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Abstract

Objectives: To understand UK women's experiences of antenatal dietary advice for risk of food borne illness and weight gain.

Design: A systematic review and thematic synthesis of peer-reviewed qualitative studies. PubMed, MEDLINE, CINAHL and PMC databases were searched for articles published from June 2008 to June 2018. The search strategy combined terms for pregnancy with terms for body composition, weight change, food safety, nutrition, diet and qualitative terminology. Studies were eligible for inclusion if (1) they explored experiences of implementing advice received during pregnancy for nutrition, physical activity and/or weight gain, and (2) participants were women who had experienced maternity care in the UK. Study quality was appraised using the Critical Appraisal Skills Programme (CASP) qualitative research appraisal tool.

Findings: Of 25,688 articles identified by the search strategy, 20 studies were identified that met the inclusion criteria. Five major themes were recognised: *control, barriers to diet and exercise, motivators, relationship with weight, information*, with a further 12 subthemes. The majority of studies reported on weight gain (n = 10).

Key conclusions: Evidence shows that UK antenatal dietary advice is currently inconsistent, vague and overwhelming despite pregnancy being an excellent time for lifestyle change. Women are primarily driven by the health of their baby and desire support to facilitate positive changes.

Implications for practice: Findings outline a wishlist which highlights a desire for tailored information on preventing weight gain, dietary requirements, safe physical activity and a deprioritisation of food safety guidelines. This provision should be delivered by HCP. e.g. Midwives, in a sensitive and supportive way to bridge the gap between women's needs and the current antenatal provision.

Keywords

Qualitative synthesis; Pregnancy; Maternal Healthcare; Maternal Obesity; Women's experiences; Diet and Lifestyle

Abbreviations

BMI: Body Mass Index

GWG: Gestational Weight Gain

GDM: Gestational Diabetes Mellitus

HCP: Health Care Providers

T2DM: Type 2 Diabetes Mellitus

Introduction

Nutrition received during a baby's first 1,000 days of life, beginning upon conception, is crucial to their development and disease risks in later life (Woo Baidal et al., 2016). Adherence to a healthy diet is associated with an increased intake of micronutrients essential for foetal development during pregnancy (Tanha et al., 2013). Effective antenatal nutrition reduces the likelihood of developing chronic illnesses and contributes to the baby's well-being (Fowles and Fowles, 2008), though many women do not maintain an adequate diet during pregnancy (Langley-Evans, 2015). Current UK guidance promotes use of the Eatwell Guide (NHS, 2016) but factors affecting dietary behaviour are not yet fully comprehended and there is limited research on UK women's experience of gathering antenatal nutritional information and their subsequent behaviour change (Bookari et al., 2017).

Maternal obesity is a growing concern in the UK, with 1 in 20 pregnant women with obesity (Morgan et al., 2014) and first trimester obesity significantly increasing (Heslehurst et al., 2009). Despite this, antenatal dietary advice is often only provided in physical handouts, which have been found to provide no guidance on weight management (Heslehurst et al., 2007). Macronutrient consumption during pregnancy is directly associated with birth weight outcomes (Sharma et al., 2018) and an elevated Body Mass Index (BMI) increases the risks of miscarriage, caesarean section, preeclampsia, gestational (GDM) or subsequent type 2 diabetes mellitus (T2DM) (Baeten et al., 2001; Fitzsimons, Modder and Greer, 2009). The cost of providing healthcare to pregnant women also increases with maternal BMI (Morgan et al., 2014). NICE (2010) guidance states that health care providers (HCP) should not routinely weigh women during pregnancy, however, there is insufficient clarity on how to achieve and maintain a healthy weight. In-depth conversations regarding gestational weight gain (GWG) are infrequent (Nikolopoulos et al., 2017), with weight management guidance described as "vague and inadequate" (Johnson et al., 2013), RCOG green top guidelines (2018) agree there is lack of consensus regarding optimal GWG (Denison et al., 2018). Physical activity during pregnancy is a safe and effective way to reduce adverse pregnancy outcomes (e.g. GDM), and prevent further GWG (Mijatovic-Vukas et al., 2018). Pregnant women should strive to achieve 30 minutes of moderate physical activity per day (NICE, 2010) which is in line with the majority of international guidance (Coll et al., 2017), yet compliance with recommendations is low (Lindsay et al., 2015).

Antenatal dietary guidelines highlight the importance of excluding certain foods from the diet which may cause foodborne illnesses such as Listeriosis and Salmonella (NHS, 2017). Foetal Listeriosis can lead to pregnancy loss, stillbirth or preterm birth (Kourtis, Read and Jamieson, 2014) but severe infection is rare during pregnancy with 3 cases per 100,000 births worldwide (Madjunkov and Chaudhry, 2017) and 462 cases in England and Wales between 1990 and 2010 (Awofisayo et al., 2015). In 2018, 'lion mark' eggs were declared safe for consumption during pregnancy almost 30 years after a salmonella scare (BNF, 2017). In comparison, risks of early miscarriage, stillbirth and preterm births were found to be significantly higher in women with living overweight and obesity when compared to healthy weight controls (Lashen, Fear & Sturdee, 2004; Denison et al., 2008; Callaway et al., 2006). Low rates of food-borne infections compared to the significant risk of excess weight prompts questions about how relevant current antenatal advice is and whether midwives may be able to use their clinical times more effectively in maternal overweight and obesity.

A UK based literature review of antenatal healthcare conducted by Downe et al., (2016) found overwhelmingly that 'women want and need a more positive pregnancy experience'. As yet, it is not clear what this support and advice should consist of in order to incite the necessary behaviour change. The aim of the current research is to examine women's experiences of nutritional information during pregnancy within UK antenatal care.

Methods

This thematic synthesis was based on principles previously published by Thomas and Harden (2008). The search strategy combined terms for pregnancy with terms for body composition, weight change, food safety, nutrition, diet and qualitative terminology. The full strategy was kept consistent across databases (see Table 1). Comprehensive searches were conducted on the following online databases and undertaken on 21st June 2018: PubMed, MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Pub Med Central (PMC). Reference lists were screened for additional articles. Duplicates were removed before screening was undertaken in a three stage process: (1) Titles were screened for eligibility; (2) Abstracts screened against inclusion criteria (see Table 2); (3) Full texts were obtained and final selection made first independently by two reviewers and then by discussion.

Table 1. Search Strategy

TITLE	Pregnan* OR matern* OR antenatal OR perinatal OR gestation*
AND	qualitative OR focus group OR interview OR experience
AND	foodborne illness OR food-borne OR food poisoning OR food safety OR pathogens OR infection OR parasite OR Listeria OR Listeriosis OR Salmonella OR Toxoplasma gondii OR Toxoplasmosis OR mercury OR dioxins OR campylobacter OR weight gain OR weight OR obesity OR obese OR overweight OR BMI OR exercise OR physical activity OR body composition OR nutrition* OR diet* OR guidelines OR guidance OR behaviour change
DATE	after Jan 2008

Table 2. Inclusion and Exclusion Criteria

	Include	Exclude
Participants	Women who had experienced pregnancy and received maternity care in the UK	Women < 16 Women with pre-existing medical conditions (excluding GDM and T2DM) Women with a BMI <18.5kg/m2 or malnourishment
Study focus	Quality of advice provision with regards to nutrition, physical activity and/or weight gain Attitudes towards implementing nutritional and physical activity changes Women's perceptions of additional	Smoking, alcohol and substance abuse, breast feeding, clinical outcomes, birth defects and other 'irrelevant' areas Not focusing on the experiences of a pregnant individual

information required during pregnancy

Study design	All primary qualitative studies, including research from mixed-methods papers	Quantitative studies or findings
Time period	Published from June 2008 onwards	Published before June 2008
Publication type	Peer-reviewed primary studies	Systematic reviews
Location	Studies conducted in the UK	Studies conducted outside of the UK

Quality of the search strategy was assessed by checking for inclusion of five pre-defined relevant papers from: Padmanabhan, Summerbell and Heslehurst (2015), Heslehurst et al., (2017), Ferrari et al., (2013), Bloomingdale et al., (2010) and Dinsdale et al., (2016). As all five studies were found to be present in the search strategy, it was determined to be of high quality and no further adjustments were made. Quality of the individual studies was assessed and classified using the Critical Appraisal Skills Programme Qualitative Study Appraisal Tool (CASP, 2018) to rate each study as low, medium or high quality (see Appendix 1). This was undertaken by two researchers who found none of the 20 studies to be of a low quality. Research was not excluded from the synthesis on the basis of quality alone but instead considered within the findings.

The process of thematic synthesis followed as such: (1) Codes were assigned on a line-by-line basis to every applicable finding, resulting in a preliminary 38 codes; (2) Descriptive themes were generated from the free codes, which began to take on a hierarchical order to group the data; (3) Analytical themes were developed by generating new concepts and attempting to analyse the themes independently from their original publication. NVivo (NVivo qualitative data analysis software, QSR International Pty Ltd. Version 11, 2015) was used for coding and data analysis. Findings were considered to be all quotations reported in the 'results' section of studies that were recorded from pregnant women. An inductive verbatim approach was taken, with the objective of generating new theory via a data search to identify relationships that could relate to the research aim. Final themes were deemed complete when they were distinct and internally consistent.

Findings

Stages of the literature search can be seen in Figure 1. Included papers provide wide geographical coverage of the UK, were published between 2010 and 2018 and included 825 women (see Table 4 for study characteristics). The majority of studies focussed on weight gain (n = 10), with the remainder exploring GDM (n = 4), behaviour change (n = 4) and nutritional advice (n = 2). Focus groups and interviews were the most commonly applied methods for data collection (n = 19), with one study using secondary data collection. Thematic synthesis identified five overarching themes: (1) Control; (2) Barriers to Diet and Exercise; (3) Motivators; (4) Relationship with Weight; (5) Information. There were a further 12 sub-themes, which can be seen in Table 3 and relationships between the subthemes are presented in Figure 2.

Table 3. Themes and sub-themes

Overarching themes	Sub-themes
1. Control The extent to which women feel in control of their pregnancy and the conditioning that influences this relationship	<i>1.1 Letting pregnancy run its course</i> <i>1.2 Self-control</i>
2. Barriers to Diet and Exercise Obstacles affecting women's ability to put healthy lifestyle advice into practice	<i>2.1 Side effects of pregnancy</i> <i>2.2 Practicalities</i> <i>2.3 Lack of information and support</i>
3. Motivators Internal and external factors which encourage women to negotiate barriers and make a desired change	<i>3.1 Caring for two</i> <i>3.2 External support</i>
4. Relationship with Weight Women's perception and resulting impact of professional and unsolicited commentary on their weight.	<i>4.1 Social Stigma</i> <i>4.2 Approach to weight management</i>
5. Information The experience women undergo in order to educate themselves during pregnancy	<i>5.1 Other resources</i> <i>5.2 Inadequate HCP care</i> <i>5.3 Wish list</i>

Figure 1. PRISMA flow chart

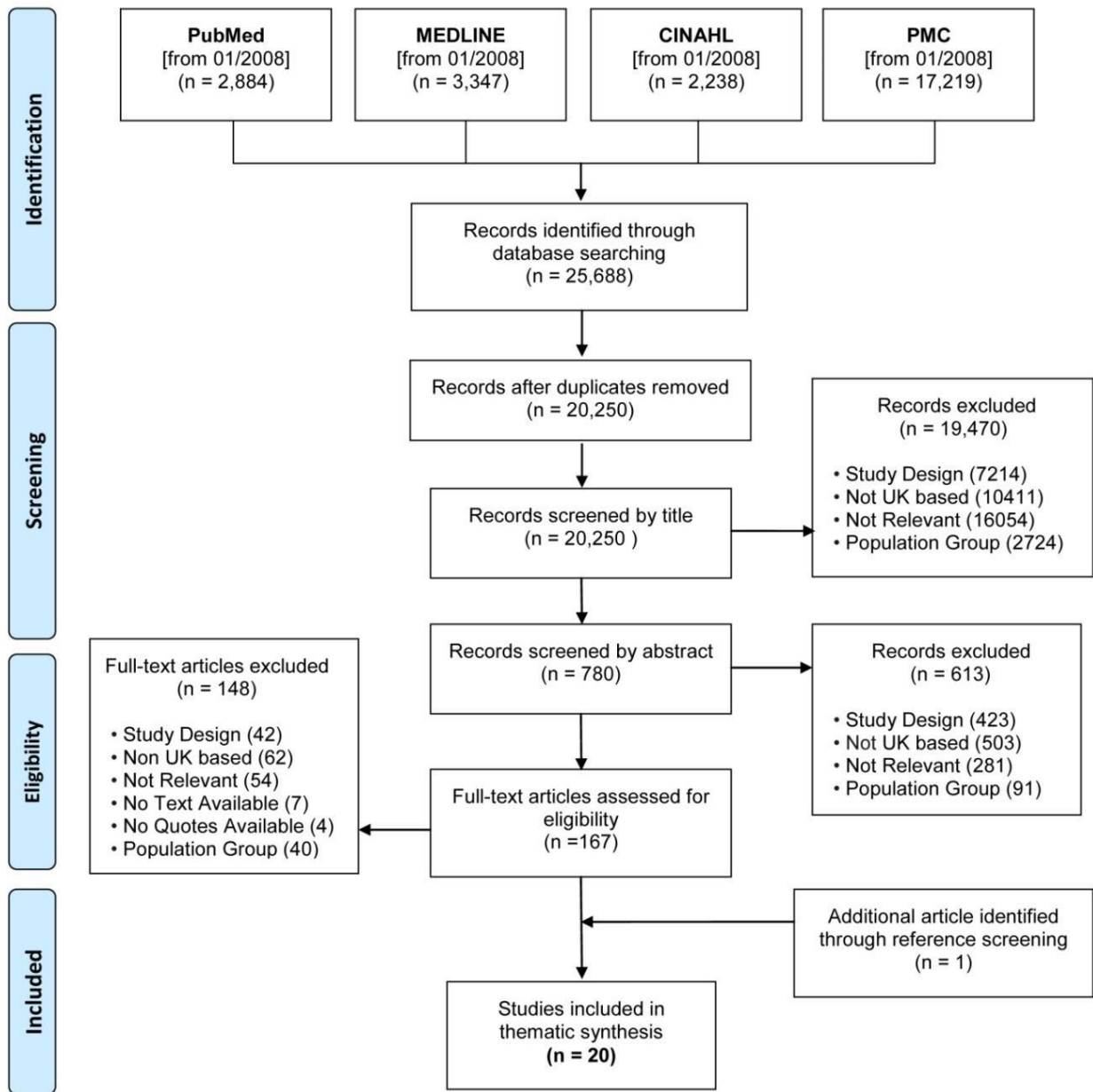


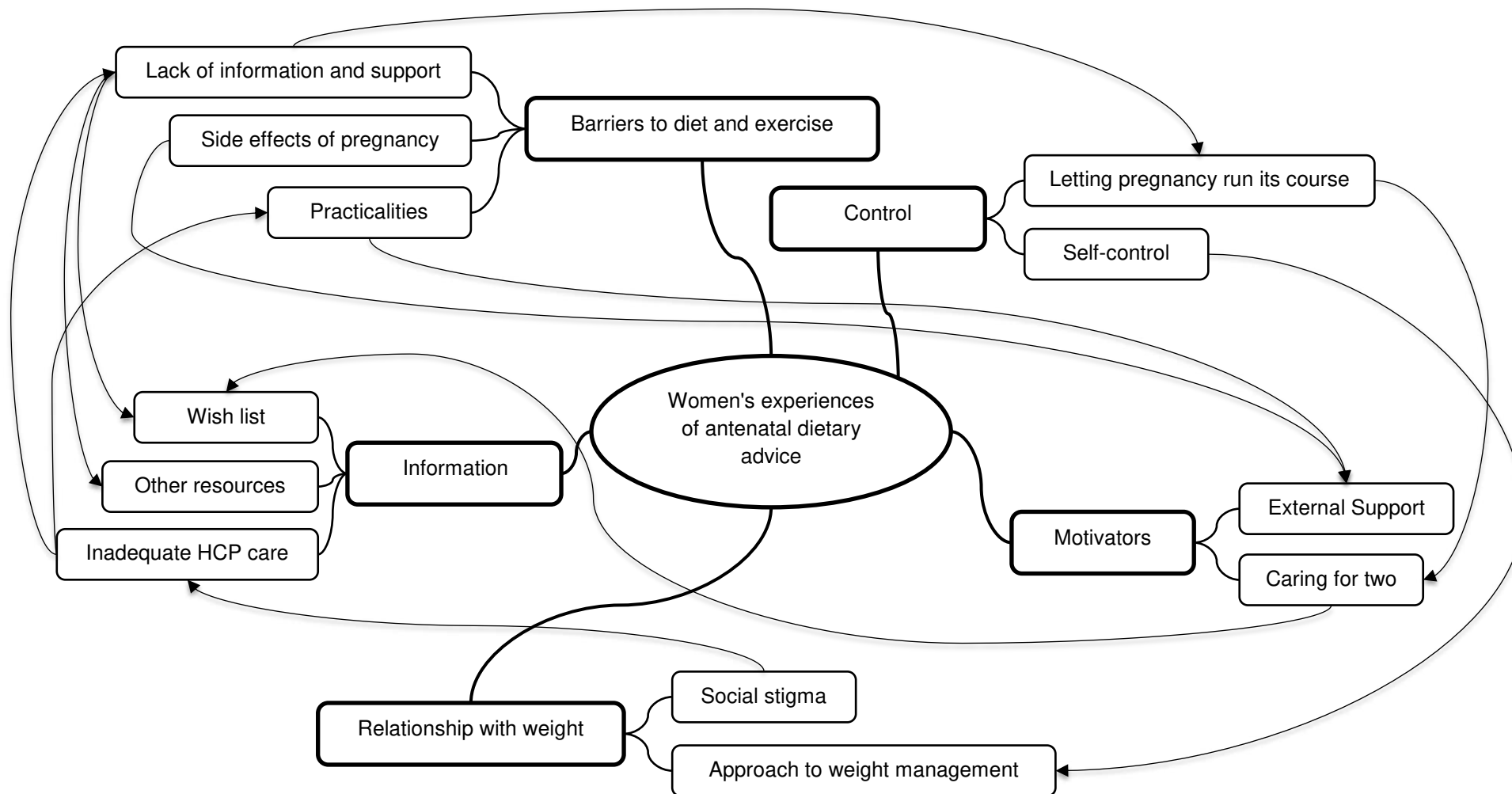
Table 4. Characteristics of included studies

Study	Research aim	Region	Data Collection Method	Participants	Themes identified
Arden, Duxbury and Soltani (2014)	Examine reception of gestational weight management guidance	UK	Secondary collection of online parenting forum posts	<i>n</i> = 202 pregnant women	Perceived control / responsibility, Risk perception, Confused messages
Atkinson, Shaw and French (2016)	Investigate whether pregnant women are receptive to behaviour change	Midlands UK	Face-to-face open interviews and video open interviews	<i>n</i> = 7 pregnant women between 24-33 weeks gestation and experiencing their first pregnancy (aged 28-42)	Acceptance of the pregnancy, Influence of pre-conception experiences, Listening to your body versus following advice, Retaining self versus selflessness
Bouga, Lean and Combet (2018)	Experiences of pregnancy nutrition, with a focus on iodine	UK	Face-to-face and phone interviews	<i>n</i> = 48 women with a child over 2 years, at pre-conception stage or pregnant	Dietary information received, Iodine knowledge, Iodine sources, Receiving information
Brown and Avery (2012)	Exploration of information and advice provided during pregnancy with a focus on BMI	Nottinghamshire UK	Mixed methods questionnaires	<i>n</i> = 60 pregnant women	Weight gain advice wanted, Diet and exercise advice wanted, Lack of advice and support, Anxiety
Denison <i>et al.</i> , (2015)	Exploration of the barriers and facilitators to lifestyle interventions during pregnancy	Edinburgh UK	Semi-structured interviews	<i>n</i> = 13 pregnant women over 16 weeks gestation and a BMI $\geq 40\text{kg/m}^2$ (aged ≥ 18)	Healthy lifestyle awareness, Complex barriers to change, Personalised solutions
Dinsdale <i>et al.</i> , (2016)	Exploration of experiences of maternal obesity care pathways	North East England	Semi-structured interviews face-to-face and via telephone	<i>n</i> = 24 women who had given birth 3-9 months prior to recruitment and a BMI $\geq 30/35\text{ kg/m}^2$	Communication, Treating obesity with sensitivity and respect, Appropriate and accessible lifestyle services

Draffin <i>et al.</i> , (2016)	Exploration of the concerns, needs and knowledge of women with GDM	UK	Focus groups	<i>n</i> = 19 pregnant women with a history of or current GDM (aged 18-45)	Dealing with a GDM diagnosis, Having adequate support Challenges of lifestyle change , Consequences of GDM
Eades, France and Evans (2018)	Exploration of experiences, knowledge and perceptions of women with GDM	Scotland UK	Semi-structured interviews	<i>n</i> = 16 pregnant women with GDM (aged ≥ 18)	Understanding of GDM, Impact of GDM, Understanding of T2DM, Lifestyle change, Prevention of T2DM
Furness <i>et al.</i> , (2011)	Exploration of experiences managing weight in pregnancy	Doncaster UK	Focus groups	<i>n</i> = 6 pregnant women with a BMI ≥ 30 kg/m ² <i>n</i> = 7 midwives	Explanations for obesity and weight management, Best care for pregnancy
Heslehurst <i>et al</i> (2013)	Experiences of pregnant women with obesity	North East England	In-depth interviews	<i>n</i> = 15 pregnant women and BMI ≥ 30 kg/m ²	Weight, Families, Negativity, Priorities and desired outcomes
Heslehurst <i>et al.</i> , (2017)	Experiences of women with obesity's referral to an antenatal dietetic service	North East England	In-depth interviews	<i>n</i> = 15 (<i>same sample as above</i>) pregnant women and BMI ≥ 30 kg/m ²	Service experience, Process of referral, Delivery of the service, Content of the service
Jarvie (2017)	Exploration of experiences of women with maternal obesity and GDM	South West England	In-depth narrative interviews	<i>n</i> = 27 pregnant women with coexisting obesity and GDM	Social and economic stressors, Stigma
Keely <i>et al.</i> , (2017)	Experiences and perceptions of pregnancy by women with obesity	Scotland	Semi-structured interviews	<i>n</i> = 11 pregnant women and a BMI ≥ 40 kg/m ² <i>n</i> = 7 male partners	Weight histories, Relationship with food, Resisting risk together, Resisting stigma together, Pregnancy as a 'pause', Dietary advice, Postnatal intentions
Lavender and Smith (2015)	Gain insight into experiences of pregnant	North West England	Semi-structured interviews and focus groups	<i>n</i> = 34 post-natal women with an	Disappointment with pregnancy, Readiness to make a lifestyle change, Spurred on by success

	women with an elevated BMI accessing maternity services			antenatal BMI \geq 30 kg/m ²	
McMillan <i>et al.</i> , (2018)	Examine the views of women with GDM to ascertain how to improve primary care	Yorkshire UK	Semi-structured interviews	<i>n</i> = 27 6-12 weeks postnatal women with previous GDM	Barriers and facilitators to a healthy lifestyle, Support from HCP, Suggestions for postnatal support, Technology to assist with a healthy lifestyle
Olander <i>et al.</i> , (2012)	Identify characteristics of services and support wanted by pregnant women	Midlands UK	Focus groups	<i>n</i> = 9 prenatal women <i>n</i> = 14 postnatal women	Early information leading to routine formation of eating habits, Delivery of practical sessions, HCP providing support and signposting
Padmanabhan, Summerbell and Heslehurst (2015)	Exploration of factors influencing lifestyle behaviours during pregnancy	North East England	Face-to-face interviews	<i>n</i> = 19 pregnant women in their 3 rd trimester (aged > 16)	Fragmentation of self, Legitimising behaviours, Body and behaviour surveillance
Parsons <i>et al.</i> , (2018)	Exploration of women's experiences of GDM and GDM care	London UK	In-depth interviews and focus groups	<i>n</i> = 50 women with a GDM diagnosis in the last 5 years and a BMI of \geq 25mg/m ² (aged \geq 18)	Disrupted Pregnancy, Projected anxiety, Reproductive asceticism, Women as baby machines, Perceived stigma Lack of shared understanding, Postpartum abandonment
Swift <i>et al.</i> , (2017)	Investigate experiences and motivators of behaviour change during pregnancy	Nottingham UK	Mixed methods questionnaires	<i>n</i> = 193 pregnant women over 27 weeks gestation (aged \geq 18)	Risk management, Coping with symptoms, Self-control Deviation from norm, Nature knows best
Weir <i>et al.</i> , (2010)	Exploration of the views of pregnant women living with overweight and obesity to inform interventions	North East England	Semi-structured interviews	<i>n</i> = 14 women with a singleton pregnancy and a BMI of \geq 25mg/m ² (aged > 16)	Behavioural beliefs and attitudes, Control beliefs, Normative beliefs

Figure 2. Thematic inter-relationships



Theme 1. Control

1.1 Letting pregnancy run its course (11/20 studies)

Women referenced pregnancy as a 'free pass' to undertake indulgent behaviour and consume unhealthy foods (Dinsdale et al., 2016; Keely et al., 2017; McMillan et al., 2018; Padmanabhan, Summerbell and Heslehurst, 2015; Swift et al., 2017). Some women reported 'embracing' this temporary pause in healthy behaviour and feeling liberated with their attitude to weight.

"I just embraced being pregnant...I just loved it and I thought what goes on can come off again... if you want two pieces of cake, then you will have it." (Dinsdale et al., 2016)

Weight gain was seen by some as synonymous with pregnancy and necessary for the health of the baby. Therefore, less concern was shown to the implications of GWG and the consumption of less healthy foods (McMillan et al., 2018; Padmanabhan, Summerbell and Heslehurst, 2015; Swift et al., 2017; Weir et al., 2010). Whilst some women were untroubled by 'inevitable' weight gain and believed that GWG would disappear postnatally (Heslehurst et al., 2013; Weir et al., 2010), others were anxious about this prospect and less able to relinquish control of their body (Arden, Duxbury and Soltani, 2014; Padmanabhan, Summerbell and Heslehurst, 2015). One participant spoke about an overwhelming sense of doom and loss of self.

"In the end you just feel like you're a dead person walking with a baby inside you, do you know what I mean? Like all these terrible things are going to happen to you" (Parsons et al., 2018).

1.2 Self-control (14/20 studies)

Women felt pressure from HCP to make informed and guided choices during pregnancy (Parsons et al., 2018). Participants believed that their control over making decisions on potential food risks and healthy behaviour was taken away from them. As a result they felt policed and believed that their autonomy was suppressed.

We are no longer credited with having the brains or common sense to assess for ourselves the risks we are taking, and so they err on the side of not so much caution but absolute suppression..... If it has happened with booze, nuts, cheese, pate, liver and mayonnaise, why shouldn't it happen with BMI? ((Arden, Duxbury and Soltani, 2014)

Some participants were open about disregarding HCP advice, feeling that they were intelligent enough to make their own choices and preferring to listen to their bodies (Atkinson, Shaw and French, 2016; Parsons et al., 2018).

"That put a lot of pressure and a lot of guilt on me, but the second time round I decided to be a bit more relaxed and trust my body a bit more." (Bouga, Lean and Combet, 2018)

Several participants felt able to exercise self-control throughout their pregnancy, through physical activity and dietary choices. These women believed that it was possible to maintain their weight and relished the resulting empowerment (Arden, Duxbury and Soltani, 2014; Denison et al., 2015; Heslehurst et al., 2013). Others recognised that despite sufficient knowledge of antenatal advice, self-discipline and ignorance sometimes acted as barriers to desired behaviour change (Weir et al., 2010).

Theme 2. Barriers to diet and exercise

2.1 Side effects of pregnancy (5/20 studies)

Women started pregnancy with positive lifestyle intentions but became waylaid after encountering pregnancy specific symptoms (Arden, Duxbury and Soltani, 2014). Back pain and fatigue prevented women maintaining their regular activity levels and had a subsequent effect on weight management (Draffin et al., 2016; Swift et al., 2017). Furthermore, consuming a healthy diet was compromised by nausea, heartburn and food cravings (Arden, Duxbury and Soltani, 2014; Bouga, Lean and Combet, 2018; Denison et al., 2015; Swift et al., 2017). Healthy foods were described as 'bland' or 'undesirable' with women prioritising comfort foods high in fat and sugar (Swift et al., 2017).

"I was going to have such a healthy pregnancy, eat only good food and be worthy, but then the sickness started, so I eat what I can keep down." (Arden, Duxbury and Soltani, 2014)

2.2 Practicalities (10/20 studies)

Practical barriers to change were classified as financial, time dependant or social. Despite intent to exercise and maintain weight, women found gym classes and weight loss services unaffordable and healthy food financially unobtainable and impractical (Denison et al., 2015; Jarvie, 2017). Frustration was expressed at class difference, with women believing that eating healthily would be an easier task for those better off.

"It's all very well saying you are not supposed to be having all this stuff that you are eating, but don't make everything that is healthy expensive. Because ...if you go and buy a week's worth of fruit and veg and it's expensive. I mean it's madness." (Jarvie, 2017)

Women lacked time to cook the food they knew they should be eating and resorted to convenient options such as frozen food (McMillan et al., 2018; Padmanabhan, Summerbell and Heslehurst, 2015). Some women struggled to cook a healthy meal to please the whole family and one participant lacked the knowledge on how to cook fish (Bouga, Lean and Combet, 2018; Jarvie, 2017). Time pressures further affected physical activity, with women feeling too exhausted after a long working day (Denison et al., 2015; Weir et al., 2010).

'I know that breakfast is the most important meal of the day ... but that's the time of the day that it's chaotic. So, you've got to feed a baby, your husband's walking out the door, you've got a toddler to get to nursery and then you need to try and cook scrambled eggs because you can't have cereal. It's like, "What am I supposed to do?"' (McMillan et al., 2018)

2.3 Lack of information and support (14/20 studies)

It would appear that women are not currently receiving sufficient antenatal guidance. Gaps in support and advice provision translated into barriers to leading a healthy lifestyle. Johnson et al., (2013) confirmed that women frequently felt anxious about engaging in behaviour that would cause harm to their baby. Negative symptoms encountered during pregnancy were linked back to exercise, which held women back from partaking even in gentle activities and indicated a lack of knowledge about appropriate and safe types of physical activity (Denison et al., 2015; Dinsdale et al.,

2016; Heslehurst et al., 2017; Padmanabhan, Summerbell and Heslehurst, 2015; Swift et al., 2017; Weir et al., 2010).

'I think we were paranoid about doing anything that might harm the baby' (Denison et al., 2015)

Cravings for certain foodstuffs, mostly carbohydrates or high fat snacks, were perceived as beneficial for the baby as they provided nutrients that were previously lacking (Bouga, Lean and Combet, 2018; Keely et al., 2017; Padmanabhan, Summerbell and Heslehurst, 2015; Swift et al., 2017). Women were therefore likely to entertain these cravings, seemingly unaware that this behaviour is not always nutritionally beneficial and strongly predicts GWG (Renault et al., 2015). Cultural ignorance from HCP was an additional barrier to implementing change; with many women feeling that dietary advice was exclusive of their heritage and cultural preferences and reducing desire to attend subsequent appointments (Draffin et al., 2016; Parsons et al., 2018).

'I remember when I first met the nutritionist. I was trying to describe a yam to her – she didn't know what it was. So, I said, when I come in for my next appointment, I'll bring a yam to show you what it is, because, you know, I was trying to describe, this is what we eat,' (Draffin et al., 2016)

In some cases, despite adequate knowledge, some women struggled to implement the change they desired, leading to frustration (Denison et al., 2015; Keely et al., 2017). It was recognised that HCP were not currently afforded enough time to assist women with breaking a lifetime of habits (Arden, Duxbury and Soltani, 2014)

Theme 3. Motivators

3.1 Caring for two (10/20 studies)

Women desired to have the healthiest possible pregnancy and were therefore very aware of their behaviour during this time frame (Eades, France and Evans, 2018; Heslehurst et al., 2013; Lavender and Smith, 2015; Padmanabhan, Summerbell and Heslehurst, 2015; Weir et al., 2010). One participant discussed pregnancy as a motivator to make changes that would last a 'lifetime' (Lavender and Smith, 2015). Women place particularly high value on nutritional knowledge, as found by Bookari et al., (2017), and wanted to feel that they had done their utmost to support the health of their child.

"I'd just explain and try and promote the benefits to the baby more than to themselves, because as soon as you mention the baby that'll be it. I know my head now is about 'what do I need to eat that's best for the baby', rather than what's best for me, you know so...that might trigger a positive response rather than a negative response." (Heslehurst et al., 2013)

It was also recognised that engaging in healthy behaviour benefitted both mental health and the birth experience. Women who undertook regular physical activity felt happier and believed they were more likely to undergo an easy birth and pregnancy (Denison et al., 2015; Weir et al., 2010).

3.2 External support (13/20 studies)

Women desired encouragement and assistance during pregnancy and welcomed the idea of someone taking control of their health to alleviate pressure on them. One participant described supportive figures as 'miracle workers' and was grateful to receive

help, despite it being unsolicited (Draffin et al., 2016). Women generally trusted HCP and some were pleased that their weight or ill health had been brought to their attention as it led to increased motivation to change (Bouga, Lean and Combet, 2018; Dinsdale et al., 2016; Eades, France and Evans, 2018; Heslehurst et al., 2017; Lavender and Smith, 2015; Olander et al., 2012).

"Uhm, I was quite pleased really.... they've pointed something out that I have a problem, but I can act on it and do something about it and personally felt like yes, really eager to participate" (Lavender and Smith, 2015)

"I trust very much what the midwife has to say in terms of my nutrition regarding my pregnancy, because they are quite experienced in that field." (Bouga, Lean and Combet, 2018)

Partners provided support with engaging in physical activity and making dietary changes (Denison et al., 2015; Draffin et al., 2016; Heslehurst et al., 2013), but were occasionally a barrier when they were not on board with the desired change (Bouga, Lean and Combet, 2018; Heslehurst et al., 2013). Furthermore, support groups were overwhelmingly viewed as positive experiences as women relished being 'in the same boat' as other participants (Furness et al., 2011). O'Brien et al., (2017) agreed that intimate social relationships encourage healthier behaviours during pregnancy.

Theme 4. Relationship with weight

4.1 Social stigma (11/20 studies)

Women encountered disparaging comments about their weight, unwanted dietary advice and general undesirable attention during their pregnancies (Arden, Duxbury and Soltani, 2014; Denison et al., 2015; Furness et al., 2011; Jarvie, 2017). This weight stigma was not unique to pregnancy but escalated during this period due to the perception of public ownership over the baby. This critique manifested in strong emotional responses; some women felt able to dismiss it (Denison et al., 2015) whilst others were made to feel very anxious and uncomfortable (Arden, Duxbury and Soltani, 2014; Heslehurst et al., 2013).

"Women's bodies are considered public property; something to be legislated about or publically shamed into different shapes." (Arden, Duxbury and Soltani, 2014)

This stigma and resulting self-consciousness held women back from engaging in physical activity and feeling able to leave their houses (Heslehurst et al., 2013; Furness et al., 2011; Weir et al., 2010), hence the need for exercise recommendations that can be undertaken in comfortable and accessible environments. Women living with overweight and obesity felt selfish for choosing to start a family and believed that people perceived them as a bad mother due to their likelihood of delivering a 'big baby' (Arden, Duxbury and Soltani, 2014; Jarvie., 2017). This fear of shame existed beyond pregnancy into their parental future (Keely et al., 2017).

"I think there's just something wrong with the way that people who are overweight are viewed in this country by everybody, whether you are pregnant or not...there's just an assumption that you're a bit thick, and that's why you are overweight, and it's not necessarily true." (Heslehurst et al., 2013)

Weight stigma extended to a healthcare setting, HCP were seen as biased against

women living with overweight and obesity. Participants believed that HCP projected judgement onto them and made unfair assumptions about their lifestyle choices (Arden, Duxbury and Soltani, 2014; Denison et al., 2015; Jarvie, 2017; Keely et al., 2017; Parsons et al., 2018). This perception added unnecessary stress to the women and inflicted a feeling of guilt, particularly when a diagnosis of GDM was received (Arden, Duxbury and Soltani, 2014; Jarvie, 2017). Some women felt they had let HCP down and were embarrassed to discuss weight issues; leaving appointments feeling overwhelmed and misunderstood (Heslehurst et al., 2017). O'Brien et al., (2017) confirm that weight bias and victimisation will only result in poor self-efficacy.

4.2 Approach to weight management (10/20 studies)

Approaches by HCP to antenatal weight management were found to be inconsistent; leaving women to feel dissatisfied and confused about the importance of their weight. Whilst some staff avoided the topic, others handled it insensitively or appeared uncomfortable (Lavender and Smith, 2015); a finding confirmed by Johnson et al., (2013) and Jones and Jomeen (2017). Some women were told not to be concerned by GWG (Furness et al., 2011; Lavender and Smith, 2015), others had no weight discussion or monitoring during their entire pregnancy (Arden, Duxbury and Soltani, 2014; Brown and Avery, 2012). Findings that HCP were often unconcerned about GWG, agrees with Stengel et al., (2012) and Whitaker et al., (2016). As a result, women were not provided with incentive to maintain their weight or offered substantial practical advice on managing further GWG. Smith and Lavender (2011) believe that pregnancy is an ideal period for HCP to intervene with weight and blame depersonalisation of care for this GWG acceptance.

"I've never been told before either by my doctor, or anything, that I needed to lose weight either which has surprised me because I'm like really overweight,...so they must have thought, right, well, you're fairly healthy, you're just overweight." (Lavender and Smith, 2015)

Some participants were unhappy with the frequency and deliverance of weight discussions (Dinsdale et al., 2016; Jarvie, 2017). Present findings reported animosity around BMI terminology as women felt that the classification of 'obesity' was insensitive and was used to place shame. Weight labels should be accompanied by reassurance and support with preventing further GWG. However, one participant expressed preference for direct treatment and preferred HCP not to skirt around the issue of weight management due to politeness (Dinsdale et al., 2016). HCP may be lacking confidence in their approach as a result of the imprecise weight management guidelines (NICE, 2010; RCOG, 2018).

"Just stop going on about it quite as much as they do. Say it once or twice, but constantly being severely obese and BMI, BMI, BMI - it's kind of drummed into your head all the time." (Dinsdale et al., 2016)

The bedside manner of HCP was critiqued; women felt lectured and picked on due to their size (Arden, Duxbury and Soltani, 2014; Heslehurst et al., 2013; Parsons et al., 2018). This dynamic affected the relationships between women and their healthcare staff and caused a reluctance to attend appointments (Heslehurst et al., 2013). As Hodgkinson et al., (2017) proposed, midwives may benefit from communication skills training to reduce perception of stigma. Women believed HCP found it easier to blame them rather than recognise the impact of an obesogenic and unjust societal

environment (Arden, Duxbury and Soltani, 2014). Weight management is a complex issue and participants felt that HCP should strive to understand the underlying personal cause by asking the women what support they would benefit from (Dinsdale et al., 2016).

Theme 5. Information

5.1 Other resources (12/20 studies)

Women appeared to prefer receiving information from trusted HCP above other sources, as confirmed by Whitaker et al., (2016), but find this advice to be infrequent and limited. HCP are currently time poor and unable to provide the quality and quantity of information and support required to elicit change during pregnancy leading to reliance on external resources. This knowledge gap was particularly apparent with nutritional information; which women wanted and actively sought out but did not receive in adequate quantities.

'I would welcome information regarding my diet and have been searching the Internet for some.' (Brown and Avery, 2012).

Leaflets can provide a useful care alternative when HCP are overstretched and short on time, but the number of physical handouts received was seen as excessive and the information often ignored (Bouga, Lean and Combet, 2018; Brown and Avery, 2012; Olander et al., 2012). Despite reliance on digital advice, women were aware of the pitfalls of the internet and questioned its reliability (Bouga, Lean and Combet, 2018; McMillan et al., 2018). Information online was found to conflict with guidance provided by HCP (Atkinson, Shaw and French, 2016) which may explain why some women were left feeling overwhelmed when conducting research (Atkinson, Shaw and French, 2016; Bouga, Lean and Combet, 2018; 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)

5.2 Inadequate HCP advice or care (15/20 studies)

Women found HCP support to be inconsistent and reported that being switched between midwives resulted in a loss of rapport, decrease in reliable care and provision of conflicting advice (Bouga, Lean and Combet, 2018; Brown and Avery, 2012; Draffin et al., 2016; Furness et al., 2011; McMillan et al., 2018). One participant felt that their GWG was a result of seeing a different HCP at each appointment (Furness et al., 2011). These inconsistencies resulted in women feeling at a loss for who to trust (Brown and Avery, 2012; Weir et al., 2010).

"I was forever asking the midwives [about exercise activities] but I got swapped between a few midwives ... so I kind of found out there wasn't much information out there." (Furness et al., 2011)

Guidance was described as generalised and inadequate with little explanation behind it. This particularly applied to GWG advice, with some staff stressing weight maintenance and others suggesting weight loss (Heslehurst et al., 2017), despite guidelines clearly advocating against the latter (NICE, 2010). Women felt that emphasis on food and physical activity avoidance was notably disorientating, overly restrictive and caused

unnecessary anxiety (Weir et al., 2010). Participants were aware of foods to avoid but lacked knowledge on foods to increase as confirmed by Crozier et al., (2009), Downs, Savage and Rauff (2014) and Poston (2017). As a result, women are overly cautious with food for fear of causing harm to the baby, reported also by Lucas et al., (2016).

"...it's always you shouldn't do this, this and this.... if you listened and took notice of everything that you heard, you wouldn't know where you were..." (Weir et al., 2010)

Whilst women were critical of the advice that they had received from HCP, they reported feeling abandoned when pre-natal healthcare appointments were terminated, potentially demonstrating the value of HCP contact (Eades, France and Evans, 2018; Heslehurst et al., 2017; McMillan et al., 2018). Feelings of abandonment also occurred postnatally, leading women to believe that the lifestyle advice they had received was no longer relevant (Dinsdale et al., 2016; Parsons et al., 2018).

5.3 Wishlist (12/20 studies)

A 'wishlist' of requests for changes to existing antenatal care has been compiled using findings of the present research and can be seen in figure 3. Many participants desired more information on ideal and average GWG and women were anxious to know if their GWG was adequate (Brown and Avery, 2012; Heslehurst et al., 2017). One participant believed that education about the risks of weight gain did not address the issue unless accompanied by support on managing weight (Arden, Duxbury and Soltani, 2014). Women were keen to increase physical activity but aside from walking, were uncertain about 'safe' recommendations, which resulted in exercise avoidance (Bouga, Lean and Combet, 2018; Brown and Avery, 2012; Padmanabhan et al., 2015; Weir et al., 2010).

Existing nutritional advice was described as too simplistic and vague and there was confusion over what a healthy diet constitutes of, as found by Fowles and Fowles (2008) (Arden, Duxbury and Soltani, 2014; Denison et al., 2015; Furness et al., 2011; Heslehurst et al., 2017). Despite a demand for knowledge, findings confirm that women are not receiving adequate nutrition education during pregnancy (Lucas et al., 2014). Information on foods to avoid was often not accompanied by practical knowledge about risks of consumption or with sources of the food such as vitamin A (Bouga, Lean and Combet, 2018). There was a clear desire for less information on foods to avoid and more guidance on foods to include (Padmanabhan, Summerbell and Heslehurst, 2015).

"It was more about what you couldn't eat though than what you should eat. It was more about avoiding things like caffeine and certain types of food rather than what was the best to eat." (Bouga, Lean and Combet, 2018)

Women requested personalised guidance which could not be found online and did not relish being seen as just another patient (Arden, Duxbury and Soltani, 2014; Denison et al., 2015; Heslehurst et al., 2017). Women felt that this could be achieved by HCP asking what type of advice they would like to receive (Heslehurst et al., 2017).

"...helping people set realistic goals, you know. And I mean realistic goals 'cause I've been to the um nutritionists in the NHS and they're not realistic" (Denison et al., 2015)

Figure 3. Wishlist information

Information on risks of dieting during pregnancy
Information on risks of an elevated BMI during pregnancy
Guidance on expected and appropriate GWG
Information on safe exercise and where to access it
Advice on which foods to eat and what 'healthy eating' is
Practical meal ideas and recipes
Guidance on portion control
Information on importance of micronutrients and recommended intake
Information about the consequences of GDM
Realistic and personalised advice that accounts for day to day pressures
Asking the individual what they would like to get out of their care experience
Tailored advice which is individually or culturally sensitive

Strengths and limitations

The study benefitted from use of thematic analysis to develop insight beyond the initial findings of the individual studies and contextualise the research. It should be acknowledged that the significance of this research is dependent upon the twenty studies that it draws upon. However, quality assessment identified that all studies fell into either the medium or high category; therefore the initial data can be considered reliable. Whilst the results appear to conform to international research, care should be taken when generalising the findings for population groups outside of the UK or for women with a BMI classification ≤ 18.5 kg/m². Furthermore, it should be recognised that there were a distinct lack of studies reporting qualitative data on foodborne illness prevalence and development (n = 2) so the research unintentionally favours weight management.

To the author's knowledge, this is the first time that a 'wishlist' of requirements derived from pregnant women has been published to enable person centred antenatal care. It is important that future research investigates HCP views and experiences with the provision of this wishlist information so as to explore potentially unaccounted for challenges with antenatal care. Further research should seek to highlight reasons for inconsistencies with dietary and weight management advice in order to improve evidence-based guidelines and better support HCP.

Conclusion

It is recognised that time with midwives is valued by women, but that if inconsistent or seemingly irrelevant advice is provided, women feel demotivated and disengaged. Findings of this review were consistent with the wider field of research (Bookari et al., 2017; Downe et al., 2016; Jones and Jomeen, 2017; Lucas et al., 2014) and confirm that women in the UK are having contrasting care experiences which are not providing them with adequate knowledge and support, or care in keeping with NICE guidelines. The 'wishlist' provided by this review may go some way to bridging the gap between women's needs and the current antenatal provision in order to reduce the burden of anxiety during this period.

The lack of existing research on food safety risks and advice during pregnancy meant it was difficult to reach a reliable conclusion. It appears that, despite the low risk of foodborne illnesses, such as Listeriosis, existing food safety evidence is overly restrictive. Whilst women seek to engage in healthy behaviours that nourish their baby, they are also anxious about inflicting harm; leading to excessively cautious behaviour which is compromising nutritional adequacy. Food borne illnesses are not always the highest risk to pregnancy for many women, such as those living with overweight or obesity.

Provision of practical, high quality information with a focus on emphasising and recommending diet and physical activity, as opposed to avoidance, may support women's autonomy and lead to improved pregnancy experiences. Although HCP recognise the importance of nutrition education, a lack of time and training are key barriers currently affecting their ability to provide this support (Lucas, Charlton and Yeatman, 2014). As the caseload for midwives expands and becomes more complex, multidisciplinary support from other relevant HCP e.g. dietitians, physiotherapists, may be a more appropriate and effective use of clinical time and input. This may involve maximising the effectiveness of clinical referral pathways for women living with overweight and obesity to seek time-critical, tailored dietary and weight management advice. Midwives may also benefit from dietary and weight management training provided by appropriately qualified dietitians and nutritionists. This training should address issues raised on the 'wishlist' and allow the nutrition-based conversations to be patient-centric.

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Appendix

Appendix 1. CASP quality assessment criteria

Study	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Overall study quality
(Arden, Duxbury and Soltani, 2014)	-	-	+	+	++	-	++	++	+	++	Medium
(Atkinson, Shaw and French, 2016)	++	++	+	++	+	-	-	++	++	++	Medium
Bouga, Lean and Combet (2018)	++	++	++	+	++	-	+	+	++	++	High
Brown and Avery (2012)	++	++	+	+	+	+	-	-	+	+	Medium
Denison <i>et al</i> (2015)	+	++	+	++	++	++	+	++	++	++	High
Dinsdale <i>et al</i> (2016)	++	++	++	++	++	++	++	++	++	++	High
Draffin <i>et al</i> (2016)	+	++	++	++	++	-	-	++	++	++	High
Eades, France and Evans (2018)	++	++	++	++	++	+	+	++	++	++	High
Furness <i>et al</i> (2011)	++	++	++	++	++	+	-	++	++	++	High
Heslehurst <i>et al</i> (2015)	++	++	++	+	++	+	-	+	++	+	Medium
Heslehurst <i>et al</i> (2017)	++	++	+	+	++	++	++	++	++	++	High
Jarvie (2017)	+	++	+	++	++	+	++	++	++	+	High
Keely <i>et al</i> (2017)	++	++	++	++	++	-	+	++	++	++	High
Lavender and Smith (2015)	++	+	+	+	++	++	-	+	++	++	Medium
McMillan <i>et al</i> (2018)	++	++	+	+	+	++	+	+	++	++	Medium
Olander <i>et al</i> (2012)	+	+	++	++	++	-	+	+	++	++	Medium
Padmanabhan, Summerbell and Heslehurst (2015)	-	++	++	++	++	+	-	++	++	++	Medium
Parsons <i>et al</i> (2018)	+	+	++	++	++	++	-	++	++	++	High
Swift <i>et al</i> (2017)	++	+	+	+	+	-	+	+	++	+	Medium
Weir <i>et al</i> (2010)	-	++	++	++	++	+	-	++	+	+	Medium

* - = LOW; + = MEDIUM; ++ = HIGH

1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate?
3. Was the research design appropriate to address the aims of the research?
4. Was the recruitment strategy appropriate to the aims of the research?
5. Was the data collected in a way that addressed the research issue?
6. Has the relationship between researcher and participants been adequately considered?
7. Have ethical issues been taken into consideration?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of findings?
10. How valuable is the research?