

Experiences with nutrition-related information during antenatal care of pregnant women of different ethnic backgrounds residing in the area of Oslo, Norway.

Keywords: Nutrition-related information; Cultural sensitivity; Nutrition literacy; Antenatal care;

Abstract

Objective: to explore experiences with nutrition-related information during routine antenatal care among women of different ethnical backgrounds.

Design: individual interviews with seventeen participants were conducted twice during pregnancy.

Data collection and analysis were inspired by an interpretative phenomenological approach.

Setting: participants were purposively recruited at eight Mother and Child Health Centres in the area of Oslo, Norway, where they received antenatal care.

Participants: participants had either immigrant backgrounds from African and Asian countries (n=12) or were ethnic Norwegian (n=5). Participants were pregnant with their first child and had a pre-pregnancy Body Mass Index above 25 kg/m².

Findings: participants experienced that they were provided with little nutrition-related information in antenatal care. The information was perceived as presented in very general terms and focused on food safety. Weight management and the long-term prevention of diet-related chronic diseases had hardly been discussed. Participants with immigrant backgrounds appeared to be confused about information given by the midwife which was incongruent with their original food culture. The participants were actively seeking for nutrition-related information and had to navigate between various sources of information.

Conclusions: the midwife is considered a trustworthy source of nutrition-related information. Therefore, antenatal care may have considerable potential to promote a healthy diet to pregnant women. Findings suggest that nutrition communication in antenatal care should be more tailored towards women's present dietary habits and nutritional knowledge, cultural background as well as level of nutrition literacy.

Introduction

The rise in the proportion of women who are overweight prior to pregnancy and experience excessive weight gain during pregnancy creates new public health challenges. It is well known that unfavourable maternal weight and nutritional status may increase the risk of adverse health outcomes during pregnancy, including gestational diabetes mellitus (GDM) (Kim et al., 2002; Ferrara, 2007; Siega-Riz et al., 2010; Zhang and Ning, 2011). Weight status in pregnancy and GDM may have long-term health consequences for the woman (Galtier et al., 2008; Aviram et al., 2011). Furthermore, there is growing evidence that unfavourable maternal in utero environment modifies the risk of diet-related chronic diseases in the offspring throughout the lifetime (Wu et al., 2004; Koletzko, 2005).

In order to meet these new public health challenges, it is vital to identify effective arenas for and strategies to promote a healthy diet and weight management in pregnancy. Antenatal care may have much potential to promote healthy dietary habits in women (Pirainen et al., 2006). Pregnant women may be more receptive to and actively seeking for nutrition-related information (Szwajcer et al., 2005). The World Health Organization's (WHO) manual for the antenatal care model provides a detailed description of how to organise antenatal care (World Health Organization, 2002). However, the current manual has little focus on the long-term prevention of diet-related chronic diseases in the mother and her offspring.

Previous research indicates that health professionals may find it challenging to communicate effectively about diet and weight management, especially when faced with a multi-cultural and socially diverse population (Fagerli et al., 2005; Schouten and Meeuwesen, 2006; Kreps and Sparks, 2008). Food is an important marker for identity, ethnicity and cultural belonging (Devine et al., 1999; Tuomainen, 2009; Garnweidner et al., 2012). Divergent thoughts and beliefs about food, health and disease between health professionals and their audience may have consequences for the patient's awareness of risk and compliance with advice (Helman, 2007). Some immigrant or low-income groups have been found to have less healthful dietary habits (Misra and Ganda, 2007; Gilbert and Khokhar, 2008). Additionally, these groups may have difficulties to understand and make use of health information in ways to promote and maintain good health (Kreps and Sparks, 2008; Carolan et al., 2010). There is growing recognition that health promotion messages are more effective when they are tailored towards individuals' needs and sensitive to cultural values (Resnicow et al., 1999; Hyman and Guruge,

2002). Furthermore, Nutbeam states that the ability to interpret and apply health information are crucial for successful health communication (Nutbeam, 2008).

There are differences in the timing and frequency of antenatal visits and the health professionals who are involved in the care. In the Norwegian guidelines for antenatal care, health professionals are encouraged to talk with the women about their lifestyles at the first visit, which also should include the provision of nutrition-related information (Directorate for Health and Social Affairs, 2005). Antenatal care is provided by general practitioners, but midwives at community based Mother and Child Health Centres (MCHC) are increasingly providing services for normal pregnancies. Women can choose their preferred health care provider. Only a few studies have investigated women's experiences of nutrition-related information during routine antenatal care (Mitchell and Lerner, 1991; Szwajcer et al., 2005; Szwajcer et al., 2009). The majority of these were conducted in an ethnically or socially homogenous group. The aim of the present study was to explore experiences with nutrition-related information in routine antenatal care of an ethnically and socially diverse study population. Findings are interpreted and discussed in relation to theoretical aspects relevant for nutrition communication in primary health care.

Methods

This research was inspired by principles of interpretative phenomenological analysis (IPA) (Smith, 2009). This approach aims at getting a deeper understanding of participants' experiences and the meanings participants attribute to them. The interpretative foundation of IPA acknowledges the active role of the researcher during the research process, as well as the interpretation of the study's findings in relation to existing theories and previous studies, in this case, related to nutrition communication.

Recruitment

Participants were purposively recruited by midwives during antenatal care at eight different MCHC in the area of Oslo, Norway. Criteria for inclusion were age 16 years or older, first-time and normal pregnancy, and a pre-pregnancy Body Mass Index (BMI) above 25 kg/m². This research did not aim for data saturation, following the epistemological idea that meanings are infinite and extending (Dahlberg et al., 2008). Participants received oral and

written information about the study. The written information was available in five languages (Arabic, English, Norwegian, Somali and Urdu). Participants gave their written informed consent. Recruitment continued until researchers perceived that richness of individual cases was achieved. The study received ethical approval from the Regional Committee for Medical and Health Research Ethics of South East-Norway (REC South East).

Data collection

Individual interviews with 17 first-time pregnant women of different ethnic backgrounds receiving antenatal care at MCHC were conducted between October 2010 and November 2011. A total of 15 participants were interviewed twice in their pregnancy, while two were only interviewed once due to pre-term birth. The first interview was conducted before the 30th week of pregnancy and the second interview at least two months afterwards. This resulted in 32 interviews conducted interviews. The interviews, lasting from 35 to 65 minutes, were carried out by a public health nutritionist at MCHC, participants' workplaces, cafés or in participants' homes. Interviews followed semi-structured interview guides (one for each interview round). The interview guides were pilot tested in three women with similar characteristics as the study sample. The researcher started the interviews by asking the participants to describe their food intake the previous day and whether this was typical, to get some insight into their dietary habits. According to the topics in the interview guides, participants were asked about the nutrition-related information received during antenatal care, their experiences with conversations about nutrition-related topics during antenatal care, their motivations and possible barriers to adhere to the information received as well as other sources for nutrition-related information. Examples of questions were: "Can you tell me about your experiences with conversations about nutrition and your eating habits during antenatal care?"; "Do you perceive a need for information about nutrition?" Interviews specifically focused on the possible influence of the participants' social surroundings and cultural backgrounds on their receptiveness for the nutrition-related information received and nutrition-information seeking behaviours. Even though the interview guides of the two interviews were similar, the longitudinal study design gave the researcher opportunity to follow-up issues raised in the first interview, to investigate participants' experiences with new events of nutrition-related information received as well as possible changes in participants' information-seeking behaviour throughout the pregnancy. In the second interviews, participants were in addition asked about their beliefs about and experiences with information

about GDM. Interviews were carried out in Norwegian or English. In one case, a participant asked if the husband could be present. He participated in the conversation and assisted with language difficulties.” Interviews were audio-taped and transcribed verbatim by the researcher who conducted the interviews. Two other researchers, [blinded information], compared the audio-tapes randomly with the transcripts to ensure the accuracy of the transcription process.

Data analysis

The analytical procedure was guided by principles of the interpretative phenomenological analysis and Fade’s description of its application in public health nutrition and dietetic research (Fade, 2004; Smith, 2009). Analysis included to: 1) read each informant’s transcripts and taking initial notes; 2) identify and name the themes (words or short phrases in the transcripts) which were relevant to understand the meanings individuals attach to their experiences; 3) create a preliminary list of themes across all the transcripts; 4) look for connections between the themes and cluster them together; 5) name the clusters representing sub-themes; and 6) arrange sub-themes to super-ordinate themes which were related to the research questions and interpreted in light of existing theories and previous research within nutrition communication. The analytical procedure was carried out by the first author (blinded information). The potential themes were discussed with the other authors as well as with colleagues with backgrounds in midwifery, in order to improve the credibility of the findings (Lincoln and Guba, 1985). The summary of super-ordinate themes and sub-themes is presented in Table 1.

Table 1 approximately here

Findings

Characteristics of the study participants

The participants were on average 28 years old and were either ethnic Norwegians (n=5) or originated from different African and Asian countries (n=12), namely Algeria, Albania, Pakistan, Thailand, Turkey, Russia, Sri Lanka and Somalia. As illustrated in Table 2, some of the participants with immigrant background had only resided in Norway for a short time (< 1 year) and had limited Norwegian language skills. Furthermore, the participants had varied

socioeconomic status, educational background and occupational status. The participants were either married or in a relationship. The majority of the study participants (n=11) received shared antenatal care from their GP and a midwife. Six study participants consulted only a midwife. On average, the participants' first visit to the midwife was in the 19th week of pregnancy. Participants met the midwife about four times during the study period. All participants had been screened for GDM by an oral 75 g glucose load test as part of the routine antenatal care due to high weight or family history, but only one participant was diagnosed with GDM.

Table 2 approximately here

Nutrition-related information received and participants' receptiveness

Although participants had different perceptions about whether they had received sufficient nutrition-related information during antenatal care, researchers had the overall impression that nutrition-related information received was sparse:

"...We haven't talked much about it (nutrition). It was more or less about two minutes." P15

One woman participated in a nutrition education group session at the MCHC, while another received nutrition counselling after being diagnosed with GDM. Otherwise, nutrition-related information seemed to be provided unsystematically and appeared not to be a core component of the participants' antenatal care. The participants received nutrition-related information primarily from their midwife. Their perceptions of their GP's role in antenatal care were to provide medical check-ups and prescriptions of medicines. Participants expressed that they had initiated conversations about nutrition-related topics themselves. Some participants had only received written information.

Interviews indicated that the nutrition-related information provided focused on the prevention of food borne diseases (i.e. toxoplasmosis and listeriosis) and on nutrient requirements:

"...It was about the food I couldn't eat. Like some types of raw fish and pasteurized milk and cheese, as I recall it?" P5.

Participants appeared to become confused and insecure when the researcher asked if they had received information about the prevention of diet-related chronic diseases, as illustrated by the following statement:

“...No I haven't got that. Salt and fibre? To prevent diseases? No...” P4. The same participant received dietary counselling from a diabetes educator after being diagnosed with GDM.

Midwives regularly checked participants' weight, but the participants' overweight status and presence of other risk factors for GDM did not appear to initiate conversations about weight management or a healthy diet. The participants tended to attribute the reason for overweight, excessive weight gain during pregnancy or GDM to heredity. Possible culturally divergent beliefs were not investigated. The researchers observed a lack of awareness among the participants that overweight and excessive weight gain during pregnancy may increase the women's and the offspring's risk of diet-related chronic diseases. The following statement from a participant originally from Sri Lanka illustrated lack of knowledge about future health consequences of GDM:

“...When you get it [GDM] you just get more follow-up from your doctor. And I know that you can get more complications during pregnancy, but anyway, it disappears when the baby is born.” P5.

Participants appeared to be very receptive towards the nutrition-related information received during antenatal care:

“...I stopped to eat chocolate and sweet things because they told me to do so. And you have to follow the advice.” P11.

However, participants often struggled to remember the information received, as they were provided with a lot of information on different topics. This is illustrated by the following response a participant provided as to whether she has heard about GDM:

“...No. You know, it doesn't say that much to me. (...). It's very, very much information you have to absorb during few consultations. I honestly have to admit that not all information is processed.” P2.

Participants' experiences with nutrition-related information and conversations about weight status

Participants experienced the provision of sparse nutrition-related information differently: Either they asked for more nutrition-related information during antenatal care, like this participant stated:

“...There are so many questions when you are first time pregnant. And I don't know what is wrong and what is right and what shall I or shall I not eat?”P4.

Others did not believe that further nutrition-related information during antenatal care was necessary and stated for instance that “...everybody knows what is healthy or unhealthy food.” P1. These two diverging views were observed across different educational or ethnic backgrounds.

An emerging theme throughout the interviews was that participants perceived to have received nutrition-related information too late in their pregnancy. Although some participants stated that they had talked about nutrition-related topics during their first visit to the midwife, this visit usually occurred halfway into the pregnancy. Nutrition-related information towards the end of the pregnancy was perceived to be less relevant, either because they had used other sources of information or they thought that their eating habits no longer influenced their own or their offspring's health.

Furthermore, participants experienced the nutrition-related information received as unspecific and presented in very general terms. They were often recommended a “...a so called normal diet...” P6 and were hardly asked about their individual dietary habits.

With regards to experiences of nutrition-related information during antenatal care, researchers observed some possible differences related to the participants' ethnical backgrounds.

Participants with immigrant backgrounds emphasised that it was important to continue with the dietary habits from their country of origin, at least to some degree. Cross-cultural differences in concerns about weight and diet were observed: “...Norwegians take care of themselves. We [the Somali] just eat.” P12.

Researchers interpreted that the nutrition-related information received was sometimes experienced as incongruent with food beliefs and the food culture in the participants' country of origin: “...You know, that's really weird, because in Norway you are told to eat eggs and fish, however in Pakistan you should stay away from it in the first three months of pregnancy”. P4. A common theme throughout the interviews among immigrant participants was that they struggled with the advice to eat several smaller meals throughout the day. A recently arrived participant from Somalia expressed that she could not follow the advice to eat 5 fruits and vegetables a day, because she was used to only eat three large, warm meals in her

country of origin. Also lay beliefs were presented. A woman originating from Pakistan had heard from her family that: "...You have to drink milk to get a white baby." P7.

During the interviews the researcher recognised that participants may perceive conversations about dietary habits and weight status as sensitive topics. The statement "...it is always a bit scary to talk about your dietary habits" P2, indicated the ambivalence related to nutrition-related issues, also in antenatal care. Participants could express a certain relief when their overweight status had not been discussed:

"...I would have expected that she (the midwife) would talk more about weight, maybe? That I am overweight, right? But I am a bit happy that she didn't. I think that it was good that I did not have to defend my weight in front of my midwife." P15.

This statement also includes an expectation that weight should have been an issue in antenatal care. Other participants longed to talk about their weight status with their midwife and reflected about their positive experiences: "I think it is quite ok. I think it is worse if my family or boyfriend start to talk about it, because it is very difficult to be overweight and to talk about it." P6. These participants often expected their midwife to make them aware about possible excessive weight gains.

The participants' nutrition-information seeking behaviours

The interviews revealed that participants had actively sought for nutrition-related information during their pregnancy, especially in the beginning of pregnancy. Participants were mainly seeking information related to food safety. As a participant told:

"...I don't seek for what is healthy food, but for what pregnant women should eat. (...) It is about the food I cannot eat." P1.

Analysis of participants' nutrition-information seeking behaviours showed that they navigated between different sources of nutrition-related information: Information provided by the midwife in antenatal care settings, information retrieved from the internet and information received from their social surroundings, such as friends, colleagues or family members. The latter was especially common among participants with immigrant backgrounds. These participants experienced contradictory advice as challenging, illustrated by the following statement from a participant with Pakistani background:

“...You are in trouble when the elders say something and the midwife says something else. Especially your mother in law. She has much influence, especially during the first pregnancy. It is really difficult sometimes to decide what I should eat.” P7. When the researcher asked how she corresponded to the advices of her mother in law she answered: “...When I want to eat some nuts or anything like that, I take that in my room, so that I can eat it.” P7. Resistance to lay advices was a common theme throughout the interviews, also among ethnic Norwegian participants: One participant told that she ate citrus fruits, although her husband told her not to so. When asked about how they dealt with possible confusions due to divergent advices, the participants told that they had discussed such lay advices with their midwife.

The participants perceived the midwife as the most reliable and trustworthy source of nutrition-related information. Many of the women appreciated the repeated contact with the same midwife. Participants with short immigration backgrounds also considered their midwife as important person giving them social support. However, the internet appeared to be the most frequently applied source of information. When the interviewer asked the participants about their search strategies on the internet, the participants did not seem to critically evaluate the quality of the information found. Very few participants stated that it was important to use the information found on web sites from official health institutions.

Discussion

This qualitative study provided valuable insights in participants’ experiences with nutrition-related information during routine antenatal care. According to participants’ accounts, nutrition-related information seemed to be sparse and focused on food safety, with little emphasis on weight management and the long-term prevention of diet-related chronic diseases. Participants were actively seeking for nutrition-related information and had to navigate between various sources of information. However, the midwife was considered as a very trustworthy source of information. This study identified relevant aspects which should be considered in order to improve nutrition communication strategies in antenatal care.

Strengths and limitations

This study was conducted with a small sample size. This is common for studies guided by IPA aiming to understand and to get deeper insights into experiences of a particular study

population (Smith, 2009). Results are derived from individuals' lived experiences, and may be transferable to similar groups in a specific context. However, care should be taken in assuming that the results can be transferred to the population at large (Malterud, 2001; Smith, 2009). The educational (public health nutrition) and ethnical background of the interviewer (immigrant to Norway from another European country) and co-authors (ethnic Norwegians), (blinded information), can have influenced data collection and analysis.

This study was conducted without the help of an interpreter, as the additional step of interpretation may cause methodological challenges in qualitative research (Wallin and Ahlstrom, 2006). Language difficulties might have influenced the participants' responses, but the individual, repeated interviews gave the opportunity to rephrase questions and to identify language misunderstandings. The longitudinal study design helped to increase the credibility of the results. For instance, the researcher could obtain feedback from the participants on initial results.

Experiences with nutrition-related information perceived to receive during antenatal care

This study only investigated what nutrition-related information participants perceived to have received at MCHCs. Systematic searches of the literature revealed a lack of published studies regarding women's experiences of nutrition-related information during antenatal care, especially among women of different ethnic backgrounds. However, other studies also find limited focus on weight management and the prevention of diet-related chronic diseases during pregnancy (Szwajcer et al., 2005; Galtier et al., 2008). As the present WHO model for antenatal care focuses on the prevention of food borne diseases and adequate nutrient requirements in relation to nutrition (World Health Organization, 2002), limited focus on weight management and the prevention of diet-related chronic diseases can be expected in many countries. Whether or to what extent the midwife talked about these topics might have been influenced by that some participants perceived conversations about their dietary habits and weight as sensitive issue.

The limited nutritional knowledge and risk awareness found in this study may be explained by that the nutrition-related information received was sparse. The participants followed the recommended program for antenatal care (Directorate for Health and Social Affairs, 2005), which suggests eight consultations until the 40th week of pregnancy. Previous studies in multi-

ethnic samples have revealed poor knowledge about GDM and lack of awareness that GDM increases the risk of disease also long-term (Kieffer et al., 2002; Hjelm et al., 2005; Smith-Morris, 2005; Lawrence and Barker, 2009; Carolan et al., 2010). In one of these studies, women diagnosed with GDM from the Middle East residing in Sweden, had a lower risk awareness and a passive attitude to self-care compared to Swedish born women (Hjelm et al., 2005). Carolan et al. also investigated knowledge about GDM among a multi-ethnic population sample and found that language proficiency alone was not associated with better comprehension of health information. In her study, higher educational level was the only factor associated with better comprehension (Carolan et al., 2010). In the present study, the participants were hardly aware of that their overweight status or excessive weight gain during pregnancy may influence the offspring's future risk for diet-related chronic diseases. Norwegian-born participants did not appear to have better risk awareness. Although the present analysis did not include interviews after pregnancy, Jones et al. found that information about the risk factors for diet-related chronic diseases during antenatal care influences weight loss behaviours after pregnancy (Jones et al., 2009). Many authors state that it is important to explain and to raise awareness of nutrition-related risks in order to change unfavourable nutrition behaviour (Rosal et al., 2001; Holli et al., 2009; Lawrence and Barker, 2009).

The finding that immigrants experienced confusion about information perceived as incongruent with food beliefs and practices from their country of origin was also investigated in other studies. A review of behavioural interventions for weight management in pregnancy indicating that lay beliefs about food behaviours may contradict messages from health professionals (Campbell et al., 2011). Migration from low and middle income countries to a Western country is often associated with the adoption of less healthful dietary habits (Gilbert and Khokhar, 2008; Wandel et al., 2008). Thus, activities to promote a healthy diet might be urgently needed especially for such groups. Differences in cultural beliefs and values have been identified as important predictors of communication difficulties (Fagerli et al., 2005; Schouten and Meeuwesen, 2006). There is a growing recognition that nutrition and health communication must be culturally sensitive (Schiavo, 2007). According to Foronda, cultural sensitivity is employing one's knowledge, consideration, understanding, respect, and tailoring after realizing awareness of self and others in encountering a diverse group or individual (Foronda, 2008).

Nutrition-related information seeking behaviours in pregnancy

This study found that participants navigated between three sources of nutrition-related information: Antenatal care ('most reliable and trustworthy'), the internet ('most used') and participants' social surroundings ('most doubtful'). Similar patterns of nutrition-related information seeking behaviours were observed regardless of immigrant status. This triangle of interaction has been explored previously (Szwajcer et al., 2005; Carolan, 2007; Larsson, 2009), but none of the previous studies has explored this in a multi-ethnic population. Two other studies found that pregnant women extensively retrieved pregnancy-related information from the internet (Larsson, 2009; Huberty et al., 2012). Participants considered this information as reliable. The internet was either consolidated prior to the meeting with the health care professional to increase their confidence when talking about their concerns (Huberty et al., 2012) or afterwards to get more information on topics brought up by the midwife (Larsson, 2009). Participants in Szwajcer's study considered the internet as an anonymous and up to date source of information, while midwives were perceived as experts and friends (Szwajcer et al., 2005). In the present study, nutrition-information from the midwife was considered as reliable and trustworthy. The inconsistency between the most reliable and most used source of information identified in the present study may be explained by that participants experienced that antenatal care started too late and that they were provided with sparse information. Previous research among Pakistani immigrants in European countries highlights that family members and peers are important sources of information about healthy food. Young women appear to be strongly influenced by cultural traditions and family expectations with regard to food preparation and consumption (Mellin-Olsen and Wandel, 2005; Råberg Kjøllesdal et al., 2010; Ludwig et al., 2011). Contrarily, the present study revealed that both participants of ethnic Norwegian and immigrant backgrounds were doubtful and somehow resistant to information from their social surroundings. This is in accordance to Carolan's findings among first-time pregnant women of different ethnic groups in Australia (Carolan, 2007).

Olson states that pregnant women may be 'easy to reach' with nutrition-related information (Olson, 2005). In her study, socio-economically disadvantaged and less health-conscious women appeared to be more likely to change their food choice behaviours when pregnant. The active information seeking behaviour observed in the present study and in others (Mitchell and Lerner, 1991; Olson, 2005; Szwajcer et al., 2005), also indicates that pregnant

women may be particularly receptive. However, not all of the participants sought for general information about a healthy diet. Similar to Szwajcer's findings among Dutch pregnant women, the information seeking was pregnancy specific in character and some participants perceived information about a healthy diet as common knowledge (Szwajcer et al., 2005). In both studies, pregnant women were mainly seeking for nutrition-related information in the beginning of the pregnancy. Furthermore, pregnant women have been shown to experience an over-load of health information. This may limit their seeking of information and lead to poor comprehension (Carolan, 2007). Similar experiences were expressed in this study.

Aspects relevant for tailored nutrition-related information during antenatal care

This study identified aspects which should be considered in order to improve nutrition-information during antenatal care. A key finding of the present study was that several participants asked for more specific and individually tailored nutrition-related information. It is generally acknowledged that health promotion communication is more effective when tailored towards individuals' characteristics, needs and culture (Hyman and Guruge, 2002). This study indicated some possible differences in participants' experiences of nutrition-related information related to their ethnic backgrounds. Thus, tailored communication may imply a culturally sensitive approach (Resnicow et al., 1999; Hyman and Guruge, 2002; Foronda, 2008). Nutrition-related information may become more culturally sensitive when health professionals increase their knowledge of, understanding of, and respect for the audience's food culture (Foronda, 2008; Garnweidner et al., 2012). However, culture may be experienced and manifested differently within cultural groups. Therefore, Kreuter emphasises the need to assess the extent to which individuals value and identify themselves with cultural beliefs (Kreuter et al., 2003).

Nutbeam states that health professionals can achieve more tailored health communication if they assess and recognise their audiences' prior knowledge and capability to process information (Nutbeam, 2008). He introduces the concept of health literacy, which is defined as a person's capacity to obtain, interpret, understand, and use health information to promote and maintain health. Nutrition literacy may be a subordinated concept within health literacy, specified towards nutrition-related information in order to make appropriate dietary decisions (Silk et al., 2008). Participants' poor knowledge about diet-related risk factors as well as their experienced overload of health information may indicate that the information received was

not tailored towards their prior nutritional knowledge or capability to process the information. Williams examined the nutrition information needs of migrant communities in Australia and stresses that it is important to assess the capacities of the target audience to improve the uptake of nutrition information (Williams and Harris, 2010). Thus, it may be important that health professionals tailor nutrition-related information to the individual's level of nutrition literacy.

Conclusions

Antenatal care has considerable potential to promote healthy diets among pregnant women of different ethnic backgrounds. However, to meet the new public health challenges, nutrition-related information during pregnancy should focus more on the prevention of diet-related diseases. Such efforts should increase the risk awareness for adverse health outcomes related to previous overweight and excessive weight gain during pregnancy. Aspects relevant for more tailored nutrition communication may imply a culturally sensitive approach. The assessment of and adaptation to the users' prior nutritional knowledge and level of nutrition literacy is also important. This study explored experiences from the users' perspective. Further research to examine health professionals' experiences is needed.

Conflict of interest statement

There are no conflicts of interest in this paper.

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Table 1 Summary of super-ordinate themes and sub-themes

Super-ordinate themes	Sub-themes
1. Nutrition-related information received during antenatal care	<p><u>Feels to receive sparse nutrition-related information</u></p> <p><u>Feels to received sufficient nutrition-related information</u></p> <p>Information focuses on food safety</p> <p>Information focuses on the prevention of diet-related diseases</p> <p>Information focuses on vitamin supplements</p> <p>Information focuses on other pregnancy-related topics in antenatal care</p> <p><u>Expects the midwife to provide nutrition-related information, rather than the GP</u></p> <p>Initiators for conversations about nutrition</p>
<u>2. Received information about weight management and gestational diabetes mellitus (GDM) during antenatal care</u>	<p>GDM was not a topic during antenatal care</p> <p><u>Experiences of receiving too little information about weight management</u></p> <p>Lack of knowledge about GDM</p> <p><u>Lack of risk-awareness related to GDM</u></p> <p>Divergent beliefs about GDM</p>
<u>3. Receptiveness for nutrition-related information in antenatal care</u>	<p><u>Follows the advices because of increased risk awareness</u></p> <p><u>Feels to “have to follow” the advices</u></p> <p>Examples for following received advices from the midwife</p>
<u>4. Experiences with the nutrition-related information received during antenatal care</u>	<p>Information was perceived too late</p> <p><u>Experiences too unspecific and subjective information</u></p> <p>Asks for more nutrition-related information</p> <p><u>Experiences difficulties to follow the received advices</u></p> <p>Lack of nutritional knowledge</p> <p>Self-confident about what is a healthy diet</p> <p><u>Challenges due to different food habits and beliefs</u></p> <p><u>Experiences an informational overload due to too much</u></p>

information about other pregnancy-related issues

Participant focuses on other pregnancy related topics

Acknowledges the relationship to the midwife

Different expectations to the midwife

Misses conversations about individual food habits

Confused due to many sources of and convergent nutrition-related information

Confused due to nutrition-information which was incongruence with food practices from the country of origin

5. Experiences with conversations about participants weight status during antenatal care

Weight status is perceived as sensitive topic

Avoidance of the topic

Expects the midwife to talk about weight or weight management

Awareness about the interconnection between weight, diet and health outcomes

Openness to being weighted by the midwife

Experiences of stigmatisation related to overweight in social settings

Initiators to talk about weight and weight management

6. Nutrition-information seeking behaviours

Actively seeking for nutrition-related information

Not interested in nutrition-related information

Focused on food safety

Negotiation between divergent sources of information

Antenatal care is perceived as a reliable source

Internet is the most applied source

Social surroundings is perceived as doubtful source

Resistance to lay advices

Confusion due to lay nutrition-related information

Table 2 Characteristics of the study participants

Characteristics	Immigrant Background	Ethnic Norwegian
Ethnicity (n=17)		
Ethnic Norwegian	0	5
Norwegian-born to immigrant parents	2	0
Foreign born and moved to Norway	10	0
Years of residence in Norway (n=10)		
0-1 year	2	0
1-5 years	3	0
5-10 years	4	0
> 10 years	1	0
Education (n=17)		
Primary school (1-7 years) or less	2	0
Lower secondary school (8-10 years)	2	0
Upper secondary school (11-13 years)	2	1
Higher education (3 to 5 years at University or University college level)	6	4
Occupational status (n=17)		
Unemployed	2	0
Full or part time employed	8	4
Language training course/education	2	1