

Research

Experiences of dietary advice and nutrition-related information: a qualitative analysis of primigravid women in England during the COVID-19 pandemic

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Background

There is limited research in England on the impact and experiences of dietary advice and nutrition-related information for pregnant women. However, overseas research has shown that such information can cause women to feel anxious and confused. This study aimed to analyse the impact and experience amongst primigravids in England.

Methodology

This was a qualitative study. Twelve semi-structured individual interviews were carried out (videoconference and telephone). Interviews were audio recorded and transcribed verbatim. Inductive thematic analysis was used for data analysis. Data quality measures were adhered to throughout the research process.

Results

Five major themes were identified: 'physiological changes and taste preferences', 'the health and safety of the baby comes first', 'scarcity of nutrition information given', 'seeking nutrition information for control' and 'every pregnant woman is unique'. Participants put the health and safety of their baby first, and this was amplified due to the COVID-19 pandemic. There was a lack of information given to participants from health care professionals. Information was broadly sought out as a way of exerting control; either to feel informed, or to restrict contact with new information in order to avoid feeling overwhelmed. In both cases, participants expressed that information was abundant. Official dietary guidelines were seen as trustworthy but too generic and not applicable to them. Some participants used multiple pregnancy apps with inaccurate information.

Conclusions

As nutrition in pregnancy is important for the woman and the growing foetus, midwives are in a critical position to advise primigravids in England. Further research is needed to understand their barriers for doing so. More is needed from the National Health Service to signpost women to using evidenced-based pregnancy apps and to enable a healthy nutrition environment post-pregnancy.

INTRODUCTION

During pregnancy, women go through many changes: biologically, physiologically, socially and emotionally (Bianchi et al. 2016). A healthy diet, with a variety of macro and micronutrients, is essential at every age. However, in the weeks leading up to conception and during pregnancy, it ensures the health of both the woman and her growing foe-

tus with specific vitamins and minerals being especially important during pregnancy (Rolfes and Whitney 2016). However, excessive amounts of certain nutrients, such as vitamin A, can be damaging to the growing foetus and lead to congenital disabilities (Rolfes and Whitney 2016). Contaminants such as *listeria monocytogenes* and *toxoplasma gondii*, found in foods such as raw shellfish or cured meats, can lead to long-term consequences including stillbirth,

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meningitis, blindness and cognitive difficulties (Pfaff and Tillett 2016). In addition, extensive research has shown the increased health risks for women who are either under or over a healthy BMI range. Excessive weight gain can increase health risks such as gestational diabetes mellitus (Kim, Newton, and Knopp 2002; Ferrara 2007; Siega-Riz et al. 2009; Flick et al. 2010; Zhang and Ning 2011). Being underweight in pregnancy can increase the risk of a low-birth-weight neonate (Han et al. 2011; Rolfes and Whitney 2016).

Research has shown that pregnant women's food practices (what a pregnant woman eats as well as what she does not eat) are influenced by multiple factors (Szwajcer et al. 2005; Bianchi et al. 2016; Bjelke et al. 2016; Bland et al. 2020). One of these factors are her individual characteristics which can be numerous and multifaceted (Inglis, Ball, and Crawford 2005; Hilton 2007).

In England, pregnant women under eighteen are the most likely to smoke and be underweight (Public Health England 2019). Alternatively, older women may be influenced by factors such as fertility issues such as difficulty in conceiving. Studies have shown that these factors can amplify a pregnant woman's risk awareness and whether she 'trusts' certain foods (Carolan and Nelson 2007; Bayrampour et al. 2012a, 2012b; House and Coveney 2013; Muñoz et al. 2019).

A woman's culture, as well as her belief in cultural myths, can also play a role in nutrition in pregnancy (Chakona and Shackleton 2019). A study of pregnancy and childbirth experiences in Somali women resident in Sweden (Essén et al. 2000), described the cultural belief of eating less food during pregnancy. Participants believed that eating less food would prevent them from having a large foetus and thus that complications were less likely to occur during childbirth.

Sámamo et al. (2020) examined the belief in myths amongst 695 pregnant women in Mexico City and found that 91% of participants had at least one belief in a non-evidenced based myth. This figure is similar to the 90% reported amongst Italian pregnant women in Guggino et al.'s (2016) study.

Moreover, the nutrition knowledge that women have before pregnancy can also have an impact on their food practices (Lee et al. 2016; Okesene-Gafa et al. 2016; Aktaç et al. 2018; Blondin and LoGiudice 2018). There is evidence that women increase their motivation to adopt a healthy diet during pregnancy (Bianchi et al. 2016; Bookari, Yeatman, and Williamson 2017; Forbes et al. 2018). This has been highlighted as especially true for first-time pregnant women, also known as primigravids (Szwajcer et al. 2005, 2008). Szwajcer et al. (2005) have also shown that pregnant women find nutrition information vital because it is one of the few things they can apply in their daily lives for their health and their growing foetus. This has been confirmed in subsequent research studies which have shown that pregnant women change the way they check food, especially when they do not know the origins of the food (Wennberg et al. 2013).

Another factor influencing a pregnant woman's food practices are the sources of her dietary advice and nutrition-related information. These sources of information can range from health care professionals, international guide-

lines (WHO 2001), government guidelines, partners, families, friends and the mass media, including books, the internet and recently, mobile applications (apps).

Moreover, pregnant women are more likely to talk about their pregnancy with other pregnant women or those that have recently been pregnant (Szwajcer et al. 2005). A pregnant woman's ethnic and cultural background could also mean that she is more prone to receiving nutrition information from family members or friends (Ludwig, Cox, and El-lahi 2011; Råberg Kjøllesdal et al. 2011). Studies in China, Australia and the UK have all shown that pregnant women are increasingly using apps as a source of nutrition information (Tripp et al. 2014; Bland et al. 2020; Wang et al. 2019). In the UK, of the 29 apps available for pregnant women, there is a wide range in the accuracy of information given, including incorrect information. Only two apps in one study were identified as holding exclusively accurate information, the National Health Service (NHS) recommended app, Baby Buddy and Emma's Diary (Bland et al. 2020).

Numerous studies (Szwajcer et al. 2009; Jackson et al. 2011; de Jersey et al. 2013; Arrish, Yeatman, and Williamson 2016) have shown the critical role that health care professionals play in nutrition during pregnancy. Yet many (Arrish, Yeatman, and Williamson 2014; Lucas, Charlton, and Yeatman 2014; Lee et al. 2016, 2018; Bryant et al. 2019) have also repeatedly shown that pregnant women do not receive adequate nutrition advice and information from health care professionals. A possible explanation for this has been demonstrated in Arrish et al.'s (2017) study in Australia, which showed that this is due to the lack of nutrition education midwives receive themselves. Another possible explanation is that medical professionals are generally more orientated towards giving advice when problems occur, and treatment is needed, as opposed to prevention (Persson et al. 2011).

Research in countries outside the UK has shown that the abundance of dietary advice and nutrition-related information during pregnancy may result in dietary change but is also causing confusion, guilt, and anxiety (Ferrari et al. 2013; Wennberg et al. 2013; de-Graft Aikins 2014; Bianchi et al. 2016; Kennedy et al. 2017; Taylor et al. 2018; Bryant et al. 2019; Dalhaug and Haakstad 2019; Ghiasi 2019; Cannon et al. 2020; Lobo et al. 2020). When it comes to fish consumption, pregnant women have been observed to avoid it entirely because the information in guidelines is confusing (Taylor et al. 2018). Across nineteen national guidelines and two international guidelines there was significant variance in the content, presentation, and complexity of the guidance on this issue. Advice given predominately focused on the mercury content of fish (with less emphasis on the nutritional benefits), which can lead pregnant women to stop eating fish rather than take the risk of potential harm (Taylor et al. 2018).

A study on pregnant women in Sweden (Wennberg et al. 2013), found that the participants mostly had to discover nutrition information themselves and often felt confused or guilty. Feeling guilty was due to the difficulty of trying to follow lots of advice at the same time, accompanied by the fear of harming their foetus if they accidentally ate something unsafe. Furthermore, a study in Norway (Garnweidner, Sverre Pettersen, and Mosdøl 2013) found that the

women were confused when given information by a midwife that was incongruent with their original food culture.

However, there is a complex relationship between 'passive absorption' and 'active seeking' of information during pregnancy. A study in France (Bianchi et al. 2016) showed that pregnant women saw food restrictions as numerous and these were perceived as intrusive and oppressive. However, although participants were often confused as they received conflicting information from healthcare providers, their social environment and the mass media, they also developed information seeking practices so they could achieve "nutrition-related empowerment" (Bianchi et al. 2016, 9).

At the time of the present study in England (June 2020), pregnant women were included in the vulnerable category for COVID-19 and asked to be particularly stringent in following social distancing measures (Public Health England 2020). Primigravids were chosen because of their increased motivation to adopt a healthy diet during pregnancy (Szwajcer et al. 2005). To the authors knowledge, this is the first research to identify food practices amongst primigravids in England, the factors that influenced these practices, as well as the participants' perception of the impact of nutrition information.

RESEARCH AIM

The objectives of this study are fourfold: to identify food practices amongst primigravids in England, to identify the factors that influence these practices, to assess the participants' perceptions of impact of dietary advice and nutrition-related information on primigravids, and to assess the impact that the COVID-19 pandemic has had on dietary advice and nutrition-related information given to and sought by pregnant women and on their food practices.

METHODS

This was a qualitative study grounded in the theory of phenomenology. This approach aims to gain a deeper understanding of participants' subjective experiences (Braun and Clarke 2013). The study used snowballing and convenience sampling to recruit primigravid women across England. As the study was undertaken during the COVID-19 pandemic, virtual individual semi-structured interviews were required by the University of Westminster's Ethics Committee as the most appropriate data collection method.

PARTICIPANTS

Participants were recruited using the social media platforms WhatsApp, Facebook and LinkedIn and an advert posted on the website Mumsnet. The criteria for inclusion in the study were as follows: primigravid women, over the age of eighteen, to have no medical complications such as gestational diabetes, to be living in England and to have no learning difficulties and a level of basic English language. Twelve participants took part and ranged in age from 26-41 years old.

Sixteen women expressed an interest in the study, but four did not take part. Of the four women who did not take part, one of them was a friend of the researcher and there-

fore did not meet the ethical guidelines for participation. The researcher was unable to contact the remaining three women, and the women did not contact the researcher after expressing an initial interest. The sample size was fixed when the data obtained from the in-depth interviews appeared to reach saturation (Braun and Clarke 2013).

INTERVIEW QUESTION GUIDE

An interview question guide with open-ended questions was used and the interviews lasted approximately one hour each. The order of the questions in the guide reflects the study's objectives. The semi-structured interviews were digitally recorded and then transcribed by the researcher verbatim using the software Dragon (Dragon Transcription Solutions, n.d.).

DATA ANALYSIS

The analytical procedure was guided by the principles of thematic analysis and inductive coding (Braun and Clarke 2006). Inductive thematic analysis was chosen due to its flexibility (Braun and Clarke 2006). The researcher used the Critical Skills Appraisal Programme (CASP 2018) checklist throughout the research process to adhere to high standards of practice in qualitative research studies. After each interview, the researcher took notes in a journal and recognised her role in the research process (Draper and Swift 2011; Braun and Clarke 2013). This was done by critically examining her role and potential bias during the formulation of the research questions, data collection and sample recruitment (CASP 2018).

ETHICS

The participants were aware that their participation in the study was voluntary. Each received a recruitment leaflet, the participant information sheet and the consent form before their interview via email. Participants were able to ask questions to the researcher about the study at various points. All the participants were informed that their interview was being recorded and would be transcribed by the researcher with codes to ensure confidentiality. All twelve participants expressed feeling comfortable at being interviewed by videoconference using Skype. However, two participants were interviewed via telephone due to technological constraints on the day of the interviews.

The data collected was password-protected, encrypted and securely backed up to be compliant with the General Data Protection Regulation (The European Parliament and The Council of the European Union 2018). The study was approved by the University of Westminster's Ethics Committee (VRE ETH1920-1460).

RESULTS

Multiple inter-related themes were found concerning the participants' food practices, how they were given and sought out dietary advice and nutrition-related information, and their perceptions of the impact this had on them.

Table 1. Themes and subthemes identified

Themes	Subthemes
Physiological changes and taste preferences	<ul style="list-style-type: none"> • 'I just can't face it' • Negotiating taste preferences
The health and safety of the baby come first	<ul style="list-style-type: none"> • Health consciousness • Risk awareness
Scarcity of nutrition information given	<ul style="list-style-type: none"> • Prior nutrition knowledge but sources unclear • Forgiving the midwife • Questioning if COVID-19 pandemic caused a lack of information from the social environment
Seeking nutrition information for control	<ul style="list-style-type: none"> • 'Nutrition is something I can do for myself and my baby' • Restriction of information for control • 'I want to know why I can't eat it'
Every pregnant woman is unique	<ul style="list-style-type: none"> • Evidenced-based information is key • There is a lot of information out there for good and for bad • 'I can't be perfect all the time'

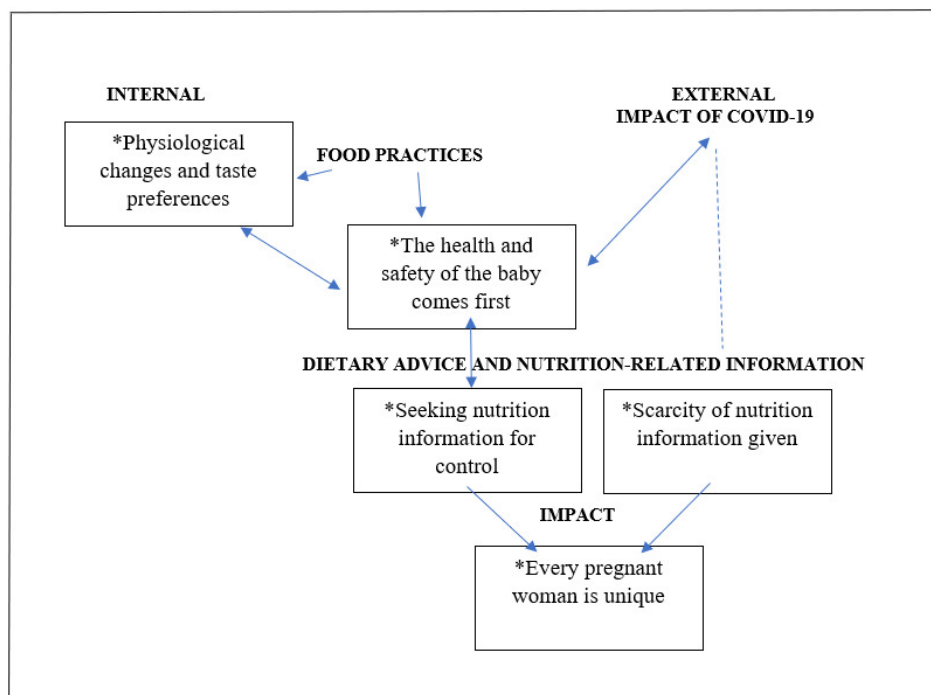


Figure 1. Thematic Map showing the relationship between *five overarching themes and the overriding effect of the COVID-19 pandemic

In total, five themes and thirteen subthemes were identified (Table 1).

At the time when the interviews were conducted in June 2020, England had been under a national lockdown for three months. Most of the participants had been almost exclusively in the company of their (male) partner or husband for over twelve weeks. The context of this proximity and adjacent lockdown measures manifested itself across different themes and subthemes which are depicted visually in a thematic map (Fig. 1).

PHYSIOLOGICAL CHANGES AND TASTE PREFERENCES

As all the participants in this study were either in their second or third trimester when they spoke about the phys-

iological changes during their pregnancy, many of them focused on nausea and sickness they felt in their first trimester (which was also before the COVID-19 pandemic lockdown measures).

Participant B, 34 years, 38 weeks pregnant
 "...week 6-9 is when I was really quite sick...I just didn't want to eat..."

Participant E, 35 years, 18 weeks pregnant
 "...the second trimester is much better ((laughs)) the first one was awful it was really hard because I had terrible morning sickness and I was exhausted, so I spent probably a month in bed..."

Participants spoke about how they negotiated their changing taste preferences in different ways. This differed from expressing how it was easy to stop eating something which they did not like, to expressing their annoyance at no longer being able to eat something they did enjoy. In addition, participants mentioned how they would eat something they did not like because they knew it would be good for the baby.

Participant D, 34 years, 20 weeks pregnant
 "...I'm not a massive fan of nuts but I eat them because I feel I should...because it's good for the baby ((laughs)) and I don't hate them so I can kind of force them down ((laughs))..."

Furthermore, due to the COVID-19 pandemic lockdown measures, as the participants were spending most of, if not all their time with their partners or husbands at home, this also meant negotiating their taste preferences with their partner. The women therefore adopted food practices that might not otherwise have been the case. The impact on the women was different depending on whether she adapted to his taste preferences, or he adapted to hers. For example:

Participant F, 29 years, 16 weeks pregnant
 "before pregnancy I would eat it [fish] way more often, nothing would stop me but because staying at home and you know we are eating both together so he doesn't like eating fish as much so I wouldn't buy as much..."

Participant D, 34 years, 20 weeks pregnant
 "...he has found it quite helpful having the same diet as me because it's quite healthy and nutritious and everything"

THE HEALTH AND SAFETY OF THE BABY COMES FIRST

Most participants expressed feeling a motivation and desire to eat healthily in a variety of ways; from being dismissive of the 'eating for two' myth, to avoiding certain risks and having a varied diet across all food groups. However, the participants' risk awareness was amplified in relation to the impact of the COVID-19 pandemic. Many of the participants shifted their consumer practices from their usual supermarkets to local shops because there were fewer people. Participants also cooked from scratch at home, citing positive changes to their diets.

Participant C, 31 years, 22 weeks pregnant
 "...so like I think it is pretty well established now and made up about 'eating for two' and that you shouldn't eat more than you otherwise would..."

Participant F, 29 years, 16 weeks pregnant
 "...we use more of the fruit fresh and meat so if anything, my diet got better since I am at home...I definitely eat better, regularly and healthier."

SCARCITY OF NUTRITION INFORMATION GIVEN

A recurring pattern was that participants expressed that they had prior nutrition knowledge but were unable to recall who had told them or where they had first heard of the information. Participants received little to no nutrition-related information from health care professionals, particularly from their main point of contact, their midwife. The

majority of participants were very forgiving in the way that they expressed this. Participants blamed themselves for not asking, or they spoke about the contextual nature of the pandemic, or a mixture of the two.

In relation to their social environment, some participants questioned whether the reason they were not receiving any nutrition advice or information from their family and friends was due to the COVID-19 pandemic limiting direct interpersonal contact. However, family and friends were rarely mentioned, even when reflecting on the start of their pregnancies, prior to the COVID-19 lockdown measures.

Participant L, 33 years, 30 weeks pregnant
 "...with the folic acid, I'm not even really sure where I heard that from, I think maybe it's been on adverts?"

Participant C, 31 years, 22 weeks pregnant
 "...maybe if I'd asked the midwife when she phoned me up... It would be nice to have a bit more input, but I understand why that's not been possible..."

Participant L, 33 years, 30 weeks pregnant
 "...maybe my mum would have offered more advice if we were just sat around a table or something...and maybe people at work, so I am not getting those sorts of informal chats about things as much as I might have been if it hadn't been a pandemic..."

SEEKING NUTRITION INFORMATION FOR CONTROL

Many participants sought out nutrition information through a variety of sources: Instagram, Facebook, books, the NHS website (2020) and generic Google searches. All but one participant used at least one app during pregnancy, with the majority using multiple apps. However, depending on the app they were using, the amount and accuracy of nutrition information varied considerably.

Participant K, 30 years, 17 weeks pregnant
 "...so I've got the app 'what to expect when you're expecting', I also have three other apps...erm... the 'Baby Center' app, one that's the 'pregnancy plus' app and one that's called 'sprout'(pause) I basically downloaded all of them because I was over excited..."

Participant L, 33 years, 30 weeks pregnant
 "...I've downloaded quite a few different apps, some are American and some are UK based, so I like have a mixture..."

Many participants shared that, across all sources, there was a lot of nutrition information. Some participants expressed that seeking out nutrition information and choosing what they were eating was something they could control. In contrast, some participants were also aware that the abundance of dietary advice and nutrition-related information could be overwhelming and therefore had chosen not to seek out information to avoid this happening. In either case, they expressed how it was important for them to understand the reasons why they were not supposed to eat something.

Participant A, 34 years, 40 weeks pregnant
 "...and it [nutrition information] has given me a sense of

control...when I say control...I guess it's like something I can do to influence the health of myself and my baby...."

Participant H, 41 years, 32 weeks pregnant
"...sometimes it can be a bit overwhelming which is probably why I haven't engaged so much with finding stuff online because there is so much information on everything and I guess if I am really honest I was kind of scared of feeling a little inadequate that I am not eating the right things..."

Participant A, 34 years, 40 weeks pregnant
"...I have found the information I have sought out...more useful...and has given me a lot more depth and understanding of why I am eating or not eating certain things..."

EVERY PREGNANT WOMAN IS UNIQUE

While the women sought nutrition information for control, many participants stated that they were most likely to rely on, or believe dietary advice and nutrition-related information, if it were evidenced-based, listing a range of sources such as the NHS website, popular pregnancy websites or an app affiliated to an organisation deemed by them to be a credible source. However, searching for information on the NHS website was not the primary source of information for most participants. Although they largely referred to the NHS as trustworthy, the information was either seen as not personal to them, generic or that it was constantly changing.

Participant E, 35 years, 18 weeks pregnant
"...I feel secure because they [NHS website] are coming from the doctors from researchers, they are not coming from people who think they know something about it..."

Participant A, 34 years, 40 weeks pregnant
"...[NHS is] supporting [the] masses I suppose... Which has made me think well...I need to think about myself...because I am not the same as everyone else..."

There was a discrepancy among participants on the perceptions of the impact of dietary advice and nutrition-related information. For some, the variety and abundance of information meant that they felt confident and well informed to make the best choices for their baby. Whereas others described how it made them feel overwhelmed or guilty if they felt they ate the 'wrong' food. At times, the two sentiments appeared more closely linked, where describing feeling confident and informed with their nutrition-information seeking practices also included feeling anxious.

Participant L, 33 years, 30 weeks pregnant
"I feel that I have access to lots of information which means I can be informed but there is so much out there..."

Participant B, 34 years, 38 weeks pregnant
"...sometimes I will feel guilty...when I read you shouldn't be eating...lots of this...or avoiding this...and if I haven't always followed the advice exactly..."

Towards the end of the interview when asked the question: "what do you know now that you wish you had known at the start of your pregnancy?" many participants responded in various ways that they wished they had been kinder to themselves. In particular, they often laughed dur-

ing the interview when talking about how they had certain 'vices' that they continued throughout pregnancy. For example:

Participant K, 30 years, 17 weeks pregnant
"...not being hard on yourself for your choices...if you feel like having a BLT [bacon] sandwich...have a BLT sandwich..."

DISCUSSION

FOOD PRACTICES

Consistent with previous studies (Garnweidner, Sverre Petersen, and Mosdøl 2013; Wennberg et al. 2013; Bianchi et al. 2016; Lucas et al. 2016), participants' food practices were influenced by a combination of their physiological changes, individual characteristics and a variety of sources of information during pregnancy. Most participants in this study were not able to clearly identify any cravings or aversions during pregnancy, but often spoke about their nausea and sickness, especially during their first trimester. These are common features of the first trimester. Consistent with previous research (Szwajcer et al. 2005; Bookari, Yeatman, and Williamson 2017; Forbes et al. 2018), all the participants also reported an increase in motivation to eat healthily and put the health and safety of their baby first.

However, unique to this study was the context of the COVID-19 pandemic, which meant that their health consciousness and risk awareness were amplified. Many participants were acutely aware that the pandemic led to a loss of control, as the UK Government imposed public health measures overnight and regular every day routines were suddenly changed.

This meant that eating well for their health and their baby's health became a way for participants to be able to exert control. Using food as a method of control has been seen in previous studies (Szwajcer et al. 2005) and in relation to checking food packages and wanting to know the origins of the food (Wennberg et al. 2013). However, in the context of the COVID-19 pandemic, there was a heightened sense of anxiety and need for control. This heightened health consciousness and risk awareness was a result not seen in previous similar studies. However, due to the contextual nature of COVID-19, the participants' behaviour is comprehensible. This is because research on previous epidemics, including severe acute respiratory syndrome coronavirus (SARS) and Middle East respiratory syndrome coronavirus (MERS), have shown a largely negative impact on the health of pregnant women (Alfaraj, Al-Tawfiq, and Memish 2019; Alserahi et al. 2016; Hantoushzadeh et al. 2020; World Health Organization 2015, 2019; Wong et al. 2004; Yan et al. 2020).

Consistent with Yuen et al.'s (2020) research on shifts in consumer behaviour, the participants in this study shifted their consumer habits as a way of exerting control over what they were eating to protect themselves and their growing foetus. Moreover, by being at home for large amounts of time, the participants found themselves cooking from scratch and trying out new recipes, the majority citing this as a positive effect of the pandemic whereby their diets had become more diversified (Sheth 2020). Moreover, in line with Bittman et al.'s (2019) study, participants in this

study also experienced the benefits of shared mealtimes. However, the intensity and amount of time the participants spent cooking and eating with their partners and husbands was also amplified due to COVID-19.

In contrast to Sámano et al.'s (2020) study where the majority of participants believed non-evidenced based myth, participants in this study were dismissive of the myth 'eating for two', citing themselves that it was not grounded in scientific evidence.

FACTORS INFLUENCING FOOD PRACTICES

As with previous research (Bianchi et al. 2016), this study found that there was a complex relationship between pregnant women seeking and receiving information. Many of the participants reported having received little to no information from their midwife on nutrition which is consistent with various studies (Arrish, Yeatman, and Williamson 2014; Lucas, Charlton, and Yeatman 2014; Lee et al. 2016, 2018; Bryant et al. 2019).

Interestingly, unlike with previous studies (Garnweidner, Sverre Pettersen, and Mosdøl 2013; Wennberg et al. 2013; Bianchi et al. 2016), which showed more substantial frustration from participants or confusion regarding information from health professionals, the participants in this study were forgiving of their midwife. As seen in the findings, the participants would question the reason for the lack of information from the midwife in various ways. This is significant, as midwives have a crucial role to play in health care messaging. Without further investigation into midwives' experiences or their barriers for giving more nutrition information, it is difficult to speculate as to why or the extent that the COVID-19 pandemic impacted this. However, other studies have shown that the reasons include midwives receiving a lack of nutrition information themselves (Arrish, Yeatman, and Williamson 2017) or that medical professionals are generally more focused on treatment rather than prevention (Persson et al. 2011).

Moreover, consistent with Bland et al. (2020) and Brown et al. (2019), the majority of the participants in this study used apps which either held limited or inaccurate nutrition information. This widespread usage is of potential concern given that it has been highlighted that aside from two apps available in the UK, the rest are not evidence-based and current (Bland et al. 2020).

Interestingly, unlike Sz wajc er et al.'s (2005) study which found that pregnant women are more likely to communicate with other pregnant women, the participants in this study were not able to meet other pregnant women due to COVID-19 restrictions. As in the case of family and friends, they speculated that the lack of nutrition information from others was because they had not seen them. The pandemic context was unique to this study and – as far as the author is aware – there are currently no other studies which have similar findings.

Similar to Bianchi et al.'s (2016) study, participants had different levels of nutrition knowledge and awareness. The knowledge and awareness were translated into behaviour by making dietary modifications during pregnancy. The participants' nutrition-seeking practices, particularly in relation to foods they should not eat, was centred on wanting to un-

derstand why they should not eat it. This can be attributed to risk awareness playing an essential role in modern society (Giddens 1991).

THE PERCEPTIONS OF IMPACT OF DIETARY ADVICE AND NUTRITION-RELATED INFORMATION

Consistent with Garnweidner, et al.'s (2013) study, the participants mostly trusted and relied on science-backed and evidence-based information. However, while the participants often cited the NHS as a credible source of information, it was not their most used source of information. A possible explanation for this was that the information from the midwife was very limited or non-existent. Moreover, they did not primarily seek it out themselves, as it was seen as not personal to them.

Although feeling overwhelmed by the abundance of information is consistent with similar studies in other countries (Garnweidner, Sverre Pettersen, and Mosdøl 2013; Wennberg et al. 2013; Bianchi et al. 2016), the novel finding to this study was that some of the participants chose to restrict their consumption of nutrition information in order to avoid feeling this way.

As with Bianchi et al.'s (2016) study, participants sought out information as a way of exerting control. However, participants in this study did not find that the information they discovered heightened their confusion; instead, they expressed feeling confident and informed to make choices. It is not clear to what extent this was due to the effects of the pandemic.

Participants in this study that had difficulty conceiving were more likely to seek out information as a way of controlling their health and that of their foetus, which is consistent with previous studies (Carolan and Nelson 2007; Bayrampour et al. 2012a, 2012b; House and Coveney 2013; Muñoz et al. 2019)

Furthermore, participants had expressed the need to be kinder to themselves and that what might work for one pregnant woman might not work for them. Being kinder to oneself and the idea of 'I can't be perfect all the time' manifested itself across both their food practices and in relation to dietary advice and nutrition-related information. By seeing themselves as unique, it also meant that while the NHS dietary guidelines were respected, they were not viewed as personal to them, either because the advice was seen as too generic or continuously changing. If one combines these thoughts with the lack of information given to them from health care professionals, it thus created a need to seek out more information for themselves.

RECOMMENDATIONS FOR FUTURE DISCUSSIONS ON NHS DIETARY GUIDELINES FOR PREGNANT WOMEN

The researcher identified three key recommendations for future discussions on the NHS dietary guidelines for pregnant women. First, health care professionals and particularly midwives continue to play a critical role and are respected due to their position. They should therefore ensure they provide pregnant women with clear, current and evidenced-based dietary advice and nutrition-related information.

Secondly, as the usage of apps during pregnancy continues to rise, a short-term recommendation is for midwives in England (as they are the main point of contact) to signpost all pregnant women to the NHS recommended app Baby Buddy (Bland et al. 2020).

Thirdly, as England continues to emerge from the impact of the COVID-19 pandemic, this presents a novel opportunity to look ahead at both pregnant women's food practices and nutrition-seeking practices. The pandemic showed that families can cook from scratch at home and practice heightened health consciousness. As pregnancy is a critical stage in the life cycle and can influence the habits of other family members (Bianchi et al. 2016), the NHS and health care professionals have a unique opportunity to work across industries to enable the continuation of healthy eating, not just amongst primigravids but across society at large.

STRENGTHS AND LIMITATIONS

Remote individual semi-structured interviews worked well to allow participants to speak about their experiences of dietary advice and nutrition-related information at a time that best suited them. The small sample size is common for inductive thematic analysis studies in order to understand participants' lived experiences. As with all qualitative research, the results of this study cannot be generalised to other groups of primigravid women.

No pregnant women in their first trimester came forward for this study. A possible explanation is that as it is a critical

time during pregnancy and thus often not shared with a wider circle of people (Rolfes and Whitney 2016). It is possible that participating in a study would therefore not have been at the forefront of their mind.

CONCLUSIONS

While health consciousness and risk awareness are common in pregnancy, particularly amongst primigravid women, this study has shown that these were amplified due to the COVID-19 pandemic. Participants received very limited to no nutrition information from their midwives, attributing the reasons to either their lack of asking for more information or due to the contextual nature of the pandemic. In addition, inaccurate apps were widely used. Participants felt that nutrition-related information was abundant and either overtly felt overwhelmed by it or expressed feeling informed by the knowledge discovered. However, with the latter group, feeling informed was also closely tied to feeling anxious about wanting to do the right thing. With both groups, their nutrition-seeking practices were closely linked to exerting control, whether for seeking out more information to make up for the lack of advice given by health care professionals or for restricting information to avoid feeling overwhelmed. Further research is needed into midwives' experiences and barriers to giving nutrition information and into app usage in pregnancy in England.

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REFERENCES

- Aktaş, Sule, Guleren Sabuncular, Dicle Kargin, and Fatma Esra Gunes. 2018. "Evaluation of Nutrition Knowledge of Pregnant Women before and after Nutrition Education According to Sociodemographic Characteristics." *Ecology of Food and Nutrition* 57 (6): 441–55. <https://doi.org/10.1080/03670244.2018.1544561>.
- Alfaraj, Sarah H., Jaffar A. Al-Tawfiq, and Ziad A. Memish. 2019. "Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Infection during Pregnancy: Report of Two Cases & Review of the Literature." *Journal of Microbiology, Immunology and Infection* 52 (3): 501–3. <https://doi.org/10.1016/j.jmii.2018.04.005>.
- Alserehi, Haleema, Ghassan Wali, Abeer Alshukairi, and Basem Alraddadi. 2016. "Impact of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) on Pregnancy and Perinatal Outcome." *BMC Infectious Diseases* 16: 105. <https://doi.org/10.1186/s12879-016-1437-y>.
- Arrish, Jamila, Heather Yeatman, and Moira Williamson. 2014. "Midwives and Nutrition Education during Pregnancy: A Literature Review." *Women and Birth: Journal of the Australian College of Midwives* 27 (1): 2–8. <https://doi.org/10.1016/j.wombi.2013.02.003>.
- . 2016. "Australian Midwives and Provision of Nutrition Education during Pregnancy: A Cross Sectional Survey of Nutrition Knowledge, Attitudes, and Confidence." *Women and Birth: Journal of the Australian College of Midwives* 29 (5): 455–64. <https://doi.org/10.1016/j.wombi.2016.03.001>.
- . 2017. "Midwives' Role in Providing Nutrition Advice during Pregnancy: Meeting the Challenges? A Qualitative Study." *Nursing Research and Practice* 2017 (7698510): 1–11. <https://doi.org/10.1155/2017/7698510>.
- Bayrampour, Hamideh, Maureen Heaman, Karen A. Duncan, and Suzanne Tough. 2012a. "Advanced Maternal Age and Risk Perception: A Qualitative Study." *BMC Pregnancy and Childbirth* 12: 100. <https://doi.org/10.1186/1471-2393-12-100>.
- . 2012b. "Comparison of Perception of Pregnancy Risk of Nulliparous Women of Advanced Maternal Age and Younger Age." *Journal of Midwifery & Women's Health* 57 (5): 445–53. <https://doi.org/10.1111/j.1542-2011.2012.00188.x>.
- Bianchi, Clélia M., Jean-François Huneau, Gaëlle Le Goff, Eric O. Verger, François Mariotti, and Patricia Gurviez. 2016. "Concerns, Attitudes, Beliefs and Information Seeking Practices with Respect to Nutrition-Related Issues: A Qualitative Study in French Pregnant Women." *BMC Pregnancy and Childbirth* 16 (1): 306. <https://doi.org/10.1186/s12884-016-1078-6>.
- Bittman, Michael, Eimear Cleary, Charlotte Wilkinson-Bibicos, and Jonathan Gershuny. 2019. "The Social Disorganization of Eating: A Neglected Determinant of the Australian Epidemic of Overweight/Obesity." *BMC Public Health* 19: 454. <https://doi.org/10.1186/s12889-019-6768-3>.
- Bjelke, Maria, Anna-Karin Martinsson, Lena Lendahls, and Marie Oscarsson. 2016. "Using the Internet as a Source of Information during Pregnancy — A Descriptive Cross-Sectional Study in Sweden." *Midwifery* 40: 187–91. <https://doi.org/10.1016/j.midw.2016.06.020>.
- Bland, Catherine, Kathryn V. Dalrymple, Sara L. White, Amanda Moore, Lucilla Poston, and Angela C. Flynn. 2020. "Smartphone Applications Available to Pregnant Women in the United Kingdom: An Assessment of Nutritional Information." *Maternal & Child Nutrition* 16 (2): e12918. <https://doi.org/10.1111/mcn.12918>.
- Blondin, Jennifer Heller, and Jenna A. LoGiudice. 2018. "Pregnant Women's Knowledge and Awareness of Nutrition." *Applied Nursing Research* 39: 167–74. <https://doi.org/10.1016/j.apnr.2017.11.020>.
- Bookari, Khlood, Heather Yeatman, and Moira Williamson. 2017. "Falling Short of Dietary Guidelines – What Do Australian Pregnant Women Really Know? A Cross Sectional Study." *Women and Birth: Journal of the Australian College of Midwives* 30 (1): 9–17. <https://doi.org/10.1016/j.wombi.2016.05.010>.
- Braun, Virginia, and Victoria Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2): 77–101. <https://doi.org/10.1191/1478088706qp063oa>.
- . 2013. *Successful Qualitative Research a Practical Guide for Beginners*. London: SAGE Publications.
- Brown, Hannah M., Tamara Bucher, Clare E. Collins, and Megan E. Rollo. 2019. "A Review of Pregnancy iPhone Apps Assessing Their Quality, Inclusion of Behaviour Change Techniques, and Nutrition Information." *Maternal & Child Nutrition* 15 (3): e12768. <https://doi.org/10.1111/mcn.12768>.
- Bryant, Jamie, Amy E. Waller, Emilie C. Cameron, Rob W. Sanson-Fisher, and Alexis J. Hure. 2019. "Receipt of Information about Diet by Pregnant Women: A Cross-Sectional Study." *Women and Birth* 32 (6): e501–7. <https://doi.org/10.1016/j.wombi.2018.12.005>.
- Cannon, Summer, Michele Lastella, Lisa Vincze, Corneel Vandelanotte, and Melanie Hayman. 2020. "A Review of Pregnancy Information on Nutrition, Physical Activity and Sleep Websites." *Women and Birth: Journal of The Australian College of Midwives* 33 (1): 35–40. <https://doi.org/10.1016/j.wombi.2018.12.007>.
- Carolan, M., and S. Nelson. 2007. "First Mothering over 35 Years: Questioning the Association of Maternal Age and Pregnancy Risk." *Health Care for Women International* 28 (6): 534–55. <https://doi.org/10.1080/07399330701334356>.
- Chakona, Gamuchirai, and Charlie Shackleton. 2019. "Food Taboos and Cultural Beliefs Influence Food Choice and Dietary Preferences among Pregnant Women in the Eastern Cape, South Africa." *Nutrients* 11 (11): 2668. <https://doi.org/10.3390/nu11112668>.

- Critical Appraisal Skills Programme. 2018. "CASP Qualitative Checklist." CASP UK. March 2018. http://casp-uk.net/wp-content/uploads/2018/03/CASP-Qualitative-Checklist-2018_fillable_form.pdf.
- Dalgaard, Emilie Mass, and Lene Annette Hagen Haakstad. 2019. "What the Health? Information Sources and Maternal Lifestyle Behaviors." *Interactive Journal of Medical Research* 8 (3): e10355. <https://doi.org/10.2196/10355>.
- de Jersey, Susan J., Jan M. Nicholson, Leonie K. Callaway, and Lynne A. Daniels. 2013. "An Observational Study of Nutrition and Physical Activity Behaviours, Knowledge, and Advice in Pregnancy." *BMC Pregnancy and Childbirth* 13: 115. <https://doi.org/10.1186/1471-2393-13-115>.
- de-Graft Aikins, Ama. 2014. "Food Beliefs and Practices during Pregnancy in Ghana: Implications for Maternal Health Interventions." *Health Care for Women International* 35 (7-9): 954-72. <https://doi.org/10.1080/07399332.2014.926902>.
- Dragon Transcription Solutions. n.d. "Dragon Transcription Solutions." <https://www.nuance.com/en-gb/dragon/transcription-solutions.html>.
- Draper, A., and J. A. Swift. 2011. "Qualitative Research in Nutrition and Dietetics: Data Collection Issues." *Journal of Human Nutrition and Dietetics* 24 (1): 3-12. <https://doi.org/10.1111/j.1365-277x.2010.01117.x>.
- Essén, Birgitta, Sara Johnsdotter, Birgitta Hovellius, Saemundur Gudmundsson, N.-O. Sjöberg, Jonathan Friedman, and P.-O. Ostergren. 2000. "Qualitative Study of Pregnancy and Childbirth Experiences in Somali Women Resident in Sweden." *BJOG: An International Journal of Obstetrics and Gynaecology* 107 (12): 1507-12. <https://doi.org/10.1111/j.1471-0528.2000.tb11676.x>.
- Ferrara, Assiamira. 2007. "Increasing Prevalence of Gestational Diabetes Mellitus: A Public Health Perspective." *Diabetes Care* 30 (Suppl 2): S141-46. <https://doi.org/10.2337/dc07-s206>.
- Ferrari, Renée M., Anna Maria Siega-Riz, Kelly R. Evenson, Merry-K. Moos, and Kathryn S. Carrier. 2013. "A Qualitative Study of Women's Perceptions of Provider Advice about Diet and Physical Activity during Pregnancy." *Patient Education and Counseling* 91 (3): 372-77. <https://doi.org/10.1016/j.pec.2013.01.011>.
- Flick, Amy, Kathleen Brookfield, Lesley de la Torre, Carmen Tudela, Lunthita Duthely, and Víctor Hugo González-Quintero. 2010. "Excessive Weight Gain among Obese Women and Pregnancy Outcomes." *American Journal of Perinatology* 27 (4): 333-38. <https://doi.org/10.1055/s-0029-1243304>.
- Forbes, Laura, Jocelyn Graham, Casey Berglund, and Rhonda Bell. 2018. "Dietary Change during Pregnancy and Women's Reasons for Change." *Nutrients* 10 (8): 1032. <https://doi.org/10.3390/nu10081032>.
- Garnweidner, Lisa M., Kjell Sverre Pettersen, and Annhild Mosdøl. 2013. "Experiences with Nutrition-Related Information during Antenatal Care of Pregnant Women of Different Ethnic Backgrounds Residing in the Area of Oslo, Norway." *Midwifery* 29 (12): e130-37. <https://doi.org/10.1016/j.midw.2012.12.006>.
- Ghiasi, Ashraf. 2019. "Health Information Needs, Sources of Information, and Barriers to Accessing Health Information among Pregnant Women: A Systematic Review of Research." *Journal of Maternal-Fetal & Neonatal Medicine* 34 (8): 1320-30. <https://doi.org/10.1080/14767058.2019.1634685>.
- Giddens, A. 1991. *Modernity and Self-Identity. Self and Society in the Late Modern Age*. Cambridge: Polity Press.
- Guggino, Alice, Sara Barbero, Valentina Ponzio, Elsa Viora, Marilena Durazzo, and Simona Bo. 2016. "Myths about Nutrition in Pregnancy." *Journal of Obstetrics and Gynaecology* 36 (7): 964-65. <https://doi.org/10.3109/01443615.2016.1168372>.
- Han, Zhen, Olha Lutsiv, Sohail Mulla, Allison Rosen, Joseph Beyene, and Sarah D. McDonald. 2011. "Low Gestational Weight Gain and the Risk of Preterm Birth and Low Birthweight: A Systematic Review and Meta-Analyses." *Acta Obstetrica Et Gynecologica Scandinavica* 90 (9): 935-54. <https://doi.org/10.1111/j.1600-0412.2011.01185.x>.
- Hantoushzadeh, Sedigheh, Alireza A. Shamshirsaz, Ashraf Aleyasin, Maxim D. Seferovic, Soudabeh Kazemi Aski, Sara E. Arian, Parichehr Pooransari, et al. 2020. "Maternal Death Due to COVID-19." *American Journal of Obstetrics and Gynecology* 223 (1): 109.e1-109.e16. <https://doi.org/10.1016/j.ajog.2020.04.030>.
- Hilton, Judith Johnson. 2007. "A Comparison of Folic Acid Awareness and Intake among Young Women Aged 18-24 Years." *Journal of the American Academy of Nurse Practitioners* 19 (10): 516-22. <https://doi.org/10.1111/j.1745-7599.2007.00259.x>.
- House, Elizabeth, and John Coveney. 2013. "'I Mean I Expect That It's Pretty Safe': Perceptions of Food Trust in Pregnancy - Implications for Primary Health Care Practice." *Australasian Medical Journal* 6 (7): 358-66. <https://doi.org/10.4066/amj.2013.1748>.
- Inglis, V., K. Ball, and D. Crawford. 2005. "Why Do Women of Low Socioeconomic Status Have Poorer Dietary Behaviours than Women of Higher Socioeconomic Status? A Qualitative Exploration." *Appetite* 45 (3): 334-43. <https://doi.org/10.1016/j.appet.2005.05.003>.
- Jackson, Rebecca A., Naomi E. Stotland, Aaron B. Caughey, and Barbara Gerbert. 2011. "Improving Diet and Exercise in Pregnancy with Video Doctor Counseling: A Randomized Trial." *Patient Education and Counseling* 83 (2): 203-9. <https://doi.org/10.1016/j.pec.2010.05.019>.
- Kennedy, R.A.K., L. Mullaney, C.M.E. Reynolds, S. Cawley, D.M.A. McCartney, and M.J. Turner. 2017. "Preferences of Women for Web-Based Nutritional Information in Pregnancy." *Public Health* 143: 71-77. <https://doi.org/10.1016/j.puhe.2016.10.028>.

- Kim, Catherine, Katherine M. Newton, and Robert H. Knopp. 2002. "Gestational Diabetes and the Incidence of Type 2 Diabetes: A Systematic Review." *Diabetes Care* 25 (10): 1862–68. <https://doi.org/10.2337/diacar.e.25.10.1862>.
- Lee, Amelia, Regina Belski, Jessica Radcliffe, and Michelle Newton. 2016. "What Do Pregnant Women Know About the Healthy Eating Guidelines for Pregnancy? A Web-Based Questionnaire." *Maternal and Child Health Journal* 20 (10): 2179–88. <https://doi.org/10.1007/s10995-016-2071-4>.
- Lee, Amelia, Michelle Newton, Jessica Radcliffe, and Regina Belski. 2018. "Pregnancy Nutrition Knowledge and Experiences of Pregnant Women and Antenatal Care Clinicians: A Mixed Methods Approach." *Women and Birth: Journal of the Australian College of Midwives* 31 (4): 269–77. <https://doi.org/10.1016/j.wombi.2017.10.010>.
- Lobo, Shannen, Catherine J. Lucas, Jane S. Herbert, Michelle L. Townsend, Melissa Smith, Elise Kunkler, and Karen E. Charlton. 2020. "Nutrition Information in Pregnancy: Where Do Women Seek Advice and Has This Changed over Time?" *Nutrition & Dietetics: The Journal of the Dietitians Association of Australia* 77 (3): 382–91. <https://doi.org/10.1111/1747-0080.12589>.
- Lucas, Catherine, Karen E. Charlton, and Heather Yeatman. 2014. "Nutrition Advice during Pregnancy: Do Women Receive It and Can Health Professionals Provide It?" *Maternal and Child Health Journal* 18 (10): 2465–78. <https://doi.org/10.1007/s10995-014-1485-0>.
- Lucas, Catherine, P. Starling, A. McMahon, and Karen E. Charlton. 2016. "Erring on the Side of Caution: Pregnant Women's Perceptions of Consuming Fish in a Risk Averse Society." *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association* 29 (4): 418–26. <https://doi.org/10.1111/jhn.12353>.
- Ludwig, Alison F, Peter Cox, and Basma Ellahi. 2011. "Social and Cultural Construction of Obesity among Pakistani Muslim Women in North West England." *Public Health Nutrition* 14 (10): 1842–50. <https://doi.org/10.1017/s1368980010003472>.
- Muñoz, Araceli, Andrés Fontalba-Navas, Juan Pedro Arrebola, and Cristina Larrea-Killinger. 2019. "Trust and Distrust in Relation to Food Risks in Spain: An Approach to the Socio-Cultural Representations of Pregnant and Breastfeeding Women through the Technique of Free Listing." *Appetite* 142: 104365. <https://doi.org/10.1016/j.appet.2019.104365>.
- NHS. 2020. "Foods to Avoid in Pregnancy. Your Pregnancy and Baby Guide." NHS. 2020. <https://www.nhs.uk/conditions/pregnancy-and-baby/foods-to-avoid-pregnant/>.
- Okesene-Gafa, Karaponi, Carol Chelimo, Shireen Chua, Marcus Henning, and Lesley McCowan. 2016. "Knowledge and Beliefs about Nutrition and Physical Activity during Pregnancy in Women from South Auckland Region, New Zealand." *Australian and New Zealand Journal of Obstetrics and Gynaecology* 56 (5): 471–83. <https://doi.org/10.1111/ajo.12456>.
- Persson, Margareta, Åsa Hörnsten, Anna Winkvist, and Ingrid Mogren. 2011. "'Mission Impossible'? Midwives' Experiences Counseling Pregnant Women with Gestational Diabetes Mellitus." *Patient Education and Counseling* 84 (1): 78–83. <https://doi.org/10.1016/j.pec.2010.06.008>.
- Pfaff, Nicole Franzen, and Jackie Tillett. 2016. "Listeriosis and Toxoplasmosis in Pregnancy: Essentials for Healthcare Providers." *Journal of Perinatal & Neonatal Nursing* 30 (2): 131–38. <https://doi.org/10.1097/jpn.000000000000164>.
- Public Health England. 2019. "Health of Women before, during Pregnancy: Health Behaviours, Risk Factors, Inequalities Health of Women before and during Pregnancy: Health Behaviours, Risk Factors and Inequalities." Public Health England. 2019. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/844210/Health_of_women_before_and_during_pregnancy_2019.pdf.
- . 2020. "Guidance on Social Distancing for Everyone in the UK." Withdrawn. Public Health England. 2020. <https://www.gov.uk/government/publications/covid-19-guidance-on-social-distancing-and-for-vulnerable-people/guidance-on-social-distancing-for-everyone-in-the-uk-and-protecting-older-people-and-vulnerable-adults>.
- Råberg Kjøllestad, Marte Karoline, Victoria Telle Hjellset, Benedikte Bjørge, Gerd Holmboe-Ottesen, and Margareta Wandel. 2011. "Food Perceptions in Terms of Health among Norwegian-Pakistani Women Participating in a Culturally Adapted Intervention." *International Journal of Public Health* 56 (5): 475–83. <https://doi.org/10.1007/s00038-010-0191-y>.
- Rolfes, S.R., and E. Whitney. 2016. *Understanding Nutrition*. 14th ed. Stamford, CT: Cengage Learning.
- Sámamo, Reyna, Citlali Lara-Cervantes, Hugo Martínez-Rojano, Gabriela Chico-Barba, Bernarda Sánchez-Jiménez, Orly Lokier, María Hernández-Trejo, Juan Manuel Grosso, and Solange Heller. 2020. "Dietary Knowledge and Myths Vary by Age and Years of Schooling in Pregnant Mexico City Residents." *Nutrients* 12 (2): 362. <https://doi.org/10.3390/nu12020362>.
- Sheth, Jagdish. 2020. "Impact of Covid-19 on Consumer Behavior: Will the Old Habits Return or Die?" *Journal of Business Research* 117: 280–83. <https://doi.org/10.1016/j.jbusres.2020.05.059>.
- Siega-Riz, Anna Maria, Meera Viswanathan, Merry-K Moos, Andrea Deierlein, Sunni Mumford, Julie Knaack, Patricia Thieda, Linda J. Lux, and Kathleen N. Lohr. 2009. "A Systematic Review of Outcomes of Maternal Weight Gain According to the Institute of Medicine Recommendations: Birthweight, Fetal Growth, and Postpartum Weight Retention." *American Journal of Obstetrics and Gynecology* 201 (4): 339.e1-339.e14. <https://doi.org/10.1016/j.ajog.2009.07.002>.

- Szwajcer, Ellen M., Gerrit J. Hiddink, Maria A. Koelen, and Cees M.J. van Woerkum. 2005. "Nutrition-Related Information-Seeking Behaviours before and throughout the Course of Pregnancy: Consequences for Nutrition Communication." *European Journal of Clinical Nutrition* 59 (1): S57–65. <https://doi.org/10.1038/sj.ejcn.1602175>.
- . 2009. "Written Nutrition Communication in Midwifery Practice: What Purpose Does It Serve?" *Midwifery* 25 (5): 509–17. <https://doi.org/10.1016/j.midw.2007.10.005>.
- Szwajcer, Ellen M., Gerrit J. Hiddink, Loes Maas, Maria A. Koelen, and Cees M.J. van Woerkum. 2008. "Nutrition-Related Information-Seeking Behaviours of Women Trying to Conceive and Pregnant Women: Evidence for the Life Course Perspective." *Family Practice* 25 (Suppl 1): i99–104. <https://doi.org/10.1093/fampra/cmn077>.
- Taylor, Caroline M, Pauline M Emmett, Alan M Emond, and Jean Golding. 2018. "A Review of Guidance on Fish Consumption in Pregnancy: Is It Fit for Purpose?" *Public Health Nutrition* 21 (11): 2149–59. <https://doi.org/10.1017/s1368980018000599>.
- The European Parliament and The Council of the European Union. 2018. "General Data Protection Regulation." 2018. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679>.
- Tripp, Nadia, Kirsten Hainey, Anthony Liu, Alison Poulton, Michael Peek, Jinman Kim, and Ralph Nanan. 2014. "An Emerging Model of Maternity Care: Smartphone, Midwife, Doctor?" *Women and Birth: Journal of the Australian College of Midwives* 27 (1): 64–67. <https://doi.org/10.1016/j.wombi.2013.11.001>.
- Wang, Na, Zequn Deng, Li Ming Wen, Yan Ding, and Gengsheng He. 2019. "Understanding the Use of Smartphone Apps for Health Information Among Pregnant Chinese Women: Mixed Methods Study." *JMIR MHealth and UHealth* 7 (6): e12631. <https://doi.org/10.2196/12631>.
- Wennberg, Anna Lena, Anette Lundqvist, Ulf Högberg, Herbert Sandström, and Katarina Hamberg. 2013. "Women's Experiences of Dietary Advice and Dietary Changes during Pregnancy." *Midwifery* 29 (9): 1027–34. <https://doi.org/10.1016/j.midw.2012.09.005>.
- Wong, Shell F., Kam M. Chow, Tse N. Leung, Wai F. Ng, Tak K. Ng, Chi C. Shek, Pak C. Ng, et al. 2004. "Pregnancy and Perinatal Outcomes of Women with Severe Acute Respiratory Syndrome." *American Journal of Obstetrics and Gynecology* 191: 292–97. <https://doi.org/10.1016/j.ajog.2003.11.019>.
- World Health Organization. 2001. "Healthy Eating during Pregnancy and Breastfeeding. Booklet for Mothers." 2001. https://www.euro.who.int/_data/assets/pdf_file/0020/120296/E73182.pdf.
- . 2015. "Summary of Probable SARS Cases with Onset of Illness from 1 November 2002 to 31 July 2003." 2015. <https://www.who.int/publications/m/item/summary-of-probable-sars-cases-with-onset-of-illness-from-1-november-2002-to-31-july-2003>.
- . 2019. "Middle East Respiratory Syndrome Coronavirus (MERS-CoV). MERS Monthly Summary, November 2019." 2019. https://www.who.int/health-topics/middle-east-respiratory-syndrome-coronavirus-mers#tab=tab_1.
- Yan, Jie, Juanjuan Guo, Cuifang Fan, Juan Juan, Xuechen Yu, Jiafu Li, Ling Feng, et al. 2020. "Coronavirus Disease 2019 in Pregnant Women: A Report Based on 116 Cases." *American Journal of Obstetrics and Gynecology* 223 (1): 111.e1-111.e14. <https://doi.org/10.1016/j.ajog.2020.04.014>.
- Yuen, Kum Fai, Xueqin Wang, Fei Ma, and Kevin X. Li. 2020. "The Psychological Causes of Panic Buying Following a Health Crisis." *International Journal of Environmental Research and Public Health* 17 (10): 3513. <https://doi.org/10.3390/ijerph17103513>.
- Zhang, Cuilin, and Yi Ning. 2011. "Effect of Dietary and Lifestyle Factors on the Risk of Gestational Diabetes: Review of Epidemiologic Evidence." *American Journal of Clinical Nutrition* 94 (suppl_6): 1975S-1979S. <https://doi.org/10.3945/ajcn.110.001032>.