these symptoms were no longer present, providing women the opportunity of choosing their consumption of foods. At TP1 they were motivated to consume 'healthy' foods to support the growth and development of the unborn baby (see consumption of 'healthy' foods), however, as discussed in Theme One, these beliefs had shifted at this timepoint. This shift indicated a possible change in women's knowledge towards the potential impact their diet could have on the unborn baby (COM-B: capability psychological; TDF: knowledge). Women allocated their attention in deciding which foods to consume (COM-B: capability – psychological; TDF: memory, attention and decision processes). Women were motivated to consume foods which met their emotional needs at this timepoint in pregnancy, and were driven by beliefs of leniency and self-care, to consume foods which were associated with positive affect (COM-B: motivation – automatic; TDF: emotion). This meant that women were no longer motivated to engage in the consumption of 'healthy' foods specifically (COM-B: capability psychological; TDF: knowledge).

### **7.4.3 Theme Four: I'm the kind of person who**

There were three WRHBs identified in this theme:

1. Responding to 'cravings'
2. Consumption of 'healthy' foods
3. Engaging in physical activity - general

The women's 'health' identity and 'lifestyle' prior to pregnancy continued to inform their engagement in WRHBs during pregnancy at this timepoint. Women discussed their identity and engagement in WRHBs prior to pregnancy less at this timepoint, as they remained the same. Similar to TP1 the women discussed their 'lifestyle' and being 'healthy' holistically, which made it difficult to identify all individual WRHBs. The dominant drivers of behaviours for this theme at this timepoint were reflective motivation (TDF: social/professional role and identity) and psychological capability. Women did engage in WRHBs which were classed as 'out of character', which were driven by automatic motivation.

#### **1. Responding to 'cravings'**

Women were motivated to engage in this WRHB as it was believed it would have a positive consequence on the unborn baby's growth (see responding to 'cravings' in Theme Two. These 'cravings' were often for foods which the women labelled as 'out of character'. This meant that women perceived their engagement in this WRHB for particular foods as deviating from their identity and usual dietary behaviours (COM-B: motivation – reflective; TDF: social/professional role and identity). This was accepted by the women and did not act as a barrier to this WRHB. Women believed their engagement in these 'out of character' behaviours would cease once the cues of cravings ceased and they would return to their 'usual' behaviours.

#### **2. Consumption of 'healthy' foods**

Stable characteristics from prior to pregnancy, such as engagement in this WRHB and increased risk of health complications, which contributed to the women's identity, continued to inform their motivation in this WRHB (COM-B: motivation – reflective; TDF: social/professional role and identity), similar to at TP1. Engaging in this WRHB at this timepoint was supported by the women's partners and family, if they were also engaged in this WRHB (COM-B: opportunity – social; TDF: social influences).

#### **3. Engaging in physical activity – general**

Women's engagement in this WRHB was socially influenced by their partner's engagement (COM-B: opportunity – social; TDF: social influences). Women whose partner also engaged in this WRHB, were motivated to engage in this

WRHB as part of their identity and 'lifestyle' which was a joint venture (COM-B: motivation – reflective; TDF: social/professional role and identity).

#### **7.4.4 Summary of findings at Timepoint Two**

Some of the WRHBs engaged in at this timepoint by the women were similar to those at TP1. However, some which were present at TP1 were no longer present at TP2; and some present at this timepoint were not present at TP1. This indicates that women engage in some WRHBs across pregnancy, whilst others are time specific. WRHBs that were engaged in across pregnancy often had different underlying determinants at TP2 than TP1. Changes in determinants and WRHBs often impacted on other WRHBs and determinants; illustrating how these WRHBs exist with a 'system of behaviours' (Michie et al., 2011). Some determinants of behaviour remained stable across pregnancy, such as women's self-perceived 'health' identity established prior to pregnancy.

#### **7.5 Juxtaposing both timepoints**

At TP1 the main drivers for women's engagement in the above WRHBs were around the beliefs of how they could impact on the unborn baby's growth and development, and the viability of the pregnancy. This related to women's knowledge of 'healthy', 'unhealthy' and potentially 'harmful' foods, and those which were interpreted to be signalled through bodily cues from the unborn baby. Consuming nutritiously 'healthy' foods was believed to be essential in supporting the growth and development of the unborn baby. Increasing calories was not considered to benefit the unborn baby at this stage, the nutritional content of the diet was believed to be more important.

Engaging in physical activity was not considered essential in supporting the growth and development of the unborn baby, and was believed to benefit the woman. Women believed it was physical activity that was 'vigorous' and involved 'over-exerting' that had the potential to harm the unborn baby, with all women, including those engaged in physical activity, avoiding vigorous activity. Having the knowledge and skills to adapt physical activity so it was not vigorous, and therefore did not have the potential to harm the unborn baby was fundamental in maintaining engagement in physical activity. Those who had adapted physical activity to be appropriate for pregnancy and were engaging in physical activity at TP1 had maintained their engagement at TP2. Women who did not have these psychological capabilities ceased engagement in physical activity to avoid the risk of harm physical activity was associated with.

The physiological aspects of pregnancy, often interacted with the psychological aspects of pregnancy, described above. For example, pregnancy symptoms and

cues in early pregnancy sometimes acted as a barrier towards women's engagement in the behaviours they were motivated to engage in. Women's engagement in WRHBs prior to pregnancy also impacted on their engagement during pregnancy, specifically around engaging in physical activity. Maintaining engagement in physical activity was engaged in by women more so than initiating engagement in physical activity.

By TP2 women's knowledge and beliefs towards the impact of consuming 'healthy' foods and limiting 'unhealthy' foods on the unborn baby had shifted, and it was no longer believed they were essential for the unborn baby's growth and development. This reduced women's motivation to engage in these WRHBs. Additionally, these views had been reinforced through the pregnancy as the unborn baby had grown and developed sufficiently since TP1 regardless of their engagement, which led women to believe the nutritional composition of their diet had limited impact on the unborn baby's development. Women did remain motivated by meeting the needs of the unborn baby at this stage of pregnancy, with some women believing an increased rate of the unborn baby's growth required an increase in calories.

Women continued to believe that the needs of the unborn baby were communicated to them through bodily cues and signals such as cravings and tiredness. Women had continued to respond to cues in the belief they were signals from the unborn baby throughout the pregnancy, in favour of WRHBs identified as 'healthy' in Theme One. This subsequently reinforced the belief that responding to cues met the needs of the unborn baby more so than engaging in 'typically healthy' WRHBs, which were not specific to their own unborn baby's needs. The experience of the woman diagnosed with gestational diabetes provides interesting insight into how sustained beliefs towards the impact diet could have on the unborn baby at TP2 drove engagement in reducing sugar and carbohydrate consumption.

## **7.6 Chapter summary**

This analysis has identified individual WRHBs which are present in women's experiences across pregnancy. Furthermore, these WRHBs have been mapped to existing psychological theory to identify their underlying determinants across pregnancy. This has demonstrated how WRHBs and their determinants exist in a 'system of behaviours' (Michie et al., 2011), which are interconnected and influence each other, and has provided insight into the importance of treating WRHBs individually, rather than grouping them under the umbrella terms of 'diet' and 'physical activity'. All COM-B components and most (10) of the 12 TDF domains were determinants of WRHBs across pregnancy.

It was evident that the drivers of WRHBs interacted with each other and changed across pregnancy, mainly due to changing reflective motivation and psychological capability in the women. This understanding provides insight into which WRHBs women engage in (or not) during pregnancy and why. It is the WRHBs discussed above, which are of personal relevance to the women, that could be used to guide the behaviours targeted in future interventions.

The understanding of the drivers of the WRHBs provided here, provides insight into how WRHBs can be supported or changed. Key WRHBs from this study, guided by the level of importance from the women's perspectives and complexity of the behavioural determinants, would be the 'consumption of healthy foods', 'engaging in physical activity' and 'avoidance of being sedentary'. These WRHBs appear to be the most relevant behaviours for women to engage in during pregnancy, with a complex range of drivers which changed across pregnancy due to both psychological factors (e.g. knowledge) and pregnancy specific physiological factors (e.g. pregnancy symptoms). These three key WRHBs were behaviours that women were motivated to engage in, but their engagement was impacted on by other psychological and physiological factors. Women's healthy self-identity and pre-existing behaviours also compounded the psychological and physiological factors underlying these WRHBs. The high relevance of these WRHBs to women, in addition to their motivation to engage in the WRHBs and the complex myriad of drivers as identified above through the theoretical mapping, suggests these WRHBs could be tentatively recommended as candidate WRHBs for future interventions. The findings presented in this chapter and the previous two chapters (Chapter 5 and Chapter 6) will be discussed in the followed chapter (Chapter 8 Discussion). This will demonstrate the novel findings of this study and situate the contribution of the findings in relation to existing literature.



## Chapter 8 Discussion

### 8.1 Introduction

This study conducted qualitative longitudinal (QL) research with women across pregnancy, looking at weight-related health behaviours (WRHBs), and was the first study to integrate the QL findings with the COM-B model of behaviour and theoretical domains framework (TDF).

The overall aim of this study was to understand women's experiences of WRHBs across pregnancy. A systematic review was designed to identify, critique and thematically synthesise the existing literature investigating women's experiences of gestational weight gain (GWG) (Chapter 2); this review identified research gaps and refined the aims for the main study. A qualitative longitudinal (QL) approach was utilised for the main study to address the overall aims. Analysis of the QL data inductively generated a thematic framework. Four themes were found and applied at both timepoints (Chapter 5 and Chapter 6), however a different narrative was evident for each timepoint: Timepoint One (TP1) disruption and adaptation, and Timepoint Two (TP2) Passivity. WRHBs were identified from the themes presented in Chapter 5 and Chapter 6 and were subsequently mapped to existing psychological theory to identify their individual determinants (presented in Chapter 7). The WRHBs and their theoretical determinants added a novel element to the QL findings, and reflect the similarities of the themes and the different narratives across the timepoints.

The current chapter will identify the unique contribution to knowledge that is offered through the findings of this study and the novel methodological approach adopted; re-visit the overall findings of the study and position them within wider literature. Lastly, the chapter presents recommendations, strengths and limitations of the study, researcher reflections and concludes the research.

### 8.2 Unique contribution to knowledge

The findings from this study have made a unique contribution to three key areas of knowledge:

1. The identification of individual weight-related health behaviours (WRHBs) and their determinants provides new insights rather than focussing on 'diet' and 'physical activity' as umbrella terms
2. The unborn baby's health and women's well-being are a priority over weight management

3. Women's pre-existing lifestyles, identities and social context impact women's personally relevant WRHBs across pregnancy

These findings have been made possible by adopting a qualitative longitudinal (QL) methodological approach across pregnancy, and the novel mapping of existing psychological theory to the QL findings.

### **8.3 The importance of thinking about individual weight-related health behaviours and their determinants**

This study identified 25 individual WRHBs which existed in the experiences of women across pregnancy, eight of which were present at both timepoints. It has also identified three key WRHBs which could be recommended as candidate WRHBs for future research and interventions. These three behaviours have been identified as they were considered relevant to the women during pregnancy (as discussed in Chapter 5 and Chapter 6), and the theoretical mapping (Chapter 7) identified them as behaviours women were motivated to engage in, but were hindered in doing so by other interacting psychological factors (e.g. knowledge) and pregnancy specific physiological factors (e.g. pregnancy symptoms). On the surface, the identified WRHBs could have been categorised into 'diet' and 'physical activity' as umbrella groups, however, they have been investigated and presented individually in the current study (see Chapter 7). This approach is different to other research which often groups 'diet', 'physical activity' and/or 'lifestyle' as umbrella terms when discussing associations with GWG; without identifying the individual health behaviours (Gardner et al., 2011; Skouteris et al., 2010). Reviews investigating the effectiveness of dietary and physical activity interventions targeting weight as an outcome have found mixed findings of which 'category' of behaviours (i.e. diet, physical activity or a combination of both) are more effective in managing GWG (Muktabhant, et al., 2015; Shieh, et al., 2018; Skouteris et al., 2010; Tanentsapf, et al., 2011). Furthermore, the intervention components and behaviour change techniques used in GWG-related behaviour change interventions are often poorly reported, which has made it difficult to identify what works and with which populations of women (Gardner et al., 2011; Fair & Soltani, 2021; Martin, et al., 2014; Skouteris et al., 2010; Soltani et al., 2016; Thangaratinam et al., 2012).

Whilst quantitative research has previously identified changes to women's diet and physical activity levels once they become pregnant (Borodulin et al., 2008; Melzer et al., 2010; Hillier & Olander, 2017), why, or how this happens has remained unknown, due to a dearth of qualitative literature exploring WRHBs from the women's perspectives during pregnancy. The QL component of this

study has explored GWG and its contributing WRHBs, from the women's perspectives. This has provided further insight into the complex field of research around GWG and its management. This research has attempted to take a step back from the complex picture and understand women's existing WRHBs and their role in contributing to GWG, from the views of the women. Further research has suggested that this frequent categorisation of WRHBs into umbrella terms, has hindered the understanding of individual WRHBs and their underlying processes of behaviour (Gardner et al., 2011; Hillier & Olander, 2017). The result is a disparate evidence base, with a lack of consensus towards which WRHBs to target and how, (Guelinckx et al., 2008; Hill, Skouteris & Fuller-Tyszkiewicz, 2013). This has led to recommendations for research to investigate WRHBs and their determinants from women's perspectives and to incorporate psychological theory to inform future intervention design and development (Anderson, 2001; Ayers & Olander, 2013; Heslehurst et al., 2013; Olander, Smith & Darwin, 2018; Oteng-Ntim et al., 2010).

The COM-B model has been identified as a model of behaviour which could provide insight into the different factors which interact to generate behaviour across pregnancy, with a view to providing a more holistic approach towards women's WRHBs across pregnancy, in addition to increased motivation. (Olander et al., 2018). The findings in the current study demonstrate the value of applying the COM-B model to increase understanding of the behaviour system, i.e. the different determinants interacting with motivation to generate women's WRHBs across pregnancy. By treating the WRHBs as individual entities in the current study (i.e. during the mapping to the COM-B model and TDF), the determinants for each WRHB were identified. This uncovered differences concerning the determinants of behaviours, as each individual WRHB had unique behavioural determinants, i.e. not all 'dietary' or 'physical activity' WRHBs were driven by the same factors. These driving factors for each WRHB interacted with each other, and changed across the course of pregnancy. For example, in the WRHB 'consumption of healthy foods', at TP1 women were highly motivated to engage in this WRHB, but were prevented in doing so by physiological pregnancy symptoms such as sickness. At TP2 their motivation had reduced, and they experienced less sickness. By providing insight into what factors influence women's WRHBs and when during pregnancy (see Chapter 7), these findings can be used to inform how to support or change women's engagement in WRHBs and any differences that should be taken into account depending on the stage of pregnancy. These subtle differences suggest different approaches are required when targeting WRHBs, depending on the specific target behaviour, and that information is lost when behaviours (and their determinants) are grouped. This is

likely also to be relevant for intervention evaluation and testing mechanisms of change, and should be considered in future research and intervention design and development targeting GWG and WRHBs.

### **8.3.1 A nuanced approach to individual weight-related health behaviours and their determinants across pregnancy**

Specifically, this study found that at TP1, women's existing WRHBs were disrupted (as described in TP1 narrative, Chapter 5) and they re-evaluated their beliefs towards what WRHBs they considered as 'healthy' in the context of pregnancy (i.e. how they impacted on the health of the unborn baby and themselves). These beliefs, which comprised subtle variation between the WRHBs (as describe in Chapter 7), underpinned an increase in women's reflective motivation (COM-B component) towards WRHBs. The dominance of reflective motivation across WRHBs adds to the existing literature which identifies pregnancy as a time where women are motivated to engage in behaviours for the health and well-being of their unborn baby (Gardner et al., 2012; O'Brien et al., 2017; Phelan, 2010; Sui et al., 2013). This could be initially seen to indicate support for the teachable moment, which is primarily based on the understanding that pregnancy is a time of increased motivation (Phelan 2010; McBride et al., 2003).

However, this study found that reflective motivation was not stable across pregnancy and decreased as the pregnancy progressed. This was related to the women's beliefs which underpinned it shifting, and the physiological changes of pregnancy, such as symptoms and cues (as described in the narratives of both timepoints Chapter 5 and Chapter 6, and in the description of WRHBs in Chapter 7). These findings provide support for, whilst also challenging pregnancy as a 'teachable moment' (Phelan, 2010), and the premise of basing the 'teachable moment' on the concept on motivation (Phelan 2010; McBride et al., 2003). Through the application of the COM-B model and TDF, the findings of the current study identified that reflective motivation did not drive WRHBs in isolation; it interacted with additional behavioural determinants (such as women's capability and opportunity) which, in cohesion, drove women's WRHBs as a behaviour system (Michie et al., 2011) (as presented in Chapter 7). Previous literature has challenged the teachable moment and its foundations being primarily focussed on motivation, as it is suggested that there are additional behavioural determinants (Olander et al., 2016). The application of the COM-B model in understanding behaviour has been suggested to provide a more holistic insight of behaviour, due to it being a system of behaviour including other behavioural determinants (such as capability and opportunity) in addition to motivation

(Dinsdale et al., 2016; Olander et al., 2016). It was suggested that this could identify a 'series' of teachable moments across pregnancy. Whilst the change in reflective motivation (and other determinants) across pregnancy found in the current study support the possibility of a series of teachable moments, these changes were not found to happen in response to a specific event, or 'moment'. They appeared, instead, to change on a continuum as the pregnancy progressed. Previous literature has hypothesised that specific moments such as ultrasound scans and foetal movement during pregnancy may act as a teachable moment (Olander et al., 2016). This was not found in the current study, however, the current study interviewed women at two timepoints in pregnancy (towards the beginning and end) which were not necessarily after specific moments or events. Future research could build on the findings of the current study by examining opportunities for change of the WRHBs and determinants identified here, after specific events to explore opportune moments of change.

### **8.3.2 Why weight gain and management is a low priority**

This study has found that in the context of pregnancy, women perceived GWG and its management as a low priority. This builds on existing literature which has found mixed findings towards the acceptability of GWG and appropriateness of weight management during pregnancy, as discussed in the systematic review (Chapter 2.) (Abayomi et al, 2020; Denison et al, 2015; Olander et al, 2011; Olander et al, 2013; Weir et al, 2010). The unique way in which this study has identified different 'types' of GWG, as perceived by the women, provides a richer understanding of the acceptability of weight gain and the appropriateness of its management during pregnancy. However, GWG is a complex topic of interest, as acknowledged in previous research (Denison et al., 2015; Arden et al., 2014; Johnson et al., 2012; Padmanabhan et al., 2015; Vanstone et al., 2016), with the women in this study also demonstrating uncertainty around managing GWG.

At Timepoint One (TP1) women initially held expectations towards how their weight would change. Changes to weight were believed to result from two causes. The first was weight gain directly related to the pregnancy, which was considered inevitable and healthy; the second was due to possible changes in their WRHBs, which women thought they had some, but limited, control over. Whilst women indicated some interest in how weight gain from the different causes (i.e. pregnancy related and WRHB related) would show on their body as the pregnancy progressed, most women did not plan to monitor GWG. Women perceived weight gain associated with the 'pregnancy' as a positive indicator of the unborn baby's development; but had limited association between excessive GWG and health implications or pregnancy complications. These findings build

on research included in the systematic review carried out as part of this project (see Chapter 2), which suggests women have a limited understanding of health implications associated with excessive GWG (Allen-Walker et al, 2017; Denison et al, 2015; Weir et al, 2010; Wiles et al, 1998). Furthermore, this study identifies that managing weight gain to prevent it from becoming excessive was perceived as being primarily for aesthetic purposes, not health; which emphasise how women's lack of understanding towards the possible health and pregnancy complications associated with excessive GWG can reduce the perceived importance of it.

Although the women in the current study were aware that changes in their WRHBs during pregnancy could impact on their GWG, most women did not believe it was appropriate to manage their GWG through engaging in WRHBs during pregnancy, and illustrated uncertainty around appropriate was of managing their GWG. This meant women in the current study primarily 'hoped' GWG would not be excessive, without aiming to manage their weight through their WRHBs. There was some indication of women being mindful of not 'taking advantage' of being pregnant and gaining excessive weight, however, actively engaging in weight management through engaging in WRHBs was considered inappropriate during pregnancy. Wider literature around GWG-related interventions have found women's engagement to be low (Atkinson et al., 2013; Campbell et al., 2011; Davis et al., 2012; Knight & Wyatt, 2010). Feasibility studies which have explored the acceptability of GWG-related interventions reflect the findings of the current study, and suggest women's limited interest in weight management during pregnancy is one of the key reasons for low engagement (Atkinson et al., 2013; Olander et al., 2011). The current study builds on this by demonstrating how the experience of physiological pregnancy changes at TP1 such as pregnancy symptoms impacted on the women's ability to engage in WRHBs associated with weight management. Furthermore, it is also evident how these physiological symptoms interacted with women's psychological beliefs towards GWG and their ability to manage it (as outlined previously in Chapter 7).

At Timepoint Two (TP2) weight gain was mainly accepted as a positive indicator that the unborn baby was growing and developing sufficiently. Women indicated less interest in examining their weight gain and how WRHBs had contributed to it, in contrast to TP1. This suggests their interest in understanding their weight changes had declined across the pregnancy. Women had not engaged in WRHBs with the goal of weight management since TP1 and had no interest in managing their GWG for the remainder of the pregnancy; instead, most women planned on engaging in weight loss after the birth.

The findings from the review (Chapter 2) indicated how an absence of information from midwives around GWG was interpreted by women to mean it was of low concern to the midwives; which led the women to believe it was of low concern to their own pregnancy (Brown & Avery, 2012; Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011). This reflects research that explored women's comments about GWG on parenting forums (Arden et al., 2014), which suggested the absence of information from midwives reduced its importance to the women. In spite of the low importance GWG had to women, research indicates they still indicate a desire for information (Duthie, Drew & Flynn, 2013; Lavender and Smith, 2016; Nikolopoulos et al., 2017; Stengel et al., 2012; Stockton et al., 2020). GWG is a topic of antenatal care which midwives are expected to include as part of their increasingly growing public health role (Biro, 2011; Mattison, Lavis, Wilson, Hutton et al., 2020; NICE 2010). However, research indicates women often do not receive information, or receive inaccurate and inconsistent information around GWG from their midwives (Weeks et al., 2018; Whitaker et al., 2020). Discussions around obesity and long term weight gain are considered by some midwives to be less relevant to their role, as they feel they will have an extremely limited impact on women's long term weight (DeVivo & Hills, 2019; Smith, Cooke, & Lavender, 2012). However, the review in the current study identified that women expressed an interest for receiving more information around GWG, with midwives being considered as the most trustworthy source of information (Abayomi et al, 2020; Allen-Walker et al, 2017; Brown et al, 2012; Cunningham et al, 2018; Furness et al, 2011; Olander et al, 2011; Weir et al, 2010). Although the current study did not actively explore the impact of healthcare professionals, the focus of previous research around GWG has been orientated around the provision of information from healthcare professionals and women's experiences of antenatal care around weight (as identified in the review, Chapter 2). This provides understanding of the instrumental role midwives have in supporting women's GWG during pregnancy, and the importance of their involvement in future research and the design of future interventions, practice and policy changes.

### **8.3.3 Baby's health and well-being as a priority**

This study found women did not foreground their experiences of WRHBs during pregnancy around GWG or management. This contrasts with the focus of other antenatal weight-related literature, such as the current debate around the reintroduction of routine weighings (Allen-Walker et al., 2015; Daley et al., 2015; Fealy et al., 2020), and interventions which often identify GWG as a primary outcome measure (Abrams, Altman & Pickett, 2000; Gardner, Wardle, Poston, Croker, 2011; Hamad, Cohen & Rehkopf 2016; Muktabhant et al., 2015; Shieh et

al., 2018; Tanentsapf et al., 2011). The women in this study were instead motivated to engage in WRHBs for the health of their unborn baby and their own well-being during the pregnancy. WRHBs associated with weight management and not believed to contribute to the unborn baby's health and therefore were not viewed as a priority by the women.

Previous literature has identified the unborn baby's health and well-being is important to women during pregnancy and that they are motivated to support their unborn baby's health (Lavender and Smith, 2016; McBride et al., 2003; Nikolopoulos et al., 2017; Phelan, 2010). The findings of this study have built upon this in more detail. Through adapting a QL approach and applying a theoretical lens to women's experiences, the underlying drivers relating to the unborn baby's health and well-being, that influence women's engagement in and motivation towards specific WRHB across pregnancy have been identified (as discussed in detail in Chapter 7). This has provided a richer understanding of women's motivation to engage in health behaviours for the well-being of the unborn baby. For example. Women's engagement in dietary WRHBs in this study, were largely driven by reflective motivation (COM-B) which was primarily informed by their beliefs about the consequences of engaging in those WRHBs on the unborn baby (TDF). The QL aspect of the research has also further unpicked what exactly those beliefs are, for example, the potential for particular dietary related WRHBs to support or hinder the development of the unborn baby, and how these beliefs remain consistent or change across the course of pregnancy.

Overall, the findings discussed above (and in section 8.3.2) add further in-depth insight around the complexities of WRHBs and weight management during pregnancy. They indicate that future research around WRHBs, GWG and/or its management, could avoid focussing on 'weight' and instead be more fruitful if focussed on the associations between WRHBs and the health and well-being of the unborn baby and woman (as identified through the behavioural determinants in the current study and as presented in Chapter 7). GWG-related interventions, which currently attain low engagement (Atkinson et al., 2013; Davis et al., 2012; Knight & Wyatt, 2010), may continue to target WRHBs to reduced excessive GWG, but could benefit from considering how best to frame these to women, without necessarily having an emphasis on weight management. These findings suggest GWG and management interventions could instead focus on the health implications of specific WRHBs for unborn baby and woman. This is also supported by the suggestion in previous research, predominantly with women who begin pregnancy with a raised BMI, that 'weight' is an uncomfortable topic of conversation; with both women and healthcare professionals experiencing



feelings of embarrassment when discussing weight (Furber & McGowan, 2011; Johnson et al., 2013; Keely et al., 2016; Nyman et al., 2010; Mulherin et al., 2013). Thus focusing on women's WRHBs and their association with health, more so than weight, may be more relevant to pregnant women and reduce the embarrassment and stigma associated with discussing weight. Although midwives perceive discussions around obesity and longer term weight gain as less relevant to their role (as outlined in the previous section), they are more accepting towards supporting women with health behaviours which can have an impact on their pregnancy outcomes and health during pregnancy (Beenstock et al., 2012; DeVivo & Hills, 2019; Smith et al., 2012; Wilcox et al., 2012). Whilst this approach could be relevant for the women, and considered by midwives to be within the remit of their role, a recent metareview has identified that there is only limited understanding of how a healthy GWG could impact on health and pregnancy outcomes for mother and unborn baby (Fair & Soltani, 2021). Clear evidence of health outcomes is needed to guide midwives' conversations with women around the health outcomes associated with GWG.

Additionally, it is questionable whether it is ethical to focus on the implications WRHBs could have on the health of the unborn baby, particularly in light of the unclear evidence (Fair & Soltani, 2021). The findings of the current study found women indicated levels of anxiety around the growth, development and well-being of their unborn baby at TP1. This anxiety was allayed by women engaging in WRHBs that they considered to promote the health of the unborn baby; and subsequently reassured them they were supporting the growth and development of the unborn baby. Existing literature (Lennon, 2016), also suggests that messages to women around risk of harm to them or their unborn baby can further increase anxiety (Keely et al., 2011; Lennon, 2016); particular for women who begin their pregnancy with a raised BMI (Keely et al., 2011). Furthermore, in instances of perinatal loss, previous research has indicated that if women feel they may have done something 'wrong' which could have contributed to the loss this can intensify feelings of guilt and self-blame, and the projection of blame from others (Kersting & Wagner, 2012). This was reflected in the experiences of women in the current study who had previously experienced perinatal loss. In particular for one woman, family cultural influences influenced others' perceptions around the risk of engaging in physical activity and their projections of blame were experienced by the woman. Similarly, feelings of guilt can be experienced by women who are diagnosed with gestational diabetes (Craig et al., 2020). One woman in the current study was diagnosed with gestational diabetes, who demonstrated feelings of guilt and negative emotions and the experience of being diagnosed with and managing gestational diabetes dominated the interview at

TP2. Whilst the study has identified women's increased in reflective motivation which is orientated around achieving a healthy pregnancy and avoiding risk, it also emphasises recommendations towards supporting women in understanding the complexities of risk (Lennon, 2016) and increasing the use of health promotion messages (Keely et al, 2017; Swift et al., 2017). There is indication that communicating messages around the risk of engaging in particular WRHBs may evoke negative emotions and should be treated with caution.

### **8.3.4 Working with women's pre-existing lifestyle, identify and beliefs**

The women's lifestyles, family health history, social contexts, attitudes and beliefs towards general health, that were established prior to their pregnancy, influenced how relevant women perceived 'health' to be to their life, and subsequently their pregnancy (as presented in Theme Four ('I'm the kind of person who...')). This meant that women's previous engagement in WRHBs, family health history (including conditions such as type 2 diabetes or high blood pressure which are manageable through diet and physical activity) and their perceived risk of how preventable it is through WRHBs (such as dietary behaviours), experiences with weight, and the support of others, informed their attitudes, beliefs and expectations towards their own WRHBs during pregnancy. These factors, which were established prior to pregnancy remained the same across pregnancy, and continued to inform women's engagement in WRHBs. These findings were identified through the inductive framework analysis of women's experiences. Furthermore, they were primarily prevalent in Theme Four, which was not amenable to mapping to the COM-B model and TDF (as outlined in Chapter 7). This supports previously suggested limitations of the COM-B model; as overlooking individual variance which can influence behaviour (Ogden, 2016). It also indicates that psychological theory such as the COM-B model and TDF should be applied in conjunction with qualitative research, that can capture behavioural influences which would otherwise be missed if only theoretically explored.

These findings build on the limited evidence which indicates that pre-pregnancy behaviours, attitudes and social context can contribute to women's behaviours and attitudes towards GWG during pregnancy (Campbell et al., 2011; Khan et al., 2019). The way in which the women discussed these factors in the current study, as encompassing their personal 'health', meant they were considered to be women's 'self-perceived health identity'. From the women's perspective, these factors contributed to 'the kind of person' they were. The term 'self-perceived health identity' was not theoretically derived, but generated from the women's

experiences, as presented in Theme Four ('I'm the kind of person who...'). This suggestion of a 'health identity' prior to pregnancy is consistent with similar to previous life course research which followed women throughout pregnancy exploring their GWG and strategies to manage their GWG (Devine et al., 2000). This study has suggested that women's prior experiences of weight are internalised by women and develop into attitudes, beliefs, and actions. They found this internalised identity was the primary influence on weight, and patterns of physical activity and diet which were engaged in for the purposes of weight management (Devine et al., 2000).

This self-perceived health identity, identified in the current study, remained stable across pregnancy and continued to inform women's engagement in WRHBs. It interacted with the physiological and psychological changes women experienced across pregnancy (as previously discussed), for example the adoption of the important new role of motherhood, which was found to increase reflective motivation of WRHBs in the current study, (as discussed in Chapter 7). Women sometimes reported engaging in WRHBs which were considered 'out of character'. This was mainly due to physiological symptoms and psychological beliefs interacting with their healthy self-identity. For example responding to physical cues such as cravings differently than they would outside of pregnancy (as discussed in Chapter 5, Chapter 6 and Chapter 7), with women feeling that they deviated from their healthy self-identity. However, women still retained their self-perceived health identity and expected their WRHBs would return to 'normal' after the pregnancy. This is reflected in existing literature which suggests women consider pregnancy as a temporary time of transition, where they could engage in WRHBs which were out of the norm (Campbell et al., 2011). Furthermore, these findings are similar to previous life course research which followed women throughout pregnancy exploring their GWG and strategies to manage their GWG (Devine et al., 2000). This suggests that women's prior self-perceived health identity is retained throughout pregnancy, whilst women also adopt the identity of a mother. The findings from the current study builds on this suggestion, and also identified additional factors such as the women's family health history, in contributing to this 'self-perceived health identity'.

Understanding women's identity and previous lifestyle, and how this could be compounded by physiological and psychological changes during pregnancy, could be important in understanding how women are likely to respond to interventions. The Medical Research Council's guidance for complex interventions (Moore et al., 2015) emphasises the importance of identifying the acceptability of interventions, from the participants' perspectives (Moore et al., 2015). This study has identified how women's engagement and 'health' identity

prior to pregnancy informs which WRHBs are personally relevant to women. These findings could be utilised to better understand women's readiness to engage in behaviour change interventions targeting WRHBs and the associated mechanisms.

Additionally, the findings of the current study have identified that women's engagement in WRHBs are different prior to pregnancy. This means that some women would be engaging in different WRHBs, for example the WRHBs identified in this study: 'Engaging in physical activity' and 'Maintaining engagement in physical activity'. These two WRHBs were identified as separate behaviours in the current study due to their different determinants (as identified in Chapter 7). This emphasises the importance of identifying and understanding women's engagement in WRHBs prior to pregnancy, as behaviour initiation and maintenance are driven by different determinants. Current behaviour change guidelines in pregnancy are thought to over-simplify behaviour change, and target a myriad of behaviours (Olander et al., 2018). This, in addition to pregnancy as a time of change and transition to women (Campbell et al., 2011) can mean women can become overburdened with health messages, and behavioural expectations of change (Olander et al., 2018). Identifying WRHBs that are personally relevant to women could therefore be more appropriate than identifying theoretically derived WRHBs.

## **8.4 Using under explored methodologies**

This study has utilised two approaches, firstly by carrying out serial interviews with women during their pregnancy to explore their journey, and secondly by applying existing psychological theory to the qualitative findings. The use of QL methodology is under-used in qualitative research, and the integration of theory is novel in antenatal weight-related research (Ayers & Olander, 2013; Olander et al., 2016). There has recently been a call for research to investigate women's experiences of WRHBs, which utilises existing psychological theory and/or a QL approach to explore changes across pregnancy (Olander et al., 2016; Olander, Smith & Darwin, 2018).

### **8.4.1 Qualitative longitudinal approach across pregnancy**

QL research is useful for exploring experiences and change across time (Neale, 2018), but is seldom utilised due to the challenges associated with it, such as participant attrition, and the extensive nature and time frames it requires (Neale, 2018). The QL approach utilised in the current study enabled the exploration of women's experiences at the beginning of pregnancy and in later pregnancy; and for change to be explored between those two timepoints through a temporal lens.

This is demonstrated in the thematic framework identified at both timepoints, specifically the different narratives and WRHBs and determinants at each timepoint and the ability to juxtapose these and understand the way in which the findings differed across timepoints, as illustrated in the relevant chapters (Chapter 5 and Chapter 6). The unique contribution to knowledge in the key areas described above, would not have been possible if a QL approach had not been adopted; the overall findings of this study would have been very different if data had been collected at only one timepoint (i.e. at 10-16 or 28-32 weeks pregnant) as illustrated in Chapter 5 and Chapter 6. This indicates the contribution of QL research to understanding women's experiences across pregnancy, rather than at one particular timepoint.

As identified in the systematic review (Chapter 2), most qualitative studies exploring weight during pregnancy carry out data collection at one timepoint in pregnancy. One of the studies included in the review carried out serial interviews with each participant: one during pregnancy and one after pregnancy (Wiles et al., 1998). This is reflective of the small number of other QL studies in pregnancy-related research, which investigate women's experiences during and after pregnancy. One-off data collection only provides a snapshot for that particular point in time (Neale et al., 2018) (as discussed in Chapter 2). Most studies included in the review carried out data collection towards the end of pregnancy or with postnatal women with a view to allowing women to reflect back across their pregnancy (Abayomi et al., 2020; Cunningham et al., 2018; Denison et al., 2015; Padmanabhan et al., 2015; Weir, 2010; Wiles et al., 1998). However, serial interviews are considered more appropriate when attempting to look across time (Read, 2018), particularly when the topic is complex and involves more than one particular experience, which pregnancy does (Read, 2018). Previous research investigating weight during pregnancy identify it as a 'complex' topic and often present 'complex' findings (Denison et al., 2015; Arden et al., 2014; Johnson et al., 2012; Padmanabhan et al., 2015; Vanstone et al., 2016), but without providing details of these complexities. Serial interviews allow the participant to build and reflect on experiences, views and beliefs, which can be followed up in subsequent interviews to gain an in-depth understanding of conflicting beliefs and/or how they change over time (Neale, 2018; Read, 2018). This subsequently raises questions towards the transferability of findings from previous research which carried out one-off interviews with women in later pregnancy, to the whole of pregnancy.

The use of serial interviews in the current study have not only provided the opportunity to follow the women's pregnancy journeys, but also to better understand conflicting and changing views, which are often present in this complex field of research. The review (Chapter 2) identified mixed findings

between the studies in identifying the relevance of weight gain to women and whether or not to accept or manage it. The QL nature of this study has explored that in-depth and has provided further understanding and explanation of why and how it occurs (which are presented above). Personalised prompts, which were developed based on the participant responses at TP1, were integrated into the topic guide of the interviews carried out at TP2. This was to ensure that relevant experiences, views, beliefs discussed at TP1 were followed up at TP2. This technique was useful to understand views and beliefs which had been discussed at TP1 but were discussed less, or not at all, by the women at TP2. These prompts are an example of how serial interviews can provide richer understanding and offer explanations of seemingly contradictory beliefs when compared with one-off interviews.

Additionally, some studies included in the review (Chapter 2) interviewed women postnatally to reflect on pregnancy (Abayomi et al, 2020; Allen-Walker, 2017; Olander et al, 2011; Olander et al 2013). During the current study women were interviewed (approximately 6-10 weeks) after the birth of their baby. The data from these interviews have not been included in this thesis. This was primarily due to the scope of the PhD focussing on antenatal experiences, and preliminary analysis of the postnatal interviews indicated they would not significantly contribute to the understanding of the antenatal period. This was because participants predominantly discussed postnatal experiences and found it difficult to reflect back on pregnancy to recall details (as discussed in Chapter 4 Methods). This raises implications for the usefulness of utilising postnatal data collection to explore women's experiences during pregnancy.

The findings generated from the QL approach in this study indicated the methods utilised in previous qualitative research of exploring women's experiences of GWG and WRHBs at one timepoint during pregnancy, may not be applicable to understanding pregnancy as a whole. Findings from previous research exploring GWG and WRHBs during pregnancy are mainly applicable to later pregnancy only (Abayomi et al, 2020; Allen-Walker, 2017; Olander et al, 2011; Olander et al 2013). Women's experiences and views collected have often been retrospective, and therefore may not truly reflect their experience of all experiences across pregnancy. This may provide explanation towards why there are mixed findings of the women's views towards weight and WRHBs during pregnancy and why current weight-related antenatal care and interventions are not meeting women's needs (Campbell et al., 2011; Stockton & Nield, 2020). The findings from this research found that it is early pregnancy where women are the most motivated to make changes and allocate most attention to assess which WRHBs to engage in and how, to support the health and development of the unborn baby, but that

they do not necessarily engage in behaviour change. Women's engagement in WRHBs in early pregnancy (and prior to pregnancy) has implications for women's engagement in WRHBs later in the pregnancy. This detailed understanding is not likely to be developed with retrospective interviews, and research is lacking for early pregnancy. This indicates the need for future QL research and, at a minimum, that researchers carrying out one-off interviews need to specify the gestation of participants so others can ascertain which stage of pregnancy the findings relate to.

#### **8.4.2 Mapping qualitative longitudinal findings to existing psychological theory**

The application of the COM-B model of behaviour and TDF in the area of antenatal research is new (Olander et al., 2016). Few other studies utilising the COM-B model and TDF with pregnant women have recently been published (Flannery et al., 2018; Boyd et al., 2020). Flannery and colleagues (2018) conducted one-off interviews with women in Ireland, in order to map the themes to the COM-B model and TDF. This provided insight into the perceived barriers and facilitators of physical activity during pregnancy for overweight and obese women. Boyd and colleagues (2020) interviewed postnatal women and coded the qualitative data to the COM-B components; providing insight into theoretical factors for behaviour change interventions.

The current study is the first study to identify women's individual WRHBs across pregnancy and explore their determinants through the application of the COM-B model and TDF. Utilising the COM-B model and TDF to understand women's WRHBs across pregnancy is useful as it provides findings that are underpinned by theory, which can be applied to intervention development, clinical recommendations and future research (Boyd et al., 2020; Flannery et al., 2018; Michie et al., 2011; Olander et al., 2016).

Interventions are more effective when they are theory based (Hardeman, 2000; Glanz & Bishop, 2010; Webb et al., 2010). However, antenatal interventions and research which is underpinned by relevant theory are sparse (Ayers & Olander, 2013). In spite of established frameworks for the application of theoretical input (Atkins et al., 2017; French et al., 2012), many interventions that claim to be theory based often do not adequately apply the underlying theory (Prestwich et al., 2015). Furthermore, behavioural aspects such as the psychological determinants and intervention components are often poorly reported (Gardner et al., 2011; Martin et al., 2014). This means that there is limited understanding in the underlying process of behaviours (Gardner et al., 2011). A more thorough application of theory to antenatal research has been recommended, which this

study implements through the mapping of COM-B and TDF to WRHBs present in the thematic findings.

In addition to a call for a theoretical input into weight-related antenatal research, there is also limited understandings of women's WRHBs during pregnancy from women's perspectives (Campbell et al., 2011; Gardner et al., 2011). Previous literature has identified the need for research to be more orientated around the women's perspectives (Anderson, 2001; Campbell et al., 2011; Gardner et al., 2011; Heslehurst et al., 2013; Olander, Smith & Darwin, 2018; Oteng-Ntim et al., 2010). In this study, WRHBs were identified using an inductive approach, foregrounding the women's experiences, rather than asking women about specified behaviours. Identifying the WRHBs in this way, has meant that WRHBs which are personally relevant to women during pregnancy have been identified, before being mapped to existing psychological theory. By first identifying the WRHBs that exist and are personally relevant to women before integrating them with theory, means the findings of this study provided a theoretical understanding of WRHBs across pregnancy, whilst simultaneously remaining grounded in the women's experiences and foregrounding their perspectives. This has provided recommendations which are grounded in women's experiences and supported by existing psychological theory which can be utilised to inform future weight-related antenatal care and intervention development.

## **8.5 Implications for future research, practice and policy**

The next steps for advancing the findings presented in this study would be to conduct stakeholder consultations with midwives and other healthcare professionals; to gain their views towards the identified behaviours, and suggestions towards the orientation of care around WRHBs in favour of 'weight'. Midwives' views towards providing 'weight-related' information as part of their role have been previously explored (DeVivo & Hills, 2019; Johnson et al., 2013; Mattison, Lavis, Wilson, Hutton et al., 2020; McParlin, Bell, Robson et al., 2017; Wilcox et al., 2012), however, these novel findings suggesting an approach which is more focussed on individual WRHBs and health, have not yet been explored. Whilst the findings of this study provide a theoretical starting point, it is often difficult for researchers to bridge the gap between theory, evidence based recommendations and implementation in practice (Henshall, Taylor, Goodwin, Farre, et al., 2018). In practice, it is considered important for midwives' views to inform recommendations for care, and explore the feasibility and acceptability of recommendations. More recently, the co-production of interventions with health professionals are becoming more common and are considered to improve the implementation of interventions in healthcare settings (Henshall, Taylor,



Goodwin, Farre, et al., 2018). Seeking the views and perspectives of healthcare professionals would contribute to understanding around how to implement the findings into practice, and guide future development.

The findings of the current study have identified 25 WRHBs which are personally relevant to women across pregnancy, and can be utilised in future weight-related research. Three WRHBs have been tentatively identified from the women's experiences and theoretical mapping, which could be treated as candidate behaviours for future behaviour change interventions: consumption of healthy foods, engaging in physical activity and avoidance of being sedentary. The WRHBs identified in the current study are led primarily by the women's experiences. Future research could further explore the impact of these WRHBs on women's weight and health outcomes from a quantitative or epidemiological perspective to further inform specific candidate WRHBs for future interventions, and contribute to the limited understanding around the health outcomes associated with these WRHBs. The way in which these WRHBs have been identified and mapped to the COM-B components and TDF is consistent with the steps of intervention development utilising the behaviour change wheel (BCW) (Michie et al., 2014). Therefore, future research to continue the application of the BCW (Michie et al., 2014) could utilise the findings here and map intervention components and behaviour change techniques to the WRHBs (Michie et al., 2014). Furthermore, the understanding provided in the current study around the way women's 'healthy self-identity' prior to pregnancy, and the physiological and psychological changes which happen during pregnancy interact to influence women's WRHBs should be considered in future intervention development. The findings of this study do however recognise that there is still limited understanding of the best ways to manage GWG, from the women's perspectives, which require exploring further before theory based interventions can be developed.

This study suggests women's individual WRHBs which are present during pregnancy are primarily driven by the health of the unborn baby. This increased women's motivations towards engaging in WRHBs, particularly in early pregnancy. Women's engagement in WRHBs changed as the pregnancy progressed, primarily due to their beliefs shifting towards how WRHBs can impact on the unborn baby. These changing views were informed by indicators experienced by women across pregnancy, which indicated the growth and development of the unborn baby. This study did not find any specific times or events which prompted these changes, meaning specific timings which provide opportunities for behaviour change remain unclear. Further research investigating the specific timings during pregnancy which provide opportunities

for change, as hypothesised in previous literature (Olander et al., 2016) could next be explored.

Women's previous lifestyles and beliefs informed which WRHBs were personally relevant to them during pregnancy and informed the determinants of behaviour during pregnancy. This individual variance, which is developed through previous experiences over time, is an important consideration when developing and designing intervention and evidence-based recommendations; to ensure women's engagement. Additionally, considering the prioritisation of 'health' over 'weight' by the women in this study, it may be more relevant to women if antenatal weight management interventions were framed around women's perceptions towards 'health', and their engagement in WRHB's within the context of health, instead of weight management. Whilst this approach would be in line with the women's beliefs, as discussed in the findings of the current study, there remains a lack of consensus in the existing literature around the impact on health related outcomes weight management interventions during pregnancy can have (Fair & Soltani, 2021; Hinman et al., 2015). Further research to identify the health outcomes associated with WRHBs and weight management in pregnancy are first needed to understand the appropriateness of utilising this approach in future interventions. A way to assess these pre-pregnancy at the beginning of pregnancy could aid any personalised WRHB focussed care or intervention. Furthermore, further research to identify specific predictors of women's engagement in WRHBs could also be useful to guide future interventions, rather than being designed around BMI and focussing on weight.

## **8.6 Strengths and limitations of this study**

A key strength of this PhD is the novel QL approach adopted, and the integration of existing psychological theory with the QL findings. Adopting this approach allowed the opportunity to explore women's experiences across pregnancy and provided in-depth understanding of women's experiences which were inductive and grounded in the women's experiences, whilst also providing a theoretical understanding. The COM-B model and TDF have previously been criticised by some due to their deductive approach which fails to acknowledge individual variance in women's behaviours (Ogden, 2016). Due to the QL aspect of this study, and inductive analysis of the QL data before applying it to theory, individual variance and aspects such as previous experiences, views and beliefs were captured and contributed to the findings of this study. This is a strength of the current study as it overcomes the main criticism associated with applying the COM-B model and TDF.

One of the challenges of carrying out QL research, and one of the reasons it is often not utilised, is due to high potential for attrition of participants (Neale, 2018). A strength of this study is the high retention rate of participants achieved, with no women dropping out of the study in between TP1 and TP2, even though there was approximately 4 months in between the two interviews. It is anticipated that high retention was due to the researcher building a strong rapport with the women participating in the study.

This study also included a relatively diverse sample of women, including women of different ethnicities, area of deprivation, BMIs, parity, previous loss, and age. This means the findings reflect the views and experiences from a range of women. Whilst this is an inclusive study, and has provided some insight into factors such as culture and religion, the analysis did not allow a case by case comparison to illuminate any specific experiences relevant to diversity factors. The findings produced are a collective account of the women's experiences. This diverse sample contrasts with those of previous research, such as the studies included in the systematic review (Chapter 2) which predominantly include white, middle class women. However, a limitation of this study is that, apart from the one woman who developed gestational diabetes, there were no pregnancy complications experienced by any of the women. Therefore, for women who do experience pregnancy complications, these findings may not be applicable and should be considered with caution. This is particularly pertinent given the ethical considerations raised in considering message framing regarding health behaviours.

A limitation is that although the sample is relatively diverse, women were only recruited from one northern UK city. Therefore the findings of this study have been tentatively deduced, and may not be transferable to women in other areas of the UK. During recruitment, information provided by midwives without researcher visibility resulted in minimal uptake. The most effective method of recruiting participants was by researcher attendance to antenatal appointments. This highlighted the importance of researcher attendance and required the researcher to focus recruitment to one site at a time. This required a significant amount of time, but sufficiently increased recruitment uptake.

A further possible limitation of this study is that only WRHBs which were experienced up to that moment in time by women were mapped from the thematic framework, and *intended* WRHBs were not mapped. Although this could limit the theoretical understanding of women's intentions of behaviour, this decision was made as intentions do not equate to action, and including intentions could have over-estimated women's engagement. Additionally, intentions are a theoretical construct in themselves (Cane et al., 2012), which would have required follow up

and defining during the interviews with participants, if they were to be treated as such during the analysis. This was not within the scope of the study nor would it have contributed to the aims of the study. The findings of the thematic framework discuss women's expectations around weight and WRHBs in-depth, therefore, it is anticipated that women's intentions and expectations are sufficiently captured in the thematic framework findings (Chapter 5 and Chapter 6). Furthermore, the temporal lens applied by the very nature of this QL study meant that the framework analysis involved looking backwards and forwards over time across the data, and the juxtaposition of the findings (in Chapter 6) are presented in a temporal fashion.

## **8.7 Conclusions: Understanding women's weight-related health behaviours across pregnancy**

This study has addressed the overall research aim by exploring women's experiences of GWG across pregnancy from a psychological perspective, adding a unique contribution to this complex field of research. The thematic framework identified at both timepoints identify similarities in the women's WRHBs at both timepoints, whilst also demonstrating nuanced differences across the pregnancy, through the different narratives of disruption and adaption (TP1) and passivity (TP2). These nuanced differences were also captured through the identification of individual WRHBs and their determinants; with a total of 25 different WRHBs present across pregnancy, eight of which being the same across both timepoints. This study has identified how differences in women's WRHBs across pregnancy can, from a psychological perspective, be explained by women's changing beliefs which underly the theoretical determinants of behaviour. These psychological beliefs interact with the physiological aspects of pregnancy, such as pregnancy symptoms and cues, and women's pre-existing engagement in WRHBs and their associated 'healthy self-identity'. As outlined in the study limitations (section 8.6) above, due to the limited transferability of these findings in addition to the complexity of this field of research, the following conclusions are tentative.

The determinants of WRHBs, identified through the application of the COM-B model identified an increase in women's reflective motivation (underpinned by beliefs about consequences WRHBs could have on them or their unborn baby) as a dominant driver. However, motivation did not generate WRHBs in isolation, and was situated with the system of behaviour, involving interaction with women's capability and opportunity. This suggests that whilst motivation plays a large part in women's WRHBs across pregnancy, it is not stable and is not sufficient to generate behaviour independently. By treating these WRHBs individually, these findings have provided new insights rather than focussing on 'diet' and 'physical

activity' as umbrella terms, as is often done in previous research. These findings that identify different behavioural determinants for individual WRHBs emphasises the need to apply a more specific approach to WRHBs, and continue treating them as separate entities, whilst acknowledging the system of behaviours they are situated within.

The unique contributions made here, were realised through adopting a novel approach to provide findings which were grounded in women's experiences, whilst also being underpinned by existing psychological theory. This illustrates the value of integrating qualitative longitudinal data with existing psychological theory to provide evidence-based recommendations.

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## Appendices

### Appendix A Example of search strategy

# ▲	Searches	Results
1	(pregnan* or ante#natal* or ante#partum or pre#natal or peri#natal or peri#partum or post#partum or post#natal or puerperal or childbearing or childbirth or matern*).tw.	869983
2	Pregnancy/	899599
3	Prenatal Care/	29606
4	Postnatal Care/	5659
5	Maternal Health Services/ or Obstetrics/ or Midwifery/	53807
6	Perinatal Care/	4630
7	exp Obesity/ or exp Body Weight Changes/	284296
8	exp Diet/	280605
9	exp Exercise/	222446
10	(obes* or weigh* or over#weight or diet* or exercise or food or GWG or BMI or body mass index).tw.	2274849
11	(physical adj1 activity).tw.	125997
12	(healthy adj1 eating).tw.	9184
13	exp Weight Gain/	34887
14	exp qualitative research/	71633
15	qualitative.tw.	360300
16	interview/	28494
17	narrative*.tw.	101112
18	(personal adj2 experience*).tw.	29772
19	interview*.tw.	654229
20	(survey* or questionnaire* or "focus group*").tw.	1507345

21	theme*.tw.	194020
22	"surveys and questionnaires"/	465610
23	Focus Groups/	30063
24	1 or 2 or 3 or 4 or 5 or 6	1316651
25	7 or 8 or 9 or 10 or 11 or 12 or 13	2502236
26	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	2455138
27	24 and 25 and 26	25780
28	limit 27 to yr="2017 -Current"	2272

**Appendix B Systematic review data extraction form**

Reviewer/Date	
Study details (First Author, Year, Endnote number)	
Aim (state whether author / reviewer's words)	
Recruitment	
Study design	
Methodological approach i.e. Underpinning theory/ approach/ paradigm	
Data Collection	
Types of participants	
Inclusion/ exclusion criteria	
Sample	
<b>ANALYSIS/ RESULTS</b>	
Data analysis	
Themes and raw data and my interpretation	
Author's interpretation	
What does this study tell me overall	
<b>CONCLUSION</b>	
Author's conclusion and recommendation	
Reviewer Comments (e.g. any concerns about the paper...)	

## Appendix C Example of CASP form completed for systematic review

(Brown and Avery, 2012)



### Section A: Are the results valid?

1. Was there a clear statement of the aims of the research?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- what was the goal of the research
- why it was thought important
- its relevance

Comments: Good rationale provided in introduction

2. Is a qualitative methodology appropriate?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
- Is qualitative research the tight methodology for addressing the research goal

Comments: Mixed methods - collected quant info on % of certain info received by women, and qualitative questions gave more info on what women would want

### Is it worth continuing?

3. Was the research design appropriate to address the aims of the research?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- if the researcher has justified the research design (e.g. have they discussed how they decided which method to use)

Comments:

4. Was the recruitment strategy appropriate to the aims of the research?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the researcher has explained how the participants were selected
- If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study
  - If there are any discussions around recruitment (e.g. why some people chose not to take part)

Comments: May be slightly bias as women recruited were members on NCT only (and those who attended antenatal class). So may be more health aware/ conscious

5. Was the data collected in a way that addressed the research issue?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the setting for the data collection was justified
- If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)
- If the researcher has justified the methods chosen
  - If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews are conducted, or did they use a topic guide)
    - If methods were modified during the study. If so, has the researcher explained how and why
  - If the form of data is clear (e.g. tape recordings, video material, notes etc.)
    - If the researcher has discussed saturation of data

Comments: Explanation of how they designed the questionnaire - however, no mention of piloting the questionnaire. Questionnaire was completed online, or hard copies from antenatal class teachers.

6. Has the relationship between researcher and participants been adequately considered?

Yes	<input type="checkbox"/>
Can't Tell	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If the researcher critically examined their own role, potential bias and influence during (a) formulation of the research questions (b) data collection, including sample recruitment and choice of location
- How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

Comments: Not explicitly discussed  
Do mention in analysis that themes were not predefined and came participants' perceptions  
Also mentions in limitations that qual is open to bias, and therefore checked by independent researcher to limit this (and also claims use of software i.e. NVivo should limit it, but I don't think that would have an an impact??)

Section B: What are the results?

7. Have ethical issues been taken into consideration?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained
- If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)
- If approval has been sought from the ethics committee

Comments: Ethical approval granted from University REC - therefore assume ethical issues have adequately been taken into consideration

8. Was the data analysis sufficiently rigorous?

Yes	<input type="checkbox"/>
Can't Tell	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider

- If there is an in-depth description of the analysis process
- If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data
- Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process
- If sufficient data are presented to support the findings
  - To what extent contradictory data are taken into account
- Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

Comments: Thematic analysis - Seems ok and the use of an 'independent researcher' verified themes. Although, process seems a bit confused for TA

9. Is there a clear statement of findings?

Yes	<input checked="" type="checkbox"/>
Can't Tell	<input type="checkbox"/>
No	<input type="checkbox"/>

HINT: Consider whether

- If the findings are explicit
- If there is adequate discussion of the evidence both for and against the researcher's arguments
- If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)
- If the findings are discussed in relation to the original research question

Comments: Yes - good discussion, suggestions of future research and application to practice

Section C: Will the results help locally?

10. How valuable is the research?

HINT: Consider

- If the researcher discusses the contribution the study makes to existing knowledge or understanding (e.g. do they consider the findings in relation to current practice or policy, or relevant research-based literature)
- If they identify new areas where research is necessary
- If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

Comments: Valuable



**Appendix D Participant Information Sheet (PIS)****UNIVERSITY OF LEEDS****Participant Information Sheet****Study Title:** Understanding Women's Weight Related Health Behaviours during Pregnancy and Following Birth

We would like to invite you to take part in a study which aims to explore your views and experiences of weight management and different behaviours you may engage in which may have an impact on your weight during your pregnancy and following your baby's birth. Joining the study is entirely up to you, before you decide we would like you to understand why the research is being done and what it would involve for you. You can contact the researcher (Hannah) on the details at the end of this information sheet to help you decide whether or not you would like to take part and answer any questions you may have. Please feel free to talk to family or friends about the study if you wish.

**What is the purpose of the project?**

Weight gain is an expected part of pregnancy. Different behaviours we engage in during pregnancy may have an impact on our weight. Research tells us there is limited understanding of what health behaviours women may engage in throughout their pregnancy that may have an impact on their weight gain. This research project is about your views and experiences of weight management and different behaviours you may engage in during your pregnancy and following the birth which may have an influence on your weight.

**Who is doing the study?**

This study is funded by the University of Leeds and organised by the School of Healthcare, University of Leeds. The lead researcher is Hannah Hartley, a PhD student at the School of Healthcare, under the supervision of Professor Linda McGowan, Dr Zoe Darwin and Dr Debbie Smith. and advised by Alison McIntyre, matron of community midwives in Leeds.

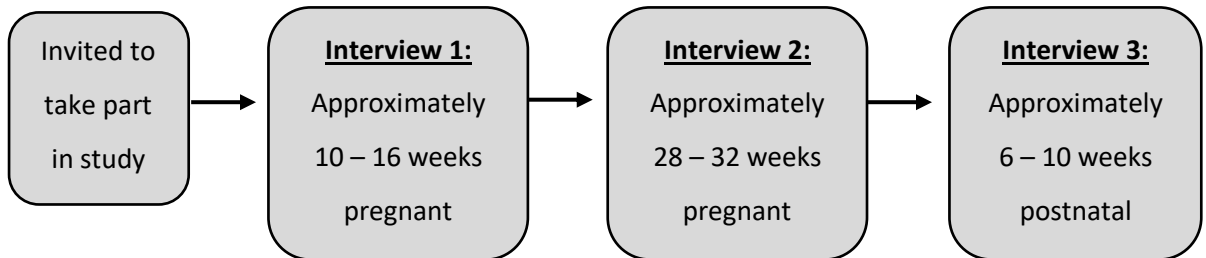
**Who can take part?**

You can take part in this study if you are between 10-16 weeks pregnant and are aged 18 years old or over. Unfortunately women with a history of gestational diabetes, or pre-existing diabetes will not be recruited. A total of approximately 20 pregnant women will take part in this study.

**What will happen to me if I take part?**

The aim of this study is to follow women's views and experiences throughout their pregnancy. To do this, if you decide to take part in this study you will be asked to participate in three interviews; 2 during your pregnancy and 1 after your baby's birth.

- Interview 1 will be when you're around 10-16 weeks pregnant
- Interview 2 will be when you're around 28-32 weeks pregnant
- Interview 3 will be around 6-10 weeks after your baby's birth



Each interview will be with Hannah, the lead researcher, and will be approximately 1 hour long. You may choose whether to be interviewed face-to-face at home or at the University, or by telephone. Hannah will ask you to fill out a short questionnaire about yourself, for example your age and ethnicity, during the first interview. You would not have to complete all questions or the questionnaire at all if you would rather not. Each interview will include open ended questions where you will be asked to talk openly and freely about your views and experiences of weight management during your pregnancy and after your baby's birth. You do not have to answer any questions you prefer not to. If at any point in the interview you would like to take a break or stop the interview, we would be able to pause or stop the interview at any point. You would not have to give a reason for wanting to stop or pause the interview. Each interview will be audio-recorded using an encrypted Dictaphone. These recordings will be typed up into a transcript which will be anonymised through the removal of any identifying information. You will be asked to provide your NHS identification number and name of your named midwife, so Hannah can be made aware of changes in your circumstance during your pregnancy. Your midwife will not be asked to disclose any detailed clinical information but if your midwife does tell Hannah about a change in your circumstances, then Hannah may contact you with information on your participation before organising any more interviews. Taking part in this study will not have any impact on the care you receive during your pregnancy. If you have any questions about the study or your participation please don't hesitate to contact Hannah. By contacting Hannah you are not committing to take part in the study.

**Will my participation in this project be kept confidential?**

Yes. All information about you will be handled in confidence. The audio recordings of your interviews will be uploaded onto the University of Leeds server

(where we keep all data) and stored securely in a password protected encrypted file. Audio recordings will be typed up into a transcript and anything you say in your interview will be entirely anonymised, meaning you can't be identified. Hannah will type up some of the interviews, and a University approved transcription service may also be used. Any transcription services used will be bound by a confidentiality agreement. Your personal details will be destroyed within three months of the study ending. Research documentation (including your consent form) will be securely stored for 5 years after the study ends. After 5 years, all of your non-anonymised data will be destroyed. Your anonymised interview data may be stored indefinitely and included in future analysis, but this is optional and you can choose whether you would like this to happen or not. Only Hannah, her supervisors (Professor Linda McGowan; Dr Zoe Darwin and Dr Debbie Smith) and advisor (Alison McIntyre) will have access to your interviews throughout the study. If you tell Hannah something that suggests possible risk of harm to yourself or someone else, this information may also have to be shared with the supervisory and advisory team, and your named midwife.

**Do I have to take part?**

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and asked to sign a consent form. You can still withdraw at any time without it affecting the provision of care you are entitled to in any way. You do not have to give a reason. If you decide to withdraw your interview after you have done it, you can do this by contacting Hannah up to two weeks after the interview, as after this time analysis will have begun.

**Will I be paid to take part?**

You will not be paid to take part. If you decide to take part in an interview at the University then your travel costs will be refunded.

**What are the possible disadvantages and risks of taking part?**

There are no risks associated with your participation in this study. A possible disadvantage is the amount of your time taken to complete the three interviews.

**What are the possible benefits of taking part?**

There are no direct benefits to you taking part but it is anticipated that this work will provide information about the experiences of women's weight management during their pregnancy and be used in future to improve support for women.

**What will happen to the results of the study?**

This research project is part of a PhD research project. It is important to share the findings with others, so Hannah may also attend conferences to present the findings, and write the findings up into academic papers. Direct quotes from your interview may be used in these, but they will be anonymous. Hannah is also

happy to share information about the findings of the study with you when it is completed in 2019/2020.

### **How do I take part?**

If you would like to take part or want to discuss this research further please contact the lead researcher **Hannah Hartley. Telephone: 0113 34 33472 Email: [hchlh@leeds.ac.uk](mailto:hchlh@leeds.ac.uk)**. By contacting Hannah you are not committing to taking part in this research, you may wish to find out further information before deciding whether to take part or not. Hannah is more than happy to answer any questions about the research or your participation. If you talk to Hannah at the antenatal clinic you can discuss the research and your participation and any questions you may have. By talking to Hannah at the antenatal clinic you are not committing to take part in the research. If you would like to take part, after discussing any queries, you may be asked to provide your contact details to Hannah so she can get in touch with you once you've had time to decide if you wish to take part.

### **What if there is a problem?**

If you have any concerns or complaints about the study, you can speak to Hannah, who will do her best to answer your questions. Should you have a complaint about the way this study is being conducted please contact Hannah's lead supervisor Linda McGowan. You can withdraw from this study at any time without giving a reason.

### **Further information and details**

**Lead Researcher:** Hannah Hartley. **Tel:** 0113 34 33472 **Email:** [hchlh@leeds.ac.uk](mailto:hchlh@leeds.ac.uk)

**Address:** Room 2.30, School of Healthcare  
Baines Wing  
University of Leeds  
LS2 9JT

**Lead Supervisor:** Professor Linda McGowan (Professor in Applied Health Research) **Tel:** 0113 3431339 **Email:** [l.mcgowan@leeds.ac.uk](mailto:l.mcgowan@leeds.ac.uk)

**Co-Supervisor:** Dr Zoe Darwin (Lecturer in Maternal Health). **Tel:** 0113 34 30549 **Email:** [z.j.darwin@leeds.ac.uk](mailto:z.j.darwin@leeds.ac.uk)

**Co-Supervisor:** Dr Debbie Smith (Senior Lecturer in Health Psychology and Health Psychologist). **Tel:** 0113 283 7100 **Email:** [D.Smith@leedstrinity.ac.uk](mailto:D.Smith@leedstrinity.ac.uk)



## Appendix E Standardised contact details form

**Participant Contact Details**

**Study Title:** Understanding Women's Weight Related Health Behaviours during Pregnancy and Following Birth

Name

Email address

Telephone number

Home address

How many weeks pregnant

Expected delivery date

**Appendix F Participant consent form**

Consent to take part in Understanding Women's Weight Related Health Behaviours during Pregnancy and Following Birth	Add your initials next to the statement if you agree
I confirm that I have read and understand the information sheet dated 04.01.2018 explaining the above research project and I have had the opportunity to ask questions about the project.	
<p>I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without it affecting the standard of care I receive in any negative way. In addition, I do not have to answer any questions that I prefer not to.</p> <p>If I wish to withdraw data from an interview I have already taken part in I have up to two weeks from the date of the interview to notify the lead researcher using the details below.</p>	
I give permission for my interview to be audio recorded.	
<p>I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in any reports that result from the research.</p> <p>I understand that my responses will be kept strictly confidential. Exceptions to confidentiality may be made if I disclose anything that suggests possible risk of harm to myself or someone else.</p>	
I understand that relevant sections of the data collected during the study, may be looked at by auditors from the University of Leeds where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.	
I understand I am providing my NHS identification number and named midwife so the researcher can be made aware of any changes in circumstances to my pregnancy. In addition I give permission for the lead researcher to contact my named midwife.	
I give permission for my anonymised interview data to be securely stored and included in future analysis.	
I agree to take part in the above research project and will inform the lead researcher should my contact details change during the project.	

**Lead Researcher: Hannah Hartley**

**Email: [hchlh@leeds.ac.uk](mailto:hchlh@leeds.ac.uk)**

**Telephone: 0113 34 33472 or  
07XXXXXXXXXX**

Name of participant	
Participant NHS ID Number	
Named midwife	
Participant's signature	
Date	
Name of lead researcher	
Researcher's signature	
Date	

**Appendix G Topic guide for Timepoint One****Topic Guide for Interview 1****Setting the Scene****Introduction pre-interview**

- Welcome and thank you
- Introduce self and study – PhD research
- Explain why them and how selected – would like views from a range of women, they were selected as attending their booking appointment at antenatal clinic in Leeds
- Key points
  - Length of interview approximately 1 hour. First interview likely to be the longest
  - Your views are important, and I would like to understand your views as much as possible, there are no right or wrong answers, so if you could speak as openly and freely as possible, and if I ask you to repeat anything it's only for my own understanding and clarity for the recording
  - Emphasise confidentiality and that all will be anonymised but if you disclose anything which may indicate risk of harm to themselves or someone else I may have to report this to the relevant person
  - You have the right to withdraw without giving a reason at any point in this interview, and you can ask to pause the interview if you'd like a break at all
  - The topics to be discussed in the interview are around weight gain and weight management in pregnancy, and what you think might contribute to these during a pregnancy
- Any questions?
- Confirm consent
- Happy to proceed?

**Concluding summary post-interview**

- Thank for taking part
- Anything else you'd like to add?
- Verbally signpost to GP or midwife or health visitor for more information if appropriate
- Identify approximate time period for next contact to arrange subsequent interviews
- Confirm preferred contact details for future contact

**Topic Guide for Interview One****Expectations for weight change**



1. Can you tell me whether you think your weight is going to change as a result of being pregnant?
2. How important do you think weight is to your pregnancy?
  - a. Why do you think / expect this to happen?
  - b. Explore – self, baby, birth and ‘healthy pregnancy’
  - c. Impact on your pregnancy?

### **Understanding of weight management**

3. What do you think the term ‘weight management’ means in pregnancy?
  - a. **Tell me about any similarities or differences between weight management in pregnancy and when you’re not pregnant**
4. Can you tell me about any differences you see between weight management and weight *gain* during pregnancy?
  - a. *This study refers to weight management as managing weight gain so it’s not “too much”.*

### **Excessive weight gain**

5. Tell me about if you think it’s possible to gain too much weight in pregnancy
  - a. How would this be judged as ‘too much’?
  - b. Who by

### **What has an impact on weight management?**

6. What do you think has an impact on weight management?
  - a. Influences on ability or health behaviours
  - b. Is there anything you can do which you think could have an impact on your weight during pregnancy?
7. Since finding out you were pregnant, have you thought about weight management during pregnancy at all?
  - a. What do you think triggered that?
  - b. Have any of these views changed between then and now?

### **Influences on views towards weight management**

8. Have you received any information on weight management in this pregnancy before or whilst you’ve been pregnant?
  - a. Health professionals/ family/ friends
  - b. At booking?

- c. Did any information you received at your booking appointment have an impact on your views?
9. What do you think has influenced your views towards weight management during this pregnancy?
- a. Have your views changed at all between finding out you're pregnant, and now at X weeks?
  - b. Probe – how, why do you think that is?
  - c. Have these views resulted in you making any changes which may have an impact on your weight in pregnancy?

### **What has an impact on weight during pregnancy? WRHBs**

10. What do you think has an impact on your weight during pregnancy?
- a. Can you tell me about anything you think you could do which might have an impact on your weight during pregnancy?
    - i. To what extent do you think you could change/ have an impact on that?
    - ii. Explore - purposely or unintentionally
    - iii. Have you thought about/ planned to do that?
    - iv. Do you think you would/ would not do that? why/what would prevent you/make it more likely?
  - b. Probe if mention diet or physical activity:
    - i. And do you think that would have any impact on your pregnancy/ health (or the health of your baby?) And long-term?

### **Relevance of *weight related health behaviours* to this pregnancy**

11. How important do you think *weight related health behaviours* are to your pregnancy?
- a. What impact do you think *weight related weight behaviours* might have on your pregnancy?
  - b. What do *weight related health behaviours* mean to your pregnancy?
  - c. To what extent do you think *weight related health behaviours* have an impact on your weight in pregnancy?

### **Any changes to *weight related health behaviours* so far in this pregnancy**

12. Have any of your *weight related health behaviours* changed in during this pregnancy? As a result of the pregnancy or for the pregnancy.
- i. To what extent do you think this will have on your weight?

13. Have you made any changes to *weight related health behaviours* so far in your pregnancy?

- a. When did you first think about making changes to that/those *weight related health behaviours*?
- b. Why those behaviours; how did you do it; any barriers or facilitators; what influenced your decision?
- c. How long do you plan to continue with those *weight related health behaviours*? Throughout the whole pregnancy and after the pregnancy?
- d. Do you want to see/ expect any sort of an outcome as a result of doing that?
- e. To what extent do you think this will have on your weight?

**Weight related health behaviours further along in this pregnancy**

14. Do you plan to make any other changes to your *weight related health behaviours* throughout the pregnancy?

- a. Why are they important to your pregnancy? Tell me about why you have considered those behaviours for later on in the pregnancy but not immediately?
- b. How do you plan on doing that; any perceived barriers or facilitators; what influenced that decision?
- c. How long do you plan to continue with those *weight related health behaviours*? Throughout the whole pregnancy and after the pregnancy?
- d. Do you want to see/ expect any sort of an outcome as a result of doing that?

## Appendix H Example of notes and reflections made when piloting topic guide

### Overall thoughts

- Questions elicited lengthy answers
- Order of questions was good – the participant usually mentioned something I wanted to follow up with the subsequent question
- Did answer the objectives on the topic guide (1. To understand women's perceptions of what health behaviours are related to weight management throughout pregnancy and following birth; 2. To understand how and why weight related health behaviours may change during the course of a pregnancy and following birth.)
- Didn't probe barriers and facilitators of the changes made – should have
- Seems quite weight management/ gain focussed, try to increase content on health behaviours?
- Health behaviour information was not elicited through questions asking about weight management/ gain, thus suggests they're not really considered as part of weight management/ gain, which is interesting, however means I need to find an alternative way to elicit information about health behaviours.
- I added the word 'lifestyle' to the question (pg. 4 in transcript) in an attempt to discuss health behaviours, which was followed by discussion on physical activity
- Didn't give definition of weight management as wasn't necessary

### Things to consider for future interviews

- Make sure to consider parity as that had a big impact and dominated the discussion i.e. her current child had a big impact on her life in terms of diet and being active – identity as and role of being a mum, has a child, she's already a mum and that dictates things like meal choices whilst pregnant, is this different for first time mums?
- Breast feeding as a stage after pregnancy (relates to AN v. PN discussion from earlier) – perceived that mother's choices still have an impact on their baby at that stage which therefore influences health behaviours
- Early interview is interesting – seems that although not very big bump yet, seems an interesting time for perception and thoughts towards weight and clothes (i.e. normal vs. maternity clothes). In terms of the literature, I think most studies interview women later in pregnancy when they are 'obviously' more pregnant – interesting concept and does this change over time?
- Should add a question about what impact pregnancy has had on their weight related health behaviours (maybe before asking what they've intentionally changed?) – i.e. behaviours that may have changed because of the pregnancy, but not necessarily intentionally for the pregnancy?
- Make sure to ask about barriers and facilitators of the health behaviours

### Potential alterations to topic guide.

- Additional questions:
  - 1d. When was it that you first thought about weight management/ gain?
  - 3d. Tell me about if you think it's possible to gain too much weight in pregnancy
  - 3e. How would you judge it as 'too much'
  - 7a. What do you think affects what you weigh in pregnancy?

- 9e. Can you tell me about whether you see these weight related health behaviours as linked to weight gain or management

## **Appendix I Researcher check in procedure**

When undertaking fieldwork in participants' homes, the following check-in procedure has been agreed with Hannah Hartley's academic supervisors Professor Linda McGowan; Dr Zoe Darwin and Dr Debbie Smith. Hannah will implement procedure when attending interviews at participants' homes.

1. Hannah will provide the nominated supervisor with details of the interview: participant name and contact information, location, date and time, planned journey times and method of travel, including details of own car, telephone numbers (research and personal mobiles). If these are known in advance, they will be stored on the University of Leeds M Drive.

2. Three 'check-in times' have been agreed

- Hannah reports she has arrived at the location, and the time anticipated she will leave
- Hannah reports she is leaving the location
- Hannah reports she has returned to her onward location e.g. home

The nominated supervisor will confirm receipt of Hannah's message informing that she has arrived home at the end of the interview

3. If 15 minutes pass since the anticipated 'check-in' time without Hannah making contact, the nominated supervisor will attempt to contact her by phone and if applicable, to arrange a new 'check-in' time. If she is unable to contact Hannah and a further 15 minutes has passed, the nominated supervisor will telephone Hannah's research mobile, her personal mobile and the interviewee and if she is unable to locate Hannah, contact the police.

## Appendix J Topic guide for Timepoint Two

### Topic Guide for Interview 2

#### Setting the Scene

##### **Introduction pre-interview**

- Welcome and thank you
- Explain this is their second interview and we will be following on with things we discussed in our first interview
  - Our last interview was in **August** when you were around **15 weeks** pregnant. As you know, this research is exploring your experiences and views of weight management, diet and physical activity during your pregnancy, which we discussed in our last interview and will be discussing today
- Key points
  - Length of interview approximately 1 hour.
  - Your views are important, and I would like to understand your views as much as possible, there are no right or wrong answers, so if you could speak as openly and freely as possible, and if I ask you to repeat anything it's only for my own understanding and clarity for the recording
  - Emphasise confidentiality and that all will be anonymised but if you disclose anything which may indicate risk of harm to themselves or someone else I may have to report this to the relevant person
  - You have the right to withdraw without giving a reason at any point in this interview, and you can ask to pause the interview if you'd like a break at all
  - The topics to be discussed in the interview are around weight gain and weight management in pregnancy, and what you think might contribute to these during a pregnancy
- Any questions?
- Confirm consent
- Happy to proceed?

##### **Concluding summary post-interview**

- Thank for taking part
- Anything else you'd like to add?
- Verbally signpost to GP or midwife or health visitor for more information if appropriate
- Identify approximate time period for next contact to arrange subsequent interviews
- Confirm preferred contact details for future contact

## **Weight changes since interview one**

- Can you tell me about whether your weight has changed since I last saw you?
  - Explore anything about excessive/ not enough / ok
  - Areas of weight gain
- How do you feel about that?
  - Anything different than what you thought at the beginning of the pregnancy?
- Follow up their weight expectations from interview 1
- What do you think has resulted in that (change) to your weight?
  - FOLLOW UP AND PROBE ANYTHING DIET AND PHYSICAL ACTIVITY RELATED

### **Changes to diet and physical activity?**

- Follow up from when women have had physiological symptoms that have impacted on diet and physical activity in interview 1 i.e. sickness/ tired – did that reduce and did anything change?
- Follow up any plans for change discussed in interview 1
  - Diet
  - Physical activity
  - After symptoms subsided i.e. return to eating X after sickness subsided
  - Why were they important?
  - How did they do that? (THINK BCTs)
  - Barriers / facilitators
  - How long do you plan to continue with that/those
  - To what extent do you think this will have on your weight?
- Relevance to pregnancy
  - Why were they important?
  - What role do they play to their pregnancy?

### **Influences**

- Follow up anything discussed in interview 1 as an influencing factor
- Follow up anything which has had an impact on weight/ diet/ physical activity since interview 1

### **Future thoughts**



- Rest of the pregnancy
- Postnatal
- How long postnatal?

**Interview 1 key points to follow up**

- Expects to be bigger – already feels it. Doesn't want to put much more weight on herself
- Eating has increased
- Eating healthier i.e. fruit and veg– wants to for the baby and has done – took fruit to work to snack on
- Reduced takeaways
- Meal prep to maintain healthier eating – on a weekend
- Reduce sweets and fizzy pop
- Avoid harmful foods – rare steak, prawns
- Stopped going to the gym – first reduced because didn't know how safe, but too tired
  - Doesn't plan on going further down the pregnancy but does after the pregnancy
  - Has she been, how does she feel about that as she used to go a lot
- No cravings – expecting some cravings to come

**Appendix K Copy of the letter to be sent in cases of perinatal loss****UNIVERSITY OF LEEDS**

Room 2.30, Baines Wing  
School of Healthcare  
University of Leeds  
Leeds  
LS2 9JT

[insert date]

*Participant Address*

Dear *participant*,

Thank you for taking part in the study on weight management. Routinely, as part of the study, I have been in contact with your named midwife since we last spoke. *She/He* has informed me of a change in your circumstances and I would like to offer my condolences and let you know how grateful I am of your participation in my research. I understand this may be a stressful time for you and wanted to assure you that you do not have to continue participating in this study. I will not contact you again and wish you all the best for the future.

Best wishes

Hannah Hartley

**Appendix L Copy of the letter to be sent in cases of a pregnancy complication****UNIVERSITY OF LEEDS**

Room 2.30, Baines Wing  
School of Healthcare  
University of Leeds  
Leeds  
LS2 9JT

[insert date]

*Participant Address*

Dear *participant*,

Thank you for taking part in the study on weight management. Routinely, as part of the study, I have been in contact with your named midwife since we last spoke. *She/He* has informed me of a change in your circumstances. I understand this may be a stressful time for you and wanted to assure you that you do not have to continue participating if you wish. Your continued participation would be welcomed if you would like to continue, but please do not please obliged to if you would rather not. If you would like to carry on taking part in my study please let me know on the contact details below. In light of this, I will not contact you again if I do not hear from you.

All the best

Hannah Hartley

Email: [hchlh@leeds.ac.uk](mailto:hchlh@leeds.ac.uk)

Telephone: 0113 34 33472 or 07XXXXXXXXXX

Address: Room 2.30, Baines Wing  
School of Healthcare  
University of Leeds  
Leeds  
LS2 9JT

**Appendix M Example of mapping table utilised in identification of weight-related health behaviours; COM-B component and TDF**

Chapter text	WRHB	COM-B	TDF	Comments
<b>TP1 Theme 1a.</b>				
The women considered their diet to be a direct source of nutrition to the unborn baby, providing them with the nutrition needed to grow and develop. This meant the women “wanted to eat as healthy as they could” (Ava), by consuming ‘healthy’ foods, which were perceived to benefit the growth and development of the unborn baby.	Consumption of ‘healthy’ foods	Capability - psych	Knowledge	Beliefs towards the fact that food can impact on the unborn baby. Some lay views towards what impacts
<i>“I generally just want to be a healthier person, I guess, being pregnant you do worry about, you know, what you are giving your baby nutritionally”. Ava</i>  <i>“Obviously what I eat the baby gets, so I’d want to try and eat as healthily as I can, and give that baby good development and a good start.” Ella</i>	Consumption of ‘healthy’ foods	Motivation – Reflective	Beliefs about consequences	Pregnancy specific to how the food directs the unborn baby i.e. baby’s development. The impact of not consuming a ‘healthy’ diet/ nutritionally rich foods would be insufficient growth and development
	Consumption of ‘healthy’ foods	Capability - psych	Behavioural regulation	Wanting to eat healthier and consume more nutritionally rich and diverse foods

Chapter text	WRHB	COM-B	TDF	Comments
<p>A 'healthy' diet was usually viewed by the women as being 'varied and balanced' to provide maximum nutrition to the unborn baby. A 'varied, balanced diet', was thought by women to encompass the 'different food groups' with a high fruit and vegetable content. Furthermore, they were concerned that not consuming enough nutrients could potentially hinder the unborn baby's growth and development. This meant women were largely concerned with achieving a nutritionally varied and rich diet during their pregnancy.</p> <p><i>"Making sure I'm getting all my food groups in there. In my tea, for example, I've got my protein and natural fat with my salmon, carbs and potatoes, fat and protein again with the eggs, and then getting some vegetables and fibre with the broccoli. [...] I feel like it will give the baby the nutrients it needs to help it develop and give it the best chance of developing in line with where it should and being healthy."</i> Milly</p> <p><i>"Baby can't take what's not there, so, if I've missed out like an important food group, baby can't get something that I haven't had, I want to minimise that risk and I want to make sure that I am eating healthily and do as much as I possibly can, to keep baby all ok."</i> Violet</p>	Consumption of 'healthy' foods	Capability - psych	Knowledge	What foods constitute to a healthy diet. In addition to terms such as 'varied balanced diet' women also cite particular foods such as fish and vegetables etc.
The idea of achieving a nutritionally 'balanced' diet was considered more important than increasing calorie consumption. Some women	Increasing calorie intake	Opportunity – social	Social influences	That other's think increasing calories is

Chapter text	WRHB	COM-B	TDF	Comments
<p>reported being encouraged to increase their calorie consumption by others because they were “eating for two”. However, the women often refuted this, and discussed how they did not think it was necessary to increase their calorie consumption. On the whole, the need to increase their calorie consumption because they were “eating for two” was describe as a ‘myth’ by the women. They considered the nutritional quality of their diet as more important in supporting the growth and development of the unborn baby, than the calorie quantity.</p> <p><i>“There used to be a saying of eating for two, and people still say it to you now, but really you’re not. [...] I think you’ve just got to maintain a healthy balanced diet.”</i> Alice</p> <p><i>“I think things from the past like eating for two and things are not true, I don’t think you have to do that, I think you just have to make sure you’re getting like well-balanced food.”</i> Ava</p>	Increasing calorie intake	Motivation – Reflective	Beliefs about consequences	<p>acceptable and normalise it to the women</p> <p>Don’t think that increasing calories will have a positive impact on the unborn baby, more concerned with the consequences of consuming a ‘healthy’ diet (see deleted quote)</p>
<p>In addition to their food intake, for the women to feel assured they were consuming a sufficient amount of nutrients, they often took pregnancy specific supplements. Women perceived these did not replace the nutrition present in foods, but believed they ‘topped up’ their dietary consumption to the sufficient levels needed to support the growth and development of the unborn baby. Supplements were also perceived to</p>	Consumption of ‘healthy’ foods	Motivation - Automatic	Emotion	Taking supplements as assurance – feeling like they’re doing the ‘right thing’
	Consumption of ‘healthy’ foods	Motivation - Reflective	Beliefs about consequences	The impact on their own ability to carry the

Chapter text	WRHB	COM-B	TDF	Comments
<p>support their own nutrition levels, to ensure their body was supported in carrying a pregnancy.</p> <p><i>“I take pregnancy supplements and have done since I found out I was pregnant and possibly, I think I even took them before, like trying for a baby, vitamins and stuff. I haven’t really thought about it, I just try to get nutrition in me so I’ve got the energy to keep cooking it.”</i> Freya</p> <p><i>“From the point of view of the vitamins and things, I mean, I take double the folic acid purely because, I take it in the multivitamin and I take a separate tablet of it as well because nobody’s told me it’s an issue you know [...] I take a vitamin D supplement as well, because that’s an important vitamin as well. But yeah, I mean you never really know what your body’s doing [...] You don’t know whether you’re getting the right vitamins and minerals to support a pregnancy I suppose do you”</i> Martha</p>				<p>pregnancy and on the baby’s growth and development</p>
<p>Whilst ‘healthy’ foods were thought to positively contribute to the unborn baby’s growth and development, ‘unhealthy’ foods were perceived as having the possibility of detrimentally impacting on the unborn baby. Women’s perception of the risk of ‘unhealthy’ foods negatively impacting the unborn baby were orientated around prolonged excessive consumption of ‘unhealthy’ foods. Subsequently,</p>	<p>Limiting of ‘unhealthy’ foods</p>	<p>Motivation - reflective</p>	<p>Beliefs about consequences</p>	<p>Consequences on unborn baby if consume too many unhealthy foods (see also the deleted quotes)</p>
	<p>Limiting of ‘unhealthy’ foods</p>	<p>Capability - psych</p>	<p>Behavioural Regulation</p>	<p>Limiting unhealthy foods and replacing with healthy</p>

Chapter text	WRHB	COM-B	TDF	Comments
<p>women often tried to 'limit' their consumption of 'unhealthy' foods, and substituted 'unhealthy' foods with 'healthy' ones. There were also foods women avoided altogether, due to the perceived risk of immediate harm to the unborn baby and the viability of the pregnancy. These foods were treated differently to 'unhealthy' foods. Whilst there was a level of 'balance' associated with consuming 'healthy' and 'unhealthy' foods, foods which were associated with immediate harm to the unborn were completely avoided.</p> <p><i>"You can make your baby diabetic I believe if you have too much sugar when you're pregnant so, it kind of is something that I know you need to control."</i> Martha</p> <p><i>"I would never eat anything that would put at risk my pregnancy so, I don't eat liver or pate or raw anything. But, then if I want something a bit more sugary or a bit more salty or something that I fancy I will eat it, I am not going to feel guilty for eating something I fancy when I know that the majority of things I eat are okay."</i> Freya</p>				<p>ones. Also see that limiting intake but not ceasing (see also deleted quotes)</p>
	Avoiding potentially harmful foods	Motivation – Automatic	Emotion	<p>Knowledge</p> <p>Of which foods to limit</p> <p>Foods which were considered to have the potential to cause immediate harm to the unborn baby were avoided . Driven by fear rather than knowledge – didn't know how it effected</p>
<p>The women were uncertain about how their unborn baby was growing at this stage of pregnancy due to limited indicators, such as limited contact with healthcare professionals and a visible 'bump'. This led to anxiety and a perceived lack of control over ensuring the baby was developing appropriately. However, dietary consumption was</p>	Consumption of 'healthy' foods	Motivation – Reflective	Beliefs about consequences	<p>The women perceived their dietary intake to directly impact on the</p>



Chapter text	WRHB	COM-B	TDF	Comments
<p>something which was thought to have an impact on the unborn baby's development, and something they had an element of control over, to increase the likelihood that the baby was growing and developing sufficiently. This meant that engaging in 'healthy' dietary behaviours was thought to support the growth and development of the unborn baby. Furthermore, it also acted as reassurance to the women that they were doing 'all they can' in their role as a mother, at this stage of pregnancy to support the well-being of their unborn baby.</p>				<p>growth and development of the unborn baby</p>
<p><i>"I want to try and eat as healthily as I can, and give that baby good development and a good start, and a good, being able to grow and develop as best as I can inside me. Obviously, I don't have any control of how that's happening or what's going on in there, but I do want to try my best and think that I've done all I can for my baby's development inside."</i> Ella</p>	Consumption of 'healthy' foods	Motivation – Reflective	Social/Professional role and identity	<p>The role as a mother begins during pregnancy, and that includes consuming healthy foods which are thought to support the baby's growth and development (see also deleted quotes)</p>
<p><i>"It's one of the few things you have control over really, because you don't know, you don't know how, whether your baby's going to be healthy, you hope it is, but one thing you can control is eating a good diet and things like that. So, I suppose it gives you a sense of being able to help your child before it's born, so in that sense it's really important"</i> Alice</p>	Consumption of 'healthy' foods	Motivation – Automatic	Emotion	<p>Perceived limited control and anxiety over the growth and development of the unborn baby and 'what is going on inside'. Consuming healthy foods allays anxiety as it is something within their control that could possibly be having a positive impact</p>

