National Institute for Health and Care Excellence

Final

Maternal and child nutrition

[Q] Evidence reviews for facilitators and barriers to increase the uptake of government advice on healthy eating and drinking in pregnancy

NICE guideline NG247

Evidence reviews underpinning recommendations 1.2.1 to 1.2.4 in the NICE guideline

January 2025

Final

These evidence reviews were developed by NICE

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Facilitators and barriers to increase the uptake of government advice on healthy eating and drinking in pregnancy

Review question

What are the barriers and facilitators to increasing the uptake of government advice for women and families with children up to five years in the following areas:

- folic acid supplements (including before pregnancy)
- vitamin supplements (including Healthy Start vitamins)
- healthy eating and drinking in pregnant women
- appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months
- healthy eating and drinking in children from 12 months to 5 years?

This report focuses on the topic of healthy eating and drinking in pregnancy.

Introduction

Pregnancy provides a key opportunity to promote health and well-being. A healthy diet is particularly important during pregnancy for the growth and development of the unborn baby as well as for the wellbeing of the pregnant person. There is national guidance on healthy eating and drinking during pregnancy, however, this is not always followed. In order to support pregnant people to adopt healthy eating and drinking practices in line with the government advice, it is important to gain understanding of their views, perceptions and experiences on issues that might enable or hinder their uptake of advice on healthy eating and drinking in pregnancy. The aim of this review is to explore facilitators and barriers for increasing the uptake of government advice for healthy eating and drinking in pregnant women.

Summary of the protocol

See Table 1 for a summary of the population and phenomenon of interest, for this review.

The original review question and protocol includes the facilitators and barriers for increasing in uptake of government advice on the following areas:

1. folic acid supplements (including before pregnancy)
2. vitamin supplements (including Healthy Start vitamins)
3. healthy eating and drinking in pregnant women (this review)
4. appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months
5. healthy eating and drinking in children from 12 months to 5 years.

Number 1 and 2 are reported on in evidence reviews P and number 4 and 5 are reported in evidence review R.

Table 1: Summary of the protocol (population and phenomenon of interest)

Population	Women during a single or multiple pregnancy
Phenomenon of interest	Barriers to, and facilitators for increasing uptake of government advice. Themes will be identified by the available literature.

	The committee identified the following potential themes (however, they are aware that not all of these themes may be found in the literature and that additional themes may be identified): • thoughts, views and perceptions of women • issues relating to acceptability • issues relating to accessibility • issues relating to mis-information or a lack of information and communication of information, including food marketing and other commercial determinants • women's thoughts on discourse, ethnic and cultural attitudes healthy eating • acceptability and misinformation • motivational factors

For further details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual. Methods specific to this review question are described in the review protocol in appendix A and the methods document (supplementary document 1).

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Qualitative evidence

Included studies

Twenty qualitative studies were included in this review (Abayomi 2020, Atkinson 2016, Beasant 2023, Bouga 2018, Chana 2019, Coathup 2017, Heslehurst 2017, Hussain 2021, Keely 2017, Lavendar 2016, Lawrence 2020, Morris 2020, Newson 2022, Ohly 2019, Olander 2012, Padmanabhan 2015, Poston 2013, Rundle 2018, Strommer 2021, Warren 2017).

As per protocol, all studies were conducted in the United Kingdom.

The included studies are summarised in Table 2.

The population of interest stated in the protocol was pregnant women. However, many studies interviewed women postnatally about their pregnancy experience which was relevant to this review and as such these studies were also included. One study (Bouga 2018) included a small proportion of participants that were planning a pregnancy, and these views were not included in the data. In 3 studies the participants were interviewed during pregnancy (Chana 2019, Keely 2017, Poston 2013), in 5 studies the participants were mixed prenatal and postnatal (Abayomi 2020, Hussain 2021, Ohly 2019, Olander 2012, Rundle 2018), in 1 study the participants were mixed prenatal, postnatal, and pre-conception (Bouga 2018), in 4 studies participants were in the postnatal period (Beasant 2023, Lavendar 2016, Lawrence 2020, Morris 2020), in 2 studies participants were in the prenatal period (Atkinson 2016, Padmanabhan 2015), and for 5 studies there was no information given (Coathup 2017, Heslehurst 2017, Newson 2022, Strommer 2021, Warren 2017).

Seventeen studies used a general qualitative inquiry as a study design (Abayomi 2020, Beasant 2023, Bouga 2018, Chana 2019, Coathup 2017, Hussain 2021, Keely 2017, Lavendar 2016, Lawrence 2020, Morris 2020, Ohly 2019, Olander 2012, Padmanabhan 2015, Poston 2013, Rundle 2018, Strommer 2021, Warren 2017), 1 study used grounded theory (Newson 2022), and 2 studies used a phenomenological study design (Atkinson 2016, Heslehurst 2017).

One study used focus groups to collect data (Abayomi 2020), 2 studies used focus groups and semi-structured interviews (Lavender 2016, Olander 2012), 4 studies used interviews (Bouga 2018, Heslehurst 2017, Keely 2017, Poston 2013) and 13 studies used semi-structured interviews (Atkinson 2016, Beasant 2023, Chana 2019, Coathup 2017, Hussain 2021, Lawrence 2020, Morris 2020, Newson 2022, Ohly 2019, Padmanabhan 2015, Rundle 2018, Strommer 2021, Warren 2017).

Data were identified for some themes listed in the protocol by the committee and additional themes 'advice and information' and 'inadequate knowledge, advice and information' were generated which encompassed the protocol theme 'issues relating to mis-information or a lack of information and communication of information, including food marketing and other commercial determinants' (please see section below 'The outcomes that matter most' for further details).

Data for subset populations were available for women in the obesity weight category (Heslehurst 2017 interviewed women with a body mass index (BMI) >30kg/m^2 referred to a dietetic service; Keely 2017 interviewed women with a BMI >40kg/m^2), Pakistani women (Hussain 2021) and pregnant teenagers (Rundle 2018, Strommer 2021). These were discussed separately within any given theme or subtheme where relevant. Some studies included women from deprived or mixed socioeconomic areas (Chana 2019, Lawrence 2020, Morris 2020 and Ohly 2019). These studies were highlighted if included in any given theme or subtheme.

See the literature search strategy in appendix B and study selection flow chart in appendix C.

Excluded studies

Studies not included in this review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies.

Study	Population	Methods	Themes applied after thematic synthesis
Abayomi 2020 General qualitative inquiry United Kingdom **Study aim** To understand, through a patient and public involvement investigation, pregnant or postpartum women's experiences of healthy eating and weight management advice during pregnancy. **Sources of funding**	N=32 women (mixed prenatal and postnatal) Mean age (SD), years: NR (NR)	**Data collection** Focus groups. **Data analysis** Inductive thematic analysis.	• thoughts, views and perceptions of women • advice and information • issues relating to delivery, a lack of information and/or communication of information and advice • demotivating factors

Study	Population	Methods	Themes applied after thematic synthesis
Not industry funded.			
Atkinson 2016 Phenomenological United Kingdom **Study aim** To understand whether pregnancy experiences indicate that women would be open to changing behaviour during this time. **Sources of funding** Not reported.	N=7 women (all prenatal) Age range, years: 28-42	**Data collection** Semi-structured interviews. **Data analysis** Interpretative phenomenological analysis.	• thoughts, views and perceptions of women • inadequate knowledge, advice and information • motivational factors
Beasant 2023 General qualitative inquiry United Kingdom **Study aim** To understand the effectiveness of guidance towards limiting toxin exposure and maximising nutrient intake. To understand compliance towards NHS guidance on fish consumption during pregnancy and which information sources are used and trusted on fish consumption during pregnancy. **Sources of funding** Not industry funded.	N=14 women (all postpartum) Mean age (SD), years: NR (NR)	**Data collection** Semi-structured interviews. **Data analysis** Thematic analysis.	• thoughts, views and perceptions of women • issues relating to accessibility • advice and information • inadequate knowledge, advice and information • motivational factors • demotivating factors
Bouga 2018 General qualitative inquiry United Kingdom **Study aim** To explore iodine dietary advice during	N=48 women (mixed prenatal, postnatal, and pre-conception) Mean age (SD), years: 30.8 (4.3)	**Data collection** Interviews. **Data analysis** Thematic analysis.	• thoughts, views and perceptions of women • advice and information • factors relating to acceptability • issues relating to accessibility

Study	Population	Methods	Themes applied after thematic synthesis
pregnancy by understanding women's perceptions on guidance quality, barriers to dairy and seafood intake and optimal guidance delivery methods. **Sources of funding** Not industry funded.			• inadequate knowledge, advice and information • demotivating factors • motivational factors
Chana 2019 General qualitative inquiry United Kingdom **Study aim** To understand facilitator and barriers to maintaining a healthy lifestyle during pregnancy across a diverse group of women. **Sources of funding** Not industry funded.	N=12 women (during pregnancy) Age range, years: 22-36	**Data collection** Semi-structured interviews. **Data analysis** Thematic analysis.	• advice and information • demotivating factors • thoughts, views and perceptions of women • issues relating to accessibility • inadequate knowledge, advice and information • women's thoughts on discourse, ethnic and cultural attitudes to healthy eating • motivational factors
Coathup 2017 General qualitative inquiry United Kingdom **Study aim** To understand what factors impact women's choices towards eating and drinking during pregnancy. **Sources of funding** Not reported.	N=6 women (no further information) Mean age (SD), years: NR (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic analysis.	• thoughts, views and perceptions of women • women's thoughts on discourse, ethnic and cultural attitudes to healthy eating • motivational factors
Heslehurst 2017 Phenomenological United Kingdom **Study aim**	N=15 women (no further information) Mean age (SD), years: NR (NR)	**Data collection:** Interviews **Data analysis:** Interpretive analytical approach and thematic content analysis.	• thoughts, views and perceptions of women • issues relating to accessibility

Study	Population	Methods	Themes applied after thematic synthesis
Exploration of women's direct experiences of care from antenatal dietetics services. **Sources of funding** Not industry funded.			• advice and information • inadequate knowledge, advice and information
Hussain 2021 General qualitative inquiry United Kingdom **Study aim** To understand pregnancy related food practices amongst first generation Pakistani women living in the UK and with at least one pregnancy in the UK. **Sources of funding** Not reported.	N=10 women (mixed prenatal and postnatal) Age range, years: 30-40	**Data collection:** Semi-structured interviews. **Data analysis:** Inductive thematic analysis.	• inadequate knowledge, advice and information • women's thoughts on discourse, ethnic and cultural attitudes to healthy eating
Keely 2017 General qualitative inquiry United Kingdom **Study aim** To understand experiences, attitudes and health related behaviours amongst pregnant women with a BMI >40 kg/m^2 and how these may change during and after pregnancy. **Sources of funding** Not industry funded.	N=11 women (during pregnancy) Mean age (SD), years: 31.6 (5.0)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic analysis.	• thoughts, views and perceptions of women • inadequate knowledge, advice and information
Lavender 2016 General qualitative inquiry United Kingdom	N=34 women (all postnatal) Mean age (SD), years: 26 (NR)	**Data collection:** Focus groups and semi-structured interviews. **Data analysis:** Thematic analysis.	• advice and information • factors relating to acceptability • motivational factors

Study	Population	Methods	Themes applied after thematic synthesis
Study aim To explore experiences of pregnant women with BMI of 30 kg/m^2 or above when using maternity services and partaking in a community lifestyle programme. **Sources of funding** Not industry funded.			
Lawrence 2020 General qualitative inquiry United Kingdom **Study aim** To understand the acceptability and feasibility of the 'healthy conversation skills' intervention to be included in routine maternity care. **Sources of funding** Industry funded by Nestec and Abbott Nutrition; Danone Nutricia Early Life Nutrition.	N=30 women (all postpartum) Mean age (SD), years: Intervention: 31 (6.24) Control: 33 (3.83)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic analysis.	• thoughts, views and perceptions of women • advice and information • factors relating to acceptability
Morris 2020 General qualitative inquiry United Kingdom **Study aim** To understand what influences women's diet and physical activity in pregnancy and what lifestyle support is needed during this time. **Sources of funding** Industry funded by Nutricia Early Life Nutrition.	N=17 (all postpartum) Mean age (SD), years: 33 (NR, range 23-40)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic analysis.	• thoughts, views and perceptions of women • advice and information • demotivating factors • motivational factors

Study	Population	Methods	Themes applied after thematic synthesis
Newson 2022 Grounded theory United Kingdom **Study aim** To understand women's perceptions and expectations of diet and physical activity during pregnancy. **Sources of funding** Not industry funded.	N=19 women (stage of pregnancy unclear) Mean age (SD), years: NR (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic inductive analysis.	• advice and information • inadequate knowledge, advice and information • motivational factors
Ohly 2019 General qualitative inquiry United Kingdom **Study aim** To build on previous Healthy Start programme realist theories and understand how low-income women use Healthy Start vouchers. **Sources of funding** Not industry funded.	N=5 women (mixed prenatal and postnatal) Mean age (SD), years: NR (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Realist approach.	• factors relating to accessibility • motivational factors
Olander 2012 General qualitative inquiry United Kingdom **Study aim** To understand preferred healthy eating services and support of women during pregnancy. **Sources of funding** Not industry funded.	N=23 women (mixed prenatal and postnatal) Mean age (SD), years: NR (NR)	**Data collection** Focus groups and semi-structured interviews. **Data analysis** Thematic analysis.	• thoughts, views and perceptions of women • advice and information
Padmanabhan 2015	N=19 women (all prenatal)	**Data collection:** Semi-structured interviews.	• thoughts, views and perceptions of women

Study	Population	Methods	Themes applied after thematic synthesis
General qualitative inquiry United Kingdom **Study aim** To understand pregnant women's attitudes and beliefs towards weight-related behaviours, including diet behaviour. **Sources of funding** Not industry funded.	Mean age (SD), years: 30.4 (5.6)	**Data analysis:** Thematic analysis.	• issues relating to accessibility • advice and information • inadequate knowledge, advice and information • motivational factors
Poston 2013 General qualitative inquiry United Kingdom **Study aim** To understand the experience and perceptions of pregnant women from the UPBEAT trial and intervention and the effect on everyday life. **Sources of funding** Not industry funded.	N=21 women (during pregnancy) Mean age (SD), years: 29.6 (4.9)	**Data collection:** Interviews. **Data analysis:** Comparative thematic analysis.	• thoughts, views and perceptions of women • factors relating to acceptability • advice and information • inadequate knowledge, advice and information • issues relating to accessibility • motivational factors
Rundle 2018 General qualitative inquiry United Kingdom **Study aim** To explore adolescent pregnant women's knowledge and understanding of nutrition advice and barriers and facilitators to dietary change and consumption of supplements. **Sources of funding** Not industry funded.	N=34 women (mixed prenatal and postnatal) Mean age (SD), years: 17.62 (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic analysis.	• thoughts, views and perceptions of women • factors relating to accessibility • advice and information • inadequate knowledge, advice and information • issues relating to accessibility • motivational factors • demotivating factors

Study	Population	Methods	Themes applied after thematic synthesis
Strommer 2021 General qualitative inquiry United Kingdom **Study aim** To explore how the relationship between pregnant young women and their midwives can be leveraged to provide support towards a healthier diet. **Sources of funding** Not industry funded.	N=106 women (no further information) Mean age (SD), years: NR (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Thematic inductive analysis.	• thoughts, views and perceptions of women • advice and information • demotivating factors • factors relating to accessibility • inadequate knowledge, advice and information • issues relating to accessibility
Warren 2017 General qualitative inquiry United Kingdom **Study aim** To evaluate the feasibility, acceptability and perceived efficacy of the 'Eat Well Keep Active' intervention programme during pregnancy. **Sources of funding** Not industry funded.	N=19 women (no further information) Mean age (SD), years: NR (NR)	**Data collection:** Semi-structured interviews. **Data analysis:** Deductive thematic analysis.	• thoughts, views and perceptions of women • advice and information • factors relating to acceptability • motivational factors

BMI: body mass index; NHS: National Health Service; NR: not reported; SD: standard deviation; UPBEAT: UK pregnancies better eating and activity trial.

See the full evidence tables in appendix D. As this was a qualitative review, no meta-analysis was conducted (and so there are no forest plots in appendix E).

See summary of evidence section and appendix F for further details about the themes, review findings and CERQual ratings.

Summary of the evidence

A summary of the qualitative data is presented here, by overarching theme together with a thematic map to visually illustrate the connection between the overarching themes and sub-themes.

The themes identified through analysis of all the included studies are summarised in Table 3 together with their CERQual quality rating and the number of studies contributing to each theme.

Table 3: Themes and sub-themes generated from analysis

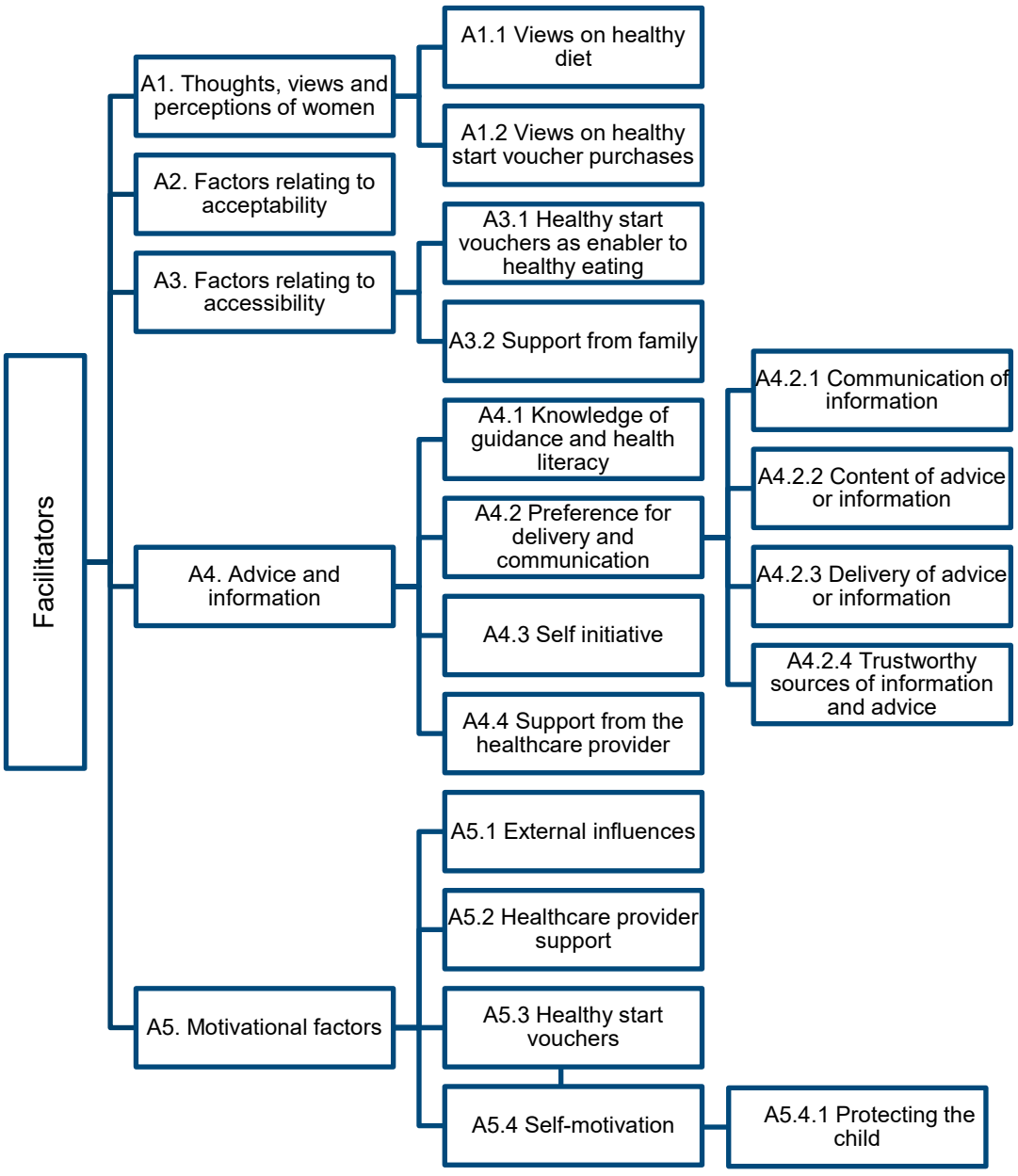
Themes and subthemes	CERQual quality	No. of studies
Facilitators for increasing uptake of government advice on healthy eating and drinking during pregnancy		
A1. Thoughts, views and perceptions of women	Low	2
A1.1 Views on healthy diet	Low	5
A1.2 Views on healthy start voucher purchases	High	1
A2. Factors relating to acceptability	High	5
A3. Factors relating to accessibility		
A3.1 Healthy start vouchers as enabler to healthy eating	High	2
A3.2 Support from family	Moderate	2
A4. Advice and information	-	-
A4.1 Knowledge of guidance and health literacy	High	6
A4.2 Preference for delivery and communication		
A4.2.1 Communication of information	High	5
A4.2.2 Content of advice or information	High	7
A4.2.3 Delivery of advice or information	High	6
A4.2.4 Trustworthy sources of information and advice	High	9
A4.3 Self initiative	Moderate	2
A4.4 Support from the healthcare provider	High	5
A5. Motivational factors		
A5.1 External influences	High	8
A5.2 Healthcare provider support	High	2
A5.3 Healthy start vouchers	Low	1
A5.4 Self-motivation	Low	4
A5.4.1 Protecting the child	High	6
Barriers for increasing uptake of government advice on healthy eating and drinking during pregnancy		
B1 Thoughts, views and perceptions of women	High	5
B1.1 Listening to self or baby over advice	Moderate	7
B1.2 Perceived lack of support from health care provider	High	5
B1.3 Views on healthy diet	Moderate	7
B2 Issues relating to accessibility	-	-
B2.1 External factors	High	9
B.3 Inadequate knowledge, advice and information		
B3.1 Confusion or uncertainty around guidance	High	4
B3.2 Issues relating to communication	High	6
B3.3 Issues relating to content of information	High	8
B3.4 Issues relating to delivery of advice or information	High	2
B3.5 Lack of information or mis-information	High	8
B3.6 Source of information	Moderate	3
B4 Women's thoughts on discourse, ethnic and cultural attitudes to healthy eating	-	-
B4.1 Cultural attitudes to healthy eating	High	3
B5 Demotivating factors	Moderate	7

See appendix F for full GRADE-CERQual tables.

Facilitators to increasing the uptake of government advice on healthy eating and drinking during pregnancy

- The evidence generated 5 themes and 12 subthemes (Figure 1).
- The evidence ranged from moderate to high quality.
- The main reasons that evidence was downgraded was due to minor concerns with methodological limitations, minor concerns relating to range of opinions expressed or adequacy of evidence contributing to a theme.

Figure 1: Thematic map for facilitators for increasing uptake of government advice on healthy eating and drinking during pregnancy



A1. Thoughts, views and perceptions of women

There were 2 subthemes that contributed to this theme.

Two studies (low confidence) reported general thoughts, views and perceptions of women. Women felt that pregnancy was the best time to change and reinforce eating habits as there was more time to make changes than after having the baby.

Some women believed that they would commit to behaviour change if they were prompted or made aware of the importance.

Five studies (low confidence) reported women's thoughts, views and perceptions about healthy diet.

There were views about the level of changes that needed to be made about diet based on perception of eating habits and lifestyle before pregnancy. Women that said they were interested in diet and nutrition before they were pregnant felt they did not need to make major changes to their overall diet during pregnancy. For those who participated in interventions with nutritional goals, this made it easier to maintain a healthy diet and achieve their goals during pregnancy as this was already part of their routine.

For some women that underwent nutrition counselling as part of an intervention, self-reflection of eating habits made them reflect on their eating habits and subsequently think differently about behaviours going forward.

Some women reported they ate more fish as it was perceived to be a healthy item to eat.

Some women tended to take multivitamins which assisted in their confidence of meeting recommended nutritional requirements.

One study (high confidence) reported that some women used Healthy Start Vouchers to exchange for ineligible foods such as bread and did not feel that this was an issue.

A2. Factors relating to acceptability

Five studies (high confidence) reported factors relating to acceptability.

Many women were accepting of nutritional guidance and mentioned changing their diets after reading and considering advice.

Regarding food item acceptability, dairy products were discussed positively, and some reported a lack of difficulty to incorporate or increase dairy consumption into diet. Milk was thought to help with heartburn and tended to be a source of craving during pregnancy. Those that did not like milk would increase dairy consumption through yoghurt or cheese.

Women who had participated in interventions that provided dietary advice generally found these acceptable. Women that did not already view themselves as leading a healthy lifestyle said that the interventions affected their lifestyle, including their diet quality, in a positive way. Women favoured the interest that the midwife and nurse showed in their health and the baby's health.

The in-depth and tailored aspects of the interventions increased acceptability of receipt of advice and information which opposed to less acceptable expectations of dictating advice.

For those women visiting dietetic services for obesity, there was acceptability of lifestyle programmes that were informal, did not 'preach' information and the focus of healthy lifestyle rather than weight loss. This led to more interactions and ability to make informed choices.

Women attending lifestyle programmes were accepting of interventions whereby information and advice was delivered in a fun or novel way of demonstrating behaviour, for example, activities and by different experts.

A3. Factors relating to accessibility

There were 2 subthemes that contributed to this theme.

Two studies (high confidence) reported the use of Healthy Start vouchers by women to enable access to variety of foods and were seen as a "nutritional safety net". Women that used Healthy Start vouchers used these for fruit and milk or to assist household food shopping. Vouchers provided access to foods that might have been too costly otherwise. Cheaper, unhealthier foods could be avoided, and decisions could be made without financial worry. This access led to greater consumption of fruit and vegetables and cow's milk or a wider variety of fruit and vegetables in their diet. Some women stated that instead of using Healthy Start vouchers to buy more food, it served to reduce the price of food that they would have already been buying. Instead, the money saved was used on other items. Vouchers were seen as a 'nutritional safety net' as these participants could save money without having to cut out any healthy foods from their shopping.

Two studies (moderate confidence) reported that for pregnant teenagers, many were dependant on others for cooking. Trusted family members were felt to be the best source of support and tended to influence healthy eating habits. For younger mothers aged 15-17 years, support tended to come from mothers or partners whereas for older participants aged 20-22 years, support could come from a wider network such as grandmothers and in-laws. Cooking would either be done solely by the family or partner or together with the women. Those least likely to cook for themselves lived in temporary accommodation or were living on their own. Differences were not observed between those who were having their first child or those who already had children.

A4. Advice and information

There were 8 subthemes that contributed to this theme.

Six studies (high confidence) reported women’s levels of knowledge towards healthy eating guidance and health literacy.

Women tended to recall and discuss salient messages from National Health Service (NHS) guidance, for example, for fish, specific types to avoid, limit, or cook. Shark, marlin, and swordfish were commonly listed as fish to be avoided while there was knowledge to thoroughly cook fish and shellfish. Some women mentioned foods to avoid being placed on folders provided by midwives.

Women were aware of the guidance relating to cooking raw fish and shellfish, along with the need to cut back on oily fish like salmon and tuna.

Interventions including dietary advice from health professionals led to increased health literacy for some, debunking myths like "eating for two" for others and a sense of gaining long-term eating habit behaviours.

Information gained influenced behaviours like food substitution, understanding labels, altered shopping habits, and healthier cooking practices. Women reported an increased awareness of eating habits and as well as for the baby’s nutrition.

Women with a BMI over 40 kg/m^2 had knowledge to increase food groups such as calcium-rich foods and fruits and vegetables in their diet after advice from health care professionals.

Five studies (high confidence) reported that women were generally positive about verbal communication of information and favoured this from a midwife rather than a general practitioner. Being understood and accepted were seen as key elements to guide a conversation around food in pregnancy. There was a desire for honest conversation and for the midwife to get to know women on a personal level so to understand their circumstance and provide reassurance.

Combining verbal communication from the midwife supplemented with leaflets or brochures and/or online material, for example, healthcare services website and emails or general internet resources such as google search, social media, or forums was seen as acceptable.

Leaflets or booklets were preferred to books due to their practicality, serving as concise reminders for crucial information. The simplicity, size, and ease of reading leaflets were appealing, and some favoured them over internet searches for quick access to relevant information. They were also valued by some as useful prompts or references after discussion with healthcare professionals. For some, written resources were deemed appropriate only when tailored to individual circumstances, for example, young teenage women preferred Tommy's Young Women's Guide to Pregnancy.

The most favoured mode of communication was in digital form such as an app. This delivery was seen as easily accessible, could provide prompts for healthy eating and drinking; be interactive and have up to date and reliable information (rather than searching online), provide information to reinforce or supplement advice received and could tailor advice. Although, some still preferred a midwife conversation over apps.

Seven studies (high confidence) reported women’s preference towards content of healthy eating advice and information.

Women emphasised that advice should be positive and cover the benefits of healthy eating and appropriate vitamin intake levels.

Women wanted proactive discussion with NHS midwives, preferring them to ask questions and initiate discussions rather than having to initiate this.

Women wanted to understand healthy eating choices within the context of individual food preferences. Many participants wanted to know how the foods they ate affected their baby and wanted this information to be evidence-based.

While some participants chose their food based on weight related concerns, they did not want the midwife to use their weight as a starting point for food conversations.

Clear, practical, and visually engaging presentation of information was preferred, with a desire for bright, visual, and colourful formats, including pictures, infographics, and charts. Visual aids were seen as memory aids and particularly helpful for those with low literacy. Participants expressed a need for better understanding of portion sizes and nutrient intake.

Women identified a need for advice on managing pregnancy-related sickness.

Six studies (high confidence) reported preferences for delivery of advice or information.

Women wanted early, consistent, ongoing and in-person delivery of healthy eating advice. It was preferable for delivery of advice or information to be integrated into routine antenatal appointments or classes. Some suggested the use of a pregnancy application created by health professionals for ongoing support.

Various ideas for nutritional delivery methods were suggested, such as tick sheets, pin boards, internet websites, recipes, meal plans, fridge magnets, reference cards, supermarket magazines, advertisements, and food packaging information.

Practical support, such as cooking classes with affordable and time-efficient healthy recipes, was identified as beneficial. Group-based sessions, like parent education or Sure Start classes, were favoured by some women, emphasising the importance of choice of delivery based on individual preferences. Some still women preferred one-on-one discussions with healthcare professionals, supplemented by reliable websites, booklets, or leaflets.

For those with obesity referred to dietetic services, the support network aspect of group-based delivery would be valued, providing a sense of shared experience and reducing vulnerability. For these women, increased contact with the dietitian was desired to form a relationship and maintain motivation. These women mentioned that they had a good relationship and regular meetings with their midwives which they suggested could be an avenue for further support between appointments or otherwise local GP practices could act as supporter.

Nine studies (high confidence) reported women's preferences towards trustworthy sources of information and advice.

The midwife was favoured by women as the professional to provide advice on healthy eating but expert advice from dietitians should also be part of the process.

While online sources tended to be used as the first resources checked at the beginning of pregnancy, women acknowledged that all the necessary information should be provided from a reliable source and written by experts. It was also seen as helpful to have a doctor or midwife to endorse any mobile phone app.

Participants preferred practical cooking sessions to be delivered by those who had been pregnant and had children.

Participants felt that the most effective way of being informed about a healthy eating service would be through their midwife. It was raised that local services could be advertised via local government websites like other commercial company websites.

Two studies (moderate confidence) reported women proactively seeking out advice and information on healthy eating and drinking during pregnancy. Women tended to raise nutrition with midwives and if they did not receive advice they were after sought it elsewhere such as online or by reading books.

Five studies (high confidence) reported women wanting and valuing greater support from health care professionals and believed that this would facilitate healthy lifestyle habits.

Women wanted the midwife to take interest in their own health so they would have the opportunity to reflect upon themselves separately than the baby. It was felt that NHS care was mainly concerned about the health of the baby and that there was opportunity to also include the mother's health, which would not have to take up too much time of the standard consultation.

For women that underwent interventions with aims to improve healthy eating, they valued the support of midwives or research nurses which was mentioned to be absent in routine NHS appointments.

A5. Motivational factors

There were 5 subthemes that contributed to this theme.

Eight studies (high confidence) reported external influences such as family, partner, friends, other pregnant women or women being in a healthy environment as motivation factors towards healthy eating behaviours in women. Women with partners that liked to cook and eat healthily were more likely to do so as well as a result. If living with family, family preference was used as a motivator for choosing healthy foods to cook. For pregnant teenagers, it was also the case where those with supportive partners were interested in cooking and introducing new foods into their diet during pregnancy.

A healthy environment was also a motivating factor towards healthy eating. Presence of a healthy lifestyle in women's households or social circles helped them keep on top of these behaviours during pregnancy. Some women described their workplace provided healthy

lunches or was as a setting that facilitated their healthy eating rather than at home. Having healthy food at hand at home or work was a way to facilitate healthier eating.

Women that underwent interventions that included dietary advice or guidance found the social element of the intervention to be a motivator due to shared experiences of other pregnant women with the same questions and concerns.

For some there was also a motivation to seek out more advice and connect with other women as a result of negative comments from social networks and related anxieties. This social aspect was also a motivator for those from deprived backgrounds.

Partners were also mentioned by women as a supportive motivator to keep women on track with healthy eating intervention goals and was valued by women.

Two studies (high confidence) reported healthcare provider support as motivators to women undergoing interventions aimed towards healthier eating.

Weekly realistic goals devised between the woman and midwife were felt to be achievable and were motivating factors for some women.

When developing goals towards healthier eating with the support of the healthcare professional, having a sense of autonomy over the type and size of goal led to greater confidence to be able to reach these goals. There was a sense of pride or achievement when meeting goals that had been set up by the women themselves. One intervention included 5-minute follow-up check-in phone calls which some found helpful to discuss challenges and keep them on track as well as share successes. It was valued that the healthcare provider took the time to check-in.

One intervention included goal cards to facilitate healthy eating, for example, to swap out food items or eating more fruit and women described that having discussions with midwives to help them achieve their goals provided them with confidence and gave them the motivation to make behavioural changes. Being supported to reach goals gave participants a sense of accomplishment and wellbeing which could then lead to greater positive changes to their lifestyle beyond their starting goals.

One study (low confidence) reported that some women felt that Healthy Start Vouchers enabled fresh food choices which motivated healthy eating habits. This was combined with the motivation to eat healthily for the benefit of the baby.

Four studies (low confidence) reported self-motivational factors leading to healthier eating amongst pregnant women. Being a role model for their children was a motivator towards keeping healthy during pregnancy. Women attending healthy eating-based interventions were motivated to improve nutrition as they wanted to set habits for a lifetime and at an early point for the health and the baby.

Sometimes palatability of food motivated eating habits, for example, some women ate more fish as it was one of the foods that didn't make them feel unwell. For others, change in diet due to medical condition, for example, gestational diabetes motivated heathier eating habits.

Six studies (high confidence) reported on the motivation towards protection of their child. Protection of the current and future health of the child was a common motivator towards nutritional behaviour change amongst pregnant women. This was also a motivating factor amongst some pregnant teenagers. Some women described as soon as they found out they were pregnant; this was a motivator to start eating healthily for the nutrition of the growing baby. Although for others this was not a sole reason as their own health and weight related reasons were also motivators.

Food choices and purchases were made more consciously, for example, buying cereal with increased folic acid and B12 and participants increased their knowledge and awareness of

healthy foods and recommended nutrition intake. Women wanted to ensure that their unborn baby were developing well and diet was seen to play an important role in this. As such, the baby's health was a motivational factor to drive healthier lifestyle choices.

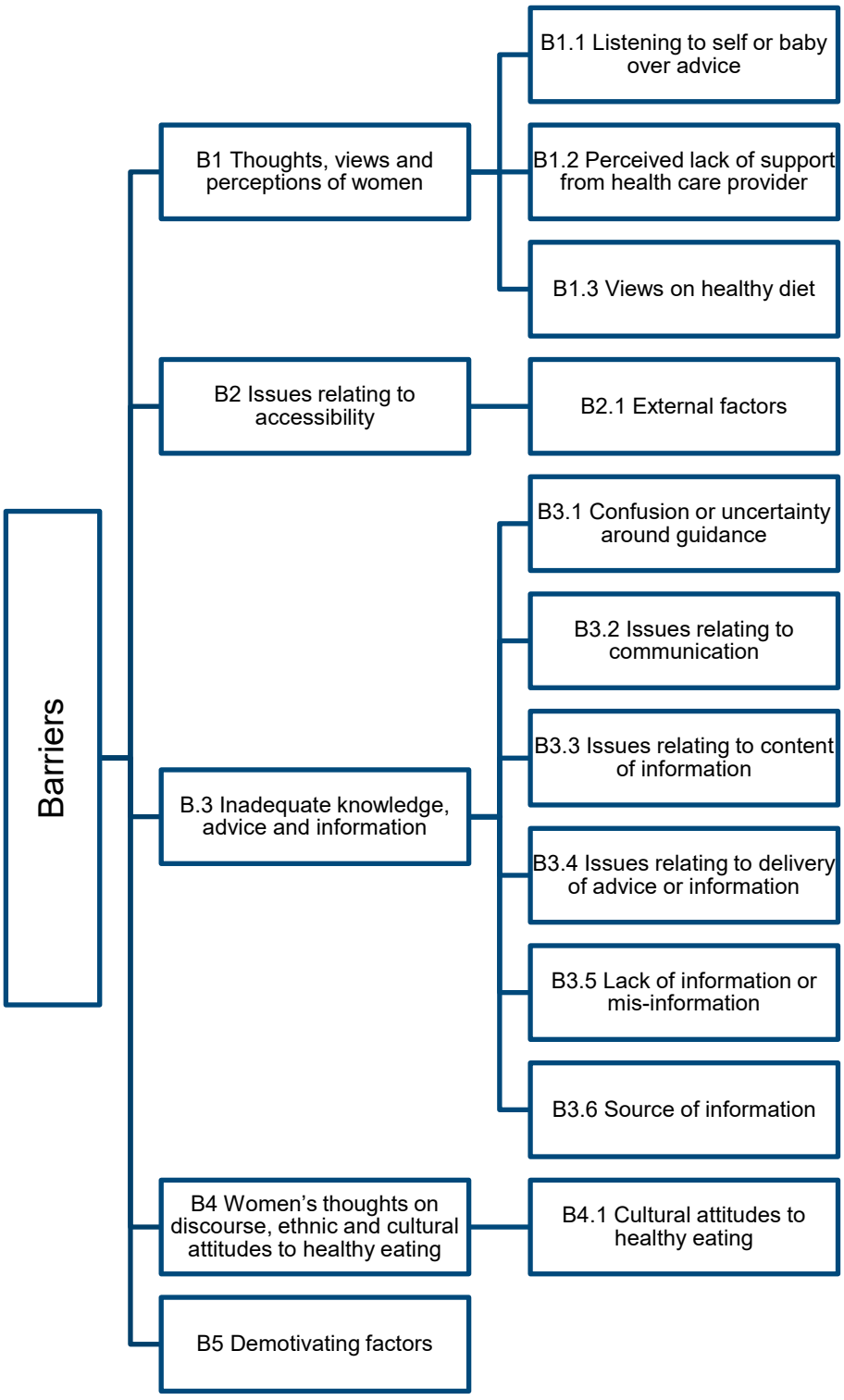
For others this was a driver to cook a healthy meal after a long day. Motivation to lower harmful risks to the baby led to avoidance of certain foods such as unpasteurised cheese, raw eggs, uncooked meats and seafood from their diet. Other products were reduced by some women such as sugary foods and drinks, starchy carbohydrates and caffeine. These behaviours were seen to be better for the health of the women and baby rather than direct risks to the baby.

Prior experiences relating to conception issues or previous miscarriage also influenced healthy eating and behaviour and decision making. These women tended to be motivated out of anxiety to protect the baby and not wanting to be responsible for anything negative happening to the baby. These women tended to be stricter about healthy food behaviours there was a tendency to do thorough research, for example, towards unsafe foods. Whereas some other women who had no trouble with conception or had previously had children adopted a laxer approach to healthy eating while still prioritising the baby’s safety.

Barriers to increasing the uptake of government advice on healthy eating and drinking during pregnancy

- The evidence generated 5 themes and 11subthemes (Figure 2).
- The evidence ranged from moderate to high quality and tended to be of high quality.
- The main reasons that evidence was downgraded was due to minor concerns with methodological limitations, minor concerns relating to range of opinions expressed or adequacy of evidence contributing to a theme.

Figure 2: Thematic map for barriers for increasing uptake of government advice on healthy eating and drinking during pregnancy



B1. Thoughts, views and perceptions of women

There were 3 subthemes that contributed to this theme.

Five studies (high confidence) reported women's various thoughts, views and perceptions towards healthy eating.

Some thought goal-oriented interventions towards healthy eating were not suited to them and did not engage with goal setting behaviours.

Some women did not eat or limited certain food products such as meat or fish due to views on environmental and sustainability reasons.

Some women attending interventions incorporating healthy eating goals felt judged or that they let themselves or their baby down if the goals were not met. Some being referred to a dietetic service for obesity felt singled out as well as judgement on their parenting.

Seven studies (moderate confidence) reported women feeling that it was important to listen to their own or their baby's wants and needs over advice when it came to food related behaviour.

Some women described listening to their body and made dietary choices based on perceived needs, such as rest, energy, or calcium from dairy foods. These choices were influenced by comfort and enjoyment, even if they contradicted advice received. This approach was more common among women who did not want major lifestyle changes due to pregnancy, those having previously been pregnant who sought a more relaxed diet this time, or those without prior conception or pregnancy issues who aimed to enjoy their pregnancy without strict dietary restrictions.

Cravings were commonly discussed in relation to perceived nutrient needs or foods that the body or baby might be signalling as necessary or to be avoided.

Eating unhealthily was justified if in moderation or thought to be balanced out by eating healthily.

Some women with a BMI over 40kg/m^2 also felt that pregnancy was a time to relax social expectations relating to diet and weight control with a 'free-pass' to eat what was desired.

Five studies (high confidence) reported women's perception towards lack of support by the health care professional.

There was commonly a sentiment of the need and want for greater support by health professionals, particularly the midwives, towards health eating. Limited time experienced in NHS appointments and brief advice provided by midwives was met with a sense of disappointment by women and did not meet their expectations of the level of support provided by health services. This was also felt towards general practitioner surgeries, where for some nutrition information was expected and none was received.

Some women had a sense that midwives were not confident or didn't have enough knowledge to provide targeted advice.

A few pregnant adolescents expressed that they had lost faith in healthcare professionals including midwives. This was due to perceived lack of support due to lack of time, reassurance or understanding of their circumstances. Instead, these women used online communities with other young mothers or different websites for sources of information.

One teenager in their second pregnancy described feeling looked over by the minimal conversations and support received from midwives compared to their first pregnancy.

Seven studies (moderate confidence) reported women's thoughts, views and perceptions on a healthy diet.

Women who perceived their diet as already healthy tended to find advice on healthy eating during pregnancy redundant. Instead, some of these women were more interested in learning about the baby's development.

Some women with a more relaxed approach to pregnancy due to previously having been pregnant, believed that common sense should guide the interpretation of healthy eating guidelines. Confidence in diet choices and behaviours increased among those who had a successful previous pregnancy, leading to a decreased interest in lifestyle information and resources.

For some pregnant teenagers, healthy eating was viewed as something that was bland and boring which was a perceived barrier to eating healthily.

B2. Issues relating to accessibility

There was 1 subtheme that contributed to this theme.

Nine studies (high confidence) reported issues relating to accessibility of healthy food or a nutritious diet.

For some healthy foods were seen as costly and time-consuming to cook whereas unhealthy foods were easier to access and eat.

For women on Healthy Start Vouchers, financial concerns sometimes dominated over healthy eating. Vouchers would be seen as a means to assist other financial matters rather than towards a healthier diet.

Other women using Healthy Start Vouchers prioritised their kids' health and nutrition over their own during pregnancy. One woman mentioned that they would go hungry during pregnancy if this meant the children were fed.

For those participating in interventions to increase healthy eating behaviours, barriers to attendance included competing priorities such as school pick-ups, work, or feeling unwell/tired.

For some pregnant teenagers, food choices were influenced by living circumstances and access to cooking facilities. Those least likely to cook for themselves lived in temporary accommodation or on their own. Those in supported housing or mother and baby units commonly felt that they didn't have agency over their lives, including diet (sourcing or preparing foods) or food choices.

For those attending dietetic services for obesity, there was an assumption that limited appointments were due to resource impacts, and long waiting lists for the NHS and busy schedules of dietitians.

B3. Inadequate knowledge, advice and information

There were 6 subthemes that contributed to this theme.

Four studies (high confidence) reported barriers to knowledge, advice or information based on confusion or uncertainty around guidance.

Women tended to exercise caution when uncertain about guidance. They reported that complete avoidance of certain foods was easier in order to remove any risks. For pregnant teenagers', certain foods avoided out of caution were tinned tuna, eggs, nuts and cheese and commonly processed soft cheeses. These foods were seen as harmful to the baby, despite not understanding why.

Food poisoning was a common concern for fish and there was a desire for clear guidance on related risks.

This led to women tending to eat less fish than recommended by NHS guidance.

Women found some recommendations complicated to understand, remember and implement such as recognising unpasteurised items or knowing what a portion of fish meant.

Lack of understanding, uncertainty or confusion towards guidance sometimes led to feelings of anxiety and lack of confidence towards following guidance. Some felt overwhelmed and a pressure to follow all of the recommendations which led to feelings of guilt for not always "getting everything right".

Six studies (high confidence) reported barriers to adequate knowledge, advice and information based on communication issues.

Verbal information provided by midwives was often brief, serving as a summary of written materials. Positive advice on healthy eating was lacking, with an emphasis on foods to avoid rather than those to consume.

Women wanted to discuss nutrition but found it challenging to initiate these conversations, assuming it was the midwife's responsibility.

Of those that did solicit nutritional advice, information provided by the midwife was still brief.

Some considered verbal communication of information alone to be overwhelming.

Others instead felt that apps and self-initiated research could be overwhelming, especially during first pregnancies. Many were given leaflets and at first antenatal booking. Some women described leaflets as unhelpful or overused and information was either ignored or if read, not retained.

Eight studies (high confidence) reported barriers to adequate knowledge, advice and information based on content of information or advice received.

Many women did not want content to contain controlling and negative messages relating to food safety on food items to limit, reduce or avoid. This was viewed as not relevant, helpful or clear. For some women, leaflets were found to contain too much information and not favoured unless information was tailored.

First-time pregnant women and those with previous children had overlapping but distinct needs in terms of content. For women that had children, the emphasis was on obtaining up-to-date information since their last pregnancy. Women experiencing first-time pregnancy sought thorough information on what to expect during their first pregnancy.

For some, a lack of tailored information towards existing nutrition knowledge was a barrier to information gained or advice followed. This was especially the case for overweight women attending routine antenatal dietetic services for obesity or those with BMI >40kg/m^2 attending a dietetics consultation. This caused some to view appointments as repetitive and uninformative, for example, information on food safety.

Some women using these services also felt that advice towards "eating for two" was patronising and unhelpful.

Two studies (high confidence) reported barriers to adequate knowledge, advice and information based on delivery of advice or information.

Delivery of information was inconsistent across women. Some received booklets or leaflets, others did not and the same was the case for verbal information. Sometimes leaflets were the only resource provided with no discussion on nutrition in pregnancy.

Lack of continuity for healthy eating advice and differing experiences of the NHS were mentioned as barriers.

Depending on the region of the UK and the participant, different types of informational support about pregnancy nutrition was received.

For example, participants residing in Scotland discussed information from "Ready Steady Baby" in the form of a book, website or phone application. Those from other areas did not report any guidance like this.

Conflicting information was also reported to be received from various healthcare professionals.

Eight studies (high confidence) reported barriers to adequate knowledge, advice and information based on lack of information or mis-information.

Not all women reported receiving advice on healthy eating during pregnancy, and when they did, information was often described as 'minimal' or 'lacking depth.' Advice tended to focus on food avoidance rather than benefits and was not always accurately recalled or was misremembered.

Women felt that the midwife assumed they had a basic knowledge of diet or would conduct their own research.

Women with children tended to receive less nutritional advice than in first pregnancy and relied on previous recollections to inform food related behaviours or decisions.

Pregnant teenagers and women from Pakistani families held misconceptions about diet affecting the baby's development and subsequent labour ease. These beliefs acted as barriers to dietary changes, contributing to reduced food intake.

Another misconception involved thinking that a mother's diet could influence the baby's future dietary behaviours.

Misconceptions regarding the limitation or avoidance of certain food items were mentioned. For example, some refrained from fish due to concern of the baby’s health, cheese products were limited due to perceptions of being unhealthy, that is, containing fat or being processed. One woman was incorrectly advised by her midwife to limit tuna to two tins per week.

Some women knew of the importance of a healthy diet for themselves and their baby but were not clear as to why.

In one study of those asked if they knew of the Eatwell Guide, only half had heard of it and another five had minimal knowledge of the guidance.

For women referred to routine dietetic services for obesity, lack of, or vague information from the midwife about the referral led to misguided expectations of the information they were going to receive in the service, that is, about weight lost rather than healthy eating.

Three studies (moderate confidence) reported barriers to adequate knowledge, advice and information based on sources of information.

Women felt that there was no one primary referral point for comprehensive nutritional information.

Inconsistent advice from various sources, including health care professionals, friends, family, and the internet, was a common concern.

Some women followed nutritional advice from their social circles when they lacked clarity on what to do.

Other women spoke about learning nutritional behaviours from observing other pregnancies or talking to other pregnant women.

Some women commented on changes over time to guidelines on certain foods from health care professionals which tended to lower confidence in advice and seek information elsewhere, such as from friends and family.

B4. Women's thoughts on discourse, ethnic and cultural attitudes to healthy eating

There was 1 subtheme that contributed to this theme.

3 studies (high confidence) reported women's thoughts on cultural attitudes to healthy eating

Views of those important to women such as friends and family could influence dietary habits based on what was thought to be 'appropriate' to eat or drink during pregnancy.

Some discussed the worry about their reputation and if they did not adhere to the often-conservative expectations of others they would not be seen as a good mother.

In women of Pakistani background, the mother or mother-in-law had a dominant role in the culture to dictate food consumption or avoidance that were tied to cultural food practices. Foods had symbolic meanings and were tied to social, cultural and religious attitudes or beliefs. They were viewed to have different effects on the body compared to western medicine and influenced choices.

For example, some foods were viewed to have a heating or cooling effect on the body and were to be eaten or avoided depending on the stage of pregnancy and effects on delivery; white foods were thought to lead to a white skin colour of the baby; red colours were thought to increase the blood in the body believed to be good for health. Women were told by family, particularly mothers and mothers-in-law that food consumption will affect the size of the baby, which in turn affected the woman's eating habits.

Disobeying the matriarch in terms of their advice on food was perceived to cause a stressful relationship and lead to blame or criticism if anything went wrong with the pregnancy.

B5. Demotivating factors

Seven studies (moderate confidence) reported demotivating factors towards healthy eating during pregnancy.

Sickness and nausea were barriers to eating healthy foods for some women. Although a healthy diet was viewed as important, foods that aided morning sickness e.g. starchy foods were prioritised by some women. Palatability of food was another barrier for others, for example, not liking the taste of fish or milk. For others, taste and smell and therefore food preferences had changed during pregnancy.

Dietary requirements such as vegetarianism was a barrier towards certain healthy food products like meat and fish while medical conditions such as lactose intolerance or eczema prevented dairy consumption.

Partner preferences reduced the motivation to eat certain foods or could lead to eating unhealthy foods, especially if needing to cook separate meals.

A lack of knowledge or confidence towards preparing or cooking certain food items was also a barrier to consumption, in particular preparing or cooking seafood. Pregnant teenagers were less motivated to prepare foods or wanted quick and easy meals. Although money was a barrier to healthy eating, convenience and taste motivated food choices.

Some women with multiple children didn't make as many changes to their diet compared to previous pregnancies due limited time or energy. Additional barriers towards healthy eating were emotional issues, anxiety about weight and challenges with childcare.

Some teenage women perceived the application process for Healthy Start Vouchers to be a barrier which reduced motivation to apply.

Economic evidence

This was a qualitative review question, therefore economic evidence was not relevant and thus no economic evidence searches were conducted.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

To answer the question of factors that facilitate or impede the increase of uptake of government advice for healthy eating and drinking in pregnant women, the review was designed to include qualitative data and as a result the committee could not specify in advance the data that would be found. Instead, they identified the following main themes to guide the review, although the list was not exhaustive, and the committee were aware that additional themes could be identified:

- thoughts, views and perceptions of women or parents/carers
- issues relating to acceptability
- issues relating to accessibility
- issues relating to mis-information or a lack of information and communication of information, including food marketing and other commercial determinants
- women's thoughts on discourse, ethnic and cultural attitudes to healthy eating
- acceptability and misinformation
- motivational factors.

Data were identified for some themes listed in the protocol by the committee and additional themes 'advice and information' and 'inadequate knowledge, advice and information' were generated from the evidence which encompassed the protocol theme 'issues relating to mis-information or a lack of information and communication of information, including food marketing and other commercial determinants'.

The quality of the evidence

The evidence was assessed using GRADE-CERQual methodology with risk of bias assessed using the Critical Appraisal Skills Programme (CASP) checklist. The overall confidence in the findings for the qualitative review ranged from low to high, with most of the evidence being high quality.

The review findings were downgraded due to minor concerns with methodological limitations of the included studies, for example for some studies there were some concerns relating to lack of detail on research design method choices, recruitment challenges or strategy, researcher participant relationship, ethical considerations or rigor of data analysis. Although the CASP checklist does not include recall bias, this was taken into account when considering the evidence as most of the evidence included women that recalled their experiences during pregnancy. Findings were also downgraded for coherence due to minor concerns relating to a variation of views expressed under a given theme or subtheme. Some findings were downgraded for adequacy when there were a small number of studies contributing to a finding that did not offer rich data.

Benefits and harms

The committee discussed that the qualitative evidence base on this topic was generally rich and mostly of high quality. Overall, the evidence corresponded with the knowledge and

experience of the committee members. The committee noted that there was qualitative evidence available for some specific populations such as first-generation Pakistani women, pregnant teenagers, women medically classified as being in the obesity weight category who had been referred to dietetic services or specialist antenatal clinics, women from deprived or mixed socioeconomic areas and women that had attended lifestyle intervention studies. This was taken into account when discussing the evidence and making recommendations.

The committee initially commented that across the evidence there appeared a strong need for positive messaging in relation to healthy eating. Across multiple themes and subthemes women described that they wanted positive advice on healthy eating as this was lacking and did not want controlling or negative messages (Facilitator theme A4. Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.1 Communication of information (high confidence); Barrier theme B.3 Inadequate knowledge, advice and information, Subtheme B3.2 Issues relating to communication (high confidence) and Subtheme B3.3 Issues relating to content of information (high confidence)). Further, the committee noticed in the evidence strong preferences towards advice on healthy eating over weight management. In the evidence women did not want weight to be the starting point for food-based conversations (Facilitator theme A4. Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.1 Communication of information, Subtheme A4.2.2 Content of advice or information (high confidence)). The committee also discussed the desire for greater support from the healthcare professional which stemmed from current perceived lack of support due to time restrictions and thus brief advice received from midwives (Facilitator theme A4. Advice and information, Subtheme A4.5 Support from the healthcare provider (high confidence); Barrier theme B1 Thoughts, views and perceptions of women, Subtheme B1.2 Perceived lack of support from health care provider (high confidence)). For those participating in interventional studies, support from the healthcare professional acted as a motivator towards healthy eating (Facilitator theme A5. Motivational factors, Subtheme A5.2 Healthcare provider support (high confidence)). Overall, the committee discussed that based on the evidence and their experience, it is important to give positive messages and encouragement about healthy eating in pregnancy, instead of focusing on weight or weight management.

The committee reviewed the evidence on issues relating to how advice or information is given, and they noted that across women interviewed, the delivery of information was inconsistent and the type of informational support differed across different regions and sometimes individuals received conflicting information from various healthcare professionals. Lack of continuity for healthy eating advice and differing experiences of the NHS were also mentioned as barriers (Barrier theme B.3 Inadequate knowledge, advice and information, Subtheme B3.4 Issues relating to delivery of advice or information (high confidence) and Subtheme B3.6 Source of information (high confidence)). Based on the evidence and their experience the committee agreed that commissioners and service providers should ensure that healthcare professionals are able to provide independent, evidence based, consistent information about healthy eating during pregnancy.

The committee recognised from the evidence that women commonly wanted tailored information and advice on healthy eating and drinking during pregnancy and for this to accommodate their needs and circumstances. This should include consideration about any difficulties with eating (related to eating disorders or sensory issues, for example) or communication. In the evidence, baseline levels of knowledge and understanding of healthy eating and drinking during pregnancy were not taken into account, and as a result the advice given was not tailored to the individual. Women expressed that often the midwife assumed they had a basic knowledge of diet or had the means to do the research themselves (Barrier theme B.3 Inadequate knowledge, advice and information, B3.3 Issues relating to content of information (high confidence)). The evidence also showed that not tailoring advice to the person’s existing knowledge on nutrition and healthy eating was a barrier towards gaining information and following advice (B3. Inadequate knowledge, advice and information, Subtheme B3.3 Issues relating to content of information). For example, women that already

perceived their lifestyle to be healthy found routine antenatal appointment advice about healthy eating to be unhelpful while some women with obesity attending specialist dietetic services found simple information about food to be repetitive, uninformative or patronising (Barriers theme B1 Thoughts, views and perceptions of women Subtheme B1.3 Views on healthy diet (moderate confidence) and theme B3 Inadequate knowledge, advice and information, Subtheme B3.3 Issues relating to content of information (high confidence)). When interventions provided tailored information or counselling about healthy eating, acceptability towards these interventions improved (A2. Factors relating to acceptability (high confidence). The evidence also showed that women wanted healthcare professionals to get to know them on a personal level in relation to their preferences and concerns. They also wanted their needs to be listened to as well as reassurance given in a safe environment where their concerns could be raised without judgement or pressure based on time constraints. (Facilitator theme A4 Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.1 Communication of information (high confidence); Barrier B1 Thoughts, views and perceptions of women (high confidence); Barrier theme B1 Thoughts, views and perceptions of women, Subtheme B1.2 Perceived lack of support from health care provider (high confidence)). Based on the evidence, the committee agreed that during pregnancy women should be offered tailored nutritional advice that is sensitive to their needs and circumstances.

The evidence also showed that there were certain misconceptions towards healthy eating such as towards limiting or avoiding certain food items that could be eaten during pregnancy or misconceptions held by pregnant teenagers and women from Pakistani families about diet affecting the baby's development. This evidence was from barrier themes and subthemes B.3 Inadequate knowledge, advice and information, B3.5 Lack of information or mis-information (high confidence). There was variation in the levels of knowledge of guidance amongst the women and at times there was confusion towards guidance that was seen as complicated to understand or implement, for example, towards recognising unpasteurised items or fish portions or safety. Uncertainty on guidance commonly led to avoidance of the food item (Barrier themes B.3 Inadequate knowledge, advice and information, Subtheme B3.1 Confusion or uncertainty around guidance (high confidence) and Subtheme B3.5 Lack of information or mis-information (high confidence)). Based on the evidence and their knowledge and experience the committee recommended that it was important for the healthcare professionals to tailor discussions based on the woman's level of understanding of the topic so that the information provision is more effective.

Evidence from multiple subthemes showed that being understood and accepted were key elements to guide a conversation around food in pregnancy (Facilitator theme A4 Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.1 Communication of information (high confidence). The evidence also showed that some women had negative experiences and felt judged by healthcare professionals. For example, those referred to a dietetic service for obesity felt singled out and judged on their parenting, or others attending interventions incorporating healthy eating goals felt judged if not meeting their goals (Barrier theme B1 Thoughts, views and perceptions of women). The committee recognised that food and dietary habits can be sensitive topics and people may easily feel judged if discussions are not carefully conducted to avoid this. Based on the evidence, the committee agreed that it was important for the delivery and discussion of healthy eating advice to be non-judgemental.

The committee discussed the impact that culture and ethnicity can have on people's dietary habits, people's perceptions of foods and their preferences and how this can pose challenges to the discussion between the healthcare professional and the pregnant person if this is not taken into account. There was a limited amount of evidence highlighting this, but there was evidence which showed that food choices amongst first generation Pakistani women were guided by symbolic and cultural meanings. (B4 Women's thoughts on discourse, ethnic and cultural attitudes to healthy eating, B4.1 Cultural attitudes to healthy eating (high confidence). Based on the evidence and from their collective experience of

current practice, the committee discussed that advice on foods specific to different cultures was currently limited. Resources such as the Eatwell Guide were mentioned as providing culturally adapted information and it was discussed that greater training for healthcare providers might be beneficial. The committee discussed the importance of healthcare professionals being aware of diversity in diet amongst different ethnic communities. Based on the evidence and their experience, the committee agreed that advice and information to women from different cultural and ethnic backgrounds should be culturally sensitive.

The evidence showed that there were differences in approach or decision making related to healthy eating behaviours during pregnancy as a result of prior pregnancy experiences. For example, having experienced a miscarriage or prior fertility problems led women to have greater anxiety to protect their baby, which motivated stricter healthy food behaviours and greater information seeking. Women without conception issues or who already had children seemed to adopt a less strict approach to healthy eating while still prioritising the baby's safety (Theme A5 Motivational factors, Subtheme A5.4 Self-motivation, Subtheme A5.4.1 Protecting the child (high confidence); Barrier theme B1 Thoughts, views and perceptions of women, Subtheme B1.1 Listening to self or baby over advice (moderate confidence)). Furthermore, the evidence showed that women who already had children tended to receive less nutritional advice than in their first pregnancy and had differing information needs to first pregnancy (Barrier theme B.3 Inadequate knowledge, advice and information, Subthemes B3.3 Issues relating to content of information (high confidence) and B3.5 Lack of information or mis-information (high confidence)). The committee agreed that while information needs may be different depending if the pregnancy is first or not, it is important not to assume that those in their second or third pregnancy won't need any advice and information on healthy eating. The level of detail and content should be tailored according to the person's needs, understanding and circumstances. Based on the evidence and their expertise, the committee agreed to highlight in the recommendations that healthcare professionals should discuss health behaviours during pregnancy whether it is the person's first or subsequent pregnancy.

The committee recognised from the evidence that women wanted proactive conversations about healthy eating with their healthcare professional, particularly the midwife, who was seen as the most favoured and trusted source of advice and information (Facilitator theme A4. Advice and information, Subtheme A4.2 Preference for delivery, Subtheme A4.2.2 Content of advice or information (high confidence) and A4.2.4 Trustworthy sources of information and advice (high confidence); Facilitator A4. Advice and information, A4.4 Self-initiative (moderate confidence)). In the evidence, women also discussed wanting to understand healthy eating choices within the context of individual food preferences (Facilitator theme A4. Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.2 Content of advice or information (high confidence)). Based on the evidence the committee agreed that understanding of their usual dietary habits along with their preferences is critical when providing healthy food, drink and eating habit advice during pregnancy. The committee therefore agreed that asking about the person's current dietary habits and preferences is important in order to provide tailored information and advice.

The committee discussed the evidence relating to the content of nutritional advice and noted that, in addition to wanting positive advice, women wanted advice to cover the benefits of healthy food and drinks and healthy eating (Facilitator theme A4. Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.2 Content of advice or information (high confidence)).

The committee also discussed that a number of themes showed that external influences of family, partner, friends or other pregnant women could influence dietary habits of the pregnant woman and also that the choices people make around health behaviours during pregnancy could have benefits to the wider family as well (A5. Motivational factors, A5.1 External influences (high confidence)). Evidence showed the influence of family dynamics towards food choices or access in women from different ethnic backgrounds and in younger

pregnant women. For example, first generation Pakistani women described the dominance of the mother or mother-in-law influencing dietary habits while some pregnant teenagers described relying on family members or partners to cook for them. Together, this evidence was from facilitator theme and subtheme A3. Factors relating to accessibility A3.2 Support from family (moderate confidence) and the barrier themes and subthemes B4 Women's thoughts on discourse, ethnic and cultural attitudes to healthy eating, B4.1 Cultural attitudes to healthy eating (high confidence). The committee therefore agreed that the benefits of healthy foods and drinks and healthy dietary habits should be discussed in the context of the pregnant person, baby and the wider family.

The committee discussed that the evidence emphasising the importance of discussing the benefits of healthy eating during pregnancy is partly a result of focus of advice often being on the foods to avoid rather than foods that should be encouraged, as shown in the evidence (Barrier theme B.3 Inadequate knowledge, advice and information, Subtheme B3.2 Issues relating to communication (high confidence)). As such, the committee recommended that both food to be encouraged and avoided during pregnancy should be discussed. This was also supported by qualitative evidence on women that received interventions where information on foods that should be encouraged and avoided during pregnancy was discussed. As a result of these interventions, some women felt that their health literacy was improved, an increased awareness of dietary habits and baby's nutrition, behaviour changes and a sense of gaining long-term eating habit behaviours (Facilitator theme A4. Advice and information, Subtheme A4.1 Knowledge of guidance and health literacy (high confidence).

In the evidence, some women described that their restricted diets due to dietary requirements prevented them from consuming certain foods and others found palatability of certain foods to be a barrier to consumption, for example, not liking the taste of fish or milk (Barrier theme B5. Demotivating factors (moderate confidence)). The committee discussed that options should be acceptable for pregnant people from diverse backgrounds. The committee also discussed that many people struggle to afford certain healthy foods and healthcare professionals should take this into consideration so that healthy options accessible to the person are discussed. Based on the evidence, the committee agreed that advice and information about nutritional options should be acceptable and accessible to the individual.

The committee discussed the evidence on women's preferences towards how advice or information on healthy eating and drinking should be communicated and delivered. In the evidence, online searches for nutritional information were common, particularly early in pregnancy whilst digital communication, like apps, was favoured for accessibility, interactivity and up-to-date information. At the same time, women felt that there was no one primary referral point for comprehensive nutritional information and inconsistent advice from various sources was a common concern (Barrier theme B.3 Inadequate knowledge, advice and information, Subtheme B3.6 source of information (moderate confidence)). Women expressed that the internet was a preferable source of information, but they acknowledged that all the necessary information should be provided from a reliable source and written by experts and preferably endorsed by midwives or GPs. Many women wanted to know how the foods they ate affected their baby and wanted this information to be evidence-based. (Facilitators theme A4. Advice and information, A4.2 Preference for delivery and communication, Subtheme A4.2.2 Content of advice or information (high confidence), Subtheme A4.2.3 Delivery of advice or information (high confidence) and A4.2.4 Subtheme trustworthy sources of information and advice (high confidence)). The committee also discussed the importance of this information not being from commercial sources because these may give misleading and non-evidence-based information. Therefore, the committee agreed that in addition to providing face-to-face information, healthcare professionals should provide evidence-based, non-commercial information sources, including printed and online materials.

The committee discussed that it was important for the healthcare professionals to gauge the individual circumstances to understand any barriers to access to healthy food. This could be in relation to living situations or financial concerns and where necessary, additional support for young pregnant people and those from low income or disadvantaged backgrounds should be considered. In the evidence, there were accounts of pregnant young people not having access to cooking facilities due to living in temporary accommodation (Theme B2 Issues relating to accessibility, Subtheme B2.1 External factors (high confidence)). Based on their experience, this is a situation many people experience. For example, asylum seekers or people experiencing homelessness may be temporarily housed in hotels where they have no access to kitchens or any cooking equipment. In this context, advice about healthy home cooked meals is unrealistic and unhelpful. This highlights the importance of tailoring advice and discussions.

The committee also discussed, based on their knowledge and experience, how commonly people experience poverty and food insecurity which can stop them from accessing healthy foods. The evidence showed that access to Healthy Start vouchers were seen as a 'nutritional safety net' to save money without having to cut out any healthy foods from shopping and enabled fresh food choices which motivated healthy eating habits (Facilitators Theme A3 Factors relating to accessibility, Subtheme A3.1 Healthy start vouchers as enabler to healthy eating (high confidence); Theme A5 Motivational factors Subtheme A5.3 Healthy start vouchers (low confidence)). However, the committee also noted the evidence showing that some women using Healthy Start Vouchers with high financial concerns prioritised their children's health and nutrition over their own during pregnancy. Vouchers would be used towards their children rather than towards themselves (Barrier theme B2 Issues relating to accessibility, Subtheme B2.1 External factors (high confidence). Alternatively, vouchers were used for ineligible items such as bread which was not seen as an issue by those reporting this (Facilitator theme A1. Thoughts, views and perceptions of women, A1.2 Views on healthy start voucher purchases (high confidence)). The committee discussed that considering people's financial circumstances and access to healthy foods is important and healthcare professionals should signpost women to, for example, the Healthy Start scheme or other local initiatives such as pantry schemes or social prescribing initiatives offering cooking or one-to-one coaching in order to reduce barriers to accessing healthy diets. The committee, however, highlighted that there needs to be increased awareness of these initiatives among healthcare practitioners in order to appropriately signpost to relevant services. The committee hence agreed that healthcare professionals should understand people's resources and circumstances and offer advice and access to schemes such as NHS Healthy Start scheme and income support schemes.

The committee noted the existing additional support for young pregnant people in the form of pregnancy specialist midwives and social workers in many units in the UK. This was in addition to tailored written resources for young pregnant people which was well received by this population in the evidence (Facilitator theme A4 Advice and information, Subtheme A4.2 Preference for delivery and communication, Subtheme A4.2.1 Communication of information (high confidence)). The committee discussed that a young pregnant person under 18 years of age is able to access Healthy Start as there is no financial threshold. At the same time, the committee acknowledged that not all young pregnant people or those from low income or disadvantaged backgrounds will need support, but it was important to be aware that these groups may need additional support. This additional support could be, for example, providing longer appointments or extra appointments, tailored or enhanced services, modifying communication (including written resources) based on for example the person's age, abilities and language skills, and referring and signposting people to services in local family hubs or charities (for example peer support groups, 'cook and eat' classes, information and education sessions), as well as providing information about Healthy Start. The committee discussed that the available services are finite so they should ideally reach those who can most benefit from them.

The evidence showed that a lack of knowledge or confidence towards preparing or cooking food was a barrier to eating healthy foods (Barrier theme B5. Demotivating factors (moderate confidence)). Further, young pregnant people were less motivated to prepare foods and were dependant on others such as family members for cooking (Facilitator theme and Subtheme A3. Factors relating to accessibility, A3.2 Support from family (moderate confidence). The committee noted in the evidence that practical support, such as cooking classes with affordable and time-efficient healthy recipes, was identified as beneficial. In addition, women preferred these cooking sessions to be delivered by those who had been pregnant and had children (Facilitators theme A4. Advice and information, A4.2 Preference for delivery and communication, A4.2.3 Delivery of advice or information (high confidence) and A4.2.4 Subtheme Trustworthy sources of information and advice (high confidence)). The committee recommended, based on the evidence, helping people gain skills and confidence to incorporate healthy foods into their diet. This can enable people to have healthier diets during pregnancy and have long lasting effects for the individuals and families. This could be, for example, referring people to cooking classes or groups which promote healthy eating. Based on the committee's knowledge, in some areas community or family hubs offer these types of activities but they acknowledged there may be geographical variation in the availability of such services in current practice.

Cost effectiveness and resource use

This was a qualitative review question, therefore economic evidence was not relevant. The recommendations made broadly reflect current practice around discussions, information and advice on healthy eating and drinking during pregnancy. Recommendations based on the evidence identified in this review question relate to approaches to communication of information and advice to women and people who are pregnant, as well as the content of information and advice provided, and therefore may have minor-to-moderate resource implications comprising health professionals' extra time to provide this information and advice, in particular if additional support (for example longer or more frequent contacts) is provided to young pregnant people and pregnant people from low income or disadvantaged backgrounds. Some resource implications around formal or informal health professionals' training are expected, to ensure that healthcare professionals can provide independent and non-commercial, evidence-based and consistent information about healthy eating and drinking during pregnancy.

Other factors the committee took into account

For this review question, the population in the evidence was women and no evidence was identified or reviewed for trans men or non-binary people. The protocol and literature searches were not designed to specifically look for evidence on trans men or non-binary people but they were also not excluded. However, there is a small chance evidence on them may not have been captured, if such evidence exists. In discussing the evidence, the committee considered whether the recommendations could apply to a broader population, and used gender inclusive language to promote equity, respect and effective communication with everyone. Healthcare professionals should use their clinical judgement when implementing the recommendations, taking into account each person's circumstances, needs and preferences, and ensuring all people are treated with dignity and respect throughout their care.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.2.1 to 1.2.4. Other evidence supporting these recommendations can be found in the evidence review G on interventions for helping to achieve healthy and appropriate weight change during pregnancy and the evidence review I on interventions to increase uptake of healthy eating and drinking advice during pregnancy.

References – included studies

Qualitative

Abayomi 2020

Abayomi, J C, Charnley, M S, Cassidy, L et al. (2020) A patient and public involvement investigation into healthy eating and weight management advice during pregnancy. International journal for quality in health care : journal of the International Society for Quality in Health Care 32(1): 28-34

Atkinson 2016

Atkinson, Lou; Shaw, Rachel L; French, David P (2016) Is pregnancy a teachable moment for diet and physical activity behaviour change? An interpretative phenomenological analysis of the experiences of women during their first pregnancy. British journal of health psychology 21(4): 842-858

Beasant 2023

Beasant, Lucy; Ingram, Jenny; Taylor, Caroline M (2023) Fish Consumption during Pregnancy in Relation to National Guidance in England in a Mixed-Methods Study: The PEAR Study. Nutrients 15(14)

Bouga 2018

Bouga, Maria; Lean, Michael E J; Combet, Emilie (2018) Iodine and Pregnancy-A Qualitative Study Focusing on Dietary Guidance and Information. Nutrients 10(4)

Chana 2019

Chana, R. and Haith-Cooper, M. (2019) Diet and physical activity in pregnancy: A study exploring women's beliefs and behaviours. British Journal of Midwifery 27(5): 297-304

Coathup 2017

Coathup, Victoria; Smith, Lesley; Boulton, Mary (2017) Exploration of dietary patterns and alcohol consumption in pregnant women in the UK: A mixed methods study. Midwifery 51: 24-32

Heslehurst 2017

Heslehurst, Nicola, Dinsdale, Sarah, Brandon, Helene et al. (2017) Lived experiences of routine antenatal dietetic services among women with obesity: A qualitative phenomenological study. Midwifery 49: 47-53

Hussain 2021

Hussain, Basharat; Bardi, Josephine NwaAmaka; Fatima, Tehniyat (2021) Pregnancy related cultural food practices among Pakistani women in the UK: a qualitative study. British Journal of Midwifery 29(7): 402-409

Keely 2017

Keely, Alice, Cunningham-Burley, Sarah, Elliott, Lawrie et al. (2017) “If she wants to eat…and eat and eat…fine! It's gonna feed the baby”: Pregnant women and partners' perceptions and experiences of pregnancy with a BMI >40kg/m^2. Midwifery 49: 87-94

Lavender 2016

Lavender, Tina and Smith, Debbie M. (2016) Seeing it through their eyes: a qualitative study of the pregnancy experiences of women with a body mass index of 30 or more. Health Expectations 19(2): 222-233

Lawrence 2020

Lawrence, Wendy, Vogel, Christina, Strommer, Sofia et al. (2020) How can we best use opportunities provided by routine maternity care to engage women in improving their diets and health?. Maternal & child nutrition 16(1): e12900

Morris 2020

Morris, T, Strommer, S, Vogel, C et al. (2020) Improving pregnant women's diet and physical activity behaviours: the emergent role of health identity. BMC pregnancy and childbirth 20(1): 244

Newson 2022

Newson, Lisa, Bould, Kathryn, Aspin-Wood, Bronte et al. (2022) The lived experiences of women exploring a healthy lifestyle, gestational weight gain and physical activity throughout pregnancy. Health expectations : an international journal of public participation in health care and health policy 25(4): 1717-1729

Ohly 2019

Ohly, Heather, Crossland, Nicola, Dykes, Fiona et al. (2019) A realist qualitative study to explore how low-income pregnant women use Healthy Start food vouchers. Maternal & child nutrition 15(1): e12632

Olander 2012

Olander, Atkinson, Lou, Edmunds, Jemma K., French, David P. et al. (2012) Promoting healthy eating in pregnancy: What kind of support services do women say they want?. Primary Health Care Research & Development 13(3): 237-243

Padmanabhan 2015

Padmanabhan, Uma; Summerbell, Carolyn D.; Heslehurst, Nicola (2015) A qualitative study exploring pregnant women’s weight-related attitudes and beliefs in UK: the BLOOM study. BMC Pregnancy and Childbirth 15(1): 99

Poston 2013

Poston, L., Briley, A.L., Barr, S. et al. (2013) Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); Assessment of behavioural change and process evaluation in a pilot randomised controlled trial. BMC Pregnancy and Childbirth 13: 148

Rundle 2018

Rundle, Rachel; Soltani, Hora; Duxbury, Alexandra (2018) Exploring the views of young women and their healthcare professionals on dietary habits and supplementation practices in adolescent pregnancy: a qualitative study. BMC nutrition 4: 45

Strommer 2021

Strommer, Sofia, Weller, Susie, Morrison, Leanne et al. (2021) Young women's and midwives' perspectives on improving nutritional support in pregnancy: The babies, eating, and LifestyLe in adolescence (BELLA) study. Social science & medicine (1982) 274: 113781

Warren 2017

Warren, Lucie; Rance, Jaynie; Hunter, Billie (2017) Eat Well Keep Active: Qualitative findings from a feasibility and acceptability study of a brief midwife led intervention to facilitate healthful dietary and physical activity behaviours in pregnant women. Midwifery 49: 117-123

Appendices

Appendix A Review protocols

Review protocol for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

Table 4: Review protocol

ID	Field	Content
0.	PROSPERO registration number	Not applicable
1.	Review title	Barriers and facilitators to increase the uptake of government advice
2.	Review question	What are the barriers and facilitators to increasing the uptake of government advice for women and families with children up to five years in the following areas: • folic acid supplements (including before pregnancy) (1.3) • vitamin supplements (including Healthy Start vitamins) (1.5) • healthy eating and drinking in pregnant women (2.3) • appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months (4.1) • healthy eating and drinking in children from 12 months to 5 years (4.2).
3.	Objective	To identify the barriers and facilitators to uptake of government advice in the following areas: • folic acid supplements (including before pregnancy) (1.3) • vitamin supplements (including Healthy Start vitamins) (1.5) • healthy eating and drinking in pregnant women (2.3) • appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months (4.1)

ID	Field	Content
		• healthy eating and drinking in children from 12 months to 5 years (4.2).
4.	Searches	The following databases will be searched: • MEDLINE • Embase • Emcare • CINAHL • PsycINFO Searches will be restricted by: • The same restrictions as in equivalent intervention reviews will be used: • date limit: 2003 • English language only • human studies only. Other searches: • inclusion lists of systematic reviews The full search strategies for MEDLINE database will be published in the final review. For each search, the principal database search strategy is quality assured by a second information scientist using an adaptation of the PRESS 2015 Guideline Evidence-Based Checklist.
5.	Condition or domain being studied	Barriers and facilitators to increase government advice for families with children up to five years in the following areas: • folic acid supplements (including before pregnancy) (C): ○ Uptake of low-dose (<1 mg daily); medium-dose folic (≥1 to <5 mg daily); high-dose (≥5 mg daily) folic acid supplementation in line with government advice https://www.nhs.uk/medicines/folic-acid/how-and-when-to-take-folic-acid/ • vitamin supplements in pregnant and breastfeeding women (E):

ID	Field	Content
		○ Healthy start vitamins for pregnant and breastfeeding women (https://www.healthystart.nhs.uk/healthcare-professionals/ https://www.healthystart.nhs.uk/): ▪ the daily dose is 1 tablet, which contains: • 70 milligrams of vitamin C • 10 micrograms of vitamin D • 400 micrograms of folic acid. ○ vitamin A (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/) ▪ vitamin A (or retinol): Do not take cod liver oil or any supplements containing vitamin A (retinol) when you're pregnant. Too much vitamin A could harm your baby. Always check the label. ○ vitamin C (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/) ▪ found in fruit and vegetables, a balanced diet can provide all the vitamin C pregnant women need. ○ vitamin D (https://www.nhs.uk/pregnancy/keeping-well/vitamins-supplements-and-nutrition/ https://www.nhs.uk/start4life/pregnancy/vitamins-and-supplements-pregnancy/) ▪ 10 mcg vitamin D daily during the winter months (October until the end of March). ○ those at higher risk of not getting enough vitamin D (not outdoors often, live in an institution like a care home, usually wear clothes that cover most of their skin when outdoors) should take daily 10 mcg vitamin D daily throughout the year. ○ people with black or brown skin may also not make enough vitamin D from sunlight, so should consider taking 10 mcg of vitamin D daily throughout the year. • vitamin supplementation for babies and children up to 5 years in line with government advice (E): ○ Healthy Start children's vitamins drops (from birth to 4 years) (https://www.healthystart.nhs.uk/) ▪ The daily dose is 5 drops, which contain:

ID	Field	Content
		• vitamin A (233µg) • vitamin C (20mg) • vitamin D (10µg). ○ vitamins for children (A, C, D) Vitamin D – NHS (www.nhs.uk) https://www.nhs.uk/start4life/baby/baby-vitamins/ https://www.nhs.uk/conditions/baby/weaning-and-feeding/vitamins-for-children/ ○ babies from birth to 1 year should have a daily supplement containing 8.5 to 10mcg of vitamin D throughout the year if they are: ▪ breastfed ▪ formula-fed and having <500 mls of formula a day, as infant formula is already fortified with vitamin D. ○ all children aged 6 months to 5 years should be given vitamin supplements containing vitamins A, C and D every day (unless they are being formula fed with >500mls). • healthy eating and drinking in pregnant women (I): https://www.nhs.uk/start4life/pregnancy/healthy-eating-pregnancy/ • appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months (N): ○ Introduce solid foods at around 6 months, alongside their usual breast milk or first infant formula. Weaning teaches the baby to move solid foods around their mouth, chew and swallow solid foods. Offer a variety of foods, allow plenty of time, go at the baby's pace and stop when they show signs they've had enough. (https://www.nhs.uk/start4life/weaning/ https://www.nhs.uk/conditions/baby/weaning-and-feeding/ SACN_report_on_Feeding_in_the_First_Year_of_Life.pdf (publishing.service.gov.uk) • healthy eating and drinking in children from 12 months to years (O): ○ should be having 3 meals a day, also may need 2 heathy weaning snacks in between. No need salt or sugar added to their food or cooking water.

ID	Field	Content
		https://www.nhs.uk/start-for-life/baby/weaning/what-to-feed-your-baby/over-12-months/
6.	Population	Inclusion: • women during the preconception period and first 12 weeks of a single or multiple pregnancy (in relation to folic acid supplementation only [1.3]) • breastfeeding women (in relation to uptake of vitamins only [1.5]) • women during a single or multiple pregnancy (in relation to uptake of vitamins [1.5] and healthy eating a drinking in pregnancy women only [2.3]) • parents or carers of babies and children up to 5 (in relation to uptake of vitamins only [1.5]) • parents or carers of babies up to 12 months (in relation to introduction to solids (complementary feeding only [4.1]) • parents or carers of children between 12 months and 5 years (in relation to healthy eating and drinking only [4.2]).
7.	Phenomenon of interest	Barriers to, and facilitators for increasing uptake of government advice. Themes will be identified by the available literature. The committee identified the following potential themes (however, they are aware that not all of these themes may be found in the literature and that additional themes may be identified): • thoughts, views and perceptions of women or parents/carers • issues relating to acceptability • issues relating to accessibility • issues relating to mis-information or a lack of information and communication of information, including food marketing and other commercial determinants

ID	Field	Content
		• women/parent/carer thoughts on discourse, ethnic and cultural attitudes to vitamin supplementation and healthy eating • acceptability and misinformation • motivational factors, including child characteristics.
8.	Comparator	Not applicable as this is a qualitative review
9.	Types of study to be included	• systematic reviews of qualitative studies • studies reporting data gathered through semi-structured and structured interviews, focus groups, observations. Note: Mixed methods studies will be included but only qualitative data will be extracted and risk of bias assessed.
10.	Other exclusion criteria	<u>Population:</u> • preterm and low-birth-weight babies (defined by the World Health Organization as a birth weight less than 2,500 g) *If any study or systematic review includes <1/3 of the excluded population, it will be considered for inclusion but, if included, the evidence will be downgraded for applicability.* <u>Setting:</u> • studies other than those conducted in the United Kingdom as the government advice in other countries might not be representative of that in the UK and attitudes in other countries may also differ significantly. *Systematic reviews or studies that include evidence from both the United Kingdom and non-United Kingdom, will only be included if the source of themes and evidence from the United Kingdom can be clearly established. Studies mixing cohorts from the United Kingdom and other countries will be excluded.*

ID	Field	Content
		Methodological details and language: • studies that do not include methodological details will not be included as they do not provide sufficient information to evaluate risk of bias/ study quality • studies using quantitative methods only (including surveys that report only quantitative data) • conference abstracts will not be included because these do not typically have sufficient information to allow full critical appraisal • non-English language studies.
11.	Context	The population of this guideline may overlap with the population of women included in other NICE guidelines (such as postnatal care, antenatal care, intrapartum care, pregnancy and complex social factors or obesity prevention).
12.	Primary outcomes (critical outcomes)	Outcomes, not applicable as this is a qualitative review. For anticipated themes, see row 7 above. 'Phenomenon of interest'.
13.	Secondary outcomes (important outcomes)	Outcomes, not applicable as this is a qualitative review. For anticipated themes, see row 7 above. 'Phenomenon of interest'.
14.	Data extraction (selection and coding)	• all references identified by the searches and from other sources will be uploaded into EPPI and de-duplicated. Titles and abstracts of the retrieved citations will be screened to identify studies that potentially meet the inclusion criteria outlined in the review protocol. • duplicate screening will not be undertaken for this question. • full versions of the selected studies will be obtained for assessment. studies that fail to meet the inclusion criteria once the full version has been checked will be excluded at this stage. Each study excluded after checking the full version will be listed, along with the reason for its exclusion. • a standardised form will be used to extract data from studies, including study reference, research question, theoretical approach, data collection and analysis methods used, participant characteristics, second-order themes, and relevant first-order themes (that is, supporting quotes). One reviewer will extract relevant data into a standardised form, and this will be quality assessed by a senior reviewer.

ID	Field	Content
15.	Risk of bias (quality) assessment	Quality assessment of individual studies will be performed using the following checklists: • CASP for systematic reviews of qualitative studies • CASP checklist for qualitative studies The quality assessment will be performed by one reviewer and this will be quality assessed by a senior reviewer.
16.	Strategy for data synthesis	Qualitative review: The GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative research; Lewin 2015) approach will be used to summarise the confidence in qualitative evidence. The overall confidence in evidence about each theme or sub-theme will be rated on four dimensions: methodological limitations, applicability, coherence and adequacy of data. Methodological limitations refer to the extent to which there were problems in the design or conduct of the studies and will be assessed with the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies or systematic reviews of qualitative studies. Applicability of evidence will be assessed by determining the extent to which the body of evidence from the primary studies are applicable to the context of the review question. Coherence of findings will be assessed by examining the clarity of the data. Adequacy of data will be assessed by looking at the degree of richness and quantity of findings.
17.	Analysis of subgroups	Facilitators and barriers to increasing the uptake of government advice for women and children up to five in the following areas will be reviewed and analysed separately: • folic acid supplements (including before pregnancy) (1.3) • vitamin supplements (including Healthy Start vitamins) (1.5) • healthy eating and drinking in pregnant women (2.3) • appropriate and timely introduction to solids (complementary feeding) for babies from 6 to 12 months (4.1) • healthy eating and drinking in children from 12 months to 5 years (4.2).

ID	Field	Content			
		Within each of the areas identified above, the views and experiences of the following groups will be reviewed and analysed separately: • women • men • parents • carers			
18.	Type and method of review	☐	Intervention		
		☐	Diagnostic		
		☐	Prognostic		
		☒	Qualitative		
		☐	Epidemiologic		
		☐	Service Delivery		
		☐	Other (please specify)		
19.	Language	English			
20.	Country	England			
21.	Anticipated or actual start date	Not applicable			
22.	Anticipated completion date	Not applicable			
23.	Stage of review at time of this submission	Review stage	Started	Completed	
		Preliminary searches	☐	☑	

ID	Field	Content		
		Piloting of the study selection process	☐	☑
		Formal screening of search results against eligibility criteria	☐	☑
		Data extraction	☐	☑
		Risk of bias (quality) assessment	☐	☑
		Data analysis	☐	☑
24.	Named contact	**5a. Named contact** National Institute for Health and Care Excellence **5b. Named contact e-mail** mandcnutrition@nice.org.uk **5c. Organisational affiliation of the review** National Institute for Health and Care Excellence (NICE)		
25.	Review team members	From the National Institute for Health and Care Excellence: • NGA Senior Systematic Reviewer • NGA Systematic Reviewer		
26.	Funding sources/sponsor	This systematic review is being completed by the National Guideline Alliance which receives funding from NICE.		

ID	Field	Content
27.	Conflicts of interest	All guideline committee members and anyone who has direct input into NICE guidelines (including the evidence review team and expert witnesses) must declare any potential conflicts of interest in line with NICE's code of practice for declaring and dealing with conflicts of interest. Any relevant interests, or changes to interests, will also be declared publicly at the start of each guideline committee meeting. Before each meeting, any potential conflicts of interest will be considered by the guideline committee Chair and a senior member of the development team. Any decisions to exclude a person from all or part of a meeting will be documented. Any changes to a member's declaration of interests will be recorded in the minutes of the meeting. Declarations of interests will be published with the final guideline.
28.	Collaborators	Development of this systematic review will be overseen by an advisory committee who will use the review to inform the development of evidence-based recommendations in line with section 3 of Developing NICE guidelines: the manual. Members of the guideline committee are available on the NICE website: https://www.nice.org.uk/guidance/indevelopment/gid-ng10191
29.	Other registration details	None
30.	Reference/URL for published protocol	Not applicable
31.	Dissemination plans	NICE may use a range of different methods to raise awareness of the guideline. These include standard approaches such as: • notifying registered stakeholders of publication • publicising the guideline through NICE's newsletter and alerts • issuing a press release or briefing as appropriate, posting news articles on the NICE website, using social media channels, and publicising the guideline within NICE.
32.	Keywords	Barriers, complimentary feeding, facilitators, healthy eating, vitamin supplements
33.	Details of existing review of same topic by same authors	Not applicable

ID	Field	Content	
34.	Current review status	☐	Ongoing
		☐	Completed but not published
		☒	Completed and published
		☐	Completed, published and being updated
		☐	Discontinued
35.	Additional information	None	
36.	Details of final publication	www.nice.org.uk	

CDSR: Cochrane Database of Systematic Reviews; CENTRAL: Cochrane Central Register of Controlled Trials; DARE: Database of Abstracts of Reviews of Effects; GRADE-CERQual: Grading of Recommendations Assessment, Development and Evaluation (Confidence in the Evidence from Reviews of Qualitative research; HTA: Health Technology Assessment; mls: millilitres; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence.

Appendix B Literature search strategies

Literature search strategies for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

Database: Medline

Date of last search: 04/10/2023

#	Searches
1	exp Pregnancy/ or Pregnant Women/ or Prenatal Care/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).tw,kf.
3	1 or 2
4	Diet/ or Diet, Healthy/
5	Feeding Behavior/ or exp Drinking Behavior/
6	Nutritive Value/ or exp Nutritional Requirements/ or Energy Intake/ or exp Maternal Nutritional Physiological Phenomena/
7	fruit/ or vegetables/
8	((food* or feed* or diet* or nutrition* or nutritive or eating) adj4 (habit* or behavio* or attitude* or belief* or practice*)).tw,kf.
9	((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) adj4 (intake or consum* or requir* or value* or measur* or pattern* or track*)).tw,kf.
10	((health* or balance* or nutrition*) adj4 (food* or eat* or diet*)).tw,kf.
11	exp Sodium, Dietary/
12	(((salt* or sugar* or sodium) adj2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*).tw,kf.
13	beverages/ or alcoholic beverages/ or artificially sweetened beverages/ or carbonated beverages/ or coffee/ or drinking water/ or energy drinks/ or fermented beverages/ or "fruit and vegetable juices"/ or milk/ or cultured milk products/ or kefir/ or koumiss/ or whey/ or milk substitutes/ or soy milk/ or sugar-sweetened beverages/ or tea/
14	((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) adj2 (drink* or beverage*)).tw,kf.
15	(coffe* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?").tw,kf.
16	or/4-15
17	3 and 16
18	"treatment adherence and compliance"/ or Guideline Adherence/
19	exp "Patient Acceptance of Health Care"/
20	exp Nutrition Policy/
21	(treatment* or guid* or nutriti* or diet* or supplement* or recommend* or policy or policies or requir* or allow* or protocol*).ti.
22	(guid* or recommend* or policy* or policies* or protocol*).ab. /freq=2
23	or/18-22
24	17 and 23
25	(barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or non comply* or noncomplian* or non complian* or ignor* or inconvenien*).tw,kf.
26	(facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*).tw,kf.
27	Stress, Psychological/ or Financial Stress/
28	Adaptation, Psychological/
29	Emotions/

#	Searches
30	Anxiety/
31	Fear/
32	motivation/ or intention/
33	attitude to health/ or health knowledge, attitudes, practice/ or exp patient satisfaction/ or treatment refusal/
34	(prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*).tw,kf.
35	Consumer Behavior/
36	exp Communication/
37	education/ or teaching/
38	health education/ or exp consumer health information/ or exp health promotion/ or exp patient education as topic/
39	Health Behavior/
40	decision making/ or choice behavior/
41	(advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*).tw,kf.
42	exp Commerce/
43	capitalism/
44	(commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*).tw,kf.
45	exp Population Groups/
46	exp Culture/
47	(race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*).tw,kf.
48	"ethnic and racial minorities"/ or minority groups/ or Minority Health/ or exp social environment/ or exp socioeconomic factors/
49	exp "Health Disparate, Minority and Vulnerable Populations"/
50	"Social Determinants of Health"/
51	(communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*).tw,kf.
52	or/25-51
53	24 and 52
54	animals/ not humans/
55	exp Animals, Laboratory/
56	exp Animal Experimentation/
57	exp Models, Animal/
58	exp Rodentia/
59	(rat or rats or rodent* or mouse or mice).ti.
60	or/54-59
61	53 not 60
62	limit 61 to English language
63	ANTHROPOLOGY, CULTURAL/ or CLUSTER ANALYSIS/ or FOCUS GROUPS/ or GROUNDED THEORY/ or HEALTH CARE SURVEYS/ or interview.pt. or "INTERVIEWS AS TOPIC"/ or NARRATION/ or NURSING METHODOLOGY RESEARCH/ or OBSERVATION/ or "PERSONAL NARRATIVES AS TOPIC"/ or PERSONAL NARRATIVE/ or QUALITATIVE RESEARCH/ or "SURVEYS AND QUESTIONNAIRES"/ or SAMPLING STUDIES/ or TAPE RECORDING/ or VIDEODISC RECORDING/
64	(qualitative* or interview* or focus or questionnaire* or narrative* or narration* or survey* or experience* or themes).tw.
65	(ethno* or emic or etic or phenomenolog* or grounded theory or constant compar* or (thematic adj4 analys*) or theoretical sampl* or purposive sampl*).tw.
66	(hermeneutic* or heidegger* or husser* or colaizzi* or van kaam* or van manen* or giorgi* or glaser* or strauss* or ricoeur* or spiegelberg* or merleau*).tw.
67	(metasynthes* or meta-synthes* or metasummar* or meta-summar* or metastud* or meta-stud* or metathem* or meta-them*).tw.
68	(critical interpretive synthes* or (realist adj (review* or synthes*)) or (noblit and hare) or (meta adj (method or triangulation)) or (cerqual or conqual) or ((thematic or framework) adj synthes*)).tw.
69	or/63-68
70	62 and 69

#	Searches
71	exp United Kingdom/
72	(national health service* or nhs*).ti,ab,in.
73	(english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab.
74	(gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jw,in.
75	(bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts* or boston* or harvard*)) or ("worcester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in.
76	(bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in.
77	(aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in.
78	(armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in.
79	or/71-78
80	(exp africa/ or exp americas/ or exp antarctic regions/ or exp arctic regions/ or exp asia/ or exp australia/ or exp oceania/) not (exp United Kingdom/ or europe/)
81	79 not 80
82	70 and 81
83	limit 82 to ed=20120101-20231031
84	limit 82 to dt=20120101-20231031
85	83 or 84

Database: Embase

Date of last search: 04/10/2023

#	Searches
1	exp pregnancy/ or pregnant woman/ or prenatal care/ or prenatal period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).tw,kf.
3	1 or 2
4	diet/ or healthy diet/
5	exp feeding behavior/ or dietary pattern/
6	nutritional value/
7	nutritional requirement/
8	exp dietary intake/
9	maternal nutrition/
10	fruit/ or vegetable/
11	vegetable consumption/
12	((food* or feed* or diet* or nutrition* or nutritive or eating) adj4 (habit* or behavio* or attitude* or belief* or practice*)).tw,kf.
13	((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) adj4 (intake or consum* or requir* or value* or measur* or pattern* or track*)).tw,kf.

#	Searches
14	((health* or balance* or nutrition*) adj4 (food* or eat* or diet*)).tw,kf.
15	sodium intake/ or salt intake/
16	(((salt* or sugar* or sodium) adj2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*).tw,kf.
17	exp beverage/
18	((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) adj2 (drink* or beverage*)).tw,kf.
19	(coffe* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?").tw,kf.
20	or/4-19
21	3 and 20
22	patient attitude/ or exp patient compliance/ or patient engagement/ or patient participation/
23	protocol compliance/
24	nutrition policy/
25	(treatment* or guid* or nutriti* or diet* or supplement* or recommend* or policy or policies or requir* or allow* or protocol*).ti.
26	(guid* or recommend* or policy* or policies* or protocol*).ab. /freq=2
27	or/22-26
28	21 and 27
29	(barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or non comply* or noncomplian* or non complian* or ignor* or inconvenien*).tw,kf.
30	(facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*).tw,kf.
31	mental stress/
32	financial stress/
33	psychological adjustment/
34	emotion/
35	anxiety/
36	fear/
37	motivation/
38	behavior/
39	attitude to health/
40	patient preference/ or patient satisfaction/ or treatment refusal/
41	(prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*).tw,kf.
42	consumer attitude/
43	exp interpersonal communication/
44	education/
45	teaching/
46	health education/ or exp health literacy/ or exp health promotion/ or parenting education/ or patient education/
47	consumer health information/ or information dissemination/ or information gap/ or knowledge gap/ or exp information seeking/ or medical information/ or patient information/
48	health behavior/
49	decision making/ or patient decision making/
50	(advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*).tw,kf.
51	commercial phenomena/ or exp advertising/ or marketing/ or social marketing/
52	capitalism/

#	Searches
53	(commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*).tw,kf.
54	exp population group/
55	cultural anthropology/
56	(race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*).tw,kf.
57	minority health/
58	exp social environment/
59	exp socioeconomics/
60	exp vulnerable population/
61	"social determinants of health"/
62	(communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*).tw,kf.
63	or/29-62
64	28 and 63
65	animal/ not human/
66	nonhuman/
67	exp Animal Experiment/
68	exp Experimental Animal/
69	animal model/
70	exp Rodent/
71	(rat or rats or rodent* or mouse or mice).ti.
72	or/65-71
73	64 not 72
74	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
75	73 not 74
76	limit 75 to English language
77	CLUSTER ANALYSIS/ or CONTENT ANALYSIS/ or DISCOURSE ANALYSIS/ or ETHNOGRAPHY/ or GROUNDED THEORY/ or HEALTH CARE SURVEY/ or exp INTERVIEWS/ or NARRATIVE/ or NURSING METHODOLOGY RESEARCH/ or OBSERVATION/ or PERSONAL EXPERIENCE/ or PHENOMENOLOGY/ or QUALITATIVE RESEARCH/ or QUESTIONNAIRE/ or exp RECORDING/
78	(qualitative* or interview* or focus or questionnaire* or narrative* or narration* or survey* or experience* or themes).tw.
79	(ethno* or emic or etic or phenomenolog* or grounded theory or constant compar* or (thematic adj4 analys*) or theoretical sampl* or purposive sampl*).tw.
80	(hermeneutic* or heidegger* or husser* or colaizzi* or van kaam* or van manen* or giorgi* or glaser* or strauss* or ricoeur* or spiegelberg* or merleau*).tw.
81	(metasynthes* or meta-synthes* or metasummar* or meta-summar* or metastud* or meta-stud* or metathem* or meta-them*).tw.
82	(critical interpretive synthes* or (realist adj (review* or synthes*)) or (noblit and hare) or (meta adj (method or triangulation)) or (cerqual or conqual) or ((thematic or framework) adj synthes*)).tw.
83	or/77-82
84	76 and 83
85	exp United Kingdom/
86	(national health service* or nhs*).ti,ab,in,ad.
87	(english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab.
88	(gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jx,in,ad.
89	(bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or

#	Searches
	toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts* or boston* or harvard*)) or ("worcester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in,ad.
90	(bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in,ad.
91	(aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in,ad.
92	(armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in,ad.
93	or/85-92
94	(exp "arctic and antarctic"/ or exp oceanic regions/ or exp western hemisphere/ or exp africa/ or exp asia/) not (exp united kingdom/ or europe/)
95	93 not 94
96	84 and 95
97	limit 96 to dc=20120101-20231031

Database: Emcare

Date of last search: 04/10/2023

#	Searches
1	exp pregnancy/ or pregnant woman/ or prenatal care/ or prenatal period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).tw,kf.
3	1 or 2
4	diet/ or healthy diet/
5	exp feeding behavior/ or dietary pattern/
6	nutritional value/
7	nutritional requirement/
8	exp dietary intake/
9	maternal nutrition/
10	fruit/ or vegetable/
11	vegetable consumption/
12	((food* or feed* or diet* or nutrition* or nutritive or eating) adj4 (habit* or behavio* or attitude* or belief* or practice*)).tw,kf.
13	((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) adj4 (intake or consum* or requir* or value* or measur* or pattern* or track*)).tw,kf.
14	((health* or balance* or nutrition*) adj4 (food* or eat* or diet*)).tw,kf.
15	sodium intake/ or salt intake/
16	(((salt* or sugar* or sodium) adj2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*).tw,kf.
17	exp beverage/
18	((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) adj2 (drink* or beverage*)).tw,kf.
19	(coffe* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?").tw,kf.
20	or/4-19
21	3 and 20
22	patient attitude/ or exp patient compliance/ or patient engagement/ or patient participation/
23	protocol compliance/
24	nutrition policy/

#	Searches
25	(treatment* or guid* or nutriti* or diet* or supplement* or recommend* or policy or policies or requir* or allow* or protocol*).ti.
26	(guid* or recommend* or policy* or policies* or protocol*).ab. /freq=2
27	or/22-26
28	21 and 27
29	(barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or non comply* or noncomplian* or non complian* or ignor* or inconvenien*).tw,kf.
30	(facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*).tw,kf.
31	mental stress/
32	financial stress/
33	psychological adjustment/
34	emotion/
35	anxiety/
36	fear/
37	motivation/
38	behavior/
39	attitude to health/
40	patient preference/ or patient satisfaction/ or treatment refusal/
41	(prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*).tw,kf.
42	consumer attitude/
43	exp interpersonal communication/
44	education/
45	teaching/
46	health education/ or exp health literacy/ or exp health promotion/ or parenting education/ or patient education/
47	consumer health information/ or information dissemination/ or information gap/ or knowledge gap/ or exp information seeking/ or medical information/ or patient information/
48	health behavior/
49	decision making/ or patient decision making/
50	(advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*).tw,kf.
51	commercial phenomena/ or exp advertising/ or marketing/ or social marketing/
52	capitalism/
53	(commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*).tw,kf.
54	exp population group/
55	cultural anthropology/
56	(race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*).tw,kf.
57	minority health/
58	exp social environment/
59	exp socioeconomics/
60	exp vulnerable population/
61	"social determinants of health"/
62	(communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*).tw,kf.
63	or/29-62
64	28 and 63

#	Searches
65	animal/ not human/
66	nonhuman/
67	exp Animal Experiment/
68	exp Experimental Animal/
69	animal model/
70	exp Rodent/
71	(rat or rats or rodent* or mouse or mice).ti.
72	or/65-71
73	64 not 72
74	(conference abstract* or conference review or conference paper or conference proceeding).db,pt,su.
75	73 not 74
76	limit 75 to English language
77	CLUSTER ANALYSIS/ or CONTENT ANALYSIS/ or DISCOURSE ANALYSIS/ or ETHNOGRAPHY/ or GROUNDED THEORY/ or HEALTH CARE SURVEY/ or exp INTERVIEWS/ or NARRATIVE/ or NURSING METHODOLOGY RESEARCH/ or OBSERVATION/ or PERSONAL EXPERIENCE/ or PHENOMENOLOGY/ or QUALITATIVE RESEARCH/ or QUESTIONNAIRE/ or exp RECORDING/
78	(qualitative* or interview* or focus or questionnaire* or narrative* or narration* or survey* or experience* or themes).tw.
79	(ethno* or emic or etic or phenomenolog* or grounded theory or constant compar* or (thematic adj4 analys*) or theoretical sampl* or purposive sampl*).tw.
80	(hermeneutic* or heidegger* or husser* or colaizzi* or van kaam* or van manen* or giorgi* or glaser* or strauss* or ricoeur* or spiegelberg* or merleau*).tw.
81	(metasynthes* or meta-synthes* or metasummar* or meta-summar* or metastud* or meta-stud* or metathem* or meta-them*).tw.
82	(critical interpretive synthes* or (realist adj (review* or synthes*)) or (noblit and hare) or (meta adj (method or triangulation)) or (cerqual or conqual) or ((thematic or framework) adj synthes*)).tw.
83	or/77-82
84	76 and 83
85	exp United Kingdom/
86	(national health service* or nhs*).ti,ab,in,ad.
87	(english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab.
88	(gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jx,in,ad.
89	(bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts* or boston* or harvard*)) or ("worcester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in,ad.
90	(bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in,ad.
91	(aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in,ad.
92	(armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in,ad.
93	or/85-92

#	Searches
94	(exp "arctic and antarctic"/ or exp oceanic regions/ or exp western hemisphere/ or exp africa/ or exp asia/) not (exp united kingdom/ or europe/)
95	93 not 94
96	84 and 95
97	limit 96 to dc=20120101-20231031

Database: PsycINFO

Date of last search: 04/10/2023

#	Searches
1	exp Pregnancy/ or Prenatal Care/ or Perinatal Period/
2	(antenatal* or ante natal* or gestation* or maternal* or mother* or pregnan* or prenatal* or pre natal*).ti,ab,id.
3	1 or 2
4	diets/ or healthy eating/
5	exp eating behavior/
6	drinking behavior/
7	nutrition/
8	Ingestion/
9	food/
10	((food* or feed* or diet* or nutrition* or nutritive or eating) adj4 (habit* or behavio* or attitude* or belief* or practice*)).ti,ab,id.
11	((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) adj4 (intake or consum* or requir* or value* or measur* or pattern* or track*)).ti,ab,id.
12	((health* or balance* or nutrition*) adj4 (food* or eat* or diet*)).ti,ab,id.
13	sodium/
14	(((salt* or sugar* or sodium) adj2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*).ti,ab,id.
15	exp "beverages (nonalcoholic)"/
16	exp alcoholic beverages/
17	water intake/
18	((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) adj2 (drink* or beverage*)).ti,ab,id.
19	(coffe* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?").ti,ab,id.
20	or/4-19
21	3 and 20
22	exp Compliance/
23	health care policy/
24	client attitudes/
25	(treatment* or guid* or nutriti* or diet* or supplement* or recommend* or policy or policies or requir* or allow* or protocol*).ti.
26	(guid* or recommend* or policy* or policies* or protocol*).ab. /freq=2
27	or/22-26
28	21 and 27
29	(barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or non comply* or noncomplian* or non complian* or ignor* or inconvenien*).ti,ab,id.
30	(facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*).ti,ab,id.
31	psychological stress/

#	Searches
32	financial strain/
33	coping behavior/
34	Emotions/
35	Anxiety/
36	Fear/
37	Motivation/ or intention/
38	childrearing attitudes/ or health attitudes/ or exp parental attitudes/
39	health knowledge/ or health awareness/ or health behavior/
40	client satisfaction/
41	treatment barriers/ or exp health care utilization/ or treatment refusal/
42	(prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*).ti,ab,id.
43	Consumer Behavior/
44	exp communication/
45	Education/
46	Teaching/
47	health education/ or health literacy/ or health promotion/
48	health information/
49	client education/
50	decision making/ or choice behavior/
51	(advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*).ti,ab,id.
52	exp commerce/
53	capitalism/
54	(commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*).ti,ab,id.
55	exp "racial and ethnic groups"/
56	exp sociocultural factors/
57	psychosocial factors/
58	(race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*).ti,ab,id.
59	minority groups/
60	health disparities/ or cross cultural differences/
61	racial disparities/ or "racial and ethnic differences"/
62	exp social environments/
63	exp socioeconomic factors/
64	at risk populations/
65	(communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*).ti,ab,id.
66	or/29-65
67	28 and 66
68	animal.po.
69	(rat or rats or rodent* or mouse or mice).ti.
70	or/68-69
71	67 not 70
72	limit 71 to English language
73	"EXPERIENCES (EVENTS)"/ or CLUSTER ANALYSIS/ or FOCUS GROUP/ or CONTENT ANALYSIS/ or DISCOURSE ANALYSIS/ or ETHNOGRAPHY/ or GROUNDED THEORY/ or INTERVIEWERS/ or INTERVIEWING/ or INTERVIEWS/ or NARRATIVES/ or OBSERVATION METHODS/ or PHENOMENOLOGY/ or QUALITATIVE METHODS/ or QUESTIONNAIRES/ or QUESTIONING/ or exp SURVEYS/ or TAPE RECORDERS/
74	(qualitative* or interview* or focus or questionnaire* or narrative* or narration* or survey* or experience* or themes).tw.
75	(ethno* or emic or etic or phenomenolog* or grounded theory or constant compar* or (thematic adj4 analys*) or theoretical sampl* or purposive sampl*).tw.

#	Searches
76	(hermeneutic* or heidegger* or husser* or colaizzi* or van kaam* or van manen* or giorgi* or glaser* or strauss* or ricoeur* or spiegelberg* or merleau*).tw.
77	(metasynthes* or meta-synthes* or metasummar* or meta-summar* or metastud* or meta-stud* or metathem* or meta-them*).tw.
78	(critical interpretive synthes* or (realist adj (review* or synthes*)) or (noblit and hare) or (meta adj (method or triangulation)) or (cerqual or conqual) or ((thematic or framework) adj synthes*)).tw.
79	or/73-78
80	72 and 79
81	(national health service* or nhs*).ti,ab,in,cq.
82	(english not ((published or publication* or translat* or written or language* or speak* or literature or citation*) adj5 english)).ti,ab.
83	(gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jx,in,cq.
84	(bath or "bath's" or ((birmingham not alabama*) or ("birmingham's" not alabama*) or bradford or "bradford's" or brighton or "brighton's" or bristol or "bristol's" or carlisle* or "carlisle's" or (cambridge not (massachusetts* or boston* or harvard*)) or ("cambridge's" not (massachusetts* or boston* or harvard*)) or (canterbury not zealand*) or ("canterbury's" not zealand*) or chelmsford or "chelmsford's" or chester or "chester's" or chichester or "chichester's" or coventry or "coventry's" or derby or "derby's" or (durham not (carolina* or nc)) or ("durham's" not (carolina* or nc)) or ely or "ely's" or exeter or "exeter's" or gloucester or "gloucester's" or hereford or "hereford's" or hull or "hull's" or lancaster or "lancaster's" or leeds* or leicester or "leicester's" or (lincoln not nebraska*) or ("lincoln's" not nebraska*) or (liverpool not (new south wales* or nsw)) or ("liverpool's" not (new south wales* or nsw)) or ((london not (ontario* or ont or toronto*)) or ("london's" not (ontario* or ont or toronto*)) or manchester or "manchester's" or (newcastle not (new south wales* or nsw)) or ("newcastle's" not (new south wales* or nsw)) or norwich or "norwich's" or nottingham or "nottingham's" or oxford or "oxford's" or peterborough or "peterborough's" or plymouth or "plymouth's" or portsmouth or "portsmouth's" or preston or "preston's" or ripon or "ripon's" or salford or "salford's" or salisbury or "salisbury's" or sheffield or "sheffield's" or southampton or "southampton's" or st albans or stoke or "stoke's" or sunderland or "sunderland's" or truro or "truro's" or wakefield or "wakefield's" or wells or westminster or "westminster's" or winchester or "winchester's" or wolverhampton or "wolverhampton's" or (worcester not (massachusetts* or boston* or harvard*)) or ("worcester's" not (massachusetts* or boston* or harvard*)) or (york not ("new york*" or ny or ontario* or ont or toronto*)) or ("york's" not ("new york*" or ny or ontario* or ont or toronto*))))).ti,ab,in,cq.
85	(bangor or "bangor's" or cardiff or "cardiff's" or newport or "newport's" or st asaph or "st asaph's" or st davids or swansea or "swansea's").ti,ab,in,cq.
86	(aberdeen or "aberdeen's" or dundee or "dundee's" or edinburgh or "edinburgh's" or glasgow or "glasgow's" or inverness or (perth not australia*) or ("perth's" not australia*) or stirling or "stirling's").ti,ab,in,cq.
87	(armagh or "armagh's" or belfast or "belfast's" or lisburn or "lisburn's" or londonderry or "londonderry's" or derry or "derry's" or newry or "newry's").ti,ab,in,cq.
88	or/81-87
89	80 and 88
90	limit 89 to up=20120101-20231031

Database: CINAHL (Cumulated Index to Nursing and Allied Health Literature)

Date of last search: 04/10/2023

#	Searches
S66	S32 AND S64 Limiters - Published Date: 20120101-20231031; English Language; Exclude MEDLINE records; Human; Clinical Queries: Qualitative - High Sensitivity; Geographic Subset: UK & Ireland
S65	S32 AND S64
S64	S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63
S63	TI ((communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*)) OR AB ((communit* or environment* or social* or socioeconom* or econom* or demograph* or sociodemograph* or neighbo?rhood* or poverty or impoverish* or hardship* or privation* or income* or depriv* or financ*))
S62	(MH "Social Determinants of Health")
S61	(MH "Health Inequities") OR (MH "Health Status Disparities+")
S60	(MH "Socioeconomic Factors+")
S59	(MH "Social Environment+")
S58	(MH "Health Services for the Indigent") OR (MH "Health Services, Indigenous")

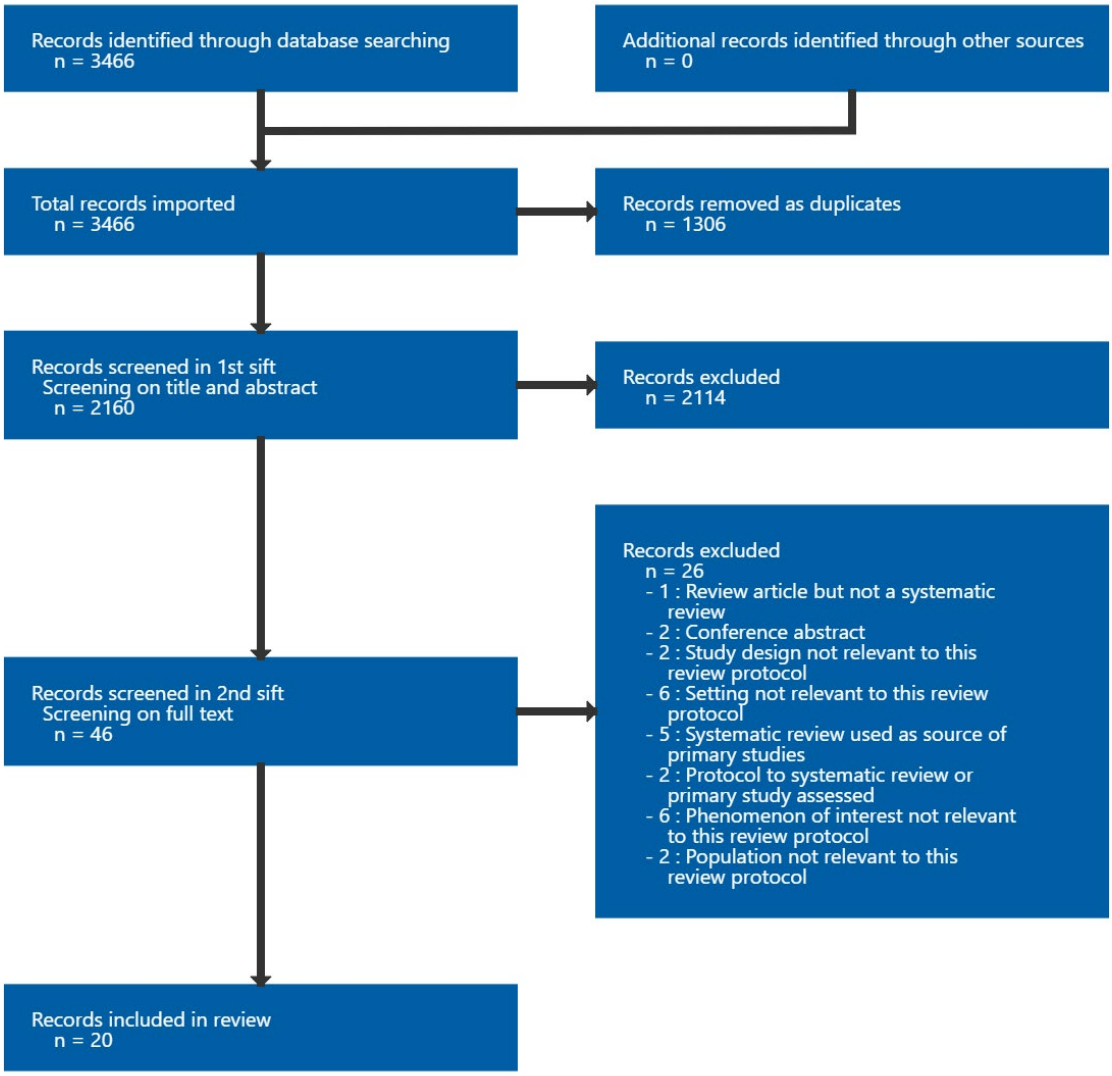
#	Searches
S57	(MH "Minority Groups")
S56	TI ((race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*)) OR AB ((race* or racial* or ethnic* or cultur* or religio* or custom* or ancest* or minorit* or multiracial* or multiethnic* or multicultural*))
S55	(MH "Culture+")
S54	TI ((commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*)) OR AB ((commerc* or capitalis* or market* or telemarket* or advertis* or corporate* or corporation* or consumer*))
S53	(MH "Economic Competition")
S52	(MH "Business") OR (MH "Electronic Commerce")
S51	TI ((advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*)) OR AB ((advis* or advice* or counsel* or educat* or communicat* or inform* or miscommunicat* or misinform* or learn* or lesson* or material* or resource* or teach* or tool* or train* or tutorial* or knowledg*))
S50	(MH "Decision Making") OR (MH "Decision Making, Patient")
S49	(MH "Health Behavior")
S48	(MH "Health Education") OR (MH "Patient Education") OR (MH "Parenting Education") OR (MH "Nutrition Education") OR (MH "Childbirth Education")
S47	(MH "Health Promotion+")
S46	(MH "Consumer Health Information+") OR (MH "Access to Information+") OR (MH "Information Literacy")
S45	(MH "Education") OR (MH "Teaching")
S44	(MH "Communication+")
S43	(MH "Consumer Attitudes")
S42	TI ((prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*)) OR AB ((prefer* or experience* or value* or perspective* or perception* or perceiv* or expectation* or choice* or choos* or willingness or attitud* or know* or belief* or believ* or opinion* or understand* or stress* or emotion* or anx* or fear* or concern* or uncertain* or unsure or thought* or feeling* or felt* or view* or aware* or priorit*))
S41	(MH "Motivation") OR (MH "Intention") OR (MH "Attitude to Health") OR (MH "Patient Attitudes") OR (MH "Patient Satisfaction+") OR (MH "Health Knowledge") OR (MH "Treatment Refusal")
S40	(MH "Fear")
S39	(MH "Anxiety")
S38	(MH "Emotions")
S37	(MH "Adaptation, Psychological")
S36	(MH "Financial Stress")
S35	(MH "Stress, Psychological")
S34	TI ((facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*)) OR AB ((facilitat* or uptak* or up-tak* or takeup* or tak*-up* or awar* or increas* or impact* or effect* or improv* or enhanc* or encourag* or support* or promot* or optimiz* or optimis* or adher* or access* or motivat* or accept* or satisf* or complian* or comply* or complie* or adopt* or implement* or availab* or provision or provid* or convenience or convenient or offer or incentiv* or start* or attend* or utiliz* or utilis* or sustain* or maintain* or deter* or identif* or adequa* or persuad* or persuasion or help* or enabl* or eligib* or decid* or decision* or afford* or deliver* or equalit* or behav* or influenc*))
S33	TI ((barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or "non comply*" or noncomplian* or "non complian*" or ignor* or inconvenien*)) OR AB ((barrier* or hinder* or block* or obstacle* or limit* or restrict* or restrain* or obstruct* or inhibit* or imped* or delay* or constrain* or hindrance* or refus* or decreas* or reduc* or discourag* or prevent* or disparit* or challeng* or impact* or inequalit* or deter* or inaccessib* or prohibit* or unaffordab* or unavailab* or dissatisf* or nonadher* or noncomply* or "non comply*" or noncomplian* or "non complian*" or ignor* or inconvenien*)
S32	S24 AND S31
S31	S25 OR S26 OR S27 OR S28 OR S29 OR S30
S30	AB (guid* or recommend* or policy* or policies* or protocol*)
S29	TI (treatment* or guid* or nutriti* or diet* or supplement* or recommend* or policy or policies or requir* or allow* or protocol*)

#	Searches
S28	(MH "Nutrition Policy+")
S27	(MH "Attitude to Medical Treatment")
S26	(MH "Guideline Adherence")
S25	(MH "Patient Compliance+")
S24	S5 AND S23
S23	S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22
S22	TI ((coffe* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?")) OR AB ((coffe?* or chicory or tea* or tisane* or water* or alcohol* or wine* or beer* or spirit* or milk or kefir or buttermilk or kombucha or juice* or "soda pop?"))
S21	TI (((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) N2 (drink* or beverage*))) OR AB (((soft or fizzy or sugar* or sweet* or energy or sports or ferment* or carbonate* or fruit or vegetable* or flavo?r* or caffein*or diet) N2 (drink* or beverage*)))
S20	(MH "Beverages+")
S19	TI ((((salt* or sugar* or sodium) N2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*)) OR AB ((((salt* or sugar* or sodium) N2 (intake or consum*)) or soda* or candy or candies or chocolate* or sweet* or confection*))
S18	(MH "Sodium, Dietary+")
S17	TI (((health* or balance* or nutrition*) N4 (food* or eat* or diet*))) OR AB (((health* or balance* or nutrition*) N4 (food* or eat* or diet*)))
S16	TI (((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) N4 (intake or consum* or requir* or value* or measur* or pattern* or track*))) OR AB (((food* or nutriti* or nutrient* or micronutrient* or micro-nutrient* or alimentary or diet* or energy or calor* or fruit? or vegetable?) N4 (intake or consum* or requir* or value* or measur* or pattern* or track*)))
S15	TI (((food* or feed* or diet* or nutrition* or nutritive or eating) N4 (habit* or behavio* or attitude* or belief* or practice*))) OR AB (((food* or feed* or diet* or nutrition* or nutritive or eating) N4 (habit* or behavio* or attitude* or belief* or practice*)))
S14	(MH "Vegetables")
S13	(MH "Fruit")
S12	(MH "Maternal Nutritional Physiology+")
S11	(MH "Energy Intake")
S10	(MH "Nutritional Requirements+")
S9	(MH "Nutritive Value")
S8	(MH "Drinking Behavior+")
S7	(MH "Eating Behavior+")
S6	(MH "Diet")
S5	S1 OR S2 OR S3 OR S4
S4	TI ((antenatal* or "ante natal*" or gestation* or maternal* or mother* or pregnan* or prenatal* or "pre natal*")) OR AB ((antenatal* or "ante natal*" or gestation* or maternal* or mother* or pregnan* or prenatal* or "pre natal*"))
S3	(MH "Prenatal Care")
S2	(MH "Expectant Mothers")
S1	(MH "Pregnancy+")

Appendix C Qualitative evidence study selection

Study selection for: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

Figure 3: Qualitative evidence study selection flow chart



Appendix D Evidence tables

Evidence tables for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

Table 5: Evidence tables

Abayomi, 2020

Bibliographic Reference	Abayomi, J C; Charnley, M S; Cassidy, L; Mccann, M T; Jones, J; Wright, M; Newson, L M; A patient and public involvement investigation into healthy eating and weight management advice during pregnancy.; International journal for quality in health care: journal of the International Society for Quality in Health Care; 2020; vol. 32 (no. 1); 28-34

Study Characteristics

Study type	General qualitative inquiry Focus groups
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews conducted at community venues in Liverpool and Ulster. **Aim** To understand experiences of pregnant or postpartum women on healthy eating and weight management advice during pregnancy through a patient and public involvement investigation.
Data collection and analysis	**Data collection**

	Focus groups with four sessions in Liverpool and Ulster or a one-on-one (n=1) session in Ulster. Sessions included 5-10 participants and all women in the Liverpool sessions were postnatal while in Ulster women were either postnatal or pregnant. Interviews lasted 1 hour and were face-to-face with handwritten field notes made by patient and public involvement lead representatives in Liverpool and by a PhD student in Ulster. A digital recorder was not used. Field notes detailed discussions chronologically and were coded during workshops. Participants were consulted during and at conclusion of workshops to ensure comments and understanding were captured appropriately. Additional field notes were made by the research team following each session which captured reflections, feelings and evaluations of discussions. **Data analysis** An inductive and data-driven thematic analytic approach was taken using Braun and Clarke's approach. Field notes were initially coded by public involvement lead representatives then validated by participants. Coding and theme formation was performed iteratively with salient themes identified and defined with supportive quotations sourced from field notes.
Recruitment strategy	Recruited from different community venues in Liverpool and Ulster. Women were approached by recruited patient and public involvement lead representatives (postnatal, previous service users).
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	• Women who were pregnant or up to 12 months postnatal
Exclusion criteria	Not reported
Sample size	N=32 women (mixed prenatal, postnatal)
Participant characteristics	**Mean age in years (SD)** Not reported **Parity during pregnancy (median, IQR)** Not reported **Pregnancy status [at interview] (n, %)** • Prenatal: 10 (31)

	• Postnatal: 22 (69) • **Stage of pregnancy [at interview] (n, %)** First trimester: 0 • Second trimester: 0 • Third trimester: 9 (90) • Unclear: 1 (10) **BMI class during pregnancy (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported **Education level (n, %)** Not reported **Income status** Not reported
Results	Author's themes relevant to the review question: 1. Healthy eating advice is important but currently lacks consistency and depth 2. Expectations regarding the type of knowledge/support

Healthy eating advice is important but currently lacks consistency and depth

Not all participants received advice on healthy eating during pregnancy and the level of information provided was described as 'minimal' which was only provided at the booking visit. Participants commonly reported advice provided around 'not eating for two' and food safety and what to avoid eating was primarily discussed rather than what should be consumed.

'They told me not to be eating a lot of eggs, and what to limit, like food safety, liver and soft cheeses that sort of thing'. (page 31)

Participants reported that supplement use was raised by some midwives, but no further information was provided.

'They asked did I take vitamins but didn't really give more knowledge about the foods to get them from'. (page 31)

There appeared to be a lack of continuity for healthy eating advice. Mode of information delivery for some women were through booklets or leaflets which provided general information, however, others did not receive this. There was a sense that midwives were not confident or didn't have enough knowledge to give targeted advice

'Some of them just weren't interested in nutrition at all. It wasn't helpful at all. Maybe it was lack of knowledge as well, they maybe didn't feel comfortable and were just skimming over it'. (page 31)

This was also the case for women that were following certain diets by choice or due to appetite change or nausea.

'I'd been watching documentaries and am aware that dairy isn't that great. I'm not a vegan, but I tried to limit it, but the midwife didn't really know what to advise me'. (page 31)

'If you are unwell for the first 12 weeks of your pregnancy and can't even eat ... you'd rather know from the midwife about what supplement, Pregnacare or whatever that you could take to make sure you were getting all the nutrients.' (page 31)

Expectations regarding the type of knowledge/support

All participants were of the opinion that is important to provide positive healthy eating advice and in a consistent manner to all women. Participants expressed that at the initial booking appointment all women should be asked about specific dietary requirements. Midwives were favoured as the professional to provide this advice but expert advice from dietitians should also be part of the process.

'And even just to bring in professionals to talk about what you're eating, like a dietitian, to chat and give you advice and tell you this is what to expect.' (page 31)

The participants acknowledged that time was limited, especially during booking in appointments. However, leaflets/books were frequently viewed to not be of use and too often used. Group based sessions, for example, Parent Education or Sure Start classes were viewed favourably

	'Groups are good because there is also a social aspect to it too, you can exchange experiences, what worked/what didn't work. Chatting to people face to face is always valuable.' (page 31) Barriers discussed to healthy eating intentions early during pregnancy were nausea and vomiting which let to restricted dietary intake. Additional barriers raised were emotional issues, weight related anxiety, limited time and challenges with childcare. Anticipated facilitators to healthy eating were practical advice such as cooking/recipe ideas, advice for managing pregnancy related sickness. *'Classes for nutrition maybe with cooking to show you what you can make when you are pregnant would be good.' (page 32)* Anticipated facilitators relating to modes of delivery were suggested by participants. YouTube videos and videos displayed in waiting rooms were discussed, although it was acknowledged that this would need to come from a reliable source. The most favoured mode of delivery was in digital form such as an app. An app was seen as favourable as it could provide prompts for healthy eating and drinking; up to date and reliable information (rather than searching online), information to reinforce or supplement advice received at the clinic and tailoring of advice.

IQR: interquartile range; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Lack of discussion about recruitment challenges. No discussion of data saturation, interview method was not described)*
Overall risk of bias and relevance	Relevance	Highly relevant

Atkinson, 2016

Bibliographic Reference	Atkinson, Lou; Shaw, Rachel L; French, David P; Is pregnancy a teachable moment for diet and physical activity behaviour change? An interpretative phenomenological analysis of the experiences of women during their first pregnancy.; British journal of health psychology; 2016; vol. 21 (no. 4); 842-858

Study Characteristics

Study type	Phenomenological Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Lead author's office or participant's home **Aim** To understand whether pregnancy experiences indicate that women would be open to changing behaviour during this time
Data collection and analysis	**Data collection** Face-to-face interviews in person (n=5) or via video chat (n=2). Interviews were up to 60 minutes and conducted by an experienced researcher with postgraduate degree in health psychology and audio-recorded. Semi-structured flexible interview with prompts and task to recall all sources of information and behavioural advice received during pregnancy. **Data analysis**

	Interviews were transcribed verbatim and an interpretative phenomenological analysis approach was undertaken. Transcripts were read in an iterative manner with line-by line phenomenological and interpretative coding of individual meaning units. Patterns of meaning via summaries of coding were created and common themes were identified through an iterative process. The lead author's previous knowledge and experience guided interpretation. Reflexive notes were taken throughout data collection and analysis.
Recruitment strategy	Posts on large local employer staff intranet pages in the Midlands of England and on social networks.
Study dates	Not reported
Sources of funding	Not reported
Inclusion criteria	Not reported
Exclusion criteria	Not reported
Sample size	N=7 (prenatal)
Participant characteristics	**Mean age in years (SD)** Not reported, range of 28-42 years **Parity during pregnancy, n (%)** Nulliparous: 7 (100) **Pregnancy status [at interview], n (%)** Prenatal: 7 (100) **Stage of pregnancy [at interview]** 24-33 gestational weeks **BMI class [at booking appointment] (n, %)** Healthy range: 3 (43)

	Overweight range: 4 (57) **Comorbidities (n, %)** Not reported, one participant had a high-risk pregnancy **Ethnicity (n, %)** White: 7 (100) **Education level (n, %)** Not reported **Income status** Not reported, all worked in a professional occupation
Results	Author's themes relevant to the review question: 1. Acceptance of the pregnancy 2. Influence of pre-conception experiences 3. Listening to your body versus following advice 4. Retaining self versus selflessness **Acceptance of the pregnancy** Women commonly initiated a 'pregnancy lifestyle' once discovering they were pregnant such as removing specific foods deemed as unsafe to consume during pregnancy whilst increasing consumption of nutritious foods. This was perceived to be appropriate or necessary and done automatically without question.

	'Yeah automatically. Just automatic, as soon as you've done that test I knew I wasn't going to drink so it wasn't even a question.' (Scarlett, page 847) One participant described having a 'mother instinct' and imminent need to protect the unborn child. All participants expected to make dietary changes once becoming pregnant. One participant described acceptable behaviours prior to pregnancy compared to unacceptable behaviours once pregnant. The participant described that after becoming pregnant one of their first behaviours was to search for information on which foods she 'wasn't allowed to eat'. The authors suggested that this participant used language reflecting that these lifestyle changes were non-negotiable and with some restrictions being imposed rather than a choice. This was interpreted by authors as a passivity towards a pregnancy lifestyle using intuition or copying perceived behaviours on how to behave in pregnancy. Women spoke about food decisions based on their knowledge about what was 'good for pregnancy' or what was felt to be right. This knowledge had mostly been acquired through observing other pregnancies. One participant mentioned that they didn't actively look for information to prepare for pregnancy but vicariously observed others experiences to learn the 'do's and don'ts'. *'Lizzie: And I knew before I got pregnant there were some things that I wouldn't be able to eat, and things like that, which I guess you...* *Interviewer: Where did you get that kind of information from?* *Lizzie: I don't know, from pregnant friends. I think through my job as well, 'cause I'm a youth worker and I support a young parents' group. I learnt quite a lot from spending time with them.' (page 847)* The authors suggested that the participant's description points to the necessity of changes in diet once pregnant such that no active decision-making was made.

Influence of pre-conception experiences

The approach to lifestyle choices during pregnancy appeared to differ based on pre-conception experiences. One participant that did not have issues with conception had little understanding or interest on advice on unsafe foods whereas another participant that had challenges with conception thoroughly researched recommendations for unsafe foods.

'Interviewer: But generally pregnant women say to me, 'Oh I know what I shouldn't eat'. There's like a list of stuff that you shouldn't eat when you're pregnant. Were you aware of that? Kat: Yeah, because when I first met the midwife she read out a list of stuff that you shouldn't eat; pâté, anything with raw egg in it, that sort of thing. But I mean I did used to like pâté but obviously I've just not had any. I eat eggs as long as they're well cooked[...] but yeah, so I haven't really sort of paid massive focus.' (page 848)

'There's lots of different information in terms of diet, what you can, can't eat. And I've got the basic information off the midwife, and after the midwife says, 'Oh, you're fine with most things as long as you avoid, you know, pâtés and the cheese'. But having gone on the NHS website, there's a whole extra list of other things. Then you look at... you Google it and you come up with the Australian website, which has three times as many things on there.' (Jo, page 848)

Listening to your body versus following advice

Decision-making towards diet tended to be described by participants in relation to 'listening to their body'. This was based on what was felt their body needed, for example, rest, energy, calcium from dairy foods. Based on this, women tended to choose diet options based on comfort or enjoyment even if contradictory to advice received. In contrast, those women who had previously undergone fertility treatment tended to make deliberate decisions towards their diet. These women consulted multiple sources for detailed information relating to diet which led to a negative cycle of information seeking and behaviour modification as new information led to new sources of concern which in turn led into more research and anxieties. Once decided, these women followed strict rules and 'tuned out' their body signals even when there was the strong desire to eat something. This stemmed from a desire to minimise risk and dominated decision making during pregnancy.

'Absolutely terrifying. Because you're on tenterhooks the whole time. Everything you do, you think is this going to hurt the baby, is this going to cause me to lose it? Every time I went to the loo I was checking for blood.' (June, page 849)

Retaining self versus selflessness

From participants' descriptions of behaviour and decision making during pregnancy, authors identified a struggle between protecting the unborn baby and continuity with lifestyle and identities while pregnant. Those with previous fertility issues tended to set aside their needs and used the term 'sacrifice' in relation to lifestyle where one participant described some foods and drinks as being 'pulled' from her. The authors state that there was a 'better safe than sorry' perspective founded in a sense of responsibility towards the foetus and influenced by knowledge of the challenges in becoming pregnant and sustaining this. These participants did not want their actions to be responsible for anything negative happening to the foetus.

'Peace of mind, you know. If I haven't had anything, there's no harm in anything at all. But if I've had, you know, one cup of coffee a day, is that too much? Has that caused a problem? Don't know.' (Jo, page 850)

'Yes, well again, it was really just things like, because when they give you the result you're obviously very, very early stages, and that's at the time when you know that the pregnancy's at its most vulnerable. And obviously having lost a couple in early pregnancy before, I was even more kind of paranoid about making sure that I didn't do anything that could possibly put it at risk.' (June, page 850)

Other participants did not want pregnancy to lead to drastic changes to their usual lifestyle and thus paid less attention to pregnancy-related diet based information.

	'And some people are really, really... I mean, I'm not... I'm not really strict on things that the midwife says, you know. I don't like prawns, but if I was to eat a prawn it wouldn't be the end of my world. Whereas, some people are just checking ingredients for everything' (Lizzie, page 850) *'There's a balance because I don't want to make it all about the baby because...and this is going to sound awful to people who are pregnant and their whole life is about the baby, I think people become very obsessed about baby, baby, baby.' (Kat, page 850)* One participant had a more balanced approach of prioritising the fetus and also somewhat fulfilling their desires. They recounted advice received to not eat rare steak which included asking a chef and restaurant manager. They came to the conclusion that having the steak cooked rare would be safe but did have it cooked a bit more than what would have during pre-pregnancy. The authors interpreted that this participant prioritised the baby's safety but as they were not making decisions out of anxiety or worry, were also able to also enjoy socialising, eating and drinking. Some women described a loss of their pre-pregnancy self. One participant for example discussed making many changes to their diet and used language such as 'had to change' which suggested that adjustments were difficult and not necessarily out of choice.

SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Beasant, 2023

Bibliographic Reference	Beasant, Lucy; Ingram, Jenny; Taylor, Caroline M; Fish Consumption during Pregnancy in Relation to National Guidance in England in a Mixed-Methods Study: The PEAR Study.; Nutrients; 2023; vol. 15 (no. 14)

Study Characteristics

Study type	General qualitative inquiry Semi-structured interview
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews carried out by Zoom video (n=12) or phone call (n=2) **Aim** To understand compliance towards NHS guidance on fish consumption during pregnancy and which information sources are used and trusted on fish consumption during pregnancy. Note: part of a larger study on diet exposure to toxic metals (The Pregnancy, the Environment And nutRition (PEAR) Study)
Data collection and analysis	**Data collection** Qualitative component of mixed-methods study. Interviews were conducted one-on-one by an experienced qualitative researcher using a semi-structured format with prompts. The interviews lasted a mean of 47 minutes (range 33-56 minutes)

	and were audio-recorded using an encrypted device. At the end of the interview, participants were emailed a website link to current advice and feedback. Participants received a monetary gift voucher for their time. **Data analysis** Transcripts were coded and analysed through NVivo 8 software. A thematic analysis was undertaken using Braun and Clarke's approach. The interview content and online questionnaire free text comments were integrated into the ongoing qualitative analysis. One researcher coded all interview and free text data and another researcher independently coded 25% of the interview data. Data were discussed and themes were formed in an iterative manner. Data collection and analysis were performed until data saturation was achieved.
Recruitment strategy	Recruitment to the study was achieved via paid for advertisements on a study Facebook page which linked to the study website. For the qualitative component, purposive sampling was performed from those that had filled out an initial questionnaire.
Study dates	May to December 2021
Sources of funding	Not industry funded
Inclusion criteria	• Recently postpartum women (12 months or less) • Women residing in England for 6 months of pregnancy or longer
Exclusion criteria	Not reported
Sample size	N=14 (all postpartum)
Participant characteristics	**Mean age in years (SD)** Not reported **Parity during pregnancy, n (%)** Not reported **Pregnancy status [at interview], n (%)**

	Not reported **Stage of pregnancy [at interview]** Not reported **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** White: 7 (100) **Education level (n, %)** Not reported **Income status** Not reported Authors reported that the participants taking part in the interview tended to live in east/Greater London/south east/south west England and were more likely to be multiparous and not be in paid employment compared to those who did not proceed from the previous questionnaire to the interview.
Results	Author's themes relevant to the review question: 1. Changes in Fish Consumption during Pregnancy

2. Salient Fish Messages: Avoid, Limit and Cook Thoroughly
3. Fish Guidance Is the Most Complicated
4. Reasons for Low Fish Consumption during Pregnancy

Changes in Fish Consumption during Pregnancy

The authors identified the following 5 subthemes:

Ate less fish

6/14 participants reported they ate less fish in their last pregnancy and was commonly due to the health of the baby and difficulty in remembering how many portions to eat per week. Participants commonly reported that it was easier to avoid eating fish than to remember how often to eat it which could be potentially risky. Some women greatly under consumed fish compared to NHS recommendations guidance at the time (April 2021).

'So I remember thinking well actually maybe those things [seafood] are best limited or avoided entirely just because it seemed easier than trying to keep track of how many portions of something I'd had in a week.' (supplementary page 6 #006, nulliparous)

'So I just made sure to only eat salmon once a week so that in case I wanted fish another time I could… It was because I knew that there were certain types of fish you weren't supposed to get a lot of and I just couldn't really be bothered to remember what they were.' (supplementary page 6, #015, multiparous)

'I think I worried more that I was having too much rather than you should still have your oily fish. So I think I would have cut down quite a bit on it …' (supplementary page 6, #014, multiparous)

One participant said they ate less fish due to lack of appetite for fish.

'it was thinking maybe in the back of my mind I know I had read about limiting seafood in pregnancy, but also it was mainly just that I didn't fancy it. (supplementary page 7, #006 nulliparous)

Ate the same amount of fish

Four participants ate the same amount of fish. They discussed that they had a greater awareness of fish consumption, do not eat much fish and they did not previously eat the type of fish that should be avoided. One participant ate more fish than recommended by the NHS guidance, however, due to their pre-pregnancy high consumption of fish per week, this was not an increase in fish consumption. This participant discussed that they had some knowledge to consume more than two portions of oily fish per week

'… just being more conscious of how and what [fish] I am eating.' (supplementary page 7, #011, multiparous)

'because of the levels of whatever is in it" (main text, page 8 #009)

'I think with knowing that it was a healthy option with fish oils, but also knowing that I was ignoring the fact that I shouldn't be eating more than two portions of oily fish a week…' (supplementary page 7, #001, nulliparous)

'the main things to avoid were probably things I wouldn't really have eaten much of anyway…[for example, tuna]' (supplementary page 7, #010 nulliparous)

Ate more fish

	Three participants ate more fish due to gestational diabetes, being the food item that didn't make them feel unwell and as it was perceived to be a healthy item to eat. *'I didn't reduce my intake of tuna because I don't eat it very often, but because it was one of the few things that didn't make me feel sick… I was probably eating more of it [tuna] than I was before…I was aware that I couldn't eat very much of it.' (supplementary page 7, #002, nulliparous)* *"I think mine went up once I had been diagnosed with gestational diabetes" (main text page 8, #004)* *'we might have had salmon one day and a white fish another day, and a bit more fish than we were eating [prior to pregnancy]. it's quite a healthy thing to eat.' (supplementary page 8, #012, multiparous)* Don't eat fish One participant did not eat fish as they were vegetarian. *'I am a vegetarian so the meat and the fish thing is quite simple for me, I don't eat it anyway… I am quite anti-fish now because of the save the ocean.' (supplementary page 8, #007, nulliparous)* Fish eaten and enjoyed during pregnancy Types of fish that participants ate and enjoyed during pregnancy were discussed. The two most common fish consumed by participants were salmon and tuna, with an awareness that both fish types should be reduced during pregnancy. Other

	popular fish were cooked shellfish like prawns while others discussed eating white fish, fish and chips, mackerel, sardines and sushi/poke while pregnant. *'…I would eat white fish, I would eat cod definitely, I had quite a lot of cod. I had tuna about once a week. I ate smoked salmon a lot.' (supplementary page 8, #005, multiparous, ate fish less often during pregnancy)* *'I guess we're looking at fish being a health thing, but obviously I think this being England a lot of people's fish your first stop would be fish and chips, but I suppose that's not necessarily a health food, I don't know. I probably had fish and chips a few times through the pregnancy, but not excessively so.' (supplementary page 8, #008 nulliparous, ate fish less often during pregnancy)* *'I ate sushi, obviously we're limited in that it's expensive. A couple of times I got [supermarket] sushi which even I would admit was not the wisest choice in terms of how well prepared that sushi is. So again I limited it. I ate poke for a while…' (supplementary page 8, #015, multiparous, ate fish less often during pregnancy)* *'we'd have sardines, quite a lot of tinned sardines, quite a lot until I was nauseas, we had tinned tuna and salmon, quite a lot of smoked mackerel, like the fresh smoked mackerel, and then white fish, sea bass, fish cakes, haddock, just any fish really that was going.' (supplementary page 8-9, #001 nulliparous, ate same amount of fish during pregnancy)* **Salient Fish Messages: Avoid, Limit and Cook Thoroughly** The authors identified the following 6 subthemes: Eat in moderation

NHS guidance that was frequently discussed by participants and most commonly remembered were types of fish to avoid, limit or cook thoroughly during pregnancy. Women tended to view consumption of fish to be eaten in moderation during pregnancy.

'So I knew that the tinned tuna and salmon I could eat but in moderation.' (supplementary page 9, #009, nulliparous, ate same amount of fish during pregnancy)

'we have prawns quite often but cut that down.' (supplementary page 9, #011 multiparous, ate same amount of fish during pregnancy)

Avoid shark, marlin and swordfish

Almost all women remembered that shark, marlin and swordfish should be avoided and three women mentioned obvious messages on the outside of folders received by midwives on foods to avoid. These three fish were also seen as unusual fish not usually available or eaten in the UK.

'I had a plastic wallet to put our notes in, and on the front of the wallet it had a list of what to avoid, but we [midwife] never had that discussion, we never spoke about it. It was just a list of what to avoid eating.' (supplementary page 9, #005 - multiparous - Ate fish less often during pregnancy)

'… on the outside of the plastic folder it said to avoid shark and marlin, and raw eggs, and seafood ... I don't even know where you buy shark from, but I suppose if you were on holiday somewhere just to be aware that this could be in some restaurant food …' (supplementary page 9, #002, nulliparous, ate fish more often during)

'pregnancy I remember swordfish, I don't know why, and shark, just because it seems unusual in a British diet.' (supplementary page 9, #006, nulliparous, ate fish less often during pregnancy)

	Limit tuna Limit salmon Limit oily fish Participants had knowledge that oily fish (particularly salmon) and tuna should be cut back during pregnancy. Reasons provided for tuna (but also 'certain types of fish') tended to be due to mercury intake. Reasons to limit consumption of salmon and/ or oily fish were not discussed. *'I don't like tuna steaks, but I like tuna in a can. But I remember reading about it, and that you have got to limit some of them…' (supplementary page 10, #009, nulliparous, ate same amount of fish during pregnancy)* *'I remember reading about the metallic elements in seafood, and things like mercury build-up and that actually that's why you should limit things like tuna steaks and other types of fish.' (supplementary page 10,* #006, *nulliparous, ate fish less often during pregnancy)* *'I know that salmon is good but in small doses isn't it?' (supplementary page 11, #003, multiparous, 30yrs, ate fish less often during pregnancy)* *'I remember there was something about oily fish, and that was the only thing that I ate more of that I remember being told not to eat more than two portions or something, and that's the only thing I can remember.' (supplementary page 11, #001*, *nulliparous, ate same amount of fish during pregnancy)*

	'I did think I wonder whether I should try and stomach some oily fish, just because as I say I know omega 3 and 6 is good for brain development.' (supplementary page 11, #006, nulliparous, ate fish less often during pregnancy) Avoid raw, rare fish/shellfish There was an awareness amongst participants to thoroughly cook raw fish and shellfish with some completely avoiding shellfish based on food poisoning concerns. *'..I definitely remember avoiding sushi. (supplementary page 12, #001, nulliparous, ate same amount of fish during pregnancy)* *'In terms of fish I could eat a salmon fillet generally but it had to be cooked thoroughly the whole way through, it would have had to have been anyway because I was pregnant.' (supplementary page 12, #004, nulliparous, ate fish more often during pregnancy)* *'people would say to me you can't eat prawns or something, and I felt by being on the NHS website I could say no it quite clearly says on the NHS website you can have it…the raw shellfish I would have avoided…I like eating sushi but I would also make sure it wasn't raw…' (supplementary page 12, #014, multiparous, ate fish less often during pregnancy)* Many women that had eaten fish at pre-pregnancy ate less than the recommended by NHS guidance and for more fish types than necessary. It was less common for women to point out health benefits of eating oily fish during pregnancy and for those who did, the source of information was unclear **Fish Guidance Is the Most Complicated** The authors identified the following 4 subthemes:

How many portions a week?

Participants remembered that oily and tuna fish should be reduced but had trouble remembering the number of portions that could be safely eaten every week. NHS guidance on fish consumption was mentioned to be the 'most complicated'. All women greatly underestimated how much tuna could be consumed and tended to eat only 1-2 cans each week. One participant that had been advised by a midwife mentioned that they wouldn't have more than two tins of tuna per week. Not many participants remembered the recommendation on the NHS website at the time of being able to have up to four cans per week and were surprised to hear that they could have been eating more once looking at the guidance at the end of the interview.

There was greater consistency with remembering how many portions of oily fish that was safe to eat (no more than two portions a week). However, some participants still lowered the amount to one portion each week. The portion guidance for oily fish was sometimes viewed by participants as a rule for all fish types and other women were uncertain about portion size or thought that the portion information on a can or packet of fish might have been in relation to nutrition rather than pregnancy safety.

'It does feel quite complicated. I think the fish one is the most complicated out of all of the ones that I have read because some of these fish are okay, some of them aren't, some of them you have never heard of so why would you be thinking of them?' (supplementary page 12, #012, multiparous, ate fish more often during pregnancy)

'I love tuna … I eat quite a lot of tuna, so I remember reading that. I think it was two cans a week or something like that' (supplementary page 12, #005, multiparous, ate fish less often during pregnancy)

'you should eat no more than two tuna steaks or four medium sized cans of tuna. It's funny that did stick in my brain because I don't actually eat tuna at all.' (supplementary page 13, #006, nulliparous, ate fish less often during pregnancy)

	'Oh wow, [four cans of tuna] a week, yeah, see I would have thought it was just one #014, multiparous, ate fish less often during pregnancy.' (supplementary page 13, #014, multiparous, ate fish less often during pregnancy) *'I am sure I remember they [midwife] said something about two portions [of fish] a week seemed an acceptable level that was okay.' (supplementary page 13, #006, nulliparous, ate fish less often during pregnancy)* *'I basically just I would always look it up and I would always forget, and would just be like you just shouldn't eat fish more than twice a week…' (supplementary page 13, #015, multiparous, ate fish less often during pregnancy)* *'I suppose two portions is quite subjective anyway, I think that's probably why I didn't stick to it. If it had given me grams or… but two portions I thought well that's really variable anyway. I think I would have followed it more if it had been really evidence based as to exactly how much I could and couldn't eat, but I think because it was just two portions I thought oh well…' (supplementary page 14, #001, nulliparous, ate same amount of fish during pregnancy)* *'And also what's a portion... if you bought a packet of smoked mackerel does it say on the packet this counts as two portions? Because you have got portions nutritionally and then portions in terms of what they are allowing you to eat for the safety thing, and I am assuming that's the same things, but not necessarily…' (supplementary page 14, #008, nulliparous, ate fish less often during pregnancy)* Can I eat smoked salmon? Amongst participants that mentioned smoked salmon there tended to be confusion as to whether this was able to be consumed during pregnancy. This stemmed from uncertainty as to whether it was categorised as a raw fish or otherwise based on guidance from a prior pregnancy. The way that the NHS guidance was laid out confused one participant as they

	recalled that it was written that smoked salmon can be eaten under one section but under another heading there was information on limiting salmon intake per week. *'I think there was some points were confusing like smoked salmon you can eat, but salmon I think is one of those that you should only have a couple of times a week, so it's like okay well do I have to limit smoked salmon intake too? (supplementary page 14-15, #004, nulliparous, ate fish more often during pregnancy)* *'in my first pregnancy it was told you shouldn't eat smoked salmon, and I was always really confused on smoked salmon whether I should eat it or whether I shouldn't eat it, and then when I researched it again when I was pregnant with [child] it said it was fine, and you're okay to eat it in moderation.' (supplementary page 15, #014 multiparous, ate fish less often during pregnancy)* If frozen certain fish is okay, has it been frozen? Some women had knowledge that some fish could be consumed safely if initially frozen. However, these fish were still avoided and especially if were not preparing it themselves as they couldn't guarantee that for example sushi had been frozen. *'the one thing I had a little bit of confusion over was freezing… if the fish had been frozen before being used to make sushi for example, because you then have it… which I think the answers were probably yes that I could have it, but again always almost a bit of caution, I think I tended to avoid it.' (supplementary page 15, #008, nulliparous, ate fish less often during pregnancy)* Can I eat shellfish?

	It was common for participants to eat less fish than necessary and some limited or completely avoided fish that they would be able to likely eat safely without restriction (for example, cooked shellfish like prawns) or if adhering to guidance, (for example, raw or lightly cooked fish in sushi, if the fish has been frozen first). *'I probably wouldn't have given prawns or anything a go, but I am pretty sure you're not supposed to eat prawns anyway.' (supplementary page 16, #002, nulliparous, ate fish more often during pregnancy)* **Reasons for Low Fish Consumption during Pregnancy** The authors identified the following 11 subthemes: Weighing up risk and benefit: Err on the side of caution Participants tended to talk about limiting or avoiding fish based on harms or benefits of eating fish in pregnancy. Once reading guidelines on which fish to decrease or avoid, participants that had consumed less fish had the view that it was safer to avoid oily fish or not eat oily fish that worried them, for example, smoked mackerel or shellfish. *'I used to eat a fair bit of smoked mackerel, which is oily fish isn't it? But I haven't had that, I think I just cut that out actually really in pregnancy, just rather be safe than sorry. I would have had some salmon.' (supplementary page 16, #008 nulliparous, ate fish less often during pregnancy)* One participant that lived near the sea was consuming shellfish weekly before pregnancy but completely removed it from their diet during pregnancy to avoid any risks. Most commonly food poisoning concerns were raised and there was a want for clear guidance on this and related risks. Those who ate similar levels of fish to pre-pregnancy were also cautious while others substituted smoked for cooked salmon or ensured thorough cooking or purchasing from trustworthy suppliers.

	'I would want to know well what are my odds, what is food poisoning going to do? Is it a situation where every time I eat an oyster there's a 50/50 chance of a miscarriage? Or is it a situation where it's just like well you might get food poisoning and that will be really it, and the odds are one in 100? That was always the thing I wanted to know.' (supplementary page 16, #015, multiparous, ate fish less often during pregnancy) *'I feel like saying fish is quite important to eat but you need to be careful which fish that you're eating, and I guess but it is saying that shellfish is actually fine usually as long as you cook it properly. My gut feeling about that has always been that I don't trust that it [shellfish] will be cooked properly.' (supplementary page 16-17, #012, multiparous, ate fish more often during pregnancy)* *'Prawns and things it's just about reliable sources. So I wouldn't buy a prawn sandwich out of a vending machine kind of thing, making sure that it was as fresh as possible.' (supplementary page 17, #011, multiparous, ate same amount of fish during pregnancy)* The majority of women had done their own research online before their booking appointment on what foods to limit or avoid. There were no positive messages mentioned about nutritional benefits of fish consumption from NHS resources. *'If somebody could have said to me this fish would be particularly good for you why don't you just try it? I would have given it a go… But if there was another type of not too fishy fish then yeah I would have tried it. There was no positive diet information, there was a couple of don't eat, but there was no you really should be eating this' (supplementary page 17, #002, nulliparous, ate fish more often during pregnancy)*

	'[One of the messages is try to eat at least two portions of fish a week] No one had that conversation with me, and even looking on here under their fish section it doesn't say that you should eat two a week' (supplementary page 17, #009, nulliparous, ate same amount of fish during pregnancy) *'It made me feel [NHS website] like I would rather just stay away from it [fish/seafood] mostly, which is funny because I know actually the benefits of eating oily fish for brain development and things like that, but I think my pregnant brain was like no these things are best avoided..' (supplementary page 17, #006, nulliparous, ate fish less often during pregnancy)* Lack of tailored information about fish Participants mentioned that there tended to be a brief conversation with their midwife on what foods to avoid or reduce at booking appointment. However, no participant received any tailored nutritional advice from midwives and there was no discussion about the benefits of fish consumption. *'I didn't see anything when you were looking on there for what not to eat, I don't remember seeing more on the emphasis of what to eat. I know that overall oily fish is very healthy and important, especially for is it brain development? I can't remember where specifically I have heard that though.' (supplementary page 18, #008, nulliparous, ate fish less often during pregnancy)* *'I don't really recall having in-depth discussions on diet too much. I think she might have run over the basic things, which are pretty much on that folder anyway, don't eat too much seafood like marlin or tuna or whatever.' (supplementary page 18, #007, nulliparous, vegetarian with no fish)* Fish preparation

	There was a lack of confidence amongst some participants towards preparing or cooking seafood at home and tended to order this in restaurants. Otherwise, the effort of preparing fish at home was a barrier to consumption. *'fish is probably something I quite like to order when I go out for a nice meal, because I think chefs are probably better at cooking it than I am at home, or can do more interesting things with it, and because of lockdown, so environmental factors I wasn't going out to eat.' (supplementary page 19, #010, nulliparous, ate same amount of fish during pregnancy)* *'My preference is to eat fish that's already filleted, and I'm not a whole fish eating person, I don't like bones in my fish, so we mostly stay away from that anyway.' (supplementary page 19, #012, multiparous, ate fish more often during pregnancy)* Nausea and food aversions Participants commonly mentioned aversions to some food or food types, nausea, sickness and for one participant hyperemesis. Some discussed changes in smell or taste or lack of palatability for certain fish types. *'often I would eat sardines and pitta bread [prior to pregnancy], but I think I was just feeling nauseas at the time, and I couldn't eat sardines and pitta bread for a very long time, and I've only really just got back into it.' (supplementary page 19, #001, nulliparous, ate same amount of fish during pregnancy)* Partners influence Some participants discussed the benefit of having a partner that liked to cook and eat fish which led to increased likelihood of them eating fish. Otherwise they were less likely to prepare if cooking for oneself.

	'he [partner] likes seafood a lot, so he will tend to try to cook it every opportunity. We eat a lot of prawns and squid, and we don't buy a lot of shellfish but actually … so he does like that kind of thing, and he probably liked it more than me, but he cooks it and we both eat it.' (supplementary page 19, #008, nulliparous, ate fish less often during pregnancy) *'I was just trying to cut down on meat and fish in general for better lifestyle choices, better for the environment… fish was an easy one because I would only be cooking it for myself anyway, so that was the easy one to cut out...' (supplementary page 20, #003, multiparous, ate fish less often during pregnancy)* Didn't eat much fish prior to pregnancy Some women mentioned their limited consumption of fish prior to pregnancy. *'I don't really like fish. I manage the odd fish and chips if there's enough stuff that you can't really taste the fish, and tuna. (supplementary page 20,#002, nulliparous, ate fish more often during pregnancy)* Supplements can substitute fish One woman described being able to gain the benefits of eating fish from a supplement instead. *'I just think whatever is in It [fish] at the end of the day I could get it as a supplement.' (supplementary page 20, #009, nulliparous, ate same amount of fish during pregnancy)*

	Fish can be difficult to source The barrier to food subscription services was that there was not a lot of fish provided. The participants were pregnant during the COVID-19 pandemic, many during lockdowns, and one participant mentioned not wanting to go to populated places such as a market to purchase fish. *'My husband and I have done food subscription boxes for a few years now… but there's never an awful lot of fish in those, or they tend to be at a premium price, so they probably tend to be either we go for vegetarian things or things with meat in rather than necessarily a lot of fish in them.' (supplementary page 21, #010, nulliparous, ate same amount of fish during pregnancy)* *'We don't have a fishmonger. We do have a Saturday food market… and particularly with COVID the market did stay open but it wasn't somewhere we felt like… and it wasn't somewhere I wanted to go because I was pregnant so I didn't want to be around lots of people anyway really at that early stage.' (supplementary page 20, #012, multiparous, ate fish more often during pregnancy)* Expense Another barrier to food subscription services was that boxes with fish were more expensive, although cost of fish was only discussed by a few and not the main barrier to decisions on consumption. Participants were willing to buy fish that they liked from a trusted distributor (for example, fish market) for a greater price. One participant mentioned cost-saving options of frozen or cans of fish, however, this might be seen as old fashioned.

	'My husband and I have done food subscription boxes for a few years now… but there's never an awful lot of fish in those, or they tend to be at a premium price, so they probably tend to be either we go for vegetarian things or things with meat in rather than necessarily a lot of fish in them.' (supplementary page 21, #010, nulliparous, ate same amount of fish during pregnancy) *'we would go and buy king prawns from the fish stall on the market, getting them like that, it was a little bit more expensive than the supermarket but we knew that they were really fresh.' (supplementary page 21, #011, multiparous, ate same amount of fish during pregnancy)* *'I think people don't think about things like tinned mackerel, because it's a bit old fashioned isn't it? …I think if it [NHS guidance] makes suggestions, where it says oily fish giving ideas of a cheaper option and saying a cheaper alternative such as tinned mackerel or whatever is a good alternative.' (supplementary page 21, #011, multiparous, ate same amount of fish during pregnancy)* Sustainability and environmental reasons Some participants mentioned that their reduced fish consumption was due to sustainability and environmental issues. Certain influences towards decisions on whether to eat fish was discussed. Certain initiatives to limit fish and meat intake such as 'Fish free February' or watching the 2021 documentary Seaspiracy influenced behaviours towards what was viewed to be 'better lifestyle choices'. *'[neighbour] he's got an initiative called Fish Free February, and you encourage people to cut back on the amount of fish that eat to look at the provenance of the fish #008 1st time mum - Ate fish less often during pregnancy I am quite anti-fish now because of the save the ocean… sustainability… and the horrors of fishing... [partner] recently converted away from fish following Seaspiracy…' (supplementary page 21, #007, nulliparous, vegetarian with no fish)*

	Past pregnancies influence current advice seeking behaviour Some participants that had previous pregnancies mentioned using their previous recollections of knowledge around fish consumption to inform behaviours or decisions in their recent pregnancy. *'I think this [NHS guidance] is something that you could go through right at the very start, and just not take for granted if someone has had a pregnancy that they know it. I think that's the biggest thing that's fallen short in what I know, is that I probably have been told much of this almost five years ago, and I really don't remember it now.' (supplementary page 21, #003, multiparous, ate fish less often during pregnancy)* *'I thought it was literally one tin of tuna a week. I think it's from my first pregnancy that I thought it was just one, and then I just didn't look it up again… because I didn't know that thing about tuna, and I probably would have eaten more tuna in my pregnancy then, because a good source of protein' (supplementary page 21, #014, multiparous, ate fish less often during pregnancy)*

BMI: body mass index; NHS: national health service; NR: not reported; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use. Unclear if the researcher participant relationship has been considered.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Bouga, 2018

Bibliographic Reference	Bouga, Maria; Lean, Michael E J; Combet, Emilie; Iodine and Pregnancy-A Qualitative Study Focusing on Dietary Guidance and Information.; Nutrients; 2018; vol. 10 (no. 4)

Study Characteristics

Study type	General qualitative inquiry Interviews
Country/ies where study was carried out	United Kingdom (England, Wales, Northern Ireland, Scotland)
Setting	**Setting** Face-to-face interview setting not reported or phone call. **Aim** To explore iodine dietary advice during pregnancy by understanding women's perceptions on guidance quality, barriers to dairy and seafood intake and optimal guidance delivery methods.
Data collection and analysis	**Data collection** Qualitative component of mixed-methods study. Face-to-face interviews in person (n=8) or phone call (n=40) by a researcher running for an average time of 10.46 minutes (range 6.33-18.06 minutes). Interviews were audio recorded. During the interview, participants were provided photographs of various foods and were asked to identify which were sources of iodine. They were also given pictures of iodine-rich food portions and asked to identify the amount needed for adequate iodine during pregnancy. Interviews were pre-tested with other participants not partaking in the study. Interviews were structured around a topic guide following the Health Belief Model. Validity and reliability were reported for topic guide design, interview procedure and analysis according to Yardley's principles for qualitative research assessment. Interviews

	ended upon saturation of themes. Study recruitment ended after dual review of transcripts and agreement of data saturation. **Data analysis** Interviews were transcribed verbatim and analysed through NVivo 11 software. A thematic analysis was undertaken with familiarisation of transcripts and data, initial coding and identifying and reviewing themes.
Recruitment strategy	Recruitment for the study took place in a community setting through snowball sampling. Avenues of recruitment were by social media, fora, online advertisement and word of mouth.
Study dates	May to December 2015
Sources of funding	Not industry funded
Inclusion criteria	• Resided in the UK • Childbearing age • With a baby <2 years old, pregnant or about to start a family • English proficiency at conversation level
Exclusion criteria	None reported
Sample size	N=48 (n=18 prenatal, n=25 breastfeeding/with baby, n=5 planning a pregnancy)
Participant characteristics	**Mean age in years (SD)** 30.8 (4.3) **Parity during pregnancy (n, %)** Nulliparous: 15 (31) Multiparous: 33 (69) **Pregnancy status [at interview] (n, %)**

	Prenatal: 18 (38) Breastfeeding/with baby: 25 (52) Planning a pregnancy: 5 (10) **Stage of pregnancy [at interview] (n, %)** Not reported **Mean (SD) BMI [pre-pregnancy] (kg/m^2)** NR, median (IQR): 24 (21-29) (self-reported) **BMI class [at recruitment] (n, %)** Not obese: 40 (83) Obese: 8 (17) **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** • White Scottish: 16 (33) • Other White British: 26 (54) • Other ethnic groups: 6 (13) **Education level (n, %)** • School level: 3 (6) • College level: 6 (13) • Undergraduate degree: 24 (50)

	• Postgraduate degree: 14 (29) **Income status** Not reported **Residence (n, %)** • Scotland: 27 (56) • England, Wales, Northern Ireland: 21 (44)
Results	Authors themes relevant to the review question: 1. Dietary information received and related perceptions 2. Iodine sources - opportunities and barriers 3. Receiving dietary information **Dietary information received and related perceptions** The authors identified the following 3 subthemes: Sources and Form of Received Dietary Information Depending on the region of the UK and the participant, different types of informational support about pregnancy nutrition was received. Many were given written information such as leaflets/booklets from community midwives and primarily at the first antenatal booking appointment. A quarter of participants mentioned that no one had talked to them about nutrition in pregnancy.

	"It was really only some leaflets that I was given by the midwife. I don't think she actually talked to me through or anything, it was just literature she handed over." (page 7, IT39) Participants residing in Scotland discussed information from "Ready Steady Baby" in the form of a book, website of phone application. Those from other areas did not report any guidance like this. Verbal information provision was rarely mentioned by participants. *"My midwife on my first appointment asked whether I was aware (about dietary guidelines for pregnancy), I said I was generally aware but then she gave me general points." (page 7, IT14)* Brief communication with midwives about nutrition was not common and tended to be solicited upon participant request. Verbal information tended to be a short summary of the written information. *"It was I who brought it up with my midwife on one of the first visits. I had a couple of questions about how cheese and various things like that and it was me that actually brought it up with her. She didn't bring it up with me and really she answered a couple of questions but then told me to refer to this folder I've been given." (page 7, IT05)* Other than community midwives, general practitioners were raised as a source of verbal advice in addition to friends and family. Participants who wanted to learn more about nutrition in pregnancy tended to do their own research online or by reading books. Nutrition Information Content The authors describe three main themes discussed under nutrition information during pregnancy: healthy balanced diet, avoiding specific food items and supplements. Most participants were not able to recall any specific nutrition information and in instances where this was recalled, it tended to be related to what not to eat such as uncooked and unpasteurised items, alcohol and caffeine or supplement intake.

	Approximately half of participants reported that nutrition guidance was focused on what to avoid in pregnancy such as alcohol, raw fish and meat, vitamin A and some cheeses rather than on what foods to consume. *“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.” (page 8, IT21)* Of those who recalled being provided with information about what to eat in pregnancy, messaging around food avoidance strongly resonated. Participants who were multiparous reported having received less information about nutrition in further pregnancies compared to their first due to an assumption of previous knowledge. *“I think I didn’t receive a lot this time round, because this is my second pregnancy I think they kind of assumed I that I knew it from before.” (page 8, IT42)* Foods or Supplements? There was a lack of awareness amongst participants towards the foods that contained required micronutrients. Whilst many knew about taking supplements as advised by midwives, there was little knowledge about the food sources. *“When I was told in the beginning from my midwife you shouldn’t have too much vitamin A, nothing was really explained why and I am still not really clear what foods vitamin A is in, how I should avoid vitamin A.” (page 8, IT15)* Some participants also believed that they didn't need to focus on their diet micronutrient needs as this was taken covered by their consumption of multivitamins.

“Since I became pregnant I’ve just been taking a multivitamin designed for pregnancy, so I am hoping that kind of covers most things.” (page 8, IT42)

One participant stated that they found food guidance easier to follow as they frequently forgot to take their supplements.

Role and Responsibility of Health Services and Healthcare Professionals

Participants sought guidance from health services during pregnancy which included midwives, general practitioners, obstetricians, health services literature, tools and services. Participants had a strong expectation to receive all the nutritional information that they required at antenatal booking appointments or even at earlier appointments and through mode of verbal discussion, leaflets, booklets and direction to resources, such as online or through a phone application. Commonly it was reported that this information was provided by a community midwife at first antenatal appointment (8-12 gestational weeks). Midwives were viewed as experienced when it came to pregnancy nutrition and tended to be the first point of contact for any nutrition uncertainties.

“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.” (page 8, IT37)

Although not all expectations were reported to be met (details under trust).

Iodine sources - opportunities and barriers

Participants shared a positive attitude towards dairy products with half reporting that it was not difficult to incorporate or increase dairy consumption into diet. Milk was thought to help with heartburn and tended to be a source of craving during pregnancy. Those that did not like milk would increase dairy consumption through yoghurt or cheese.

“Milk, I probably, I had quite a lot of milk when I was pregnant, a lot of it was because of heartburn but I would say I could drink a lot of milk.” (page 9, IT25)

“I do not drink milk but I do take a lot of cheese and yoghurts.” (page 9, IT36)

Barriers to dairy consumption included taste (mostly milk), health conditions such as lactose intolerance or eczema, morning sickness in the first months of pregnancy and limiting products with cheese due to perceptions of being unhealthy, that is, containing fat or being processed.

“I think with cheese I try not to each too much because I think it is quite fat . . . ” (page 9, IT33).

Seafood consumption during pregnancy was seen by most to be difficult to increase or eat consistently during pregnancy. Many described the barrier of not enjoying fish or seafood items with pregnancy related heartburn, morning sickness and change in taste and smell increasing the barrier to consumption. Lack of cooking skills and partner dislike were also cited as barriers to consumption.

“Well, I don’t eat a lot of fish probably because my husband doesn’t enjoy it and I don’t like to cook more than one meal at once.” (page 9, IT30)

“People probably don’t have as much knowledge on how to cook fish.” (page 9, IT09)

For participants that were planning on increasing their fish and seafood consumption, there was confusion towards recommendations as well as hesitancy around consuming the wrong type of fish. Other barriers raised was price and availability as well as not tending to buy or eat these items.

	"We are not in a habit of eating a lot of fish and that's one of the things we often say to ourselves we should have a little bit more of..." (page 9, IT42) Participants who had a vegetarian diet did not plan on changing their diet during pregnancy to consume fish. **Receiving dietary information** The authors identified the following 6 subthemes: Attitudes towards Different Formats Participants discussed mode of nutritional information delivery. There was a general positive sentiment towards verbal information while a minority found this mode of delivery might be overwhelming and unhelpful. *"If I was to go to the doctors and ask for advice there I don't think that would be as beneficial because (. . .) I feel it would be quite overwhelming (. . .) so if the midwife mentioned something to me I would remember but wouldn't really know too much about it so I would have to go and look into it for myself "(page 9, IT48)* Participants recalled that when they were having a conversation about nutrition with midwives, they were given a chance to ask midwives questions if needed, even if conversations were short. Participants felt it would be helpful to have accompanying leaflets, booklets or another visual source as prompts or references after the discussion with health care professional. Although, many recounted being handed a leaflet with minimal discussion and no verbal explanation of the contents of the leaflets. *"So for me, the best thing for me would have been if the midwife had given me a brief overview and then maybe given me a leaflet or a web, specific web address to take away that I could then look into more depth afterwards" (page 10, IT05)* Many discussed the written information provided during pregnancy. Participants discussed that they did read leaflets but commented on receiving too many during pregnancy and were often lost or discarded so they could not refer to this information.

	"I was also given information in leaflet form but during pregnancy the amount of leaflets you get is unbelievable so you don't really pay attention, well I don't really pay attention to a lot of the hand out stuff I was given." (page 9, IT48) Some participants labelled themselves as "old school" and preferred written information in the form of leaflets that were bright and colourful with eye catching pictures. These participants felt that receiving this with verbal information from midwives would be the best way to receive pregnancy related nutritional information. Participants felt information should be "clear", "specific", "comprehensive" and "straight forward". Leaflets were preferred to books as they served as reminders for important information, were practical, smaller and simple to read. Participants were more likely to pay attention to brightly coloured leaflets. *"Basically kind of brightly designed or whatever, I would definitely pay attention to." (page 10, IT22)* The internet was used as a resource for nutritional information amongst most participants. Participants searched Google for nutrition and pregnancy information and also used online sources such as BabyCentre and healthcare service websites, fora, social media and weekly emails with leaflets, booklets and verbal advice. Some sources such as social media and or other online sources were seen as sometimes unreliable. These sources tended to be the first resources checked at the beginning of pregnancy. *"These days obviously everybody goes straight on the internet, and that's what was one of the first things that I did, but the problem I think with that is that you google various phrases and it's more luck than judgement which websites you come up on"; IT02: "Well the first thing I do is look on the internet, but then you cannot really rely on that." (page 10, IT05)* While the internet was a preferable source of information, participants acknowledged that all the necessary information should be provided from a reliable source and written by experts. *"I like to look online and read things of a reliable source. I might use the NHS website or something similar rather than a forum. But you need to know to look, that's the problem." (page 10, IT30)* Combining internet searching with leaflets and discussions was found to be a good way to receive information on nutrition in addition to weekly emails from healthcare services or other reliable sources.

	"The emails from the NHS, once you are registered for your pregnancy are really good because you get an email like once a week or something like that (. . .) they are really helpful." (page 10, IT37) Mobile phone applications were perceived to be an interactive form of providing information and increasing awareness about nutrition during pregnancy. Most discussed apps to be useful and easy to access and that apps would help provide information on healthy eating where there may be a current gap. It was also seen as helpful to have the doctor or midwife to endorse the app. *"You can get apps now for everything, so maybe an app that you could give out like different ideas on how you can get that nutrient you need in the right amount, maybe like meal ideas or something like that." (page 10, IT25)* Apps were also discussed in relation to tracking diet intake and tailoring advice based on needs. A few did not like the idea of apps as they thought this would be too overwhelming and preferred hardcopy information with midwife conversation. *"I found the most useful just conversation really I suppose rather than apps and research cause that's how I think you can get a bit overwhelming for pregnant mums and for first time pregnant mums." (page 10, IT08)* Preferred Formats and Stakeholders' Suggestions Half of participants wanted digestible and fast information which should be clear, practical, simple, direct and memorable as well as understandable. There was an interest for bright, visual and colourful presentation of information including pictures and simple infographics, charts and linking nutrients to foods and portion sizes. This would grab attention and assist as a memory aid. Participants identified a need for better understanding in relation to portion size and the amount of food needed for the appropriate nutrient intake.

	"I think having something visual that kind of shows you clearly what, like what the portions equate to is really helpful" (page 11, IT42) Authors stated that participants were confident of the need for nutrients during pregnancy but were not able to link nutrient needs to a balanced meal. Participants were not sure where nutrients factored into the diet, which foods had nutrients, the quantity of food to consume and the effect of cooking methods on nutrients. The biggest incentive that participants thought would lead to changes in nutritional behaviours was the future health of the child. Many were of the opinion that the health practitioner, that is, midwife, general practitioner, health visitor, nurses, pharmacists, dieticians and nutritionists were responsible for providing nutritional information and were thought to be the top information source. Participants discussed their preferences regarding mode of delivery for nutritional information and this was seen as in person during early during pregnancy, at first booking appointment or antenatal class. It was commonly suggested that healthcare professional discussion combined with written (for example, leaflet) and/or online material (for example, healthcare services website and emails or general internet resources such as google search, social media, fora) would be best for information provision so that there would be a reference guide for after the discussion. When thinking about specific nutritional advice, about half of participants thought that a mobile phone application for smartphone or tablets would be best for ease of accessibility and to track diet intake with reminders to change diet if needed. Tailored meal plans, information on portion sizes, suggested intakes and needs were thought to be useful content. Participants felt that information should be delivered in a way that linked food portions with nutritional needs. Visual cues were suggested for those with low literacy. Some wanted an easy, pictorial based tool which could be fast to refer to. Other ideas for nutritional message delivery were a tick sheet or pin board with reminders for main foods, portions and messages of nutritional importance, internet websites, recipes or meal plans online or in books, brightly coloured leaflets with pictures, fridge magnets and small reference cards, supermarket magazines, advertisements and food packaging information. There were still some participants that preferred one on one discussion with their healthcare professional with referral to reliable website, booklet or leaflet as sufficient sources of information. Confusion The authors noted a sense of confusion around the information received by participants. Participants mentioned finding information that differed in recommendation when looking at advice in the UK compared to other countries, receipt of

	differing advice depending on location in the UK as well as conflicting information received from various healthcare professionals. *“And then a different midwife had a completely different attitude.” (page 11, IT09)* There was a sentiment of not having one place to go for reference with comprehensive nutritional information. *“They should tell you exactly what you need to have, you need to have a leaflet or like a website . . . It should be clearer, now it is not clear at all.” (page 11, IT26)* Some recommendations were found to be complicated to understand and know how to use such as recognising unpasteurised items which was found to be overwhelming taken together with all other nutritional recommendations available. Empowerment - implementation of dietary changes Participants discussed that they would commit to behaviour change if prompted or made aware of the importance. *“If I knew how important it was, I would increase it.” (page 12, IT06)* This intention was high to begin with amongst participants at preconception stage due to wanting the best for their baby and themselves. Participants were also proactive as they tended to raise nutrition with midwives and if they did not receive advice they were after, sought it elsewhere such as online. All participants said they had read or considered diet advice provided to them and most said they changed their diets, although a few already believed they had a balanced diet so did not alter their diet. Participants tended to take multivitamins which assisted in their confidence of meeting recommended nutritional requirements.

	Trust The majority of participants highly regarded trustful sources of information. Healthcare services tended to be a source of trustful dietary and pregnancy advice. Participants listed "an expert", "the midwife" and "the general practitioner/doctor" in addition to professionals leading antenatal classes as trustful sources of information. *"I think probably is verbally so that we could ask questions rather than just written information, and maybe not necessarily one to one but along with those pre-antenatal type classes." (page 12, IT47)* At the same time, there was a sense of disappointment about the advice received from these health services as they were not seen to deliver the amount of advice that was expected. This was also felt towards general practitioner surgeries amongst several participants, who expected nutrition information and received none. Participants found the internet and smartphone applications to be helpful sources for information on nutrition during pregnancy. As the reliability of these sources were questioned, participants tended to seek out information from trusted online sources such as the healthcare services website, websites endorsed by experts, the health services application as well as the BabyCentre application. Negative feelings Uncertainty about diet recommendations sometimes led to anxiety and not feeling confident that guidance was being followed, for example, around fish recommendations. Some participants felt overwhelmed and a pressure to follow all the recommendations for nutrition in pregnancy which led to feeling guilty for not always "getting everything right". *"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." (page 13, IT08).*

BMI: body mass index; IQR: interquartile range; NHS: national health service; NR: not reported; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(No reported discussion about consideration of researcher participant relationship or consideration of ethical issues.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Chana, 2019

Bibliographic Reference	Chana, R.; Haith-Cooper, M.; Diet and physical activity in pregnancy: A study exploring women's beliefs and behaviours; British Journal of Midwifery; 2019; vol. 27 (no. 5); 297-304

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Conducted in a northern England city maternity unit. **Aim** To understand facilitator and barriers to maintaining a healthy lifestyle during pregnancy across a diverse group of women.
Data collection and analysis	**Data collection**

	The interview schedule was guided by the theory of planned behaviour. This looked at barriers and motivations influencing knowledge, attitudes and behaviour towards a healthy pregnancy lifestyle. Semi-structured interviews were held one-on-one in a private room for 2 hours while the participant was waiting for their blood test after drinking a sugary drink. Interviews were audio recorded. **Data analysis** Interviews were transcribed verbatim and a deductive thematic analysis approach was employed. Theoretical assumptions of the theory of planned behaviour were utilised to guide coding and theme formation. Themes were formed based on barriers and motivators rather than the overall collected data, with broader concepts also worked into the model. Coding and themes were checked by a senior researcher.
Recruitment strategy	Participants were approached while attending their 26 week glucose tolerance test at a maternity unit. A stratified sampling approach was employed based on social and ethnic background and BMI.
Study dates	December 2016 to May 2017
Sources of funding	Not industry funded
Inclusion criteria	• Aged over 16 years • Ongoing low-risk pregnancy • Ability to understand written and verbal English
Exclusion criteria	• Any medical conditions
Sample size	N=12 (all pregnant)
Participant characteristics	**Mean age in years (SD)** NR, ranged from 22-36 **Parity during pregnancy, n (%)** Nulliparous: 7 (58) Multiparous: 5 (42)

	Pregnancy status [at interview], n (%) Pregnant: 12 (100) **Stage of pregnancy [at interview]** Gestational age ranged 26+0 to 29+ 4 gestational weeks **BMI class [at booking appointment] (n, %)** Healthy: 5 (42) Overweight: 2 (16) Obese: 5 (42) Note: Time of BMI NR **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported, study states backgrounds of women to be British, Pakistani and Polish (n=4 each, respectively) **Education level (n, %)** Education beyond 16 years old: 6 (5) University: 6 (50) **Income status**

	Not reported Note: The study reported that 6/12 women lived within the most deprived areas in the UK (Ministry of Housing, Communities and Local Government, 2015).
Results	Themes identified by authors relevant to this review: 1. Knowledge of healthy lifestyle 2. Sociocultural influences 3. Health professional support **Knowledge of healthy lifestyle** Participants had a limited knowledge of the constituents of a healthy diet. Half of participants had not heard of the Eatwell Guide (Public Health England, 2018) and another five had minimal knowledge of the contents of the guide. Only one participant had adequate knowledge about healthy eating and what the guide detailed. Still, nine women compared their pre-pregnancy diet to the Eatwell Guide and felt it was comparable to guidance. *'I try eat some vegetables, some fruits, um, some milk ... so it's not bad how I am eating.' (page 299, P010)* The majority of participants felt that a healthy diet during pregnancy was vital for themselves and the baby but it was not clear as to why. One participant thought that eating healthy food during pregnancy would influence the diet behaviours of the baby.

'I believe what you eat will build up on the taste buds of my baby ... I want my baby to be healthy.' (page 299, P007, Pakistani origin, obese BMI range)

Though participants felt that a healthy diet was important in pregnancy, half did not appear to consume enough fruit and vegetables in their diet and two consumed an excess of fatty and sugary food.

Sociocultural influences

Many participants received healthy lifestyle advice from family and friends. Examples of advice content was towards eating more healthy foods, limiting junk food and not to eat for two. At the same time, some women were told contrasting advice such as to eat anything that was appealing regardless of nutrient quality. Family advice was dominant in participants from Pakistani backgrounds where one participant was advised to eat more milk, fish and pomegranates while another was told to avoid foods like nuts, pickles and fish prior to 12 gestational weeks due to the believed risk of miscarriage.

'Don't eat fish because it makes you warm inside and that causes you to bleed.' (page 300, P006)

The same participants received advice from family to eat warm foods at the end of pregnancy to help with onset of labour.

'When I was 9 days over with my son, [my mother] gave me milk, honey and nuts basically blended and mixed in milk and that was really hot, that will kick start your labour and I had them for 5 days and it was quite good, you know.' (page 301, P006)

Amongst over half of participants, advice on diet during pregnancy was taken from family members while other participants did not follow advice due to mistrust. Some participants commented that they ate certain foods due to family preference

	such as cooking unhealthy foods due to partner's preference. On the other hand, another participant who was living with their family used family preference as a motivator and chose to cook healthy foods. Most found information on diet from internet sites such as NHS Direct and medical portals, as well as from social media sites such as Whatsapp, Facebook and YouTube. Pregnancy apps were found to be easily accessible and quite informative. *'[Pregnancy apps] give you that scientific explanation ... this particular food gives you this vitamin et cetera.' (page 301, P007)* Barriers mentioned towards healthy diet were cost and not enough time. Healthy foods were seen as costly and time-consuming to cook for some. *'I have spent sometimes £15 on one meal that is going to be really healthy and I could just go buy a pizza for £2.' (page 301, P005)* **Health professional support** Only half of participants recalled receipt of dietary advice from health professionals during pregnancy. Others were able to remember foods to avoid but not healthy foods to consume. *'At first she [midwife/health professional] said blue cheese ... and fish, first couple of weeks and then after that ... [she said] "just carry on doing what you are doing."' (page 302, P008)*

	Others commented on the variation of advice received in terms of format and content. Many described the influence of advice received on their eating habits, although others thought that advice was redundant as they believed that they were already leading a healthy lifestyle, or due to having previously had children and was already told this information. *'I am listening and I am like, "Yeah I know that", but I wasn't really.' (page 302, P006)* Participants wanted greater support from health care professionals and believed that this would facilitate healthy lifestyle habits. Content of nutrition information was suggested to be the benefits of eating healthily as well as overseeing the appropriate level of vitamin intake. Preferences for mode of delivery was face-to-face and integrated into routine antenatal appointments or classes, or alternatively a pregnancy application created by health professionals could provide support. *'A session for mums or something ... because if you are, like, on your own, you are not motivated or you are not … confident maybe, or you are thinking that exercising can damage the baby, or you might do something wrong or over-exercise, so, like, doing it as a group with someone professional, maybe.' (page, 302, P007)*

BMI: body mass index; NR: not reported; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns due to lack of details on recruitment strategy and consideration of researcher participant relationship.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Coathup, 2017

Bibliographic Reference	Coathup, Victoria; Smith, Lesley; Boulton, Mary; Exploration of dietary patterns and alcohol consumption in pregnant women in the UK: A mixed methods study.; Midwifery; 2017; vol. 51; 24-32

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Setting of interview was unclear. **Aim** To understand what factors impact women's choices towards eating and drinking during pregnancy.
Data collection and analysis	**Data collection** Mixed-methods study with semi-structured face-to-face interviews conducted by the first author. Interviews were audio-recorded. Location was not described. **Data analysis** Interviews were professionally transcribed and reviewed by the interviewer. Nvivo 10 was used for coding and analysis. Analysis was thematic using the Braun and Clarke approach.
Recruitment strategy	A sub-sample of participants that completed the study initial questionnaire were chosen for the qualitative interview component. Of these participants, four were originally recruited through one of five antenatal clinics in Gloucestershire, one through attendance of one of two substance misuse antenatal clinics and one by social media.
Study dates	Not reported
Sources of funding	Not stated

Inclusion criteria	Inclusion criteria to the mixed methods study differed based on recruitment source • Pregnant and aged 16 years or over • Any gestational week • For the antenatal clinic recruitment: if they were attending one of five antenatal clinics in Gloucestershire for their 12 week scan • For other recruitment sources: Living anywhere in the UK • Reported any alcohol consumption during current pregnancy; not a requirement for the social media recruitment source
Exclusion criteria	Exclusion criteria to the mixed methods study • Did not speak English • Severe morning sickness
Sample size	N=6
Participant characteristics	**Mean age in years (SD)** Not reported, age range n (%): • ≤25: 1 (17) • 26-30: 2 (33) • 31-35: 2 (33) • >35: 1 (17) **Parity during pregnancy, n (%)** • Nulliparous: 3 (50) • Multiparous: 3 (50) **Pregnancy status [at interview], n (%)** Not reported

	Stage of pregnancy [at interview], n (%) Not reported **BMI class during pregnancy, n (%)** Not reported **Comorbidities, n (%)** Not reported **Ethnicity, n (%)** White: 6 (100) Non-white: 0 (0) **Education level, n (%)** Lower than Bachelor's degree: 1 (17) Bachelor's degree or higher: 5 (83) **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Pregnancy as a time to review behaviour

2. Listen to your body – it will tell you what you need
3. Treats are still important – on special occasions
4. Social and cultural expectations constrain behaviour
5. Inconsistent or ambiguous information creates uncertainty
6. Confidence increases following a successful pregnancy

Pregnancy as a time to review behaviour

All the participants commented recalled thinking about their diet once they found out about their pregnancy. Which changes were made and the extent of these differed by participant. Many participants said they were interested in diet and nutrition before they were pregnant and felt they did not need to make major changes to their overall diet. Most omitted foods such as unpasteurised cheese, raw eggs, uncooked meats and seafood from their diet in order to lower harmful risks to their baby. Other products were reduced by some participants such as sugary foods and drinks, starchy carbohydrates and caffeine. These behaviours were seen to be better for the health of the participant and baby rather than direct risks to the baby.

Listen to your body – it will tell you what you need

Most participants discussed cravings for specific foods during pregnancy. This was viewed as their bodies telling them what nutrients they were missing.

'Every now and then I get a real craving, like I feel like I've got to stop straight away and buy chocolate, so I have to pull into a garage or something, and I've never done that before. So that's obviously the sugar rush or something isn't it? You're lacking something.' (page 29, Participant 1, 31–35 years, first pregnancy)

Some participants mentioned avoiding some foods due to the perception that their bodies directing them to this.

Treats are still important – on special occasions

Certain food choices were talked about as enjoyable and eaten on special occasions. This was discussed by participants as a way of 'treating themselves' to change their routine or make themselves feel better.

Maybe for somebody else it would be chocolate or a dirty burger or something, but for me it's a glass of wine. I think it probably is the whole 'treat' you know, I think that's what it is. I don't really want it or need it I think, it's just part of a habit and probably a naughty treat as well. (page 29, participant 1, 31–35 years, first pregnancy)

Social and cultural expectations constrain behaviour

Views of those important to the participants such as friends and family influenced participant dietary habits based on what was thought to be 'appropriate' to eat or drink during pregnancy.

Inconsistent or ambiguous information creates uncertainty

Inconsistent advice and from many sources such as health care professionals, friends, family and the internet was commonly discussed. Some participants commented on changes over time to guidelines on certain foods from health care professionals which tended to lower confidence in advice and seek information elsewhere, such as from friends and family.

'Also my mum, because I felt comparing 30 or 40 years of difference in guidance was a good way to contrast. So have they always said it? Or is it another new fad, new thing that people are saying but actually in five years' time they will change again. So I really valued her opinion as well on some of the topics' (page 30, participant 4, 26–30 years, first pregnancy)

Confidence increases following a successful pregnancy

Those who already had children had a changed attitude in the current pregnancy compared to their first pregnancy. They described feeling more relaxed in relation to food and when thinking about guidelines referred to using 'common sense' when interpreting these. Participants remembered previously being anxious in their first pregnancy and having a healthy baby provided confidence in their choices in this pregnancy.

	'I think I have a pretty balanced diet this time round…I think I worried with my first too much, I think I could have enjoyed it a bit more, and had more food that I enjoyed, instead of worrying.' (page 30, participant 5, ≤25 years, one child, second pregnancy) However, those who had previous negative pregnancy experiences were not as confident with greater anxiety and a sense of strictness in relation to food. One participant previously had a traumatic miscarriage at 5 gestational weeks and described being protective out of fear of harm to the baby. *'Yeah, I've become extremely protective really. I'm constantly looking things up online, am I doing things right, am I being good? Driving the midwife crazy with a million and one questions. Maybe a little bit too much, but it's all like healthy, it's all, because I just want the best.' (page 30, participant 6, 31–35 years, no children, second pregnancy)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Moderate concerns *(Some concerns due to lack of details on researcher participant relationship, lack of information about ethical considerations, and few details on the rigor of data analysis.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Heslehurst, 2017

Bibliographic Reference	Heslehurst, Nicola; Dinsdale, Sarah; Brandon, Helene; Johnston, Camilla; Summerbell, Carolyn; Rankin, Judith; Lived experiences of routine antenatal dietetic services among women with obesity: A qualitative phenomenological study.; Midwifery; 2017; vol. 49; 47-53

Study Characteristics

Study type	Phenomenological Interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Women from antenatal dietetics service in an NHS Trust in North East of England with interviews held to participant's own choosing such as homes, maternity unit or Sure Start Children's Centres in local communities. **Aim** Exploration of women's direct experiences of care from antenatal dietetics services
Data collection and analysis	**Data collection** One-on-one unstructured interviews with phenomenological approach by one researcher with broad discussion prompts. Towards the end of interview participants were asked to summarise what they thought were the most important factors. Five women had family members present at the interview: partner (*n*=2), young children (*n*=2) and grandmother (*n*=1). Interviews were audio-recorded. **Data analysis**

	The interview was transcribed verbatim. Data was analysed using an interpretive analytical approach and thematic content analysis using Burnard et al. 2008 methods. Two researchers independently analysed the data and developed themes by open coding of the transcripts, coding was refined and themes were developed as coding was combined and discussed. Themes were checked with transcripts to ensure representation.
Recruitment strategy	Postal recruitment of those referred to obesity specific dietetic antenatal service as well as well as in-person recruitment from dietitian providing the participant information sheet after women attended their antenatal dietetic appointment. A researcher was available to discuss the study further in a different private room. Recruitment continued until data saturation occurred.
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	• Pregnant • Booking BMI ≥30 kg/m^2 • Attending an obesity-specific antenatal dietetic service
Exclusion criteria	Not reported
Sample size	N=15
Participant characteristics	**Mean age in years (SD)** Not reported **Parity during pregnancy (n, %)** Nulliparous: 7 (47) Multiparous: 8 (53) **Pregnancy status [at interview] (n, %)** Prenatal: 18 (38) Breastfeeding/with baby: 25 (52)

	Planning a pregnancy: 53 (10) **Stage of pregnancy [at interview] (n, %)** Not reported **Mean (SD) BMI [pre-pregnancy] (kg/m^2)** 37.9 (7.8) **BMI class [at recruitment] (n, %)** Obese: 15 (100) **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** White: 15 (100) **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Women's overall experience of the antenatal dietetic service.

2. Process of referral
3. Delivery of the service
4. Content of the Service

Women's overall experience of the antenatal dietetic service

Participants were generally positive about their experience with the antenatal dietetic service and were reassured that what they had been doing was right for the baby which they regarded as highly important. They also reported that they were additionally asked about their health in addition the baby's and were pleased to be in discussion with a health professional about any concerns or anxieties. Although there were also comments amongst participants that they were not asked what they wanted out of the service.

“I’d always wanted to eat like a balanced diet, because everyone says you should eat a balanced diet but nobody ever explains it to you, and when you ask people just say ‘oh that’s not good for you, that’s not good for you’, and nothing ends up being good for you. I think it’s information and stuff that I can use throughout the rest of my life, that’s probably the most helpful thing” (page 49, Parity 0, BMI 32 kg/m^2)

"I was never asked what I want, what I personally wanted out of it…It was just a case of well ‘we aim for you to be this’. No one’s asked me what I want… and what experience I’m looking for or anything like that so I think that would be [important], find out what the patient wants out of it really” (page 49, Parity 1, BMI 47 kg/m^2)

Process of referral

Many did not know what to expect of the dietetic service as there was minimal explanation provided about the referral. Some participants reported vague information from midwives in that the dietitian would help them “eat the right sort of foods” and “it would be better for their baby”. There was a collective want for greater explanation of the service and in particular face to face explanation rather than in letter or leaflet to alleviate concerns or anxieties.

"I just didn't think that was the right way to actually tell you about the service [the referral letter]. Well it doesn't actually tell you about the service it just said, you know I'm fat make an appointment…it wasn't explained at the appointment that I'd be given the letter, just on my way out I was handed it [by the reception staff]… it would have been nice if they'd sat and explained what the service was about you know, because when I came for the first appointment I didn't know why I was coming or what was going to happen" (page 49, Parity 1, BMI 32 kg/m^2)

"It was a very 'by the way' sort of off the cuff comment [the explanation about the dietetic referral by the midwife]…It was just 'oh because of your BMI I'm going to have to refer you to the dietitian okay?'…she didn't explain why I was going there…if she'd gone through it with me, and had explained to me…I wouldn't have been so horrified, and frightened and then angry really" (page 49, Parity 0, BMI 32 kg/m^2)

Without any explanations or reassurances, many thought they would have to be undergoing a strict diet during pregnancy. There were pre-emptive negative connotations of dietitians telling them what to eat or not eat and making them feel bad about their diets. There was also an association of seeing dietitians with weight loss and so the expectation was weight loss during pregnancy. Participants reported that they were surprised to find out that the actual focus of appointments once visited was around balanced and healthy eating during pregnancy.

"I just got the impression that it was all like salads and tuna and things like that, which I don't like salads very much and I don't like tuna and stuff so I thought it was going to be really difficult, I thought I wasn't going to be able to eat much that I liked… It was easier than I thought it would be. Like I say I thought it was going to be an extreme diet" (page 49, Parity 0, BMI 32 kg/m^2)

"I was scared you know to go…I thought I'm going to get shouted at and told off and, I wasn't quite sure what I was expecting, until I got there and as it happened it was fine" (page 49, Parity 0, BMI 46 kg/m^2)

Participants reported that discussion or endorsement of the dietetic services by a health professional, particularly the midwife led the participant to more likely want to use the service. There were reports of long waits between referral and appointment, which felt to diminish the importance of the service as relayed by the referring health professional. Feelings of

being "singled out" (page 49) and commentated that women should not be made to feel alone in their experience. Judgement on their parenting were also felt.

"I was wondering if like people might think that I wasn't bothered about the health of my baby, if I didn't go to the next appointment" (page 49, Parity 0, BMI 34 kg/m^2)

Delivery of the service

Greater frequency of contact with the dietitian was desired by participants so that a relationship could be formed and to maintain motivation. Participants mentioned that they had a good relationship and regular meetings with their midwives which they suggested could be an avenue for further support between appointments or otherwise local GP practices could act as supporter.

"I think eight weeks is a long time, especially pregnancy wise, it's been four weeks already, it'll be the best part of starting my last trimester by the time I know if I'm really on the right track and doing the right thing, to me that's probably a bit late…I think it's a bit frightening really… you just feel like yes you've got this information but other than eight weeks' time or something you're sort of on your own" (page 50, Parity 0, BMI 34kg/m^2)

Many were confident of the expertise of dietitians about nutrition and were then able to talk openly about their diets.

"It is embarrassing and you don't like just telling Tom, Dick and Harry what you eat, like 'I stuffed my face today', but seeing a professional some women open up to people like that, like I did you know" (page 50, Parity 2, BMI 34 kg/m^2)

Regarding the clinic service, there was an assumption by participants that they did not receive more frequent appointments due to resource impacts, and long waiting lists for the NHS and busy schedules of dietitians. There was a tendency to place blame on themselves if the service did not live up to their expectation or needs, for example, due to them being "fussy eaters" or that the right information was not asked or that they gave the dietitian the wrong information.

"Maybe I'm not your average person…maybe I'm being very, very, very harsh because nobody has been offensive, nobody has been unpleasant and the referral is obviously part of the midwives job and the dietitian was nothing but nice, and she was full of facts and information. It just wasn't anything new to me" (page 50 Parity 0, BMI 32 kg/m^2)

There was discussion around the mode of service delivery with potential benefits or pitfalls of group-based services on top of the one-on-one services that they experienced. One primary barrier that was raised was embarrassment and the need of one-to-one support was felt to still be needed. However, the support network aspect of a group, realising one was not alone as well as not feeling the focus of attention and therefore vulnerable were raised as benefits of group-based services.

"There'd be people in the same situation as you and, people tend to discuss things better in a social network than what they do with maybe a health professional. So I think you would probably benefit more from that than what you would just by talking to one dietitian. And then you could like share different stories and it would also be good because you'd be meeting other people who are pregnant, who are maybe at the same stage as you and things like that, so it would be all round beneficial really" (page 50, Parity 0, BMI 34 kg/m^2)

Content of the Service

Participants described that the dieticians explained nutritional properties to different foods and providing an understanding as to why these should be part of a healthy diet. An example was that participants were advised to eat dairy products due to the calcium benefits or consume meat due to the iron it contained. For some, this increased their knowledge and

	awareness of healthy eating and nutrition, which was at a low literacy level previously. They felt that this information and understanding could be used long-term in their diet. *“Probably learning more like, now I know more for my eating habits, but for the baby's eating habits as well, because I didn’t realise before so, definitely getting information [has been useful]” (page 50, Parity 0, BMI 32 kg/m^2)* Others commented that there was repetition of advice such as that around food safety that had been provided by their midwife or via previous encounters with weight management services. Some acknowledged the benefit of reinforcing their learning by an expert which in turn helped their confidence levels. Other found this a waste of time and would have preferred to learn new information about their pregnancy. This highlighted differing previous levels of knowledge on nutrition and that levels of information gained and advice followed depended on this. An example that was discussed was of "eating for two" whereby for some this was new information and useful and that perhaps this behaviour might have contributed to additional weight in previous pregnancies. For others, the information was found to be patronising and not useful. *“I think that with pregnant people tapping into what specifically is useful for the baby at different stages would possibly be fascinating for them… ‘If you swap this for that actually that’s brilliant for the baby because the baby gets this nutrition which is really good for the development of the spinal cord. Or if you eat more of whatever it really helps brain development’” (page 50, Parity 0, BMI 32 kg/m^2)* Participants found written information to be helpful as a referral tool and memory aid for what advice was discussed and behaviour change. For example, it was mentioned that discussions relating to food swapping to healthier alternatives was helpful and that details of this in writing would be useful, in addition to written information on nutrients that would aid the baby, recipes, meal plans and suggestions for quick and easy snack foods. Participants mentioned the "eat well plate" leaflet and the practical suggestions from the dietitian on limiting portions. There were some that commented on the usefulness of these suggestions, others found it hard to implement in day to day life.

	"[The eat well plate] that's good because I can look at it and monitor from day to day…I'm looking at that when I'm doing my meals and saying well I'm having that, I'm having that, I'm having that, I need to more of this and…so it's given me more awareness of what I should be eating portions wise and how big each portion should actually be, because my portion sizes were sometimes double or triple what the recommended portion should be" (page 50-51, Parity 1, BMI 47 kg/m^2) *"[The eat well plate] said a small ball of X, frankly if I knew what a small ball was I wouldn't have to go to a dietitian. If people are overweight because of portion control…they need visuals not small, medium or large, because if you knew what small, medium and large were you wouldn't need to have the conversation about what a portion looks like" (page 51, Parity 1, BMI 51 kg/m^2)*
	Participants described that dietitians gathered detailed information on their eating habits. This was discussed positively as it was perceived that the dietitian was gathering information on their situation rather than starting at an assumption that their diet not healthy. Generally, if advice was perceived to not be tailored, this was a large barrier to behavioural change. When participants discussed tailored advice applicable to their lifestyle, they felt that it directly related to them and were more likely to change behaviour. Choice and control was also viewed with importance with goals needing to be manageable, realistic and achievable. There was a desire for personalised advice around managing situations that may be a barrier to achieving goals such as challenging work patterns. *"Being allowed to choose for myself the suggestions that have been made for me, whatever feels comfortable for me I think has been the biggest plus I think I don't feel as if I've been forced into doing anything, and I've been allowed to make my own choices on what I eat and the way I eat it" (page 50 Parity 1, BMI 48 kg/m^2)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Hussain, 2021

Bibliographic Reference	Hussain, Basharat; Bardi, Josephine NwaAmaka; Fatima, Tehniyat; Pregnancy related cultural food practices among Pakistani women in the UK: a qualitative study.; British Journal of Midwifery; 2021; vol. 29 (no. 7); 402-409

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews conducted at a local community centre. **Aim** To understand pregnancy related food practices amongst first generation Pakistani women living in the UK and with at least one pregnancy in the UK
Data collection and analysis	**Data collection**

	Semi-structured interviews between 20-30 minutes with the interviewer and a female Pakistani community link worker from a volunteer organisation present as facilitator. Communication was performed completely in the participant's native language as one of the researchers was proficient in this language. **Data analysis** Interviews were translated verbatim into English from author who is from Pakistan. An inductive thematic analysis was undertaken with the Braun and Clarke approach employed. Codes were identified, grouped into categories and themes were drawn from categories.
Recruitment strategy	Recruitment was through a voluntary organisation through convenience sampling.
Study dates	Not reported
Sources of funding	Not reported
Inclusion criteria	• First generation immigrant Pakistani women • Living in the UK • With at least one pregnancy experienced in the UK
Exclusion criteria	None reported
Sample size	N=10 (7 pregnant, 3 postpartum)
Participant characteristics	**Mean age in years (SD)** Not reported, range 30-40 years **Parity during pregnancy, n (%)** Not reported **Pregnancy status [at interview], n (%)**

	Pregnant: 7 (70) Postnatal: 3 (30) (pregnant in the past few years) **Stage of pregnancy [at interview]** Not reported **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Pakistani: 10 (100) **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Classification of foods 2. Food with symbolic meaning 3. Medico-cultural conflict 4. Quantity of food intake

5. Sources of advice and compliance with food practices

Classification of foods

The authors identified the following 4 subthemes relevant to the review:

Foods having a heating effect on the body: Raising temperature, Causing miscarriage, Expanding muscles;

Foods having a cooling effect on the body: Contracting the muscles, Causing difficulty in delivery;

Good (healthy);

Food choices were determined by whether the food was seen to have a heating or cooling effect on the body. Different foods were either seen as hot or cold and were thought to have different effects on the body depending on the trimester. This vocabulary tended to be used over scientific nutritional values such as protein, carbohydrates or vitamins.

'Fish, eggs, meat, nuts and some fruits like mango and dates produce heat in the body and increase the body temperature. While foods like apples, grapes give coolness to the body.' (page 404);

'The "hot" foods should be strictly avoided in the first and second trimester, as these foods increase heat in the body and cause miscarriage. However, if a woman starts eating these "hot" foods before one month of the pregnancy, these foods will have a good effect in terms of labour during delivery. Eating "hot" foods in the third trimester opens and stretches the muscles of the pregnant woman. So, it becomes less painful during delivery. During this time, "cold" foods are not good for the pregnant women. "Cold" foods expand the muscles and delivering the baby becomes difficult and painful. The woman may have to go through an operation which is more painful and not good for the health of the mother later on in her life.' (page 404-405)

Food with symbolic meaning

The authors identified the following 2 subthemes relevant to the review:

	Effect of certain food on skin colour; Religious significance of food Choice of foods consumed during pregnancy were attached to the symbolic meaning behind the food related to Pakistani social, cultural or religious meanings: 'If a pregnant woman used foods which have white colours such as milk, it is sure that the colour of the baby will be white (authors' note: in Pakistan, white colour of the skin is appreciated/desired in terms of its beauty and as a sign of good health). Using black coloured food during pregnancy, such as tea, will bring black colour for the baby ... from inside, the colour of watermelon is red, so, eating watermelon increases the blood in the body which is good for health.' (page 405) ''Our Holy Prophet has used honey which shows that it is pious and good food. Using honey is good in the third trimester. It will bring blessings for the mother and the baby.' (page 405) **Medico-cultural conflict** The authors identified the following 2 subthemes relevant to the review: Confusion in the conflicting information received from doctors and mothers-in-law Avoiding doctor's nutritional instructions in favour of a mother-in-law's advice Participants felt conflicted when deciding whether to use modern medical treatment or listen to differing advice from family members and in-laws, and in particular their mother-in-law. Because of this participants felt overwhelmed due to ambiguity and fear.

	Quantity of food intake The authors identified the following 2 subthemes relevant to the review: Suggestion of medical professionals − increase food intake Suggestions of mother or mother-in-law − decrease food intake to keep the size of the baby in check which leads to ease of delivery Conflicting advice between healthcare professionals and family members were commonly reported to be in relation to quantity of food eaten. *'…doctors and nurses suggest that pregnant women should eat more, compared to her normal eating. But our mothers, mothers-in-law, and some friends said if you eat more, the size of the baby will be bigger and it will be difficult to deliver, and the delivery will become painful, and you may die during labour. Therefore, sometimes I do not eat even though I am feeling hungry because of the fear of delivering a bigger baby.' (page 405)* **Sources of advice and compliance with food practices** The authors identified the following 5 subthemes relevant to the review: Mother Mother-in-law Disobedience can lead to a stressful relationship Disobedience can lead to blame or criticism Enforcing food practices from overseas Participants recounted their strict instructions provided by mother-in-laws once becoming pregnant which were tied to cultural food practices.

	'When I got pregnant, my mother gave me a long list of things to do and not to do. My mother told me about eating and resting along with praying to God regularly ... Whenever I telephoned my mother, my mother used to first ask about my daily routine and health and this continued until my son was two years old.' (page 406) Participants described the family network as controlling and constantly monitoring their diet. If they did not follow this they would be blamed or criticised. This was seen as a challenge in relation to following any other advice. *'All these things about eating are told to me by my mother-in-law. Whenever I became pregnant, my mother-in-law used to check what I was eating. She regularly gave me advice in this regard and I have to obey her as she is older than me … disobeying her can create relationships problem in the family. And if something bad happens to me with regard to my health during pregnancy, I will be blamed and criticised in the family for not obeying my mother-in-law' (page 406)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns due to lack of details on researcher participant relationship and few details on the rigor of data analysis.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Keely, 2017

Bibliographic Reference	Keely, Alice; Cunningham-Burley, Sarah; Elliott, Lawrie; Sandall, Jane; Whittaker, Anne; "If she wants to eat…and eat and eat…fine! It's gonna feed the baby": Pregnant women and partners' perceptions and experiences of pregnancy with a BMI >40kg/m^2; Midwifery; 2017; vol. 49; 87-94

Study Characteristics

Study type	General qualitative inquiry Interviews
Country/ies where study was carried out	United Kingdom (Scotland)
Setting	**Setting** One-on-one interviews with women from a specialist antenatal clinic in a Scottish hospital for BMI >40 kg/m^2. Location of interview was unclear. **Aim** To understand experiences, attitudes and health related behaviours amongst women pregnant women with a BMI >40 kg/m^2 and how these may change during and after pregnancy.
Data collection and analysis	**Data collection** Flexibly framed one-on-one semi-structured interviews were held with two interviews planned antenatally and one planned postnatally. The second antenatal interview stopped after five participants due to no new data generation and time limitations. 8/11 participants nominated their partners to also participate in interview, seven partners agreed to attend. Follow-up antenatal interviews explored whether views had changed during pregnancy and the third postnatal interview were focused on the time around birth and related experiences. The interview topic guide was refined between first and second interviewed. Interviews were audio-recorded. **Data analysis** Transcripts were transcribed verbatim, coded and analysed through NVivo 10 software. A thematic analysis was undertaken using Braun and Clarke's approach. Recordings were listened to and transcripts were read multiple times for

	familiarisation with note taking. Text from transcripts were fitted into codes and themes formed, reviewed and refined. Data collection and analysis occurred at the same time and was an iterative process.
Recruitment strategy	Women were recruited at specialist antenatal clinic in a Scottish hospital providing care for pregnant women with a BMI > 40 kg/m^2. Sampling was purposive to achieve broad representation of age, ethnicity and social class. After initial recruitment interviews, participants were asked to extend the incitation to their networks. 53 women were approached, 52 received a study information pack, 14 responded to a follow-up phone call and 12 agreed to participate. As one woman miscarried prior to the interview, 11 were interviewed.
Study dates	May 2015-February 2016
Sources of funding	Not industry funded
Inclusion criteria	• Pregnant women with BMI >40 kg/m^2
Exclusion criteria	• Miscarriage prior to interview
Sample size	N=11 (pregnant)
Participant characteristics	Demographics were reported for 7/11 participants: **Mean age in years (SD)** 31.6 (5.0) **Parity during pregnancy (n, %)** Nulliparous: 4 (36) Multiparous: 3 (27) Not reported: 4 (36) **Pregnancy status [at interview] (n, %)** Pregnant: 11 (100)

	Stage of pregnancy [at interview] (n, %) Not reported **Mean (SD) BMI [pre-pregnancy] (kg/m^2)** Not reported **BMI class [at recruitment] (n, %)** Obesity class III >40kg/m^2: 11 (100) **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** • White British: 5 (46) • White European: 1 (9) • White American: 1 (9) • Not reported: 4 (36) **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Pregnancy as a Pause: '…it feels like it gives you a free pass'

2. Dietary advice: ‘I’m bright and I know what's good’

Pregnancy as a Pause: ‘…it feels like it gives you a free pass’

Many participants related pregnancy to be a period of change in relation to food and diet. Some felt that this was a time where there was a relaxation of social expectations relating to diet and weight control. This was seen as a period for a 'free-pass' in relation to food consumption and eat what one desired.

“I think it goes to extremes in pregnancy, and I think a lot of folk change their diets totally because they think ‘I need to eat healthy for the baby’ and I’m not saying that I didn’t eat healthy meals as well, I just did eat…crisps and chocolate as well…so…Oh, I think it feels like it gives you a free pass. Mmm…yeah, I do. And I shouldn’ae feel that but I do. Mm-hmm. You just think, ‘Oh, I can deal wi’ it after’… I just think, ‘Well, I’m gonna.’. ...this is likely to be my last baby, I can lose the weight once I’m done” (page 90, age 27, 2nd baby)

There was a sentiment that cravings should be listened to as this was the baby's way of 'telling them' what to eat. A few participants acknowledged their awareness that eating for two was a myth, however, it was taken to mean unrestricted intake of food. Most participants reported making an effort to consume more from certain food groups such as calcium-rich foods and fruit and vegetables. These were described as those food groups recommended by health professionals. At the same time many also described giving themselves permission during pregnancy to eat more unhealthy foods or 'treats'.

"Because, I mean, I have been eating healthily. I’ve been eating a lot more fruit and things, because I keep on getting craving for certain fruits…[Because they say whatever baby fancies is what you’re neglecting, or what you’re missing in your diet. And I was like, ‘Right, OK’" (page 91, age 28, 1st baby)

	Dietary advice: 'I'm bright and I know what's good' All participants received a dietetics consultation which was part of the high-risk service. Some reported feeling reassured by the consultation, although most felt that there was nothing new or useful discussed that they didn't already know about healthy eating. *"We're not miserable old fat people or anything,...I don't think the clinic's going to tell me, 'This is what you should be eating and this is what's good for your baby', because I'm bright and I know what's good" (page 91, age 32, 1st baby)* There was a sense of frustration and stigmatisation around the advice received at the specialist clinic. *"You know, and I understand it's like, you know, they're just doing it because they're trying to help and… But you're like, well, what's the point in telling me… that, 'You're pregnant, so you can't diet… but you're fat, so you're just kinda like…[tearful, whispering]… really bad', you know what I mean? […] Like, I can't do anything about it, so you're making a person feel - you know what I mean? - bad about something they've already got an issue with."(page 91 age 28, 3rd baby)* The same participant regarded simple information provision to be unhelpful on its own despite the underlying good intention. They considered themselves an expert on food and dieting already. There was a sense of judgement being felt behind the advice and with this came frustration. This participant described emotional and psychological challenges that came with the consultations. *"I mean, I know all this… I mean I've studied this so much… like… I could be a dietitian probably! I just can't implement it, for whatever reason, like… know what I mean?" (page 91 age 28, 3rd baby)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Lavender, 2016

Bibliographic Reference	Lavender, Tina; Smith, Debbie M.; Seeing it through their eyes: a qualitative study of the pregnancy experiences of women with a body mass index of 30 or more; Health Expectations; 2016; vol. 19 (no. 2); 222-233

Study Characteristics

Study type	General qualitative inquiry Focus groups, semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Two locations in north west England in a community setting. **Aim** To explore experiences of pregnant women with BMI of 30 kg/m^2 or above when using maternity services and partaking in a community lifestyle programme.

	Note: The community lifestyle program was a 10 week multicomponent programme addressing diet, physical activity and emotional wellbeing during pregnancy. Each session was 90 minutes minimum and content was guided by social cognitive theory with emphasis on behaviour change techniques. Sessions covered information on health consequences, behaviour demonstration, feedback, social support, goal setting and review. Sessions were held by midwife and health psychologist and a community nutrition team and qualified exercise instructor provided input.
Data collection and analysis	**Data collection** Ten focus groups and nine semi-structured one-on-one interviews. Focus groups contained 2-5 women and mean length of all interviews was 48.48 minutes. Interviews were held by three qualified midwives with knowledge of the lifestyle programme and unknown to participants. Two interviewers led the questions and the third was a moderator. Interviewers regularly confirmed understanding of participant responses throughout the interview. Field notes were recorded after each interview. The semi-structured topic guide was developed in consultation with key advisers. Weight loss was not a focus of the interview guide as a healthy lifestyle was the focus. Interviews were held until data saturation occurred. Interviews were audio-recorded. **Data analysis** Interviews were transcribed verbatim and a thematic analysis was undertaken guided by the Braun and Clarke approach. Researchers familiarised themselves with the data, initially coded the data, searched for themes with broader themes and subthemes created and themes were reviewed, discussed and refined. Themes and subthemes were not checked with interviewees.
Recruitment strategy	Participants were sampled from a larger study. Those who attended the first five programmes of the feasibility study were invited to the qualitative study. Eighty women were approached.
Sources of funding	Not industry funded
Inclusion criteria	• Attended the lifestyle programme • BMI 30 kg/m^2 or above • 4-6 weeks postpartum
Exclusion criteria	None reported
Sample size	N=34 (all postnatal)

Participant characteristics	**Mean age in years (SD)** 26 (NR) **Parity during pregnancy (n, %)** Nulliparous: 12 (35) Multiparous: 22 (65) **Pregnancy status [at interview], (n, %)** • Prenatal: 0 (0) • Postnatal: 34 (100) **Stage of pregnancy [at interview] (n, %)** All 4-6 weeks postnatal **Mean (SD) BMI [at interview]** 39 (NR), unclear at what time point BMI was measured **BMI class during pregnancy** Obese: 34 (100) **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** • White British: 25 (73)

	• Asian Pakistani: 3 (9) • Black African: 2 (6) • Asian British: 2 (6) • Asian Bangladeshi: 1 (3) • White Black African: 1 (2) **Education level (n, %)** • Lower than school leaving age: qualifications: 1 (3) • School leaving age qualifications: 18 (53) • Further education qualifications: 11 (32) • Higher education qualifications: 4 (12) **Income status** Index of multiple deprivation* • Quintile 1 (most deprived): 16 (47) • Quintile 2: 9 (26) • Quintile 3: 4 (12) • Quintile 4: 3 (9) • Quintile 5 (least deprived): 2 (6) * Based on 7 dimensions: income, employment, health and disability, education, crime, housing and services, living environment
Results	Author themes relevant to this review: 1. Readiness to make a lifestyle change 2. Spurred on by success **Readiness to make a lifestyle change**

The authors identified the following 1 relevant subtheme:

Reasons for attending the lifestyle programme

Participants welcomed the opportunity to received healthy lifestyle information and like the focus on promotion of a healthy lifestyle as opposed to losing weight.

'I found all the food, nutritional stuff really interesting....I know a bit about it from dieting in the past but it was more like looking at having a balanced diet rather than losing weight' (page 222-223, BMI of 37.27 kg/m^2, aged 24)

Participants discussed that they liked the informal style of the programme which, unlike previous experiences of being 'preached' to in the past by health care professionals, was favoured as this led to more interactions and ability to make informed choices. Expectations of the programme were met and the different ways information was delivered by different experts (for example, in fun forms and novel ways of demonstrating behaviour) was favoured.

'It was lots of fun, and it beats someone just standing up in front of you saying, do this, do that or this is ...you know, learn this, I think we learned so much from the activities that we did....the stuff we did with the food chart and you had to know where stuff went and everything else...' (page 227, BMI of 34.9 kg/m^2, aged 21)

The lifestyle programme was also an opportunity for those, particularly from deprived backgrounds, to socialise and meet others. A few participants talked about feeling lonely and the programme provided the opportunity of *'...getting out once a week...' (page 227, BMI of 37.6 kg/m^2, aged 37)*

Spurred on by success

	Attending the lifestyle programme gave participants motivation to continue to improve their lifestyle. There was a sense of pride when discussing small lifestyle changes which was seen to be habits to integrate into everyday life and long term. *'Well yeah, like I say I want to kind of set habits that will last a lifetime and I need to do that early on, and not just for them but for me' (page 22, BMI of 51.1 kg/m^2, aged 26)* The authors identified the following relevant subthemes: • Changes to diet/nutrition Some participants noted differences in their food shopping behaviours based on what was learnt in the program. Specific mention was made to new awareness and understanding of food label contents. Learning how to read contents of foods was mentioned in a positive manner and this was used to keep check of their eating behaviour. *'...a few shocks...when [they] read them things like Special K [a breakfast cereal] with hardly any fat, but lots and lots of sugar' (page 228, BMI of 38.4 kg/m^2, aged 34)* *...just doing this programme, that's helped, because it makes... it, it, makes you realise, you know, you don't realise what you shouldn't be doing. And it kind of opened my eyes, you know, when I'm going shopping I'm looking at my labels, and when I'm cooking as well (page 228, BMI of 51.1 kg/m^2, aged 26)* Shopping habits were altered as a result of being informed on nutrition al information of food. Participants said they used the UK government traffic light scheme when deciding which foods to buy and some sought out healthier options after assessing the nutritional content of foods they were previously purchasing. *'...some of that stuck with me as well, like he [the food and health advisor] showed us, you know, the traffic lights on food, and stuff... always when I buy stuff I think, oh gosh, look at that, it's like nearly all green, I'll buy that...' (page 228, BMI of 49.77 kg/m^2, aged 26)*

	'...now when we are shopping I... look for a healthier substitute, which never really used to be a priority to me' (page 228, BMI of 49.5 kg/m^2, aged 25) Increased purchasing of fruit and vegetable was also mentioned by participants. Using fresh produce such as vegetables in cooking was a large change for some. *'Yeah they've got the fresh bolognaise sauce and that... is the recipe they gave us ...and he's [nutritional advisor] like 'oh no you can actually add carrots and things like that when you're cooking your mince, it's really nice' I wouldn't have thought to do that' (page 228, BMI of 50.1 kg/m^2, aged 24)*

BMI: body mass index; NR: not reported; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use. Unclear if the researcher participant relationship has been considered.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Lawrence, 2020

Bibliographic Reference	Lawrence, Wendy; Vogel, Christina; Strommer, Sofia; Morris, Taylor; Treadgold, Bethan; Watson, Daniella; Hart, Kate; McGill, Karen; Hammond, Julia; Harvey, Nicholas C; Cooper, Cyrus; Inskip, Hazel; Baird, Janis; Barker, Mary; How can we best use opportunities provided by routine maternity care to engage women in improving their diets and health?.; Maternal & child nutrition; 2020; vol. 16 (no. 1); e12900

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews conducted face-to-face in participant's homes. Participants were originally from a trial conducted in a large teaching hospital in Southampton, United Kingdom. **Aim** To understand the acceptability and feasibility of healthy conversation skills to be included in routine maternity care. Note: study is part of the Southampton PRegnancy Intervention for the Next Generation (SPRING) trial which was an RCT of vitamin D supplementation with or without a brief intervention of Healthy Conversation Skills about health behaviour change by midwives/nurses. Healthy conversation skills focused on asking open questions, reflect on practice, listen rather than provide information and support goal setting through SMARTER planning. Participants attended four research appointments at 14, 19, and 34 gestational weeks at the maternity hospital and 1 month after birth at home. They also received a call at 26 gestational weeks from the research midwife/nurse.
Data collection and analysis	**Data collection** Face to face semi-structured interview 3-6 months after birth conducted by a researcher, audio-recorded and observed by another researcher.

	Data analysis Transcripts were transcribed verbatim, coded and analysed through NVivo software. A thematic analysis was undertaken using Braun and Clarke's approach. Text from transcripts were fitted into more than one appropriate codes and nodes organised into themes and subthemes. An initial coding frame was developed inductively from the first three transcripts using a constant comparative approach in line with a relativist ontological and subjective epistemic position. Coding was performed iteratively by two reviewers and once a final coding frame agreed, a subset of five transcripts were checked for interrater reliability. Interviews were performed until data saturation occurred.
Recruitment strategy	Two samples of women that were recruited to SPRING were selected, one sample had undergone the healthy conversation skills trial intervention and the other were controls.
Study dates	April to December 2014
Sources of funding	Industry funded (Nestec and Abbott Nutrition; Danone Nutricia Early Life Nutrition)
Inclusion criteria	• Recent 1 month post-birth visit
Exclusion criteria	Not reported
Sample size	N=30 (intervention n=20, control n=10, all postpartum)
Participant characteristics	**Mean age in years (SD)** Intervention: 31 (6.24) Control: 33 (3.83) **Parity during pregnancy, n (%)** Intervention: • Nulliparous: 10 (53) • Multiparous: 9 (47) Control: • Nulliparous: 3 (30)

	• Multiparous: 7 (70) **Pregnancy status [at interview], n (%)** Postpartum: 30 (100) **Stage of pregnancy [at interview]** N/A **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported **Education level (n, %)** Intervention: • Secondary education (CSE, O level/GCSE) Low EA: 7 (35) • Further education (A level, HND, diploma) Medium EA: 8 (40) • Higher education (degree) High EA: 5 (25) Control: • Secondary education (CSE, O level/GCSE) Low EA: 1 (10) • Further education (A level, HND, diploma) Medium EA: 3 (30)	

	• Higher education (degree) High EA: 6 (60) **Income status** Not reported Note: Authors state that participants were from an area (Southampton) which was rated in 2015 as 67th on the overall index of multiple deprivation out of the 326 local authorities in England (1=most deprived; Southampton City Council, 2015b). They also state that in 2014/2015, of the women presenting at their first midwifery appointment in Southampton 47% were classified as overweight or obese (Southampton City Council, 2015a)
Results	Authors themes relevant to the review question: 1. Acceptability to women 2. Conversations to support behaviour change goals 3. Women's views on research midwife/nurse versus routine midwifery care **Acceptability to women** Participants in the healthy conversation skills (HCS) arm discussed that they found the intervention acceptable, the process was empowering and were pleased with the interest that the midwife and nurse showed in their health and the baby's health. *'I think it just takes you away from everything else going on, and gets you to think about just being a pregnant woman for once … make you focus on being healthy for you, and exercising for you. So that was good.' (page 5, Int12309, 28 years, one child, low EA)*

On the other hand, some women felt judged.

'Every time they rang you … it was a little bit like the diet police.' (page 6, Int12496, 39 years, two children, low EA)

Those in the control group did not report any exploratory conversations about health behaviours in their appointments.

'I remember getting into a discussion with one of the midwives down to where we were buying our Christmas turkeys … it wasn't very much about the pregnancy!' (Con12275, 39 years, two children, high EA)

Conversations to support behaviour change goals

Participants in the HCS arms commonly mentioned conversations held between themselves and the midwives/nurses relating to plans for behavioural change. Participants recalled being prompted by their research midwives/nurses to identify barriers to change and create strategies to assist with this.

'I did make a change in terms of the amount of cake I was eating … we pinpointed that I worked in an office where people brought stuff in a lot. And I don't want to say no to it, because it's nice and someone's brought it in, and why shouldn't I have a bit of cake? But I think what changed is I stopped buying and taking stuff like that to work.' (page 7, Int12243, 35 years, one child, high EA)

	Those in the control arms did not mention plans to change behaviours after talking to midwives/nurses. *I: 'What plans did you make to change anything when you were pregnant?' P: 'None … not knowingly.' (page 8, Con12508, 39 years, one child, high EA)* Participants in the intervention arm recalled many healthy conversation topics discussed with their midwives/nurse asked via open discovery questions *I: 'What kind of things did you talk about with them?' P: 'A lot about diet, healthy lifestyle, how I was living. How the pregnancy was developing. How I was feeling, who supported me, the types of food I was eating.' (page 8, Int12229, 36 years, one child, high EA)* **Women's views on research midwife/nurse versus routine midwifery care** Participants across arms discussed the limited time experienced for NHS appointments and there were different experiences of the NHS. *'Once you have had more than one child you don't see midwives as much anyway … so it was nice to know that I could contact them (research midwife/nurse), but I never did really. Just got on with it … my (NHS) midwife was never there.' (page 9, Con12369, 32 years, three children, medium EA)*

	Participants receiving the healthy conversation skills intervention mentioned being able to reflect on their health as prompted by the midwives/nurses and commented on the absence of this in routine NHS appointments. *'It does make you more aware, if there was that support for general pregnancies … then maybe it would increase people's awareness of what they are eating.' (page 9, Int12087, 40 years, three children, low EA)* Participants commented that they would like to see NHS midwives ask questions so to opportunity to reflect on their health rather than having the responsibility to ask the midwife questions. *'It probably would be beneficial to have some kind of well-being discussion. It's always left to the women to ask the midwife...' (page 9, Int14021, 32 years, two children, high EA)* Participants also discussed that they liked being able to have the chance to reflect upon themselves separately from the baby. It was felt that NHS care was mainly concerned about the health of the foetus and that there was opportunity to also include the mother's health, which would not have to take up too much time of the standard consultation. *'The big difference is the fact that … they have to do the forms and medical bits as well; it's just tagging that extra five minutes on the end … How are you feeling? … that's the bit that makes the difference I think. It doesn't have to be long.' (page 9, Int12001, 44 years, two children, high EA)*

BMI: body mass index; NHS: national health service; RCT: randomised controlled trial; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use. No discussion of data saturation.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Morris, 2020

Bibliographic Reference	Morris, T; Strommer, S; Vogel, C; Harvey, N C; Cooper, C; Inskip, H; Woods-Townsend, K; Baird, J; Barker, M; Lawrence, W; Improving pregnant women's diet and physical activity behaviours: the emergent role of health identity.; BMC pregnancy and childbirth; 2020; vol. 20 (no. 1); 244

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews were conducted at the participant's home in Southampton United Kingdom **Aim** To understand what influences diet and physical activity in pregnancy and what lifestyle support is needed during this time.

	Note: study is part of the Southampton PRegnancy Intervention for the Next Generation (SPRING) trial which was an RCT of vitamin D supplementation with or without a brief intervention of Healthy Conversation Skills about health behaviour change by midwives/nurses. Healthy conversation skills focused on asking open questions, reflect on practice, listen rather than provide information and support goal setting through SMARTER planning. Participants attended four research appointments at 14, 19, and 34 gestational weeks at the maternity hospital and 1 month after birth at home. They also received a call at 26 gestational weeks from the research midwife/nurse
Data collection and analysis	**Data collection** Face-to-face semi-structured interviews were held by female researcher and one of two observers with pre-determined topics structured based on a discussion guide. Observers asked additional questions if felt the interviewer had not covered these. Interviews were audio-recorded and lasted about 30 minutes. **Data analysis** Transcripts were transcribed verbatim, coded and analysed through NVivo software. A thematic analysis was undertaken using Braun and Clarke's approach. Text from transcripts were fitted into more than one appropriate codes and nodes organised into themes and subthemes. An initial coding frame was developed inductively from the first three transcripts using a constant comparative approach in line with a relativist ontological and subjective epistemic position. Coding was performed iteratively by two reviewers and once a final coding frame agreed. Interviews were performed until data saturation occurred.
Recruitment strategy	Inclusion of women who had been in the intervention arm of Southampton PRegnancy Intervention for the Next Generation (SPRING) trial. Women were sent a letter and information sheet within 6 months of the final SPRING visit. Follow-up phone calls and text messages were undertaken to assist recruitment numbers. Invitation letters were posted in batches until data saturation occurred.
Study dates	Not reported Note: the study interviewed women in the Healthy Conversation Skills intervention arm that completed SPRING between February and December 2016. The recruitment dates from the same trial differ to Lawrence 2020.
Sources of funding	Received industry funding by Nutricia Early Life Nutrition
Inclusion criteria	• Women in the SPRING trial intervention arm that had completed the trial between February and December 2016

	• Any BMI
Exclusion criteria	Not reported
Sample size	N=17 (all after pregnancy)
Participant characteristics	**Mean age in years (SD)** 33 (range 23-40) **Parity during pregnancy, n (%)** • Nulliparous: 8 (47) • Multiparous: 9 (53) **Pregnancy status [at interview], n (%)** After pregnancy: 17 (100) **Stage of pregnancy [at interview]** N/A **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** • White British: 16 (94)

	• East Asian: 1 (6) **Education level (n, %)** • A level: 4 (24) • Higher national diploma: 1 (6) • Degree level or higher: 12 (71) **Home index of multiple deprivation quintile** • 1– most deprived: 1 (6%) • 2: 3 (18%) • 3: 4 (24%) • 4: 3 (18%) • 5 – least deprived: 6 (35%) Note: Participants were from an area (Southampton) which was rated in 2015 as 67th on the overall index of multiple deprivation out of the 326 local authorities in England (1=most deprived; Southampton City Council, 2015b). They also state that in 2014/2015, of the women presenting at their first midwifery appointment in Southampton 47% were classified as overweight or obese (Southampton City Council, 2015a)
Results	Authors themes relevant to the review question: 1. What keeps me from improving my health? 2. What things in my life help me to be healthy? 3. How did I use pregnancy-specific resources? 4. How much did I engage with the research nurses' support? 5. Why do I want to be healthy? **What keeps me from improving my health?** Authors identified 2 subthemes relevant to this review:

	The way pregnancy makes me feel Many participants reported novel barriers towards a healthy diet during pregnancy. Although a healthy diet was viewed as important, food such as starchy foods that aided morning sickness was prioritised and others discussed cravings. *"I hit six weeks and I just felt like absolute rubbish, and I pretty much lived on rice cakes and mashed potato for ages. It was just anything to settle my stomach, and that's all I fancied." (page 4, age range at interview 26–30; 1 child; IMD 3)* *"I get hyperemesis and I vomit and vomit until about six months. Both times, until almost six months. And so I didn't really eat anything except crisps and bread and Coke […] really starchy things to keep it down." (page 4, age range at interview36–40; 2 children; IMD 3)* My health is not a priority Participants with multiple children also discussed barriers of limited time or energy during pregnancy. *"The second time you just sort of have to continue as you are because you've got someone else to think about. So actually, I didn't make nearly as many changes to my life as I did the first time I was pregnant, when it was just me and my partner." (page 4, age range at interview 36–40; 2 children; IMD 3)* **What things in my life help me to be healthy?** Authors identified 3 subthemes relevant to this review: I have always had a healthy lifestyle

	Some participants did not have a hard time to maintain a healthy diet and achieve their goals during pregnancy as this was already part of their routine. *"I know how to eat healthily – I've always done it." (page 5, age range at interview 26–30; 1 child; IMD 4)* People around me are healthy too For these participants, this healthy lifestyle tended to be present in their households or social circles which helped them keep on top of these lifestyles during pregnancy. *"I'm not panicking about any of it. As I said before, obviously with someone in the house who likes to cook...so he wants to stay fit and healthy.. it's not a household where everyone wants to eat you know, junk food." (page 5, age range at interview31–35; 3 children; IMD 2)* My environment encourages healthy behaviours Other factors in their everyday life were discussed to facilitate healthy lifestyles. These were making sure that healthy food was at hand at home or work. *"I was very lucky 'cause where I work we have our lunches included… So it was really easy for me to eat quite healthily. I always had melon for my dessert instead of having the… oh I would allow myself the odd crumble here and there […] but the majority of the time, I would have sort of melon or strawberries or something like that." (page 5-6, age range at interview 31–35; 3 children; IMD 2)*

Authors stated that participants who were able to report facilitators to support a healthy lifestyle were discussed in terms of long-term health rather than in relation to pregnancy specific support.

How did I use pregnancy-specific resources?

Authors identified 3 subthemes relevant to this review:

Baby's development

Specific concerns

Most participants named one or more resource they used to obtain advice or pregnancy related information. These were in the form of books, apps, classes, internet browsing or social support groups. Most of the resources, however, were used to seek information on the development of the baby as this was seen as interesting or any concerns rather than to promote healthy eating.

"More interesting to see my baby's the size of a honeydew melon this week rather than like, 'you should be eating that honeydew melon.' I guess I like to think I kind of know what it is to eat healthy." (page 6, age range at interview 31–35; 2 children; IMD 5)

To help me improve my health

Only some women researched diet related guidance from searching the internet.

"I did print a list of every food you're supposed to eat, every vitamin you're supposed to eat in pregnancy. So I tried to eat different things off that." (page 6, age range at interview, 31–35; 2 children; IMD 5)

Over a third of participants did not mention any resources used to support their diet. The way resources were approached differed according to whether this was the first pregnancy or not. Those who had a first pregnancy had more anxieties and

	were more interested in information or resources on pregnancies. For those who had previous pregnancies, there was a relaxed attitude with less apparent interest in lifestyle information and resources. *"When you've not been pregnant before, you think, 'I mustn't eat this sort of cheese, and I mustn't eat this sort of fish, and I mustn't drink and I mustn't smoke and everything,' and blah blah. And I don't smoke and I don't drink a lot anyway, but I think when you've done it, you sort of think, 'actually…' It's not that it's scare-mongering. It's all very good advice, but I think the second time, you just have to be a bit sensible in yourself." (page 6, age range at interview 36–40; 2 children; IMD 3)* **How much did I engage with the research nurses' support?** Authors identified 2 subthemes relevant to this review: I realised that they were trying to support me to set and reach health behaviour goals Participants had received the healthy conversation skills intervention during the trial but were blind to this and generally unaware of this component in the trial. Participants tended to talk about trial research nurses asking after their health and helping them to form goals which was generally positively received. Over half of the participants set a dietary goal. *"I think actually the nurses were brilliant 'cause they were never like, 'well, you should be doing this…' they weren't telling me what to do. They were kind of asking me what I would like to do and getting me to think about what I want[…] It got me thinking and a bit more focused on what I should be eating and doing." (page 6-7, age range at interview 36–40; 2 children; IMD 3)* One participant that did not set any lifestyle goals spoke negatively about the encounter with the research nurse as they didn't feel that goal setting was a method that suited them.

	"I'm just not that sort of person […] My goal was to just get through the pregnancy relatively well, so I didn't want to set myself a goal of saying... 'I'm not going to eat any chocolate or anything.' I just kind of wanted to get through it." (page 7, age range at interview 36–40; 2 children; IMD 3) The support I had helped me to be healthier Those who did set diet based goals varied in their view of whether these were helpful. Some felt they would have achieved similar goals without the support, although many felt that the additional support of healthy conversations facilitated healthier lifestyles. There were a few participants that welcomed the research nurse interest in their health rather than just of the baby. *"I wouldn't necessarily say those goals were really important to me, but the general being fairly healthy […] it wasn't so much about the goals, it was just the [trial] that got me thinking generally about what you're eating, what you're putting in your body." (page 7, age range at interview 31– 35; 2 children; IMD 5)* *"It does make you keep up everything you set because you almost feel when you've got someone ringing you in a few months' time, you want to be able to say to them, 'yes, yes! I've still done it.' "(page 7, age range at interview 31–35; 3 children; IMD 2)* *"It was quite nice to have that, that time to actually really think about me pregnant and not just the baby whilst I was pregnant, if that makes sense." (page 7, age range at interview 36– 40; 2 children; IMD 3)* **Why do I want to be healthy?** I want to do the best I can for my children

	Motivating factors discussed for healthy lifestyles during pregnancy tended to be for the health of the baby, their own health and weight related reasons. There were only some participants that were mainly motivated to eat more healthily for the baby's sake. *"I do think that eating healthy is more important because that's what they get, isn't it, from you."* (*page 7, age range at interview 21–25; 2 children; IMD 1)* The same participant described their motivation during pregnancy for keeping healthy as an opportunity to act as a role model for their children. *"I don't want to teach my children that they've got to be skinny because they don't have to be skinny. They just have to be healthy, and that's what I want. So I can't teach them not to smoke if I'm smoking. I can't teach them not to drink if I'm an alcoholic. I can't teach them to be healthy if I'm not healthy myself." (age 7, age range at interview 21–25; 2 children; IMD 1)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Newson, 2022

Bibliographic Reference	Newson, Lisa; Bould, Kathryn; Aspin-Wood, Bronte; Sinclair, Lauren; Ikramullah, Zainab; Abayomi, Julie; The lived experiences of women exploring a healthy lifestyle, gestational weight gain and physical activity throughout pregnancy.; Health expectations : an international journal of public participation in health care and health policy; 2022; vol. 25 (no. 4); 1717-1729

Study Characteristics

Study type	Grounded theory Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Study conducted across Merseyside, UK. Interviews were conducted in a private setting. **Aim** To understand perceptions and expectations of diet and physical activity during pregnancy.
Data collection and analysis	**Data collection** Semi-structured interviews were digitally audio recorded and held one-on-one in a private setting (n=19). Three additional participants originally recruited were chosen to be patient and public involvement representatives which facilitated analytical results. These participants were seen by the researchers to be varied in their pregnancy experiences. The interview schedule was developed in consultation with healthcare professionals and pregnant women **Data analysis** Interviews were transcribed verbatim. Participant additional commentaries or reflective notes from the start and end of interview were added to the analysis as supporting data linked to transcripts. A thematic inductive analysis was undertaken

	using Charmaz's approach. Open and focused coding, memo writing and grouping data into categories was achieved while further data was collected to build upon constructed categories. Triangulation was performed, investigator self reflection of experience influencing analysis were discussed. An iterative coding process with category and theory creation was employed. Initial grounded theory categories and framework were compared to existing literature, the patient and public involvement facilitated theoretical saturation and validation of the final analysis with refinements made.
Recruitment strategy	Women enrolled in a local lifestyle intervention for pregnant women across Merseyside were emailed prior to commencement of the intervention for participation in the qualitative component. Based on grounded theory, recruitments was based on purposeful and theoretical sampling, alongside data collection and analysis, for example, greater input from first pregnancy participants was seen to be needed in later phases of theory construction and so were targeted for recruitment; barriers to healthy eating prior to maternity leave was also seen to be needed and so women at earlier stages of pregnancy were targeted.
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	Intervention study inclusion criteria: • BMI >20 kg/m^2 • Aged 18 years or older • Third trimester (>27 gestational weeks) • Uncomplicated pregnancy • Single pregnancy • English speaking Note that women prior to third trimester were included in qualitative analysis.
Exclusion criteria	Intervention study inclusion criteria: • High risk pregnancy (requiring additional care)
Sample size	N=19 (stage of pregnancy unclear at interview)
Participant characteristics	**Mean age in years (SD)** Not reported

	Parity during pregnancy, n (%) Not reported **Pregnancy status [at interview], n (%)** Not reported **Stage of pregnancy [at interview]** Not reported **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Evolving from 'I' to 'we'

2. The power of information and guidance

Evolving from 'I' to 'we'

The authors identified the following 1 relevant subtheme:

The influence of the mother and baby bond— An intrinsic motivator

A motivating factor towards eating healthier was the development of the baby and health of the child. This had influence on uptake of positive health behaviours such as following diet guidelines and omitting 'unsafe' foods during pregnancy.

'…During pregnancy, I think it is even if you weren't healthy before or not as healthy with your eating beforehand I think it's important to find a concentrated effort during pregnancy.' (page 1722, Interview 17)

Food choices were made more consciously and participants increased their knowledge and awareness of healthy foods and recommended nutrition intake.

'I've bought cereal, you know, with the added folic acid and B12 and things like that. I am more aware of things when I'm buying them, so that has probably been different to before. (page 1722, Interview 12)

Participants wanted to ensure that their unborn baby were developing well and diet was seen to play an important role in this. As such, the baby's health was a motivational factor to drive healthier lifestyle choices.

'I think you have to take yourself out the equation and what you want because it's not all about you…and, I'm a person, I'm responsible and want what's best for my child so if that means standing up and cooking when I've just got home from an 11 and a half shift, so be it, because it's important.' (page 1722, Interview 10)

The power of information and guidance

The authors identified the following 2 relevant subthemes:

Knowledge-seeking and reassurance

Participants stated that they wanted information that was trustworthy and wanted to gain knowledge about behaviour change in relation to lifestyle choices such as healthy eating. Participants viewed the midwife as a trustworthy source of advice and knowledge. It was expected that midwives would provide this information. All participants had some basic knowledge on diet but did not necessarily translate to healthy behaviours. Seeking out information on diet during pregnancy was guided by the motivating factor of foetal health. When participants became pregnant some sought pregnancy based information which in turn helped with healthier lifestyle choices.

'I was thinking right no just get to my 12 weeks, I'll see the midwife, and they'll sort me out.' (page 1723, Interview 1)

Participants commented on the usefulness of internet searches for quick access to pregnancy related diet based information which provided a sense of reassurance.

'I don't know what I would do without Google. Yeah, I don't know what women used to do [to get information], like all the stuff I've learnt about safe healthy foods.' (page 1723, Interview 12)

Others expressed caution of using the internet for a source of guidance towards diet in pregnancy due to ambiguity of information as well as ulterior motives of certain websites that might want to sell a product.

	'There is advice and general information on them, but it's obviously trying to get you to think about their products, buy their products.' (page 1723, Interview 1) Social influences The participant's networks such as friends and families were discussed to be influences on behaviour towards diet. While there was often encouragement towards healthy eating and lifestyle in pregnancy by those around them, some participants experienced negative comments and subsequent anxieties. *'Couldn't argue with them because I didn't know myself whether it's right or wrong, so I listened and avoiding it.' (page 1724, Interview 8)* At the same time, these negative comments were a motivator to seek information on healthy eating during pregnancy and also to join the lifestyle intervention so to connect with other pregnant women. The social element of the intervention was a motivator for many participants. *'Feel a little bit more comfortable because you are with other people that are pregnant who often have the same questions and concerns as I do.' (Page 1724, Interview 1)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	Minor concerns *(Some concerns with research design- authors do not provide details on how they decided which method to use.)*
Overall risk of bias and relevance	Relevance	Highly relevant

Ohly, 2019

Bibliographic Reference	Ohly, Heather; Crossland, Nicola; Dykes, Fiona; Lowe, Nicola; Moran, Victoria Hall; A realist qualitative study to explore how low-income pregnant women use Healthy Start food vouchers.; Maternal & child nutrition; 2019; vol. 15 (no. 1); e12632

Study Characteristics

Study type	General qualitative inquiry Semi-structured and realist interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Two locations in North West England with interviews held at a convenient time and location for participants. **Aim** To build on previous Healthy Start programme realist theories and understand how low-income women use Healthy Start vouchers.

Data collection and analysis	**Data collection** Semi-structured interviews conducted by lead author with topic guide and a realist approach. Vignettes were used and comprised seven fictional quotations which were printed on laminated cards. From vignettes, participants were prompted to discuss similarities or differences to their experiences. The vignettes were previously piloted. Interviews ran for 30-40 minutes. Some participants were invited to have a second interview if the lead author felt that more data was required for theory development. Interviews were audio recorded. Three participants attended the additional interview. **Data analysis** Interviews were transcribed verbatim and transcription quality was checked by lead author. The lead author coded and analysed the transcripts via an Excel database with a realist approach employed (Puntonm Vogel & Lloyd, 2016). The longest interview was reviewed by a second author. Transcripts were initially read, annotated with thoughts and interpretations. Coding and analysis was iterative and discussed with co-authors and disagreements resolved by consensus. A realist logic of analysis was undertaken which started with the outcome and worked to understand the mechanism. Outcomes were only coded if there was some explanation within the transcript. Links between context, mechanisms and outcomes were found and sometimes found across interview transcripts.
Recruitment strategy	In person recruitment through antenatal clinics and drop-in sessions such as breastfeeding support groups in Sure Start children's centres. A gift voucher incentive was employed and posters and flyers were also placed around the children's centres. A Healthy Start Study Facebook page was created with frequent advertisements aimed at women 16-40 years. Women were asked if they knew anyone in their networks that night be eligible.
Study dates	September 2016 to May 2017
Sources of funding	Not industry funded
Inclusion criteria	• Pregnant at time of study or within previous 6 months • Receiving Healthy Start vouchers or had received these during pregnancy
Exclusion criteria	None reported
Sample size	N=11 (5 prenatal, 6 recently pregnant)
Participant characteristics	**Mean age in years (SD)**

	Not reported, range 18-25 years: n=7; 26-35 years: n=4 **Parity during pregnancy (n, %)** • Nulliparous: 2 (18) • Multiparous: 9 (82) **Pregnancy status [at interview] (n, %)** • Prenatal: 5 (45) • Recently pregnant (within prior 6 months): 6 (55) **Stage of pregnancy [at interview] (n, %)** Not reported **BMI class during pregnancy (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** White British: 11 (100) **Education level (n, %)** Not reported **Income status**	

	Not reported Note: the two locations in North West England had high claim rates for out-of-work benefits when compared to the UK average.
Results	Authors themes relevant to the review question: 1. Dietary improvements 2. Shared benefits 3. Financial assistance **Dietary improvements** Some participants felt that the Healthy Start vouchers allowed them to positively adjust their diets during pregnancy. The vouchers were viewed by participants to serve this purpose. These participants were motivated to eat healthily and vouchers were a means towards behaviour change. The authors suggest that Healthy Start vouchers may have reinforced motivation to improve nutrition during pregnancy. This was combined with the motivation to eat healthily for the benefit of the baby. *"… when I used to go shopping I didn't look at fresh foods or anything like that it didn't really appeal to me but then with the vouchers that actually pushed me forward to start eating healthy and buy more stuff … I think that is what it was because I was pregnant as well and obviously I wanted to have the benefits, my daughter to have a good start instead of eating rubbish." (page 5)* Vouchers provided access to foods that might have been too costly otherwise. Cheaper, unhealthier foods could be avoided and decisions could be made without financial worry. This was viewed by one participant as allowing pregnant women to be

on an even playing ground. This access led to greater consumption of fruit and vegetables and cow's milk or a wider variety of fruit and vegetables in their diet.

"It gives people like it says, ease to be able to get the extras that they say you need rather than sit there and thing oh! my god I am pregnant I am not going to be able to afford. Let's be honest veg and fruit are higher than chocolate and sugary foods anyway. So for us to be able to go and buy the higher food, it wouldn't be fair if people like myself couldn't afford it without the Healthy Start vouchers." (page 5)

Shared benefits

Those participants with older children commented that they were able to share the benefits of healthy food from the Healthy Start vouchers with their older children. Sometimes if there were healthy start vouchers for their kids as well, this would be used as a bundle rather than separate vouchers.

"I don't put it in like, you have got £5 and you've got £5 we just put it all together in one big shop and we just help ourselves really if we want something you go and get it." (page 6)

The same participant commented that they were willing to go hungry during pregnancy if that meant the children were fed.

As a mum you don't set it down if you think about it your kids come first so your kids get if they need it, if you have only got a limited amount of something there is not enough for everybody you are always going to give it to your children first. You would leave yourself hungry for your children." (page 6)

Another participant commented that they thought their diet was balanced and contained many fruits and vegetables so reasoned that they did not need to eat differently during pregnancy. As this was the case, this participant also used their

voucher towards their two sons who ate more cow's milk, fruit, and vegetables than her. The combined vouchers allowed for greater selection of fruit and vegetables to be consumed, most by their children.

"I don't eat any different when I am pregnant because I eat a lot of fruit and veg, I have quite a balanced diet anyway. I don't really change it just because I am pregnant. The only difference I did was to take folic acid and vitamin D...Yes, when I was pregnant it went more towards … my older two boys. I would eat the fruit and veg and the milk as well but I put it more towards them with them being children. I thought they enjoy it more... I only put a tiny bit in [cups of tea] whereas the children are drinking milk … by itself or cereal so it went more towards them because they use more of the things that you can get with the Healthy Start voucher more than what I do...Yes, it makes us be able to choose more because if I didn't have the vouchers I would probably only pick one or two [fruit and vegetables] apart from the actual weekly shopping. I would probably only choose one or two as an extra but with the vouchers we can get more of a variety." (page 6)

Financial assistance

A few women stated that instead of using Healthy Start vouchers to buy more food, it served to reduce the price of food that they would have already been buying. Instead, the money saved was used on other items. The authors state that financial worries overshadowed the importance of eating healthily such that vouchers would be seen as a means to assist other financial matters rather than towards a healthier diet. Vouchers were seen as a 'nutritional safety net' as these participants could save money without having to cut out any healthy foods from their shopping.

"They do because like I said at the beginning if I pay £10- £15 a fortnight on fruit and veg that is coming out of the vouchers it is not coming out of my money. It is like sounds cheap but it sounds like it has been bought for you. It saves you that money because if you think about it, that a month is £20-£30 a month being saved that can go towards kid's clothes, days out, just stuff like that, essential other stuff that you need as well." (page 7)

"All the time. All the time. Some weeks you've got to think about buying all your food but I always think she's growing, how am I going to buy next size of clothes if I'm buying her nappies and milk. I don't want to borrow money for clothes. You want

	to treat your kids all the time, but you've got to think about what you need first...It just takes a little bit of worry off you... rather than buy extra with the £3.10 I would just take that £3.10 off the fruit and veg that I would already be buying in that week." (page 7)

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Olander, 2012

Bibliographic Reference	Olander, Ellinor K,; Atkinson, Lou; Edmunds, Jemma K.; French, David P.; Promoting healthy eating in pregnancy: What kind of support services do women say they want?; Primary Health Care Research & Development; 2012; vol. 13 (no. 3); 237-243

Study Characteristics

Study type	General qualitative inquiry Focus groups, semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting**

	Interviews conducted at 3 children's centres in the Midlands, England **Aim** To understand preferred healthy eating services and support during pregnancy.
Data collection and analysis	**Data collection** Four 30-60 minute semi-structured focus groups after pre- or postnatal classes. Two of the classes were with prenatal women (n=9) and 2 were with postnatal women (n=14). Groups were tape-recorded and held by an experienced researcher and second researcher for notetaking. Open ended and probing questions were asked. Participants were rewarded with a voucher for their time. **Data analysis** Focus groups were transcribed verbatim and an inductive and data-driven thematic analytic approach was taken using Braun and Clarke's approach. Transcripts were read initially then themes formed after reading again. Themes were refined using an iterative approach with lead author analysing all transcripts and second author reviewing themes.
Recruitment strategy	Recruited by midwives or research team at three children's centres.
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	Not reported
Exclusion criteria	Not reported
Sample size	N=23 (mixed prenatal, postnatal)

Participant characteristics	**Mean age in years (SD)** Not reported **Parity during pregnancy (median, IQR)** Not reported **Pregnancy status [at interview], n (%)** • Prenatal: 9 (39) • Postnatal: 14 (61) **Stage of pregnancy [at interview] n,%** Not reported **BMI class during pregnancy (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported **Education level (n, %)** Not reported

	Income status Not reported Note: Participants were from the same deprived area in the Midlands which was in the top third of most deprived Local Authority Districts in England. For anonymity purposes, data was not formally gathered on parity, socioeconomic status, age or weight. Researcher observations and field notes suggested women ranged in parity and weight status (healthy to obese), were majority white British and aged between 18-30 years.
Results	Authors themes relevant to the review question: 1. Early information leading to routine formation of healthier eating habits 2. The delivery of practical sessions to increase information 3. Health professionals providing support and signposting to services **Early information leading to routine formation of healthier eating habits** The authors identified the following 2 subthemes: Pregnancy is a time of change: Participants preferred to receive healthy eating support during pregnancy over any other stage. Participants identified healthy eating as a behaviour that should change and education on healthy eating during pregnancy was required. This would enable the habit to start early to allow for a healthy eating pattern prior to birth *'It's also a lifestyle change as well isn't it? When you become pregnant there's so much that has to change, not just what you eat but everything you do, and the way you take care of yourself so it just falls into the package of, I need to learn that.' (P4, prenatal woman, page 239)*

	'I think maybe if you'd started well from the beginning then you probably would have carried on, because you'd have got into more of a routine then with everything else that goes on.' (P11, postnatal woman, page 239) More time prenatally becomes less time postnatally: Participants felt that there would be more time during pregnancy to eat healthily and attend any services than during the postnatal period. This is because postnatally, taking care of the baby would take up most of their time. *'I had the time then, when I was off on maternity, you've got all the time in the world haven't you? So you eat a bit better. It just goes downhill when you have them.' (P23, postnatal woman, page 239)* **The delivery of practical sessions to increase information** The authors identified the following 3 subthemes: Practical sessions to increase information Participants wanted practical sessions to learn how to eat more healthily and to cook healthy food. Participants wanted his kind of support over information provided in leaflets on cooking healthy food. *'I think practical makes more sense, if you're given a leaflet you just go and pile up leaflets in a big box.' (P10, postnatal woman, page 240)* *'A bit like when you was at school, you were taught how to cook.' (P11, postnatal woman, page 240)* *'Somebody to come in and say, you can make this, this and this, really easy.' (P23, postnatal woman, page 240)* Local services delivered by mothers

	Participants preferred the delivery of suggested practical sessions to be by those who had been pregnant and had children with suggested demonstrations on how to cook healthy food in an affordable and time efficient manner. *'Maybe mums in the same sort of situation, who could show you how to throw something together that's healthy, that isn't really expensive and that takes 15–20 minutes, and it's realistic, something that's realistic.' (P22, postnatal woman, page 240)* Alternatives regarding healthy eating support must be offered Participants preferred group over individual sessions, however, acknowledged that this choice should be up to the individual based on preference and information wanted. *'I think group-based is quite good.' (P23, postnatal woman, page 240)* *'You could give people the option couldn't you? If there was enough people to get together for a group session, then. But some people don't like to, they just prefer to pick up an information pack and read it at their own convenience so, depends on each to the person.' (P7, prenatal woman, page 240)* **Health professionals providing support and signposting to services** The authors identified the following 2 subthemes: Health professionals providing healthy eating support Participants additionally wanted further support on eating from their midwife or alternate health professionals which could serve as a reminder to maintain a healthy diet. *'I do think if they focused a little bit more on it [healthy eating] in the midwife meetings, I know that they're only really short but if they just gave you a rundown of almost, ''OK, what have you been eating?'' it kind of puts you on the spot, oh I've eaten this this week, and then you think.' (P4, prenatal woman)* *'I think the health visitor should be a bit more helpful, I mean, you go and get your baby weighed and that's it, in, weighed, out. That's all it is. You try and talk and it's like, haven't got time to talk 'cos there's too many babies in the waiting room.'*

	(P11, postnatal woman, page 240) Health professionals in a signposting role Participants felt that the most effective way of being informed about a healthy eating service would be through their midwife as it was considered that more women listen to the advice of their midwife. *'And if it's something perhaps your midwife recommended, you always listen to what your midwife says so, if they recommend, there's a class that'll tell you about so and so, even if you don't go for seven weeks in a row or whatever, and you just go for one class, at least you've got a bit more understanding. And everyone when they're pregnant, I presume the majority, you go to your midwife, so that's going to reach most people.' (P4, prenatal woman, page 240-241)* *'Maybe at your health centre. Do things like that, advertise for group sessions and see what people, give people more information about things that they can do.' (P7, prenatal woman, page 241)* It was raised that local services could be advertised via local government websites like other commercial company websites. *'Tesco, Huggies, Boots, you name it, they've all got websites for parents or newbie parents, why hasn't the [local] government* *website got one? That you could click on a link and it could have everything on there, and they tell you sessions.' (P1, prenatal woman, page 241)*

BMI: body mass index; IQR: interquartile range; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Padmanabhan, 2015

Bibliographic Reference	Padmanabhan, Uma; Summerbell, Carolyn D.; Heslehurst, Nicola; A qualitative study exploring pregnant women's weight-related attitudes and beliefs in UK: the BLOOM study; BMC Pregnancy and Childbirth; 2015; vol. 15 (no. 1); 99

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews were held at convenient venue in Tees Valley, North East England as proposed by participant. **Aim** To understand pregnant women's attitudes and beliefs towards weight-related behaviours, including diet behaviour.
Data collection and analysis	**Data collection** Face-to-face semi-structured interviews with a responsive interviewing model and an interpretive constructionist approach used. Interviews were audio-recorded and almost all participants chose to interview at home, one chose the location to be at work. The interview questions were adapted after a preliminary analysis of the first four interviews and included application of theories around body weight so to elicit further responses. Shopping voucher provided once the interview was complete. **Data analysis**

	Transcripts were transcribed verbatim and sent to participants for verification. A thematic analysis adapted from grounded theory was undertaken and content analysis undertaken by two researchers who were blinded to each other. Data was openly coded, subthemes formed and theme formation was iterative. A third reviewer independently analysed the data for accuracy of themes.
Recruitment strategy	Convenience and then purposive sampling of women from a Large maternity unit in North East England (South Tees National Health Service Trust) who were previously recruited into the BLOOM study (Behaviour and Lifestyle Observation of Mothers). The initial study recruited by post. Sampling was conducted until theoretical saturation was achieved. Pre-pregnancy BMI and gestational weight gain data was not used to inform purposive sampling.
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	• Aged over 16 years • Third trimester • Singleton pregnancy • Could read or write English
Exclusion criteria	Not reported
Sample size	N=19 (all prenatal)
Participant characteristics	**Mean age in years (SD)** 30.4 (5.6) **Parity during pregnancy, n (%)** • Nulliparous: 8 (42) • Multiparous: 11 (58) **Pregnancy status [at interview], n (%)** Prenatal: 19 (100)

	Stage of pregnancy [at interview] Third trimester: 19 (100) **BMI class [at booking appointment] (n, %)** • Healthy: 9 (47) • Overweight: 7 (37) • Obese: 2 (11) • Not available: 1 (5) **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** White: 18 (95) Other: 1 (5) **Education level (n, %)** GCSE: 6 (32) A-levels: 7 (37) Graduate: 1 (5) Post-graduate: 1 (5) Other: 4 (21)

	Income status Not reported
Results	Authors themes relevant to the review question: 1. Legitimising behaviours **Legitimising behaviours** The authors identified the following 2 subthemes relevant to this review: When it came to lifestyle participants wondered whether they always did the right thing. Authors stated that this could have partially stemmed from the diet related information provided by the midwife. Participants used adjectives such as "vague", "lacking depth" and "insufficient" to describe the information which emphasised what not to eat in pregnancy rather than what should be eaten. *“I mean you know you get like a leaflet on foods to avoid, but you know there isn’t really that much information about you know well what you can eat… it’s more of a don’t do this and don’t do the other, so that I know what I’m not supposed to do, so surely what I’m allowed to do out-weighs the things that I’m not supposed to do?” (page 7, 2nd pregnancy, Overweight BMI)* There was a shared sentiment amongst participants that their midwives had assumed that the participants already had the basic knowledge about diet or the means to do the research themselves. There was a preference towards receipt of verbal information rather than piecing together all the written information given to them.

“I think rather than just giving people booklets and things to go and read themselves, maybe they [midwives] should have some one-to-one sessions where we are actually told this is what we should be doing, […] so just to assume that somebody will do their own research, isn’t really a good idea, so I think that they [midwives] do need to be more direct, rather than just assume they [pregnant women] can go away and use a computer” (page 7-8, 1st pregnancy, Recommended BMI)

Validation of behaviours

Those participants who were experiencing their first pregnancy felt they did not know what to expect and with the receipt of a lot of new information on lifestyle including diet, wanted to make sure to research thoroughly. For those who had previously had children, they felt that they needed to *"keep on top of the information" (page 8).* Participants expressed that there was a lot of information available that was *"non-reputable" (page 8)* and needed to determine what was myth compared to facts, therefore used their own *"common sense" (page 8)*.

“I remember when I was a little girl and my dad would sit with that slice of bread and dripping smothered in salt. That’s how it was then, that’s what you would eat but as the years have gone on and there have been more studies into food, and what’s good for you and not good, it changes over the years, so you are more aware as the years go on” (page 8, 6th pregnancy, Obese BMI)

Justifications

Participants had different justifications in relation to dietary behaviours that were not healthy. Justifications included the easing of pre-pregnancy dietary rules which dictated that unhealthy eating was not socially acceptable, during pregnancy one could reward oneself with treats, unhealthy foods being a result of cravings or what the baby required, eating unhealthily was okay if in moderation or that it would balance out by eating healthily, and other justifications were not having time and that unhealthy foods were easier to access and eat.

“Well I, just tend to eat like sweet things every now and again which I would not have done before [my pregnancy]” (Michelle, 2nd pregnancy, Overweight BMI)

	"Sometimes you do just fancy a big bar of a chocolate, and it's an excuse to pig out because I am pregnant, now I will have a little treat" (Rose, 1st pregnancy, Overweight BMI) *"Now I think my body is wanting me to eat this and maybe the baby needs a bit of calcium with the cheese or a bit of sugar from the sweet things" (page 9, 1st pregnancy, Recommended BMI)* *"I had more control [over diet] before I was pregnant whereas now I think well you know a little bit of what you fancy in moderation you can have, if it makes sense" (page 9, 2nd pregnancy, Recommended BMI)* *"I eat quite a lot of salad but I also eat quite a lot of chips and I know that chips are not healthy but I like them (laughs), in my mum's house we eat a lot of veg and fruits, so I thought that was just enough really"(page 9, 1st pregnancy, Recommended BMI)* *"We tend to eat a lot of convenience food because I'm working full time and more things like fish fingers, chicken nuggets […] its always just whatever is in the freezer type of things" (page 9, 2nd pregnancy, Overweight BMI)* *"I eat a lot better when I'm at work, […] I take my breakfast, my lunch and my tea, and there's always fruit in, whereas at home I think you're more…it's easier just to go to the biscuit jar and get a biscuit"(page 9, 2nd pregnancy, Recommended BMI)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Poston, 2013

Bibliographic Reference	Poston, L.; Briley, A.L.; Barr, S.; Bell, R.; Croker, H.; Coxon, K.; Essex, H.N.; Hunt, C.; Hayes, L.; Howard, L.M.; Khazaezadeh, N.; Kinnunen, T.; Nelson, S.M.; Oteng-Ntim, E.; Robson, S.C.; Sattar, N.; Seed, P.T.; Wardle, J.; Sanders, T.A.B.; Sandall, J.; Developing a complex intervention for diet and activity behaviour change in obese pregnant women (the UPBEAT trial); Assessment of behavioural change and process evaluation in a pilot randomised controlled trial; BMC Pregnancy and Childbirth; 2013; vol. 13; 148

Study Characteristics

Study type	General qualitative inquiry Interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Urban hospital setting or phone call. **Aim** To understand the experience and perceptions of pregnant women from the UPBEAT trial and intervention and the effect on everyday life. Note: women had participated in the UPBEAT trial, a group based intervention delivered by health trainers providing dietary and physical activity advice and behavioural targets.
Data collection and analysis	**Data collection**

	Qualitative component of mixed-methods study. Face-to-face interviews in person (n=17) or phone call (n=4) by a research interviewer. Interviews were audio recorded. **Data analysis** Health trainers conducted audio diaries where they noted the fidelity and feasibility of the intervention. Interviews were transcribed verbatim and analysed through NVivo 8 software. A comparative thematic analysis was undertaken. Themes were discussed and supporting data checked by co-researchers. Data across sites were checked and with literature on the topic.
Recruitment strategy	Recruitment from each of the study sites of the UPBEAT trial using a maximum diversity sampling approach. Study sites were 1) The Southern General Hospital and Princess Royal Maternity Hospital (Glasgow), 2) The Royal Victoria Infirmary (Newcastle), 3) Guy's and St Thomas' NHS Foundation Trust (London) and 4) King's College Hospital Foundation Trust (London)
Study dates	November 2010 to February 2011
Sources of funding	Not industry funded
Inclusion criteria	Not reported for the qualitative component; Inclusion criteria to the trial were: • BMI ≥30 kg/m^2 • Single pregnancy; • >15+0 weeks and <17+6 weeks' gestational weeks
Exclusion criteria	No reported exclusions to the qualitative component; Exclusion criteria to the trial were: • No written informed consent • <15+0 weeks and >17+6 gestational weeks • Pre-existing diabetes, essential hypertension (treated) or renal disease

	• Multiple pregnancy; systemic lupus erythematosus (SLE); antiphospholipid syndrome; sickle cell disease; thalassemia; celiac disease; currently prescribed metformin; thyroid disease or current psychosis.
Sample size	N=21 (intervention n=12, control n=9, all pregnant)
Participant characteristics	**Mean age in years (SD)** 29.6 (4.9) **Parity during pregnancy, n (%)** Nulliparous: 9 (43) Multiparous: 12 (57) **Pregnancy status [at interview], n (%)** Pregnant: 21 (100) **Stage of pregnancy [at interview]** Third trimester: 21 (100) at 29 gestational weeks **Mean (SD) BMI [at recruitment] (kg/m^2)** 37.6 (4.6) **BMI class [at booking appointment] (n, %)** Obese: 21 (100) **Comorbidities (n, %)** Not reported

	Ethnicity (n, %) White: 8 (38) Black: 12 (57) Asian: 0 (0) Other: 1 (5) **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. Context: interventions and controls 2. Dose received and acceptability of the intervention **Context: interventions and controls** There was a sense amongst participants in both arms of support from the midwives *'The midwife I've got through my GP isn't very friendly so I think it's beneficial for me to come in and speak to [the research midwives] about the issues I have with the pregnancy and other stuff, because the one I have at my GP seems to be too*

busy to care, to listen to any of these things so it's nice to come in and speak to them, it's a bit reassuring I guess.' (supplementary page 2, ID 1, control, age 26, nulliparous, BMI 37, black British).

'You feel more looked after. You feel like it's more private care, more special than just the normal midwife care or the GP. Because they just want to get you in and out really quickly. Cos they have loads more people to see. But here you feel like you have the time to talk or say what you have to say. And ask any fears about anything, really, I think.' (supplementary page 2, ID 17, Intervention, age 22, multiparous, BMI 37, mixed ethnicity).

Dose received and acceptability of intervention

Some participants had different expectations of the interventions and thought it would be less intensive and solely advice-based.

'I thought it was going to be healthy eating and exercising. I thought it was going to be like how they tell you in the news, that we have to eat better. Or what you hear media- wise. But it's more in-depth and more suitable to how you are, basically. It's more fitted to how you are. Instead of every thousand people. It's just for you. It's more suitable that way, I feel.' (supplementary page 4, ID 17, Intervention, age 22, multiparous, BMI 37, mixed ethnicity).

Access to intervention

While participants were generally willing to come to eight health trainer sessions, there were different commitments that prevented this at times such as school pick-ups, work, or feeling unwell/tired.

'I couldn't come to all the sessions, I think it started at 3 and school finishes at 3:15 so it's a bit difficult to try and get [to the hospital] for that time.' (ID 2, intervention, age 27, multiparous, BMI 34, black African).

'The only thing I was worrying about was being able to commit every week. But I think there was once that I couldn't do it and [HT] e-mailed and she phoned so I didn't miss out on anything.' (supplementary page 4, ID 8, intervention, age 29, BMI 43, white British).

'I also found it quite hard saying 'Oh, I need eight Thursday afternoons off work', and I just felt like I was taking advantage of them by taking extra time off work.' (supplementary page 4, ID 4, intervention, age 25, nulliparous, BMI 35, white British).

Effect on mood

Some participants felt that the weekly goals were motivational, others felt guilty, observed or judged for not meeting these.

'… I just felt quite … quite bad, and I felt that … that I wasn't doing good … I wasn't doing what was good for my baby … by not being healthy and fit and … and all of that, I felt like I was doing something wrong, so … I don't know…you're on a diet of guilt, you know, you should be eating this because otherwise you're doing badly.' (supplementary page 4, ID 4, intervention, age 25, nulliparous, BMI 35, White British).

'…because you're on the [research] project, you feel good when you do something good. And when you do something bad, you feel bad. Because you feel like you're letting yourself down.' (supplementary page 4, ID 17, intervention, age 22, multiparous, BMI 37, mixed ethnicity).

Handbook and dietary change

	The intervention dietary handbook was seen as too rudimentary for some but was informative for others. Most participants said that they had made changes to their dietary habits due to the intervention. *'Instead of the basmati rice, I'd had the normal long grain rice, and instead of mashed potato, you can have sweet potatoes, it's just really silly things you didn't know, you thought you were eating healthily and you weren't, so changing that, swapping… The benefits are you're definitely not gaining that much weight, which is a plus. All the women will like that bit of it, so it kept you going.' (supplementary page 4, ID 13, intervention, age 36, multiparous, BMI 32, black African).* *'I've always bought wholemeal bread but because we were encouraged to buy seedy bread, I am still buying it and I think I'll continue to buy it.' (supplementary page 4, ID 11, intervention, age 35, multiparous, BMI 41, black African).* *'I don't know how to say it, [the handbook] was more for people who didn't really have … good knowledge with food, or cooking or eating well, do you know what I mean? It's just like … I eat healthy… maybe too many desserts or cakes or sweets or whatever, but I do know how to eat healthy, but [the handbook] was more aimed at people who don't know, who are just eating for the sake of eating. (supplementary page 4, ID 4, intervention, age 25, nulliparous, BMI 35, white British).*

BMI: body mass index; SD: standard deviation; UPBEAT: UK Pregnancies Better Eating and Activity Trial

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Rundle, 2018

Bibliographic Reference	Rundle, Rachel; Soltani, Hora; Duxbury, Alexandra; Exploring the views of young women and their healthcare professionals on dietary habits and supplementation practices in adolescent pregnancy: a qualitative study.; BMC nutrition; 2018; vol. 4; 45

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Multicentre study conducted across three study sites in Doncaster, Manchester and the London boroughs of Lambeth and Southwark. Interviews were conducted in quiet areas in the antenatal setting, community venues or at home. **Aim** To explore knowledge and understanding of nutrition advice for adolescent pregnant women and barriers and facilitators to dietary change and supplements consumption.
Data collection and analysis	**Data collection** Strategy for data collection and interview guide relevant to pregnancy were developed after consulting research user group of n=5 (antenatal and postnatal). Some suggestions of word replacements were made “food you choose to eat” instead of “your diet”, “healthy eating” instead of “nutrition” and “young women” or “young mums” instead of “teens” or “teenagers”. Semi-structured interviews independently held by two researchers who had experience in interview data collection and working with young women from low socio-economic status areas. Interviews ran between 10-42 minutes (mean 25 minutes). Visual interview guides were utilised to focus conversations and to reduce distractions from, for example, phone

	use. Interviewers reassured participants that individual experiences were valued and that there was no wrong or right answer. Interviews were audio-recorded **Data analysis** Interviews were professionally transcribed verbatim. Audio recordings and transcriptions were checked by researchers. A thematic analysis was undertaken using Braun and Clarke's approach. An iterative coding and comparative analysis was employed to develop overarching and subthemes. Two researchers independently analysed the data with a third reviewer check.
Recruitment strategy	Purposive sampling with referral to study by midwife or family nurse practitioner. A monetary reward was offered for their time.
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	• 16-19 years old whilst pregnant • Currently pregnant or had given birth <6 months prior
Exclusion criteria	Not reported
Sample size	N=34 (mixed, n=24 pregnant, n=10 postpartum)
Participant characteristics	**Mean age in years (SD)** 17.62 (NR) **Parity during pregnancy, n (%)** Nulliparous: 22 (97) Multiparous: 1 (3) **Pregnancy status [at interview], n (%)**

	See below **Stage of pregnancy [at interview]** Pregnant: 24 (70), 28 gestational weeks Postpartum: 10 (30), 14 weeks **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported **Ethnicity (n, %)** Not reported **Education level (n, %)** Not reported **Income status** Not reported
Results	Authors themes relevant to the review question: 1. A time for dietary change amidst confusion 2. Seeking relevant and reliable information and support

	A time for dietary change amidst confusion The authors identified the following 6 relevant subthemes: Poor quality habitual diet Many participants mentioned pregnancy as a period of dietary change but misconceptions and habitual food behaviours tended to be a barrier to healthier food choices. *'I'm not really good at taking advice any, because I will just eat what I want to eat regardless of what people tell me.' (supporting information 2, page 1)* Though participants said they had been eating healthier, they also ate junk food, crisps and confectionary. However, small changes to diet were made such as swapping carbonated sugary drinks for fruit juice, milk or water, eating breakfast or adding a portion of fruit per day instead of no fruit. *'Mainly crisps; in a day I'd probably have five packets.' (supplementary file 2, page 1)* *'I guess it's junk food. That's not really healthy. Different types like burgers, chips, kebabs. Yeah, but I've tried to balance it out in my pregnancy, I tried to get a few fruits in there.' (supplementary file 2, page 3)* Social circumstances

	Participant food choices were influenced by living circumstances, access to cooking facilities and finances. Participants did not tend to cook for themselves and usually relied on others (family members). Those least likely to cook for themselves lived in temporary accommodation or were living on their own. *'I'll eat takeout because of where I'm living now. Because we can't cook, we're staying in a hostel.' (supplementary file 2, page 2)* *'I didn't have much money so I'd just eat like the cheap stuff, noodles, sandwiches, stuff like that.' (supplementary file 2, page 2)* Those with supportive partners in particular mentioned being interested in cooking and introducing new foods into their diet during pregnancy. *'Wanting to look after me and make sure I'm eating the fruit. He [their partner] basically shovels it down me the fruit.' (supplementary file 2, page 2)* *'Yeah, we [mother and participant] both cook really. We [do it together.' (supplementary file 2, page 2)* Changes in pregnancy Some participants made healthier choices during pregnancy, others commented that they did not. There were healthy additions added to diet, however, cravings, sickness and nausea were sometimes barriers to eating healthily.

	'I wouldn't eat that much fatty food before but since I've been pregnant I've been eating more fatty food. Like I don't want nothing else, I just want that.' (supplementary file 2, page 2) *'I started to eat fruit, like bananas, apples, grapes, and I used to eat broccoli for iron, and more vegetables and more healthy food.' (supplementary file 2, page 2)* *'I guess it's junk food. That's not really healthy. Different types like burgers, chips, kebabs. Yeah, but I've tried to balance it out in my pregnancy, I tried to get a few fruits in there.' (supplementary file 2, page 3)* *'At the minute I'm craving mash, mash or veg.' (supplementary file 2, page 3)* *'I used to eat a lot of veg, but now it makes me want to be sick.' (supplementary file 2, page 3)* Food safety advice usually led to diet changes, however, when asked participants couldn't name many details. The expressed that they were confused and as such avoided certain foods such as tinned tuna, eggs, nuts and cheese and commonly processed soft cheeses. These foods were seen as harmful to the baby, despite not understanding why and out of caution omitted these from their diet. *'Now I don't know what soft cheese I can eat and what soft cheese I can't eat, so I just avoid the whole of it.' (supplementary file 2, page 3)* Motivation to change Some young women were motivated to make changes and eat healthier for the sake of the baby. *'All the way through, like, I just eat healthier because then your baby will come out healthier' (main text, page 3)*

'I think the motivation I get to eat veg and fruit, because I was a stubborn girl, I wouldn't eat it, was my baby, because as soon as I found out I was pregnant I was like, right, this is where I'm going to have to change, this is where I need to start eating good stuff to make my baby be healthy because if I didn't do that then God knows what the baby would be like when it gets older, so no, that was my motivation straightaway.' (supporting information 2, page 3)

'I decided to eat a lot more fruit and veg, just because I thought the baby's still getting everything they need, and then it's healthy for me I'm not going to be like putting loads of weight on.' (supporting information 2, page 3-4)

'So baby just likes it, it makes me feel better in my body every day and obviously I've got a baby inside, so I have to look after it.' (supporting information 2, page 4)

Barriers to change

There were some misconceptions about diet in relation to the baby's development and easier labour which acted as a barrier to changes in nutrition.

'I think it's more to do with labour. I don't want to make my baby overgrown. [discussing not wanting to eat]' (supporting information 2, page 4)

Lack of confidence in cooking skills was also a barrier to eating healthily.

	'I know I have to eat and I have to make myself something to eat, so I have to do it. I'm not a big cooker. I haven't been a big cooker since I've been pregnant.' (supporting information 2, page 4) *'I can't be bothered to cook most of the time, and it's easier just to have snacks.' (supporting information 2, page 4)* Healthy Start vouchers for food Participants that used Healthy Start vouchers talked about using these for fruit and milk or to assist household food shopping. Applying for these vouchers was viewed as a barrier and reduced motivation for some to apply. *'I've been getting fruit, just fruit. Literally I've been getting grapes and oranges, apples, bananas, pineapple, melon.' (supplementary file 2, page 4)* *'I think my mum will use them for the things that she's buying in for me like for fruit and vegetables' (supplementary file 2, page 5)* Some participants mentioned using vouchers to exchange for ineligible foods such as bread and did not feel that this was an issue. *'The shop up road that lets me get bread. So if I've run out of bread or stuff like, I can get bread and that on it.' (supplementary file 2, page 5)* **Seeking relevant and reliable information and support**

	The authors identified the following 3 relevant subthemes: Barriers to information provision Some participants mentioned limited discussion of information provided to them with their midwives *'But we don't really talk about much, she just checks me, we don't talk about much. She checks me, asks me if I have any questions, which I usually don't.' (supplementary file 4, page 2)* *Participant: 'I did read, I read everything that I was given but I don't really remember any of it.' I: 'Did your midwife go through the leaflets…?' Participant: 'She just gave it to me, she didn't go through it.' (supplementary file 4, page 2)* Written resources Participants had mixed feelings about leaflets and booklets that were regularly given to them throughout pregnancy. Some saw them as a valuable resource which could be checked after their appointment whilst others were not in favour, unless tailored to them (for example, Tommy's Young Women's Guide to Pregnancy) *'I find the physical books much easier... whereas the Internet you've got to be searching and you don't know if you're finding the right information, so I think booklets are easier.' (supplementary file 4, page 3)* *'Well I got leaflets but I didn't read them because to be honest with you leaflets that you get these days are so packed full of information, very tiny writing, you just can't be bothered.' (supplementary file 4, page 3)* Digital technologies, alternative formats, accessing information & support Participants mentioned that influential sources of information came from their partner, family and friends, however, were unsure of the accuracy and consistency of advice received. Many felt overwhelmed and confused after receiving leaflets without further discussions. Participants did their own research via websites and apps for mobiles, You Tube clips and

	online discussion forums which were seen as accessible. Social media was also cited by participants as a common source of information and sharing experiences. Hearing of other's experiences were valued and practical tips and ideas for changes to diet were also favoured as they were viewed as relevant to their needs. *'I do watch online videos on YouTube of other young mums, so I type in 33 weeks pregnancy updates and the women, people usually say what kind of tablets, vitamin's they're into, what veg and fruits, things they eat.' (supplementary file 4, page 3)* *'I go on NHS I know all right, these are doctors and stuff, so it's more trustworthy. Whereas I go on Facebook more... so if I know it's still the same NHS people that are providing this information, but they're providing it on Facebook, you'll find me more on Facebook. Especially if it's young mums, I think you'd find a lot more on them on social networking.' (supplementary file 4, page 4)* *'Don't actually have to have cartoons and sound like you're talking to a five year old, which is quite annoying with a lot of the videos, you don't need to speak like [we] don't understand, and we're not children.' (supplementary file 4, page 4)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Strommer, 2021

Bibliographic Reference	Strommer, Sofia; Weller, Susie; Morrison, Leanne; Soltani, Hora; Stephenson, Judith; Whitworth, Melissa; Rundle, Rachel; Brewin, Jane; Poston, Lucilla; Lawrence, Wendy; Barker, Mary; Young women's and midwives' perspectives on improving nutritional support in pregnancy: The babies, eating, and LifestyLe in adolescence (BELLA) study.; Social science & medicine (1982); 2021; vol. 274; 113781

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (England)
Setting	**Setting** Interviews conducted at three urban sites in Manchester, Doncaster and Southampton at local community venues, public trusted places, supported housing units or a Sure Start Children's Centre. **Aim** To explore how the relationship between pregnant young women and their midwives can be leveraged to provide support towards a healthier diet.
Data collection and analysis	**Data collection** There were two phases of data collection, a shallow and a deep dive. Phase one consisted of informal one-on-one or group discussions with fieldwork facilitators which occurred in local community venues and the same public trusted places as recruitment. Phase two consisted of a one-on-one interview with participants which were semi-structured and lasted around 30 minutes. Field notes were taken with direct quotes and interviews were not audio-recorded. Text was fitted into more than one appropriate codes and coding frames were developed. Data was deductively analysed using coding frames

	and these were checked by a second reviewer. Codes were arranged into themes and subthemes and discussed with senior authors with the creation of a conceptual map. **Data analysis** An inductive and data-driven thematic analytic approach was taken with coding and analysis through NVivo 12 software. As verbatim transcripts were not available, it was acknowledged that data contained field worker interpretations introduced into field notes. Note: The study took a critical realist ontological and subjective epistemic approach.
Recruitment strategy	Participants recruited in public 'trusted locations' such as commonly used discount shops, fast food venues, cafés, mother and baby units, supported housing units, and children's centres. Snowball sampling was introduced where social networks of the person recruited were utilised.
Study dates	2015-2016
Sources of funding	Not industry funded
Inclusion criteria	• Women aged between 16-22 who were pregnant at time of interview or had been pregnant in the last 12 months
Exclusion criteria	None reported
Sample size	N=106
Participant characteristics	**Mean age in years (SD)** NR, age range n (%): 15: 1 (1) 16-17: 37 (35) 18-19: 33 (31) 20-22: 35 (33)

	Parity during pregnancy, n (%) Nulliparous: 16 (15) Multiparous: 90 (85) **Pregnancy status [at interview], n (%)** See below **Stage of pregnancy [at interview]** NR in total, reported by phase of interview: Phase 1 (n=55) Pregnant: 15 (27) Postpartum: 40 (73) Phase 2 (n=58, 7 were also in phase 1) Pregnant: 25 (43) Postpartum: 33 (57) **BMI class [at booking appointment] (n, %)** Not reported **Comorbidities (n, %)** Not reported

	Ethnicity (n, %) Not reported **Education level (n, %)** Not reported **Income status** Not reported **Housing status (n,%)** • Private rent: 15 (14) • Family home: 13 (12) • Social housing: 29 (27) • Mother and baby unit: 29 (27) • Hostel: 2 (2) • Undisclosed: 18 (17)
Results	Authors themes relevant to the review question: 1. I want to be independent but other people are heavily involved in my life 2. I know I should eat better but I want to eat what I know and like 3. I want someone to understand me and help me do well **I want to be independent but other people are heavily involved in my life** The authors identified the following 2 relevant subthemes:

	I sometimes feel like other people are controlling my life Participants living in supported housing or mother and baby units commonly felt they didn't have agency over their lives, including their diet (sourcing or preparing foods) or food choices. This sentiment was particularly pronounced in the 16-17 year old age group where 51% were living in mother and baby units, or living in hostels or couch surfing did not have any access to cooking facilities. This sentiment was less pronounced in those living at home. '*Complex situation, living in hostel, not able to control diet when kitchen closes and feeling sick. No control to make own choices. Lack of support- but wants to do the right thing.'* (*supplementary file page 2, YM60)* I rely on people I trust to help me with things in my life Many participants were dependent on others for support and for cooking in particular. There was a lack of interest or motivation to cook for themselves. Trusted family members were felt to be the best source of support. For younger mothers aged 15-17 years, support tended to come from mothers or partners whereas for older participants aged 20-22 years, support could come from a wider network such as grandmothers and in-laws. Differences were not observed between those who were having their first child or those who already had children. *'Wasn't interested and wouldn't get involved, that was mum's job. [I] eat what I want …. When [I was] at home with mum [it] was easier.' (main text page 5, aged 16–17, 1 child, mother & baby unit).* *'Fussy about what I eat. Not confident about food prep wouldn't know where to start. Family meals, cooked by mum and nan. I eat what I am given.' (supplementary file page 2, YM15)* *'Partner cooks, introduced to lots of new foods. Eat what he cooks for me. Partners mum, and partner, they look after me – I look after the baby inside me and they look after me.' (supplementary file page 2, YM21)*

Other participants commented that they enjoyed food and cooking.

'Enjoys food prep, lots of different meals and wide tastes.' (supplementary file page 2, YM1)

I know I should eat better but I want to eat what I know and like

The authors identified the following 3 relevant subthemes:

I feel connected to my baby and that guides what I eat

Many participants, both first time and not first time mothers, felt that what they were eating during pregnancy was guided by their baby. Food choice was guided by cravings which in turn was attributed to what the baby wanted at the time. These foods tended to be unhealthy convenience foods such as fast food and snacks high in fat or sugar.

'My second pregnancy has been really different. This one is loving sugary food, I can't get enough sweets. It's totally different from last time … he wanted so much spicy food. I know I probably shouldn't eat that much of it, but if it's what he wants I can't ignore it.' (main text page 6, aged 18–19, 1 child, family home)

'Bacon butties, fry up. Chocolate, crisps, energy drinks, pickled onions … Lots of takeaways … Went on what baby told me.' (main text page 5, aged 18–19, 1 child, mother & baby unit).

Nausea was discussed to be a limiting factor towards food consumption, which again was connected to the baby choosing what the mother should or shouldn't eat.

	'Ginger biscuits helped with sickness. Not interested, not much knowledge or confidence in food prep so lots of convenience food. Anything I fancy.' (main text page 6, aged 20–22, three children, in social housing). *Q: What did you change during your pregnancy?* *'Couldn't eat anything due to really bad sickness – so ate what baby allowed me to eat.' (supplementary file page 3, YM15)* *Q: What affected what you ate during your pregnancy?* *'Sickness and eating what baby said I could eat and keep down.' (supplementary file page 3, YM52)* The authors stated that most participants appeared to understand that quality of diet in pregnancy was important. Many understood this to mean eating enough food to aid the baby's growth. The authors also stated that some participants were aware that a healthy diet included increased fruit and vegetable consumption and eating breakfast. My midwife tells me what not to eat and it's not always helpful Many participants expressed wanting advice about food from their midwives and that having a conversation about food would be of assistance. Many recounted that there was minimal discussion about diet with their midwives. *Q: What conversations did your midwife have about food?* *'None. Wanted from MW but conversation didn't happen, too many other issues going on to deal with but would help me when desperate needed some info.' (supplementary page 4, YM18)*

	Many participants were also disheartened with the focus on controlling and negative messages relating to food safety on food items to limit, reduce or avoid. This kind of advice was viewed as not relevant, helpful or clear and positive messaging was desired. *'Sugar is key but the message is misleading as you do need to keep your sugar levels up. Messages need to be explained better.' (main text page 6, aged 18–19, 1 child, social housing).* *'All negative, what you can't do, "don't do this". Don't tell you what is good for you/baby.' (supplementary page 4, YM1)* There was an awareness amongst participants of health messaging related to diet such as five portions of fruit and vegetables per day or consumption of a variety of foods, however, there tended to be confusion in what this meant in everyday life. *'5 a day – I don't eat 5 meals a day. It's stupid, and what they all say. Healthy – easy word to use but has no meaning, what do they mean, why can't they say what they mean.' (supplementary page 4, YM26)* Healthy eating guidance tended to be viewed as strict controlling rules, which led to a resistance to follow these due to lack of trust.

	'Was only told what NOT to eat, was only mentioned/listed, no discussion around it. Ate prawns anyway.' (supplementary page 4, YM106) Participants expressed that they did want to discuss nutrition and healthy eating but felt that they were not able to raise these conversations and expected the midwives to take this role. Across all participants, it was commonly stated that there were no conversations about food with midwives and there was confusion around food messaging. *'Healthy doesn't mean anything. Just words. Different interpretations. I think I'm healthy, healthy if you are happy, that's more important really. 5 a day – no meaning. Just something they say so wouldn't listen. Meaning changes all the time, confusing different rules, so don't listen to any.' (supplementary page 4, YM63)* One participant recounted that they had less conversations with their midwife during their second pregnancy compared to their first and was left feeling looked over. *'Not told much during 2nd pregnancy. Just because it's not my first baby doesn't mean I know it all! I still need help! Messages have changed and are confusing.' (main text page 6, aged 18–19, 1 child, social housing).* I like foods I'm familiar with and I don't want to give them up Participants discussed barriers to healthy eating such as laziness, disinterest in food preparation or choosing to cook with convenient foods as they were quick and easy. While money was found to be a barrier to healthy eating, convenience and taste tended to drive food choices.

	Q: What makes it hard to eat well? 'Can't be bothered , Lazy. Doesn't want to spend too much time cooking so needs quick and healthy. (supplementary file page 3, YM105) *Q: What makes it hard to eat well? 'Not confident in food prep and small appetite, not much interest in food – it's about eating when hungry and convenient.' (supplementary file page 3, YM11)* *'Confidence and its boring. No one makes it fun. Its time consuming, easier to just buy frozen foods and shove in the oven.' (supplementary file page 4, YM66)* Most were particular on the foods they liked and wanted to eat. *'Very fussy. I don't eat fruit and veg only something with chicken, chicken nuggets, chicken Kiev, McDonald's chicken, I like fast food cos how its cooked. I eat what I know and enjoy.' (supplementary file page 4, YM40)* Many described the barriers to eating healthy food as it was described as boring or flavourless. *'Healthy eating is salad and chicken. It's all boring stuff, nothing tasty or that I like. I don't like salad so I can't eat healthy.' (supplementary page 4, YM69)* **I want someone to understand me and help me do well**

	The authors identified the following 3 relevant subthemes: Health care professionals did not support me as much as I had hoped Participants felt that advice from health care professionals were not relevant to them or found the information unclear or overwhelming. This was felt by those who had multiple children as well. *'Not there when I asked for help, so why are they interested now? Professionals just butt-in, worried they will take my baby away if [I] don't pass assessment. No support with food prep or helpful information.' (main text page 6, aged 16–17, 1 child, mother & baby unit).* *'FNP talked about not eating seafood not midwife. Very little conversation if any, nothing memorable. Not relevant to her situation.' (supplementary file page 5, YM30)* Most participants still wanted their midwife to deliver information relating to healthy eating as this was seen as a trustworthy person from whom they wanted greater support. *Q: Who should be the person to talk to you about food and health? 'Midwife is a key person expected to talk about it and say everything I need to know.' (supplementary file page 5, YM58); 'Midwife. Expects midwife to cover everything, hadn't met one yet and had very high expectations, wanted to ask about everything. She tells you what you need to know.' (supplementary file page 5, YM60)* A subset of participants had lost faith in their healthcare professionals including midwives. Some instead made use of online communities with other young mothers or different websites for sources of information.

'Friends at community groups, with other young mums. Online information and social media for information. (main text page 6 aged 16–17, 1 child, social housing).

I want clear and specific advice that is tailored to me and what my life is like

Many participants wanted to know how the foods they ate affected their baby so to know what to eat or not eat and wanted this information to be evidence-based.

'Food that just causes sickness, it doesn't affect the baby growing, so why avoid it. Just tell us what affects the baby's health. First at booking, then throughout, but they need to go through it with you.' (Main text page 6, aged 18–19, 1 child, mother & baby unit).

There was a sentiment of need for support to facilitate understanding of healthy eating choices in a digestible manner and how this could be achieved within the context of their food related wants and needs.

'Needs to be easy to read and not patronising. Realistic and including what I would eat. Check understanding. Eat well plate – can pick what you like for it, include what to have that's "picky" or to snack on.' (supplementary file page 6, YM57)

Q: What would make healthy eating important? 'Why- to eat nor not to eat? Both messages of good and bad food and tell me WHY this is important. (supplementary file page 6, YM4) 'Clear message about why. Explain the impact of food. How best I can help my baby grow.' (supplementary file page 6, YM86)

	While some participants chose their food based on weight related concerns, they did not want the midwife to use their weight as a starting point for food conversations. *'Don't want MW to talk to be about food straight after weighting me as makes me feel fat. Very self conscious about weight and this is the most important thing BUT feels judged for saying it.' (supplementary file page 7, YM77)* I want support from someone who makes time for me and has compassion There was a sense of rushed appointments and a need for more time from health care professionals. Participants wanted their needs listened to as well as reassurance in a safe environment where concerns could be raised without judgement or pressure based on time constraints. *'Honest conversation at the beginning, need to be able to carry it on when I need [it]. Don't give me a load of leaflets. Listen to me, answer my questions and reassure me.' (main text page 7, aged 18–19, 2 children, mother & baby unit).* *'I need to get the information, make the changes to my life and be able to ask lots of questions. Anxious mum needs quick responses and reassurance.' (Supplementary file page 6, YM83)* *'Not confident to always ask for help, expects midwife to say all she needs to say, scared of being judged for not knowing.' (Supplementary file page 6, YM9)* Consistency in discussion relating to healthy foods and ongoing conversations about this were desired.

	'Wanted it at the start, in depth convo about me, my weight, attitude to food, to help me make good choices in my lifestyle from then on. Wanted reassurance throughout, wanted to ask questions. Felt rushed through booking and appointments so couldn't have the conversations she wanted. Give us more time, talk to us.' (supplementary file page 7, YM74) Participants across different backgrounds, ages and number of children felt that eating healthier foods required someone to get to know them on a personal level in relation to their preferences and concerns. Being understood and accepted were seen as key elements to guide conversations around food in pregnancy. Participants expressed a want for someone that empathised and appreciated their specific and difficult situations and understood that they were doing their best in their circumstances. *'I need to be happy and feel good about myself and what I am doing as a mum. Informal chats to ask about my life and how I'm feeling. Food is a big part of my life so I will talk about it but don't make me feel bad. midwife needs to ask about you and what you do to understand how food fits in your life. To get me.' (supplementary file page 7, YM15)*

BMI: body mass index; NR: not reported; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Warren, 2017

Bibliographic Reference	Warren, Lucie; Rance, Jaynie; Hunter, Billie; Eat Well Keep Active: Qualitative findings from a feasibility and acceptability study of a brief midwife led intervention to facilitate healthful dietary and physical activity behaviours in pregnant women.; Midwifery; 2017; vol. 49; 117-123

Study Characteristics

Study type	General qualitative inquiry Semi-structured interviews
Country/ies where study was carried out	United Kingdom (South Wales)
Setting	**Setting** Participants were from South Wales and location of interviews for qualitative component was unclear. **Aim** To evaluate the feasibility, acceptability and perceived efficacy of the ‘Eat Well Keep Active’ intervention programme Note: This was a qualitative analysis of the ‘Eat Well Keep Active’ intervention programme designed to facilitate healthy decisions towards diet and physical activity behaviours according to latest recommendations for pregnant women. The intervention involved counselling at participant's home by midwife, goal card and brief follow-up phone call.
Data collection and analysis	**Data collection** Semi-structured one-to-one audio-recorded interviews conducted 6-8 weeks after the initial session of the intervention.

	Data analysis Transcripts were transcribed verbatim, coded and analysed through NVivo software. A deductive thematic analysis was undertaken using Braun and Clarke's approach. The first stage of analysis was around acceptability of the intervention, second stage was if the intervention was supported by the three psychological needs of Self Determination theory and transcripts were checked to see if the intervention supported autonomy, competence and relatedness.
Recruitment strategy	For the intervention study, antenatal clinic midwives recruited participants during routine dating scan in a large maternity unit in South Wales (at gestational age usually around 10–12 weeks).
Study dates	Not reported
Sources of funding	Not industry funded
Inclusion criteria	• <16 weeks gestational age at recruitment • Suitable for midwife led care
Exclusion criteria	• Not fluent in English • Previous early pregnancy complications (for example, threatened miscarriage) • History or diagnosis of eating disorders • BMI >30 kg/m^2
Sample size	N=19
Participant characteristics	**Mean age in years (SD)** Not reported, age range n, %: • 18–24: 7 (35) • 25–29: 3 (15) • 30–34: 8 (40) • 35+: 2 (10)

Parity during pregnancy, n (%)

- Nulliparous: 14 (70)
- Multiparous: 6 (30)

Pregnancy status [at interview], n (%)

Pregnant: 20 (100)

Stage of pregnancy [at interview]

Not reported

BMI class [at booking appointment] (n, %)

- Healthy weight (18.5–24.9 kg/m^2): 14 (70)
- Overweight (25–29.9 kg/m^2): 6 (30)

Comorbidities (n, %)

Not reported

Ethnicity (n, %)

Caucasian: 20 (100)

Education level (n, %)

Not reported

Income status

Not reported, n=18 (90%) were employed

	Note: participant characteristics available for n=20 recruited n=1 dropped out at 6 weeks post intervention.
Results	Authors themes relevant to the review question: 1. Acceptability of the 'Eat Well Keep Active' intervention 2. The counselling session 3. The goal card 4. The follow-up phone call 5. Supporting autonomy 6. Supporting competence 7. Supporting relatedness **Acceptability of the 'Eat Well Keep Active' intervention** Participants tended to find the intervention acceptable and said that it affected their lifestyle, including their diet quality, in a positive way. However, one participant who already viewed themselves as fit and healthy commented that the intervention made no difference to their lifestyle in terms of diet. *'I think for me, because you know, my outlook is quite healthy anyway, then I don't think the study actually influenced me to make changes' (page 119, P8)* This participant did acknowledge that the intervention would probably have an impact on those who were not as healthy in their lifestyle. The participant also used the goal card daily. No participant could list a part of the intervention that could be removed. **The counselling session** The first counselling session involved motivational interviewing which many participants said made them reflect on their dietary behaviours and made them think differently about their diet. *'You were asking me what I ate and I thought, I'm not that bad, I eat brown bread and stuff, but then I have a really sweet tooth. So it makes you think differently it did' (page 119, P11)* Authors suggested that this view suggests that participants were not thinking about improving their diet previous to the

intervention. Rather, what not to eat was only considered.

The goal card
The participants reported that the individualised goal card gave them confidence to make behaviour changes towards their lifestyle with the ability to make concrete goals facilitating this.

'I think that when you came and we had the chat and we went through the goals. …. I had a plan. And I knew what I was doing, and I found that really beneficial. It really made a difference to me. It didn't put any pressure on me, but they filled me with confidence in what I was doing.' (page 120, P9)

Some were able to make use of the goal card to make positive behavioural changes towards their diet such as specific goals of swapping out unhealthy foods for healthier foods or more generalised goals of eating more fruit.

'I used to have like a big bag of crisps round with me but I don't do that now. I've got cereal bars, nuts more fruit. I'm doing it to protect the baby you know and it's good for myself as well.' (page 120, P4)

'That goal card is good you know: Eat more fruit! Oh yes, OK it's on my goal card so I will, it's written down!' (page 120, P3)

Being able to reach goals gave participants a sense of accomplishment and wellbeing which could then lead to greater positive changes to their lifestyle beyond their starting goals.

'I wanted to do the little steps, little steps on the goal card. And once you've done them you feel so good about yourself that you think, well actually I am going to try something bigger' (page 120, P20)

The follow-up phone call

Some participants felt that the 5 minute follow-up phone call was helpful and acted as a prompt to keep on track with goals.

'It was fine. Like I said to you some days are good and some not so good, so speaking to someone then makes you think. Oh get back on it. Or come on start again tomorrow' (page 120, P13)

'It was good just to keep an eye and act as a reminder' (page 120, P7)

Others thought that the call added additional support which allowed them to discuss any challenges in reaching goals.

'You haven't been too pushy, you know. You gave a quick phone call and answered any questions I had. You were there on the other end of the phone. So I think it's good to have that extra support that people really need' (page 120, P15)

The phone call also provided the opportunity to share successes and feel a sense of accomplishment. The call was valued by participants as they felt that someone was taking time to check-in on their progress towards goals.

'I thought I've done really well and I was really excited when you spoke to me on the phone. Trying to, you know, not please you but, I was pleased with myself and wanted to show you. Look no crisps!' (page 120, P17)

'I thought; she's actually taken an interest. So I thought, oh yeah, it's not just forgotten. So it was nice. Someone to ask me how I'm doing.' (page 120, P6)

Supporting autonomy

	The intervention program was developed based on Self Determination Theory and Motivational Interviewing, with emphasis on choice and personal control towards behavioural change. Comments by participants reflected this where they stated a sense of ownership over their goals. *'I think everybody has got like an individual plan and that I think makes a difference. Everyone's is individual and it does alter depending on what they are trying to do and what their plan is and stuff.' (page 120, P9)* *'Because I made the decisions in the first place, not you. I made them and you just typed them out for me really!' (page 120, P3)* Some participants commented that this approach was different to their expectations of an encounter with a health professional in that they were not being dictated advice but instead asked what they wanted to do. *'You asked me what I wanted to change. So most health people say you should change this if you are doing this and to change that. And they were my goals, not like someone else's just thrown at me! That might not mean anything to me then' (page 120, P1)* Participants were encouraged to think about what behaviours to change, for example, limiting unhealthy snacks like crisps, rather than told what to do. This led a sense of autonomy amongst participants. *'They were definitely the things that I have always thought about changing, but just haven't got around to changing.' (page 120, P18) 'They were what I wanted to do anyway. You didn't come in here and crack a whip! You've got to do this. You've got to do that!' (page 120, P7)*

Supporting competence

Many felt a sense of pride or achievement that they had met their target goals themselves and with this brought a sense of confidence to continue with these healthier behaviours.

'The more of an effort I've made the better I've felt afterwards, so you know I've thought, yes. There is a reason I should be doing this. Not just because I feel I should do it, but because I know it's good for me if I do it. I feel better if I do it' (page 121, P18)

Some participants set themselves small and achievable goals which they felt that they could reach. Achieving these small dietary changes brought a sense of confidence towards making changes to their lifestyle.

'I cut it down and cut it down a bit more and it was a lot easier. It was better than saying; don't do this, because you make the changes gradually and get used to it and then you're doing it all the time.' (page 121, P1)

There were some behaviour changes that were found to be challenging and participants discussed strategies they employed to overcome these. One participant was drinking cola daily prior to the intervention and consumed sweets on a regular basis. They chose goals to cut down on these behaviours and restrict consumption to weekends only rather than remove the habits entirely. During the week they swapped out this behaviour to replace with fruit consumption.

	'The sweets were hard and the coke was hard as well. But knowing that I could still have it on the weekends and not cut it out fully was a bit better, you know…Oranges help me and grapes help me. Because they have a little bit of sugar in them in oranges which I didn't realise.' (page 121, P1) Being able to choose their own goals allowed participants to feel confident that they would be able to reach these. *'It's just making sure it's realistic, obviously I didn't want to put anything in there that I knew I wouldn't eat. It's just being realistic really' (page 121, P16)* **Supporting relatedness** Participants commented on the encouragement provided by their partner in supporting them to achieve their goals. *'He's like, 'Right we are going to have to start this now, you need lots of fruit'. So he buys loads of fruit and the water and we have chicken breast and rice and veg for tea. So it helps when there's two and he does it as well.' (page 121, P7)* Some participants stated that the intervention and particularly the goal card facilitated their partners to support them. Partners tended to embrace the goal cards as they were devised in consultation with midwives (that is, a health professional). Participants reported that partners referred to the goal cards and checked-in with participants on their progress towards their goals.

	'He was like 'How are you getting on with your targets for the midwife?' and I'd say 'well I haven't done this'…. So he would sort of keep me motivated as well which was nice' (page 121, P18) *'Even my husband says, 'have you got your brown bread this week?'…He loves that [the goal card] so he can say 'Are you eating this? Are you eating this?' Something in black and white you know?' (page 121, P4)* Participants valued this support and also of those in the intervention such as midwives towards achieving their goals. *'I think to have someone…. because obviously it's your job and you know what you are talking about. So to have someone to remind you that it's still important and that it does help the baby' (page 121, P10)* *'Because you make people feel so comfortable, you know…. And it was nice to know you were thinking like; I'd better ring her and see how she's doing, it was nice.'(page 121, P19)*

BMI: body mass index; SD: standard deviation

Critical appraisal - Qualitative Critical Appraisal Skills Programme (CASP) checklist

Section	Question	Answer
Overall risk of bias and relevance	Overall risk of bias	No or very minor concerns
Overall risk of bias and relevance	Relevance	Highly relevant

Appendix E Forest plots

Forest plots for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

No meta-analysis was conducted for this review question and so there are no forest plots.

Appendix F GRADE-CERQual tables

GRADE tables for review question: What are the facilitators and barriers for increasing uptake of government advice on healthy eating and drinking during pregnancy?

Table 6: Evidence profile for facilitators for increasing uptake of government advice for healthy eating and drinking during pregnancy

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Theme A1 Thoughts, views and perceptions of women						
2 studies Bouga 2018 General qualitative inquiry with interviews N=48 women Olander 2012 General qualitative inquiry with focus groups and semi-structured interviews N=23 women	2 studies reported general thoughts, views and perceptions of women. Women felt that pregnancy was the best time to change and reinforce eating habits as there was more time to make changes than after having the baby. Some women believed that they would commit to behaviour change if they were prompted or made aware of the importance. *"I think maybe if you'd started well from the beginning then you probably would have carried on, because you'd have got into more of a routine then with everything else that goes on"* [Quote: Olander 2012, p. 239, P11, postnatal woman] *"'If I knew how important it was, I would increase it."* [Quote: Bouga 2018, p. 12, IT06]	Moderate concerns[6]	No or minor concerns	Moderate concerns[5]	No or very minor concerns	LOW
Subtheme A1.1 Views on healthy diet						
5 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with	5 studies reported women's thoughts, views and perceptions about healthy diet. There were views about the level of changes that needed to be made about diet based on perception of eating habits and lifestyle before pregnancy. Women that said they were interested in diet and nutrition before they were pregnant felt they did not need to make major changes to their overall diet during pregnancy. For those who participated in interventions with nutritional goals, this made it easier to maintain a healthy diet and	Moderate concerns[6]	Minor concerns[2]	Minor concerns[4]	No or very minor concerns[3]	LOW

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
interviews N=48 women Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women Warren 2017 General qualitative inquiry with semi-structured interviews N=19 women	achieve their goals during pregnancy as this was already part of their routine. For some women that underwent nutrition counselling as part of an intervention, self-reflection of eating habits made them reflect on their eating habits and subsequently think differently about behaviours going forward. Some women reported they ate more fish as it was perceived to be a healthy item to eat. Some women tended to take multivitamins which assisted in their confidence of meeting recommended nutritional requirements. *"I know how to eat healthily – I've always done it."* [Quote: Morris 2020, p. 5, age range at interview 26–30; 1 child; IMD 4] *"You were asking me what I ate and I thought, I'm not that bad, I eat brown bread and stuff, but then I have a really sweet tooth. So it makes you think differently it did"* [Quote: Warren 2017, p. 119, P11]					
Subtheme A1.2 Views on healthy start voucher purchases						
1 study Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women	1 study reported that some women used Healthy Start Vouchers to exchange for ineligible foods such as bread and did not feel that this was an issue. *'The shop up road that lets me get bread. So if I've run out of bread or stuff like, I can get bread and that on it.'* [Quote: Rundle 2018, supplementary file 2, p. 5]	No or very minor concerns	No or very minor concerns	Moderate concerns[5]	No or very minor concerns[3]	HIGH
Theme A2 Factors relating to acceptability						
5 studies Bouga 2018 General qualitative inquiry with interviews N=48 women Lavendar 2016	5 studies reported factors relating to acceptability. Many women were accepting of nutritional guidance and mentioned changing their diets after reading and considering advice. Regarding food item acceptability, dairy products were discussed positively and some reported a lack of difficulty to incorporate or increase dairy consumption into diet. Milk was	Minor concerns[1]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with focus groups and semi-structured interviews N=34 women Lawrence 2020 General qualitative inquiry with semi-structured interviews N=30 women Poston 2013 General qualitative inquiry with interviews N=21 Warren 2017 General qualitative inquiry with semi-structured interviews N=19 women	thought to help with heartburn and tended to be a source of craving during pregnancy. Those that did not like milk would increase dairy consumption through yoghurt or cheese. Women who had participated in interventions that provided dietary advice generally found these acceptable. Women that did not already view themselves as leading a healthy lifestyle said that the interventions affected their lifestyle, including their diet quality, in a positive way. Women favoured the interest that the midwife and nurse showed in their health and the baby's health. The in-depth and tailored aspects of the interventions increased acceptability of receipt of advice and information which opposed to less acceptable expectations of dictating advice. For those women visiting dietetic services for obesity, there was acceptability of lifestyle programmes that were informal, did not 'preach' information and the focus of healthy lifestyle rather than weight loss. This led to more interactions and ability to make informed choices. Women attending lifestyle programmes were accepting of interventions whereby information and advice was delivered in a fun or novel way of demonstrating behaviour, for example activities and by different experts. *"I think it just takes you away from everything else going on, and gets you to think about just being a pregnant woman for once … make you focus on being healthy for you, and exercising for you. So that was good."* [Quote: Lawrence 2020, p. 5, Int12309, 28 years, one child, low EA] *"I thought it was going to be healthy eating and exercising. I thought it was going to be like how they tell you in the news, that we have to eat better. Or what you hear media-wise. But it's more in-depth and more*					

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
	suitable to how you are, basically. It's more fitted to how you are. Instead of every thousand people. It's just for you. It's more suitable that way, I feel." [Quote: Poston 2013, supplementary p. 4, ID 17, Intervention, age 22, multiparous, BMI 37, mixed ethnicity]					
Theme A3 Factors relating to accessibility						
Subtheme A3.1 Healthy start vouchers as enabler to healthy eating						
2 studies Ohly 2019 General qualitative inquiry with Semi-structured interviews Realist interviews N=11 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women	2 studies reported the use of Healthy Start vouchers by women to enable access to variety of foods and were seen as a "nutritional safety net". Women that used Healthy Start vouchers used these for fruit and milk or to assist household food shopping. Vouchers provided access to foods that might have been too costly otherwise. Cheaper, unhealthier foods could be avoided and decisions could be made without financial worry. This access led to greater consumption of fruit and vegetables and cow's milk or a wider variety of fruit and vegetables in their diet. Some women stated that instead of using Healthy Start vouchers to buy more food, it served to reduce the price of food that they would have already been buying. Instead, the money saved was used on other items. Vouchers were seen as a 'nutritional safety net' as these participants could save money without having to cut out any healthy foods from their shopping. *"It gives people like it says, ease to be able to get the extras that they say you need rather than sit there and thing oh! my god I am pregnant I am not going to be able to afford. Let's be honest veg and fruit are higher than chocolate and sugary foods anyway. So for us to be able to go and buy the higher food, it wouldn't be fair if people like myself couldn't afford it without the Healthy Start vouchers."* [Quote: Ohly 2019, p. 5]	No or very minor concerns	No or very minor concerns	Moderate concerns[5]	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
	"They do because like I said at the beginning if I pay £10- £15 a fortnight on fruit and veg that is coming out of the vouchers it is not coming out of my money. It is like sounds cheap but it sounds like it has been bought for you. It saves you that money because if you think about it, that a month is £20-£30 a month being saved that can go towards kid's clothes, days out, just stuff like that, essential other stuff that you need as well." [Quote: Ohly 2019, p. 7]					
Subtheme A3.2 Support from family						
2 studies Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	2 studies reported that for pregnant teenagers, many were dependant on others for cooking. Trusted family members were felt to be the best source of support and tended to influence healthy eating habits. For younger mothers aged 15-17 years, support tended to come from mothers or partners whereas for older participants aged 20-22 years, support could come from a wider network such as grandmothers and in-laws. Cooking would either be done solely by the family or partner or together with the women. Those least likely to cook for themselves lived in temporary accommodation or were living on their own. Differences were not observed between those who were having their first child or those who already had children *'Partner cooks, introduced to lots of new foods. Eat what he cooks for me. Partners mum, and partner, they look after me – I look after the baby inside me and they look after me.'* [Quote: Strommer 2021, supplementary file p. 2, YM21]	No or very minor concerns	Minor concerns[2]	Moderate concerns[5]	No or very minor concerns[3]	MODERATE
Theme A4. Advice and information						
Subtheme A4.1 Knowledge of guidance and health literacy						
6 studies Beasant 2023 General qualitative inquiry with semi-	6 studies reported women's levels of knowledge towards healthy eating guidance and health literacy.	Minor concerns[1]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
structured interviews N=14 women Heslehurst 2017 Phenomenological with interviews N=15 Keely 2017 General qualitative inquiry with interviews N=11 women Lavendar 2016 General qualitative inquiry with focus groups and semi-structured interviews N=34 women Poston 2013 General qualitative inquiry with interviews N=21 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women	Women tended to recall and discuss salient messages from NHS guidance, for example, for fish, specific types to avoid, limit, or cook . Shark, marlin, and swordfish were commonly listed as fish to be avoided while there was knowledge to thoroughly cook fish and shellfish. Some women mentioned foods to avoid being placed on folders provided by midwives. Women were aware of the guidance relating to cooking raw fish and shellfish, along with the need to cut back on oily fish like salmon and tuna. Interventions including dietary advice from health professionals led to increased health literacy for some, debunking myths like "eating for two" for others and a sense of gaining long-term eating habit behaviours. Information gained influenced behaviours like food substitution, understanding labels, altered shopping habits, and healthier cooking practices. Women reported an increased awareness of eating habits and as well as for the baby's nutrition. Women with a BMI over 40 kg/m^2 had knowledge to increase food groups such as calcium-rich foods and fruits and vegetables in their diet after advice from health care professionals. *"Probably learning more like, now I know more for my eating habits, but for the baby's eating habits as well, because I didn't realise before so, definitely getting information [has been useful]"* [Quote: Heslehurst 2017, p. 50, Parity 0, BMI 32 kg/m^2]					
Subtheme A4.2 Preference for delivery and communication						
Subtheme A4.2.1 Communication of information						
5 studies Abayomi 2020 General qualitative	5 studies reported women were generally positive about verbal communication of information and favoured this from a midwife rather than a general practitioner. Being	Minor concerns[1]	Minor concerns[2]	Minor concerns[4]	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
inquiry with focus groups N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	understood and accepted were seen as key elements to guide a conversation around food in pregnancy. There was a desire for honest conversation and for the midwife to get to know women on a personal level so to understand their circumstance and provide reassurance. Combining verbal communication from the midwife supplemented with leaflets or brochures and/or online material, for example, healthcare services website and emails or general internet resources such as google search, social media, or forums was seen as acceptable. Leaflets or booklets were preferred to books due to their practicality, serving as concise reminders for crucial information. The simplicity, size, and ease of reading leaflets were appealing and some favoured them over internet searches for quick access to relevant information. They were also valued by some as useful prompts or references after discussion with healthcare professionals. For some, written resources were deemed appropriate only when tailored to individual circumstances, for example, young teenage women preferred Tommy's Young Women's Guide to Pregnancy The most favoured mode of communication was in digital form such as an app. This delivery was seen as easily accessible, could provide prompts for healthy eating and drinking; be interactive and have up to date and reliable information (rather than searching online), provide information to reinforce or supplement advice received and could tailor of advice. Although, some still preferred a midwife conversation over apps. *"So for me, the best thing for me would have been if the midwife had given me a brief overview and then maybe given me a leaflet or a web, specific web address to take away*					

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
	that I could then look into more depth afterwards" [Quote: Bouga 2018, p. 10, IT05] *"You can get apps now for everything, so maybe an app that you could give out like different ideas on how you can get that nutrient you need in the right amount, maybe like meal ideas or something like that."* [Quote: Bouga 2018, p. 10, IT25]					
Subtheme A4.2.2 Content of advice or information						
7 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Heslehurst 2017 Phenomenological with interviews N=15 women Lawrence 2020 General qualitative inquiry with semi-structured interviews N=30 women Olander 2012 General qualitative	7 studies reported women's preference towards content of healthy eating advice and information. Women emphasised that advice should be positive and cover the benefits of healthy eating and appropriate vitamin intake levels. Women wanted proactive discussion with NHS midwives, preferring them to ask questions and initiate discussions rather than having to initiate this. Women wanted to understand healthy eating choices within the context of individual food preferences. Many participants wanted to know how the foods they ate affected their baby and wanted this information to be evidence-based. While some participants chose their food based on weight related concerns, they did not want the midwife to use their weight as a starting point for food conversations. Clear, practical, and visually engaging presentation of information was preferred, with a desire for bright, visual, and colourful formats, including pictures, infographics, and charts. Visual aids were seen as memory aids and particularly helpful for those with low literacy. Participants expressed a need for better understanding of portion sizes and nutrient intake. Women identified a need for advice on managing pregnancy-related sickness.	Minor concerns[1]	No or very minor concerns	Minor concerns[4]	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
inquiry with focus groups and semi-structured interviews N=23 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	*"I think having something visual that kind of shows you clearly what, like what the portions equate to is really helpful"* [Quote: Bouga 2018, p. 11, IT42] *"It probably would be beneficial to have some kind of well-being discussion. It's always left to the women to ask the midwife..."* [Quote: Lawrence 2020, p. 9, Int14021, 32 years, two children, high EA]					
Subtheme A4.2.3 Delivery of advice or information						
6 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Heslehurst 2017 Phenomenological with interviews N=15 women Olander 2012 General qualitative inquiry with focus	6 studies reported preferences for delivery of advice or information. Women wanted early, consistent, ongoing and in-person delivery of healthy eating advice. It was preferable for delivery of advice or information to be integrated into routine antenatal appointments or classes. Some suggested the use of a pregnancy application created by health professionals for ongoing support. Various ideas for nutritional delivery methods were suggested, such as tick sheets, pin boards, internet websites, recipes, meal plans, fridge magnets, reference cards, supermarket magazines, advertisements, and food packaging information. Practical support, such as cooking classes with affordable and time-efficient healthy recipes, was identified as beneficial. Group-based sessions, like parent education or Sure Start classes, were favoured by some women, emphasising the importance of choice of delivery based on individual preferences. Some still women preferred one-on-one discussions with healthcare professionals, supplemented by reliable websites, booklets, or leaflets. For those with obesity referred to dietetic services, the support network aspect of group-based delivery would be valued,	Minor concerns[1]	No or very minor concerns	Minor concerns[4]	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
groups and semi-structured interviews N=23 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	providing a sense of shared experience and reducing vulnerability. For these women, increased contact with the dietitian was desired to form a relationship and maintain motivation. These women mentioned that they had a good relationship and regular meetings with their midwives which they suggested could be an avenue for further support between appointments or otherwise local GP practices could act as supporter. *"Classes for nutrition maybe with cooking to show you what you can make when you are pregnant would be good."* [Quote: Abayomi 2020, p. 32] *"'I think eight weeks is a long time, especially pregnancy wise, it's been four weeks already, it'll be the best part of starting my last trimester by the time I know if I'm really on the right track and doing the right thing, to me that's probably a bit late…I think it's a bit frightening really… you just feel like yes you've got this information but other than eight weeks' time or something you're sort of on your own"* [Quote: Heslehurst 2017 p. 50, Parity 0, BMI 34kg/m^2]					
Subtheme A4.2.4 Trustworthy sources of information and advice						
9 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women	9 studies reported women's preferences towards trustworthy sources of information and advice. The midwife was favoured by women as the professional to provide advice on healthy eating but expert advice from dietitians should also be part of the process. While online sources tended to be used as the first resources checked at the beginning of pregnancy, women acknowledged that all the necessary information should be provided from a reliable source and written by experts. It was also seen as helpful to have a doctor or midwife to endorse any mobile phone app.	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Heslehurst 2017 Phenomenological with interviews N=15 women Newson 2022 Grounded theory with semi-structured interviews N=19 women Olander 2012 General qualitative inquiry with focus groups and semi-structured interviews N=23 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-	Participants preferred practical cooking sessions to be delivered by those who had been pregnant and had children. Participants felt that the most effective way of being informed about a healthy eating service would be through their midwife. It was raised that local services could be advertised via local government websites like other commercial company websites. *"Q: Who should be the person to talk to you about food and health? 'Midwife is a key person expected to talk about it and say everything I need to know."* [Quote: Strommer 2021 supplementary file p. 5, YM58]					

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
structured interviews N=106 women						
Subtheme A4.3 Self initiative						
2 studies Bouga 2018 General qualitative inquiry with interviews N=48 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women	2 studies reported women proactively seeking out advice and information on healthy eating and drinking during pregnancy. Women tended to raise nutrition with midwives and if they did not receive advice they were after sought it elsewhere such as online or by reading books. *"I did print a list of every food you're supposed to eat, every vitamin you're supposed to eat in pregnancy. So I tried to eat different things off that."* [Quote: Morris 2020, p. 6, age range at interview, 31–35; 2 children; IMD 5]	Minor concerns[1]	No or very minor concerns	Moderate concerns[5]	No or very minor concerns[3]	MODERATE
Subtheme A4.4 Support from the healthcare provider						
5 studies Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Lawrence 2020 General qualitative inquiry with semi-structured interviews N=30 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women	5 studies reported women wanting and valuing greater support from health care professionals and believed that this would facilitate healthy lifestyle habits. Women wanted the midwife to take interest in their own health so they would have the opportunity to reflect upon themselves separately than the baby. It was felt that NHS care was mainly concerned about the health of the baby and that there was opportunity to also include the mother's health, which would not have to take up too much time of the standard consultation For women that underwent interventions with aims to improve healthy eating, they valued the support of midwives or research nurses which was mentioned to be absent in routine NHS appointments.	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Poston 2013 General qualitative inquiry with interviews N=21 Warren 2017 General qualitative inquiry with semi-structured interviews N=19 women	*'The midwife I've got through my GP isn't very friendly so I think it's beneficial for me to come in and speak to [the research midwives] about the issues I have with the pregnancy and other stuff, because the one I have at my GP seems to be too busy to care, to listen to any of these things so it's nice to come in and speak to them, it's a bit reassuring I guess.'* [Quote: Poston 2013, supplementary p. 2, ID 1, control, age 26, nulliparous, BMI 37, black British]					
Theme A5 Motivational factors						
Subtheme A5.1 External influences						
8 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Lavendar 2016 General qualitative inquiry with focus groups and semi-structured interviews N=34 women Morris 2020 General qualitative inquiry with semi-	8 studies reported external influences such as family, partner, friends, other pregnant women or women being in a healthy environment as motivation factors towards healthy eating behaviours in women. Women with partners that liked to cook and eat healthily were more likely to do so as well as a result. If living with family, family preference was used as a motivator for choosing healthy foods to cook. For pregnant teenagers, it was also the case where those with supportive partners were interested in cooking and introducing new foods into their diet during pregnancy. A healthy environment was also a motivating factor towards healthy eating. Presence of a healthy lifestyle in women's households or social circles helped them keep on top of these behaviours during pregnancy. Some women described their workplace provided healthy lunches or was as a setting that facilitated their healthy eating rather than at home. Having healthy food at hand at home or work was a way to facilitate healthier eating. Women that underwent interventions that included dietary advice or guidance found the	Minor concerns[1]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
structured interviews N=17 women Newson 2022 Grounded theory with semi-structured interviews N=19 Padmanabhan 2015 General qualitative inquiry with semi structured interviews N=19 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Warren 2017 General qualitative inquiry with semi-structured interviews N=19 women	social element of the intervention to be a motivator due to shared experiences of other pregnant women with the same questions and concerns. For some there was also a motivation to seek out more advice and connect with other women as a result of negative comments from social networks and related anxieties. This social aspect was also a motivator for those from deprived backgrounds. Partners were also mentioned by women as a supportive motivator to keep women on track with healthy eating intervention goals and was valued by women. *"he [partner] likes seafood a lot, so he will tend to try to cook it every opportunity. We eat a lot of prawns and squid, and we don't buy a lot of shellfish but actually … so he does like that kind of thing, and he probably liked it more than me, but he cooks it and we both eat it."* [Quote: Beasant 2023, supplementary p. 19, #008, nulliparous, ate fish less often during pregnancy] *'Feel a little bit more comfortable because you are with other people that are pregnant who often have the same questions and concerns as I do.'* [Quote: Newson 2022, p. 1724, Interview 1]					
Subtheme A5.2 Healthcare provider support						
2 studies Poston 2013 General qualitative inquiry with interviews N=21 women Warren 2017	2 studies reported healthcare provider support as motivators to women undergoing interventions aimed towards healthier eating. Weekly realistic goals devised between the woman and midwife were felt to be achievable and were motivating factors for some women. When developing goals towards healthier eating with the support of the healthcare professional, having a sense of autonomy over the type and size of goal led to greater confidence to be able to reach these goals.	No or very minor concerns	Minor concerns[2]	Minor concerns[4]	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=19 women	There was a sense of pride or achievement when meeting goals that had been set up by the women themselves. One intervention included 5-minute follow-up check-in phone calls which some found helpful to discuss challenges and keep them on track as well as share successes. It was valued that the healthcare provider took the time to check-in. One intervention included goal cards to facilitate healthy eating, for example, to swap out food items or eating more fruit and women described that having discussions with midwives to help them achieve their goals provided them with confidence and gave them the motivation to make behavioural changes. Being supported to reach goals gave participants a sense of accomplishment and wellbeing which could then lead to greater positive changes to their lifestyle beyond their starting goals. '*I think that when you came and we had the chat and we went through the goals. …. I had a plan. And I knew what I was doing, and I found that really beneficial. It really made a difference to me. It didn't put any pressure on me, but they filled me with confidence in what I was doing.'* [Quote: Warren 2017, p. 120, P9]					
Subtheme A5.3 Healthy start vouchers						
1 study Ohly 2019 General qualitative inquiry with semi-structured and realist interviews N=23 women	1 study reported that some women felt that Healthy Start Vouchers enabled fresh food choices which motivated healthy eating habits. This was combined with the motivation to eat healthily for the benefit of the baby. *"… when I used to go shopping I didn't look at fresh foods or anything like that it didn't really appeal to me but then with the vouchers that actually pushed me forward to start eating healthy and buy more stuff … I think that is what it was because I was pregnant as well and obviously I wanted to have the benefits,*	No or very minor concerns	No or very minor concerns	Moderate concerns[5]	No or very minor concerns[3]	LOW

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
	my daughter to have a good start instead of eating rubbish." [Quote: Ohly 2019, p. 5]					
Subtheme A5.4 Self-motivation						
4 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Lavendar 2016 General qualitative inquiry with focus groups and semi-structured interviews N=34 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women	4 studies reported self-motivational factors leading to healthier eating amongst pregnant women. Being a role model for their children was a motivator towards keeping healthy during pregnancy. Women attending healthy eating based interventions were motivated to improve nutrition as they wanted to set habits for a lifetime and at an early point for the health and the baby. Sometimes palatability of food motivated eating habits, for example, some women ate more fish as it was one of the foods that didn't make them feel unwell. For others, change in diet due to medical condition, for example, gestational diabetes motivated heathier eating habits. *"Well yeah, like I say I want to kind of set habits that will last a lifetime and I need to do that early on, and not just for them but for me'* [Quote: Lavendar 2016, p. 22, BMI of 51.1 kg/m^2, aged 26] *"I didn't reduce my intake of tuna because I don't eat it very often, but because it was one of the few things that didn't make me feel sick… I was probably eating more of it [tuna] than I was before…I was aware that I couldn't eat very much of it."* [Quote: Beasant 2023, supplementary p. 7, #002, nulliparous]	Moderate concerns[6]	Minor concerns[2]	Minor concerns[4]	No or very minor concerns[3]	LOW
Subtheme A5.4.1 Protecting the child						

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
6 studies Atkinson 2016 Phenomenological with semi-structured interviews N=7 women Bouga 2018 General qualitative inquiry with interviews N=48 women Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women Ohly 2019 General qualitative inquiry with Semi-structured interviews Realist interviews N=11 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Warren 2017	6 studies reported on the motivation towards protection of the child. Protection of the current and future health of the child was a common motivator towards nutritional behaviour change amongst pregnant women. This was also a motivating factor amongst some pregnant teenagers. Some women described as soon as they found out they were pregnant, this was a motivator to start eating healthily for the nutrition of the growing baby. Although for others this was not a sole reason as their own health and weight related reasons were also motivators. Food choices and purchases were made more consciously, for example, buying cereal with increased folic acid and B12 and participants increased their knowledge and awareness of healthy foods and recommended nutrition intake. Women wanted to ensure that their unborn baby were developing well and diet was seen to play an important role in this. As such, the baby's health was a motivational factor to drive healthier lifestyle choices. For others this was a driver to cook a healthy meal after a long day. Motivation to lower harmful risks to the baby led to avoidance of certain foods such as unpasteurised cheese, raw eggs, uncooked meats and seafood from their diet. Other products were reduced by some women such as sugary foods and drinks, starchy carbohydrates and caffeine. These behaviours were seen to be better for the health of the women and baby rather than direct risks to the baby. Prior experiences relating to conception issues or previous miscarriage also influenced healthy eating and behaviour and decision making. These women tended to be motivated out of anxiety to protect the baby and not wanting to be responsible for anything negative happening to the baby. These women tended to be stricter about healthy food behaviours there was a tendency	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[3]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=19 women	to do thorough research, for example, towards unsafe foods. Whereas some other women who had no trouble with conception or had previously had children adopted a laxer approach to healthy eating while still prioritising the baby's safety. *'I used to have like a big bag of crisps round with me but I don't do that now. I've got cereal bars, nuts more fruit. I'm doing it to protect the baby you know and it's good for myself as well"* [Quote: Warren 2017, p. 120, P4] *'Yeah, I've become extremely protective really. I'm constantly looking things up online, am I doing things right, am I being good? Driving the midwife crazy with a million and one questions. Maybe a little bit too much, but it's all like healthy, it's all, because I just want the best.'* [Quote: Coathup 2017, p. 30, participant 6, 31–35 years, no children, second pregnancy]					

1 Minor concerns about methodological limitations as per CASP qualitative checklist
2 Minor concerns relating to range of opinions expressed incorporated into both facilitators and barriers
3 Studies with a specific setting or subset population or demographic: Heslehurst 2017 interviewed women BMI >30 referral to a dietetic service; Rundle 2018 and Strommer 2021 interviewed pregnant teenagers; Keely 2017 interviewed women with a BMI >40kg/m^2 from a specialist antenatal clinic; participants from Chana 2019, Lawrence 2020, Morris 2020, Ohly 2019 and Olander 2012, lived in deprived areas from the UK; Hussain 2021 interviews women from a Pakistani background living in the UK
4 Studies contributing to the theme offer moderately rich data
5 Two studies contributing to the theme offer thin data
6 Moderate concerns about methodological limitations as per CASP qualitative checklist

Table 7: Evidence profile for barriers for increasing uptake of government advice for healthy eating and drinking during pregnancy

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Theme B1 Thoughts, views and perceptions of women						

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
5 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women Heslehurst 2017 Phenomenological with interviews N=15 women Lawrence 2020 General qualitative inquiry with semi-structured interviews N=30 women Poston 2013 General qualitative inquiry with interviews N=21 women	5 studies reported women's various thoughts, views and perceptions towards healthy eating. Some thought goal-oriented interventions towards healthy eating were not suited to them and did not engage with goal setting behaviours. Some women did not eat or limited certain food products such as meat or fish due to views on environmental and sustainability reasons. Some women attending interventions incorporating healthy eating goals felt judged or that they let themselves or their baby down if the goals were not met. Some being referred to a dietetic service for obesity felt singled out as well as judgement on their parenting. *"I'm just not that sort of person […] My goal was to just get through the pregnancy relatively well, so I didn't want to set myself a goal of saying... 'I'm not going to eat any chocolate or anything.' I just kind of wanted to get through it."* [Quote: Morris 2020, p. 7, age range at interview 36–40; 2 children; IMD 3]	Minor concerns[1]	Minor concerns[2]	Minor concerns[3]	No or very minor concerns[4]	HIGH
Subtheme B1.1 Listening to self or baby over advice						
7 studies Atkinson 2016 Phenomenological with semi-structured interviews N=7 women Bouga 2018	7 studies reported women feeling that it was important to listen to their own or their baby's wants and needs over advice when it came to food related behaviour. Some women described listening to their body and made dietary choices based on perceived needs, such as rest, energy, or calcium from dairy foods. These choices were influenced by comfort and enjoyment, even if they contradicted advice	Moderate concerns[6]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[4]	MODERATE

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with interviews N=48 women Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Keely 2017 General qualitative inquiry with interviews N=11 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	received. This approach was more common among women who did not want major lifestyle changes due to pregnancy, those having previously been pregnant who sought a more relaxed diet this time, or those without prior conception or pregnancy issues who aimed to enjoy their pregnancy without strict dietary restrictions. Cravings were commonly discussed in relation to perceived nutrient needs or foods that the body or baby might be signalling as necessary or to be avoided. Eating unhealthily was justified if in moderation or thought to be balanced out by eating healthily. Some women with a BMI over 40kg/m^2 also felt that pregnancy was a time to relax social expectations relating to diet and weight control with a 'free-pass' to eat what was desired. *"That [eating recommendations] 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."* [Quote: Bouga 2018, p. 13, IT08] *"My second pregnancy has been really different. This one is loving sugary food, I can't get enough sweets. It's totally different from last time … he wanted so much spicy food. I know I probably shouldn't eat that much of it, but if it's what he wants I can't ignore it."* [Quote: Strommer 2021, main text p. 6, aged 18–19, 1 child, family home]					
Subtheme B1.2 Perceived lack of support from health care provider						
5 studies Abayomi 2020 General qualitative inquiry with focus groups	5 studies reported women's perception towards lack of support by the health care professional. There was commonly a sentiment of the need and want for greater support by health professionals, particularly the midwives, towards health eating.	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women Lawrence 2020 General qualitative inquiry with semi-structured interviews N=30 women Olander 2012 General qualitative inquiry with focus groups and semi-structured interviews N=23 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	Limited time experienced in NHS appointments and brief advice provided by midwives was met with a sense of disappointment by women and did not meet their expectations of the level of support provided by health services. This was also felt towards general practitioner surgeries, where for some nutrition information was expected and none was received. Some women had a sense that midwives were not confident or didn't have enough knowledge to provide targeted advice. A few pregnant adolescents expressed that they had lost faith in healthcare professionals including midwives. This was due to perceived lack of support due to lack of time, reassurance or understanding of their circumstances. Instead these women used online communities with other young mothers or different websites for sources of information. One teenager in their second pregnancy described feeling looked over by the minimal conversations and support received from midwives compared to their first pregnancy. *"Some of them just weren't interested in nutrition at all. It wasn't helpful at all. Maybe it was lack of knowledge as well, they maybe didn't feel comfortable and were just skimming over it."* [Quote: Abayomi 2020, p.31] *"Once you have had more than one child you don't see midwives as much anyway … so it was nice to know that I could contact them (research midwife/nurse), but I never did really. Just got on with it … my (NHS) midwife was never there."* [Quote: Lawrence 2020, p. 9, Con12369, 32 years, three children, medium EA]					
Subtheme B1.3 Views on healthy diet						
7 studies Beasant 2023	7 studies reported women's thoughts, views and perceptions on a healthy diet. Women who perceived their diet as already healthy tended to find advice on healthy eating	Moderate concerns[6]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[4]	MODERATE

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women Warren 2017 General qualitative inquiry with semi-structured interviews N=19 women	during pregnancy redundant. Instead some of these women were more interested in learning about the baby's development. Some women with a more relaxed approach to pregnancy due to previously having been pregnant, believed that common sense should guide the interpretation of healthy eating guidelines. Confidence in diet choices and behaviours increased among those who had a successful previous pregnancy, leading to a decreased interest in lifestyle information and resources. For some pregnant teenagers, healthy eating was viewed as something that was bland and boring which was a perceived barrier to eating healthily. *"I think I have a pretty balanced diet this time round…I think I worried with my first too much, I think I could have enjoyed it a bit more, and had more food that I enjoyed, instead of worrying"* [Quote: Coathup 2017, p. 30, participant 5, ≤25 years, one child, second pregnancy] *'Healthy eating is salad and chicken. It's all boring stuff, nothing tasty or that I like. I don't like salad so I can't eat healthy.'* [Quote: Strommer 2021, supplementary p. 4, YM69]					
Theme B2 Issues relating to accessibility						

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Subtheme B2.1 External factors						
9 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Ohly 2019 General qualitative inquiry with semi-structured and realist interviews N=23 women Heslehurst 2017 Phenomenological with interviews N=15 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Poston 2013	9 studies reported issues relating to accessibility of healthy food or a nutritious diet. For some healthy foods were seen as costly and time-consuming to cook whereas unhealthy foods were easier to access and eat. For women on Healthy Start Vouchers, financial concerns sometimes dominated over healthy eating. Vouchers would be seen as a means to assist other financial matters rather than towards a healthier diet. Other women using Healthy Start Vouchers prioritised their kids' health and nutrition over their own during pregnancy. One woman mentioned that they would go hungry during pregnancy if this meant the children were fed. For those participating in interventions to increase healthy eating behaviours, barriers to attendance included competing priorities such as school pick-ups, work, or feeling unwell/tired. For some pregnant teenagers, food choices were influenced by living circumstances and access to cooking facilities. Those least likely to cook for themselves lived in temporary accommodation or on their own. Those in supported housing or mother and baby units commonly felt that they didn't have agency over their lives, including diet (sourcing or preparing foods) or food choices. For those attending dietetic services for obesity, there was an assumption that limited appointments were due to resource impacts, and long waiting lists for the NHS and busy schedules of dietitians. *"They do [help] because like I said at the beginning if I pay £10- £15 a fortnight on fruit and veg that is coming out of the vouchers it is not coming out of my money. It is like sounds cheap but it sounds like it has been bought for you. It saves you that money because if you think about it, that a month is £20-£30 a month being saved that can go towards kid's clothes, days out, just*	Minor concerns[1]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with interviews N=21 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	*stuff like that, essential other stuff that you need as well."* [Quote: Ohly 2019, p. 7] *'I'll eat takeout because of where I'm living now. Because we can't cook, we're staying in a hostel.'* [Quote: Rundle 2018, supplementary file 2, p. 2]					
Theme B.3 Inadequate knowledge, advice and information						
Subtheme B3.1 Confusion or uncertainty around guidance						
4 studies Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews	4 studies reported barriers to knowledge, advice or information based on confusion or certainty around guidance. Women tended to exercise caution when uncertain about guidance. They reported that complete avoidance of certain foods was easier in order to remove any risks. For pregnant teenagers certain foods avoided out of caution were tinned tuna, eggs, nuts and cheese and commonly processed soft cheeses. These foods were seen as harmful to the baby, despite not understanding why. Food poisoning was a common concern for fish and there was a desire for clear guidance on related risks. This led to women tending to eat less fish than recommended by NHS guidance. Women found some recommendations complicated to understand, remember and implement such as recognising unpasteurised items or knowing what a portion of fish meant. Lack of understanding, uncertainty or confusion towards guidance sometimes led to feelings of	No or very minor concerns	No or very minor concerns	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
N=106 women	anxiety and lack of confidence towards following guidance. Some felt overwhelmed and a pressure to follow all of the recommendations which led to feelings of guilt for not always "getting everything right". *'It does feel quite complicated. I think the fish one is the most complicated out of all of the ones that I have read because some of these fish are okay, some of them aren't, some of them you have never heard of so why would you be thinking of them?'* [Quote: Beasant 2023, supplementary p. 12, #012, multiparous, ate fish more often during pregnancy] *'Now I don't know what soft cheese I can eat and what soft cheese I can't eat, so I just avoid the whole of it.'* [Quote: Rundle 2018, supplementary file 2, p. 3]					
Subtheme B3.2 Issues relating to communication						
6 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019	6 studies reported barriers to adequate knowledge, advice and information based on communication issues. Verbal information provided by midwives was often brief, serving as a summary of written materials. Positive advice on healthy eating was lacking, with an emphasis on foods to avoid rather than those to consume. Women wanted to discuss nutrition but found it challenging to initiate these conversations, assuming it was the midwife's responsibility. Of those that did solicit nutritional advice, information provided by the midwife was still brief. Some considered verbal communication of information alone to be overwhelming. Others instead felt that apps and self-initiated research could be overwhelming, especially during first pregnancies. Many were given leaflets and at first antenatal booking. Some women described leaflets as	Minor concerns[1]	Minor concerns[2]	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=12 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	unhelpful or overused and information was either ignored or if read, not retained. *"It was I who brought it up with my midwife on one of the first visits. I had a couple of questions about how cheese and various things like that and it was me that actually brought it up with her. She didn't bring it up with me and really she answered a couple of questions but then told me to refer to this folder I've been given."* [Quote: Beasant 2023, p. 7, IT05] *"'I was also given information in leaflet form but during pregnancy the amount of leaflets you get is unbelievable so you don't really pay attention, well I don't really pay attention to a lot of the hand out stuff I was given."* [Quote: Beasant 2023, p. 9, IT48]					
Subtheme B3.3 Issues relating to content of information						
8 studies Heslehurst 2017 Phenomenological with interviews N=15 women Keely 2017 General qualitative inquiry with interviews N=11 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Poston 2013	8 studies reported barriers to adequate knowledge, advice and information based on content of information or advice received. Many women did not want content to contain controlling and negative messages relating to food safety on food items to limit, reduce or avoid. This was viewed as not relevant, helpful or clear. For some women, leaflets were found to contain too much information and not favoured unless information was tailored. First-time pregnant women and those with previous children had overlapping but distinct needs in terms of content. For women that had children, the emphasis was on obtaining up-to-date information since their last pregnancy. Women experiencing first-time pregnancy sought thorough information on what to expect during their first pregnancy. For some, a lack of tailored information towards existing nutrition knowledge was a barrier to information gained or advice followed. This was	No or very minor concerns	Minor concerns[2]	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with interviews N=21 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021 General qualitative inquiry with semi-structured interviews N=106 women	especially the case for overweight women attending routine antenatal dietetic services for obesity or those with BMI >40kg/m^2 attending a dietetics consultation. This caused some to view appointments as repetitive and uninformative, for example, information on food safety. Some women using these services also felt that advice towards "eating for two" was patronising and unhelpful. "*Was only told what NOT to eat, was only mentioned/listed, no discussion around it. Ate prawns anyway."* [Quote: Strommer 2021, supplementary p. 4, YM106] *"I mean, I know all this… I mean I've studied this so much… like… I could be a dietitian probably! I just can't implement it, for whatever reason, like… know what I mean?"* [Quote: Keely 2017, p. 91 age 28, 3rd baby]					
Subtheme B3.4 Issues relating to delivery of advice or information						
2 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Bouga 2018 General qualitative inquiry with interviews N=48 women	2 studies reported barriers to adequate knowledge, advice and information based on delivery of advice or information. Delivery of information was inconsistent across women. Some received booklets or leaflets, others did not and the same was the case for verbal information. Sometimes leaflets were the only resource provided with no discussion on nutrition in pregnancy. Lack of continuity for healthy eating advice and differing experiences of the NHS were mentioned as barriers. Depending on the region of the UK and the participant, different types of informational support about pregnancy nutrition was received. For example, participants residing in Scotland discussed information from "Ready Steady Baby" in the form of a book, website or phone application. Those from other areas did not report any guidance like this.	Minor concerns[1]	No or very minor concerns	Moderate concerns[5]	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
	Conflicting information was also reported to be received from various healthcare professionals. *'"It was really only some leaflets that I was given by the midwife. I don't think she actually talked to me through or anything, it was just literature she handed over."* [Quote: Bouga 2018, p. 7, IT39] *'"And then a different midwife had a completely different attitude."* [Quote: Bouga 2018, p. 11, IT09]					
Subtheme B3.5 Lack of information or mis-information						
8 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Heslehurst 2017 Phenomenological with interviews N=15 women	8 studies reported barriers to adequate knowledge, advice and information based on lack of information or mis-information. Not all women reported receiving advice on healthy eating during pregnancy, and when they did, information was often described as 'minimal' or 'lacking depth.' Advice tended to focus on food avoidance rather than benefits and was not always accurately recalled or was misremembered. Women felt that the midwife assumed they had a basic knowledge of diet or would conduct their own research. Women with children tended to receive less nutritional advice than in first pregnancy and relied on previous recollections to inform food related behaviours or decisions. Pregnant teenagers and women from Pakistani families held misconceptions about diet affecting the baby's development and subsequent labour ease. These beliefs acted as barriers to dietary changes, contributing to reduced food intake. Another misconception involved thinking that a mother's diet could influence the baby's future dietary behaviours. Misconceptions regarding the limitation or avoidance of certain food items were mentioned. For example, some refrained from fish due to	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Hussain 2021 General qualitative inquiry with semi-structured interviews N=10 women Padmanabhan 2015 General qualitative inquiry with semi-structured interviews N=19 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women	concern of the baby's health, cheese products were limited due to perceptions of being unhealthy, that is, containing fat or being processed. One woman was incorrectly advised by her midwife to limit tuna to two tins per week. Some women knew of the importance of a healthy diet for themselves and their baby but were not clear as to why. In one study of those asked if they knew of the Eatwell Guide, only half had heard of it and another five had minimal knowledge of the guidance. For women referred to routine dietetic services for obesity, lack of, or vague information from the midwife about the referral led to misguided expectations of the information they were going to receive in the service, that is, about weight lost rather than healthy eating. *"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."* [Quote: Bouga 2018, p. 8, IT21] '*"I think I didn't receive a lot this time round, because this is my second pregnancy I think they kind of assumed I that I knew it from before."* [Quote: Bouga 2018, p.8, IT42]					
Subtheme B3.6 Source of information						
3 studies Atkinson 2016 Phenomenological with semi-structured interviews N=7 women Bouga 2018 General qualitative inquiry with interviews N=48 women	3 studies reported barriers to adequate knowledge, advice and information based on sources of information. Women felt that there was no one primary referral point for comprehensive nutritional information. Inconsistent advice from various sources, including health care professionals, friends, family, and the internet, was a common concern.. Some women followed nutritional advice from their social circles when they lacked clarity on what to do.	Moderate concerns[6]	No or very minor concerns	Minor concerns[3]	No or very minor concerns[4]	MODERATE

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Newson 2022 Grounded theory with semi-structured interviews N=19	Other women spoke about learning nutritional behaviours from observing other pregnancies or talking to other pregnant women. Some women commented on changes over time to guidelines on certain foods from health care professionals which tended to lower confidence in advice and seek information elsewhere, such as from friends and family. *'Couldn't argue with them [family and friends] because I didn't know myself whether it's right or wrong, so I listened and avoiding it.'* [Newson 2022, p. 1724, Interview 8] *"Lizzie: And I knew before I got pregnant there were some things that I wouldn't be able to eat, and things like that, which I guess you...Interviewer: Where did you get that kind of information from? Lizzie: I don't know, from pregnant friends. I think through my job as well, 'cause I'm a youth worker and I support a young parents' group. I learnt quite a lot from spending time with them"* [Quote: Atkinson 2016, p. 847]					
Theme B4 Women's thoughts on discourse, ethnic and cultural attitudes to healthy eating						
Subtheme B4.1 Cultural attitudes to healthy eating						
3 studies Coathup 2017 General qualitative inquiry with semi-structured interviews N=6 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Hussain 2021	3 studies reported women's thoughts on cultural attitudes to healthy eating Views of those important to women such as friends and family could influence dietary habits based on what was thought to be 'appropriate' to eat or drink during pregnancy. Some discussed the worry about their reputation and if they did not adhere to the often-conservative expectations of others they would not be seen as a good mother. In women of Pakistani background, the mother or mother-in-law had a dominant role in the culture to dictate food consumption or avoidance that were tied to cultural food practices. Foods had symbolic meanings and were tied to social, cultural and religious attitudes or beliefs. They were viewed to have different effects on the body	Minor concerns[1]	No or very minor concerns	No or very minor concerns	No or very minor concerns[4]	HIGH

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=10 women	compared to western medicine and influenced choices. For example, some foods were viewed to have a heating or cooling effect on the body and were to be eaten or avoided depending on the stage of pregnancy and effects on delivery; white foods were thought to lead to a white skin colour of the baby; red colours were thought to increase the blood in the body believed to be good for health. Women were told by family, particularly mothers and mothers-in-law that food consumption will affect the size of the baby, which in turn affected the woman's eating habits. Disobeying the matriarch in terms of their advice on food was perceived to cause a stressful relationship and lead to blame or criticism if anything went wrong with the pregnancy. *"All these things about eating are told to me by my mother-in-law. Whenever I became pregnant, my mother-in-law used to check what I was eating. She regularly gave me advice in this regard and I have to obey her as she is older than me … disobeying her can create relationships problem in the family. And if something bad happens to me with regard to my health during pregnancy, I will be blamed and criticised in the family for not obeying my mother-in-law"* [Quote: Hussain 2021, p. 406] *"…doctors and nurses suggest that pregnant women should eat more, compared to her normal eating. But our mothers, mothers-in-law, and some friends said if you eat more, the size of the baby will be bigger and it will be difficult to deliver, and the delivery will become painful, and you may die during labour. Therefore, sometimes I do not eat even though I am feeling hungry because of the fear of delivering a bigger baby."* [Quote: Hussain 2021, p.405]					
Theme B5. Demotivating factors						

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
7 studies Abayomi 2020 General qualitative inquiry with focus groups N=32 women Beasant 2023 General qualitative inquiry with semi-structured interviews N=14 women Bouga 2018 General qualitative inquiry with interviews N=48 women Chana 2019 General qualitative inquiry with semi-structured interviews N=12 women Morris 2020 General qualitative inquiry with semi-structured interviews N=17 women Rundle 2018 General qualitative inquiry with semi-structured interviews N=34 women Strommer 2021	7 studies reported demotivating factors towards healthy eating during pregnancy. Sickness and nausea were barriers to eating healthy foods for some women. Although a healthy diet was viewed as important, foods that aided morning sickness, for example, starchy foods were prioritised by some women. Palatability of food was another barrier for others, for example, not liking the taste of fish or milk. For others, taste and smell and therefore food preferences had changed during pregnancy. Dietary requirements such as vegetarianism was a barrier towards certain healthy food products like meat and fish while medical conditions such as lactose intolerance or eczema prevented dairy consumption. Partner preferences reduced the motivation to eat certain foods or could lead to eating unhealthy foods, especially if needing to cook separate meals. A lack of knowledge or confidence towards preparing or cooking certain food items was also a barrier to consumption, in particular preparing or cooking seafood. Pregnant teenagers were less motivated to prepare foods or wanted quick and easy meals. Although money was a barrier to healthy eating, convenience and taste motivated food choices. Some women with multiple children didn't make as many changes to their diet compared to previous pregnancies due limited time or energy. Additional barriers towards healthy eating were emotional issues, anxiety about weight and challenges with childcare. Some teenage women perceived the application process for Healthy Start Vouchers to be a barrier which reduced motivation to apply *"I used to eat a lot of veg, but now it makes me want to be sick."* [Quote: Rundle 2018, supplementary file 2, page 3] *"The second time you just sort of have to continue as you are because you've got someone else to think about. So actually, I didn't make nearly as*	Minor concerns[1]	Minor concerns[2]	Minor concerns[3]	No or very minor concerns[4]	MODERATE

Study information	Description of review finding	CERQual Quality Assessment				
		Methodological limitations	Coherence of finding	Adequacy	Relevance of evidence	Overall confidence
General qualitative inquiry with semi-structured interviews N=106 women	*many changes to my life as I did the first time I was pregnant, when it was just me and my partner."* [Quote: *page 4, age range at interview 36–40; 2 children; IMD 3)* *"Well, I don't eat a lot of fish probably because my husband doesn't enjoy it and I don't like to cook more than one meal at once."* [Quote: Bouga 2018, p. 9, IT30]					

1 Minor concerns about methodological limitations as per CASP qualitative checklist
2 Minor concerns relating to range of opinions expressed incorporated into both facilitators and barriers
3 Studies contributing to the theme offer moderately rich data
4 Studies with a specific setting or subset population or demographic: Heslehurst 2017 interviewed women BMI >30 referral to a dietetic service; Rundle 2018 and Strommer 2021 interviewed pregnant teenagers; Keely 2017 interviewed women with a BMI >40kg/m^2 from a specialist antenatal clinic; participants from Chana 2019, Lawrence 2020, Morris 2020, Ohly 2019 and I Olander 2012 lived in deprived areas from the UK; Hussain 2021 interviews women from a Pakistani background living in the UK
5 Two studies contributing to the theme offer thin data
6 Moderate concerns about methodological limitations as per CASP qualitative checklist

Appendix G Economic evidence study selection

Study selection for: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

This was a qualitative review question, therefore economic evidence was not relevant and thus no economic evidence searches were conducted.

Appendix H Economic evidence tables

Economic evidence tables for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

This was a qualitative review question, therefore economic evidence was not relevant.

Appendix I Economic model

Economic model for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

No economic analysis was conducted for this review question.

Appendix J Excluded studies

Excluded studies for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

Excluded qualitative studies

Table 8: Excluded studies and reasons for their exclusion

Study	Code [Reason]
Andreae, Gemma, Scott, Stephanie, Nguyen, Giang et al. (2022) Food insecurity among pregnant women living in high-income countries: a systematic review. Lancet (London, England) 400suppl1: 17	- Conference abstract *Conference abstract findings of systematic review that included one study from the UK amongst other countries. Full-text publication not yet available*
Bell, Zoe, Scott, Steph, Visram, Shelina et al. (2021) Food insecurity and the nutritional health and well-being of women and children in high-income countries: protocol for a qualitative systematic review. BMJ open 11(8): e048180	- Protocol to systematic review or primary study assessed *Published systematic review to the protocol was captured in the search and assessed for inclusion*
Bell, Zoe, Scott, Steph, Visram, Shelina et al. (2022) Experiences and perceptions of nutritional health and wellbeing amongst food insecure women in Europe: A qualitative meta-ethnography. Social science & medicine (1982) 311: 115313	- Systematic review used as source of primary studies *None of the included studies focused on pregnant women. Individual studies were checked*
Bevelander, Kirsten E, Herte, Katharina, Kakoulakis, Catherine et al. (2018) Eating for Two? Protocol of an Exploratory Survey and Experimental Study on Social Norms and Norm-Based Messages Influencing European Pregnant and Non-pregnant Women's Eating Behavior. Frontiers in psychology 9: 658	- Study design not relevant to this review protocol *Protocol for study that uses open and closed questionnaire surveys which does not meet protocol criteria*
Black, Andrew P, Brimblecombe, Julie, Eyles, Helen et al. (2012) Food subsidy programs and the health and nutritional status of disadvantaged families in high income countries: a systematic review. BMC public health 12: 1099	- Study design not relevant to this review protocol *Systematic review does not include qualitative studies and therefore does not meet the protocol criteria*
Brown, Mary Jane, Sinclair, Marlene, Liddle, Dianne et al. (2013) Motivating pregnant women to eat healthily and engage in physical activity	- Phenomenon of interest not relevant to this review protocol

Study	Code [Reason]
for weight management: an exploration of routine midwife instruction. Evidence Based Midwifery 11(4): 120-127	*Observations from the perspective of researchers rather than the women attending midwife appointments and therefore does not meet protocol criteria*
Filby, A.; Robertson, W.; Afonso, E. (2020) A service evaluation of a specialist migrant maternity service from the user's perspective. British Journal of Midwifery 28(9): 652-659	- Phenomenon of interest not relevant to this review protocol *Phenomenon of interest relates to service evaluation of temporary housing for asylum seekers rather than barriers to, and facilitators for increasing uptake of government advice*
Flannery, Caragh, Mtshede, Mavis Nomsa, McHugh, Sheena et al. (2020) Dietary behaviours and weight management: A thematic analysis of pregnant women's perceptions. Maternal & child nutrition 16(4): e13011	- Setting not relevant to this review protocol *Study conducted outside of the UK (Cork, Ireland)*
Frayne, J., Hauck, Y., Sivakumar, P. et al. (2020) Nutritional status, food choices, barriers and facilitators to healthy nutrition in pregnant women with severe mental illness: a mixed methods approach. Journal of human nutrition and dietetics : the official journal of the British Dietetic Association 33(5): 698-707	- Setting not relevant to this review protocol *Study conducted outside of the UK (Australia)*
Grenier, Lindsay N., Atkinson, Stephanie A., Mottola, Michelle F. et al. (2021) Be Healthy in Pregnancy: Exploring factors that impact pregnant women's nutrition and exercise behaviours. Maternal & Child Nutrition 17(1): 1-9	- Setting not relevant to this review protocol *Study conducted outside of the UK (Canada)*
Hamilton, E Adela A, Nowell, Ann K, Harden, Angela et al. (2018) Conduct and reporting of acceptability, attitudes, beliefs and experiences of pregnant women in randomised trials on diet and lifestyle interventions: A systematic review. European journal of obstetrics, gynecology, and reproductive biology 225: 243-254	- Systematic review used as source of primary studies *Systematic review focuses on methodology of papers containing qualitative components. Two of the included studies from the UK have been checked*
Hassan, Shaima Mohamed; Leavey, Conan; Rooney, Jane S (2019) Exploring English speaking Muslim women's first-time maternity experiences: a qualitative longitudinal interview study. BMC pregnancy and childbirth 19(1): 156	- Phenomenon of interest not relevant to this review protocol *Study phenomenon of interest covers factors relating to health seeking decisions for Muslim women when engaging with maternity services from pregnancy to postpartum. Diet is only mentioned in relation to postpartum experiences*

Study	Code [Reason]
	and the paper does cover facilitators or barriers to healthy eating and drinking during pregnancy
Khanom, A., Hill, R.A., Morgan, K. et al. (2015) Parental recommendations for population level interventions to support infant and family dietary choices: A qualitative study from the Growing Up in Wales, Environments for Healthy Living (EHL) study Health behavior, health promotion and society. BMC Public Health 15(1): 234	- Population not relevant to this review protocol *The study focuses on themes relevant to parents with infants and will be included in review question 4.2*
Killeen, Sarah Louise, Callaghan, Shauna L, Jacob, Chandni Maria et al. (2020) "It only takes two minutes to ask"-a qualitative study with women on using the FIGO Nutrition Checklist in pregnancy. International journal of gynaecology and obstetrics: the official organ of the International Federation of Gynaecology and Obstetrics 151suppl1: 45-50	- Setting not relevant to this review protocol *Study conducted outside of the UK (Dublin, Ireland)*
McFadden, Alison, Green, Josephine M, Williams, Victoria et al. (2014) Can food vouchers improve nutrition and reduce health inequalities in low-income mothers and young children: a multi-method evaluation of the experiences of beneficiaries and practitioners of the Healthy Start programme in England. BMC public health 14: 148	- Population not relevant to this review protocol *Population and analysis focused on mothers and young children. Study is included in review question 4.2*
Ngongalah, L., Rankin, J., Rapley, T. et al. (2018) Dietary and physical activity behaviours in African migrant women living in high income countries: A systematic review and framework synthesis. Nutrients 10(8): 1017	- Systematic review used as source of primary studies *Systematic review mostly includes quantitative studies and those conducted outside of the UK. No included studies were relevant to the protocol criteria*
Nunnery, Danielle L; Labban, Jeffrey D; Dharod, Jigna M (2018) Interrelationship between food security status, home availability of variety of fruits and vegetables and their dietary intake among low-income pregnant women. Public health nutrition 21(4): 807-815	- Setting not relevant to this review protocol *Study conducted outside of the UK (USA)*
Ohly, Heather, Crossland, Nicola, Dykes, Fiona et al. (2017) A realist review to explore how low-income pregnant women use food vouchers from the UK's Healthy Start programme. BMJ open 7(4): e013731	- Review article but not a systematic review *Realist review that did not apply systematic review methods for quality appraisal. The review included studies from the UK and US with UK references checked*

Study	Code [Reason]
Rhodes, Alexandra, Pimprikar, Arya, Baum, Alison et al. (2023) Using the Person-Based Approach to Develop a Digital Intervention Targeting Diet and Physical Activity in Pregnancy: Development Study. JMIR formative research 7: e44082	- Phenomenon of interest not relevant to this review protocol *Qualitative study relates to feedback around the development, testing and user experience of a lifestyle intervention mobile phone app*
Rotimi, M.I., McKelvin, G., Macdonald, M. et al. (2022) Using mixed methods to investigate the weight change, dietary intake and physical activity of Black pregnant women, incorporating a participant and public involvement approach. Proceedings of the Nutrition Society 81(4): e84	- Conference abstract *Study type does not meet protocol criteria. Focus of abstract is on public involvement in a study design*
Soltani, H., Duxbury, A.M.S., Arden, M.A. et al. (2015) Maternal obesity management using mobile technology: A feasibility study to evaluate a text messaging based complex intervention during pregnancy. Journal of Obesity 2015: 814830	- Phenomenon of interest not relevant to this review protocol *Mixed methods study on obesity management which is outside the remit of the review*
Stockton, Jessica and Nield, Lucie (2020) An antenatal wish list: A qualitative systematic review and thematic synthesis of UK dietary advice for weight management and food borne illness. Midwifery 82: 102624	- Systematic review used as source of primary studies *Systematic review includes studies with inappropriate population (gestational diabetes), focus (weight gain) or data collection method (mixed methods questionnaires). Included studies have been checked*
Taylor, Rachael M, Wolfson, Julia A, Lavelle, Fiona et al. (2021) Impact of preconception, pregnancy, and postpartum culinary nutrition education interventions: a systematic review. Nutrition reviews 79(11): 1186-1203	- Systematic review used as source of primary studies *Systematic review focused on interventional studies. One qualitative study included was from a country outside of the UK (Madagascar)*
Thomson, Gill, Cook, Julie, Crossland, Nicola et al. (2022) Minoritised ethnic women's experiences of inequities and discrimination in maternity services in North-West England: a mixed-methods study. BMC pregnancy and childbirth 22(1): 958	- Phenomenon of interest not relevant to this review protocol *Phenomenon of interest does not meet protocol criteria as the qualitative component only mentions diet in relation to food provided in hospital for women that were inpatients during or at end of pregnancy*
Versele, Vicka, Stok, F Marijn, Aerenhouts, Dirk et al. (2021) Determinants of changes in women's and men's eating behavior across the transition to parenthood: a focus group study.	- Setting not relevant to this review protocol *Study conducted outside of the UK (Belgium)*

Study	Code [Reason]
The international journal of behavioral nutrition and physical activity 18(1): 95	
Warren, Lucie; Rance, Jaynie; Hunter, Billie (2012) Feasibility and acceptability of a midwife-led intervention programme called 'Eat Well Keep Active' to encourage a healthy lifestyle in pregnancy. BMC pregnancy and childbirth 12: 27	- Protocol to systematic review or primary study assessed *Protocol to subsequent published study captured in the search and assessed for inclusion*

Excluded economic studies

This was a qualitative review question, therefore economic evidence was not relevant.

Appendix K Research recommendations – full details

Research recommendations for review question: What are the barriers and facilitators to increasing the uptake of government advice for healthy eating and drinking in pregnant women?

No research recommendations were made for this review question.