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What is needed to facilitate healthy dietary behaviours in pregnant women: A qualitative study of Dutch midwives' perceptions of current versus preferred nutrition communication practices in antenatal care

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ABSTRACT

Objective: The aim of this paper was to explore midwives' perceptions of current and preferred nutrition communication practices in antenatal care, and to identify what is needed to achieve their preferred practices.
Design: A qualitative descriptive design was used. Semi-structured interviews were conducted with twenty Dutch midwives working in primary care or secondary care settings across the Netherlands. To create a positive atmosphere, interviews were based on the principles of Appreciative Inquiry.
Findings: Opportunities identified in current practices included midwives' sense of responsibility, their skills and experience, availability of resources, and group consultations. Barriers were the precarity and lack of prioritization of the topic, and the current focus on food safety (risks). Ideally, midwives envisioned nutrition communication as a continuous trajectory, in which not only reliable and consistent information is provided, but also more personalized and positive communication, to empower pregnant women.
Key conclusions: Midwives favour nutrition communication practices characterized by continuity of care and woman-centeredness. Opportunities to realize such practices in antenatal care are the use of innovative tools to support nutrition communication, more sustainable collaborations with dietitians, and better nutrition education for midwives.
Implications for practice: Midwives could act as facilitators and gatekeepers in nutrition communication, requiring limited time and expertise from midwives, and empowering pregnant women.

Introduction

A growing body of evidence shows the important role of maternal nutrition in improving pregnancy and birth outcomes, as well as lifelong health of the child. A poor antenatal dietary intake may lead to pregnancy complications or adverse birth outcomes, and has been associated with the development of non-communicable diseases (NCD's) in the child's later life (Abu-Saad and Fraser, 2010; Barger, 2010; Ramakrishnan et al., 2017). Pregnancy is often regarded a teachable moment, as it is a critical transition in the life course during which women are increasingly aware of the consequences of their behaviours for their own health and their child's health (Lindqvist et al., 2017; Szwajcer et al., 2012). Making use of this increased awareness and interest in nutrition and promoting healthy dietary behaviours during pregnancy therefore has the potential to improve health across generations.

Antenatal care offers opportunities to promote healthy dietary behaviours. According to the World Health Organization, midwives are the most commonly reported health care providers to be responsible for providing nutrition recommendations during pregnancy (WHO, 2016a). Pregnant women perceive midwives as an important and trustworthy source of nutrition information (Baron et al., 2017a; Bookari et al., 2017; Garnweidner et al., 2013; Szwajcer et al., 2005), which makes them more likely to accept nutrition-related information from their midwife than from sources perceived to be less credible (Benoit and Strathman, 2004). Although midwives themselves generally acknowledge their role in promoting a healthy dietary intake, they often encounter structural barriers to providing nutrition communication (Arrish et al., 2017; Lucas et al., 2014; McCann et al., 2018; Schmied et al., 2011). Some of the main barriers for midwives to provide nutrition communication are time constraints and unsupportive health systems (Arrish et al., 2017; Lucas et al., 2014), as well as limited relevant and reliable resources and training (Arrish et al., 2017; Lucas et al., 2014; McCann et al., 2018). Moreover, midwives may be reluctant to discuss the topic due to concerns about harming their carefully built rapport

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with women, especially overweight and obese women (McCann et al., 2018; Schmied et al., 2011). As a result, nutrition communication in antenatal care generally remains suboptimal.

Nutrition communication is a multifaceted concept, that may be defined in various ways. Van Dillen et al. (2006) previously identified five styles of nutrition communication: (1) providing information about nutrition and health (informational), (2) calling on other health professionals to deal with nutrition problems, (3) providing guidance in dietary change (motivational), (4) warning about nutrition problems related to health complaints (confrontational), and (5) involving several aspects as being part of living circumstances (holistic). In this study, a broad definition of nutrition communication was used that encompasses all the above. It was recognized that these styles may be used complementary to each other (van Dillen et al., 2006).

Prior studies have shown that nutrition communication in antenatal care is often focused primarily on risks (e.g. food safety) and problems (e.g. nausea), and is mainly delivered through written communication, such as flyers (Baron et al., 2017b, 2017a; Garnweidner et al., 2013; Szwajcer et al., 2009; Wills and Forster, 2008). This does not fit within the broadly wellness-based field of midwifery, in which pregnancy and childbirth are viewed as normal physiological processes (Mathias et al., 2020), and the sole use of written materials is seldomly effective (Beulen et al., 2020b). In order to promote a healthy dietary intake in pregnancy a broader health promotion strategy is needed that does not only focus on changing beliefs, knowledge, or intentions, but also on empowering people to mobilize and reflect on resources already available to them. This is not only true for the ultimate target group, the pregnant women, but also applies to their health care providers. To empower pregnant women, midwives themselves need to feel empowered first (Super and Wagemakers, 2021). Gaining insights into what is important to midwives is an essential first step in their empowerment process (Tengland, 2016), as well as a next step towards identifying effective nutrition communication strategies in antenatal care.

The aim of this paper was therefore to explore midwives' perceptions of current and preferred nutrition communication practices in antenatal care, and to identify what is needed to achieve their preferred practices. While previous studies have focused mainly on identifying barriers to providing nutrition communication, the current study was focused on exploring resources that are already available and opportunities to mobilize those resources.

Methods

This study was part of a larger project to develop an integral strategy for promoting a healthy dietary intake in Dutch pregnant women (Beulen et al., 2020a), including the views of pregnant women (Super and Wagemakers, 2021) dietitians (Super et al., 2021) and midwives (Rothoff et al., 2018). In the current study, a qualitative descriptive design was used to provide a vehicle for the voices of midwives regarding the provision of nutrition communication. This design is particularly useful when a description of a phenomenon is desired, in this case of current and desired nutrition communication practices (Neergaard et al., 2009). Semi-structured interviews were conducted with twenty Dutch midwives working in primary care or secondary care settings, as they are the cornerstone of maternity service provision in the Netherlands (Cronie et al., 2019). Midwives were recruited via purposive sampling through the network of project partners and by contacting practices by email and telephone. Recruitment was ceased once data saturation, as determined by the researchers, was reached. This was the case after the 15th interview. Data from interviews with primary and secondary care midwives showed no remarkable differences and therefore no distinction was made between these midwives in the results section. The interviews were conducted by two researchers (YHB, AR) between September 2017 and January 2018.

The conduct of the interviews was based on the principles of Appreciative Inquiry, to create a positive atmosphere. Appreciative Inquiry relates closely to the concept of salutogenesis and builds on participants' existing strengths and past achievements, rather than on solving problems (Cooperrider et al., 2005; Mittelmark et al., 2016). The salutogenic perspective focuses on the resources that people have available to meet the demands of everyday life and their ability to use these resources for their health (Antonovsky, 1979). Appreciative Inquiry makes use of the 4-D cycle, containing 4 aspects: Discovery, Dream, Design, and Destiny (Cooperrider et al., 2005). In the current study the first three D's were covered, to identify current and preferred practices, as well as needs. The component Destiny will be covered later in the development of the integral strategy. Some examples of questions integrated into the topic guide for the interviews: *What is going well in your practice/hospital regarding nutrition communication?* (Discovery)*; Imagine that anything is possible, how would pregnant women receive nutrition communication according to you (what does it look like)?* (Dream); *What would help you to provide nutrition communication?* (Design). Furthermore, the topic guide was developed based on a literature review of research on nutrition communication by midwives (Rothoff et al., 2018).

Twenty interviews were conducted, most of which took place at the midwife's practice location. One was conducted at the midwife's home, and one at the university. Each interview was led by one of the researchers, while the other interviewer complemented if needed. The mean interview duration was 42 min (range 27-66 min). Midwives received a financial reward for their participation in line with their regular tariff (€60/h), to compensate for the time invested. Each midwife provided written informed consent a priori, agreeing to audio-recording of the interview, and their understanding of the data management procedure and the voluntary nature of their participation. The interviews were transcribed intelligent verbatim style, and names of persons or practices were removed. Moreover, anonymity was guaranteed by assigning each participant a unique study ID and collected data were kept confidential. This study has been approved by the Social Science Ethics Committee (SEC) of Wageningen University & Research.

The first part of the analysis involved repeated reading of the transcripts for familiarization. Next, data was analyzed through an inductive thematic analysis (Braun and Clarke, 2006), using Atlas.ti software (version 8.4). Two researchers (YHS, SS) used an open coding strategy to independently generate initial codes. Data analysis was conducted separately for each set of questions relating to the three components: Discovery, Dream and Design. For each component, potential themes were identified that described the main message for that specific component. The 'internal homogeneity' (coherence of the data within themes) and 'external heterogeneity' (clear distinction between themes) of the themes were discussed with two more co-authors (MAK, AW), after which themes were further refined and used to write down the results.

Results

Participants were practicing midwives working in both urban and more rural areas across the Netherlands. Two midwives were working in a hospital at the time of the interview, the other eighteen were working in twelve primary care group practices. Half of these practices (n=6) had at least one practice location in a multidisciplinary health center. Most participants were trained in the Netherlands, one in the UK and one in Belgium. Total work experience as a midwife ranged from 1.5 to 24 years (mean 11 years). Most midwives (n=14) had work experience in multiple primary care practices, few participants (n=3) had work experience in both primary and secondary care. Two midwives had work experience abroad as well, in the UK and Africa.

The results are organized by the three components of Appreciative Inquiry addressed in this study: Discovery (current practices), Dream (preferred practices), and Design (what is needed to achieve those preferred practices). How the themes identified relate across these different components is visualized in Fig. 1.

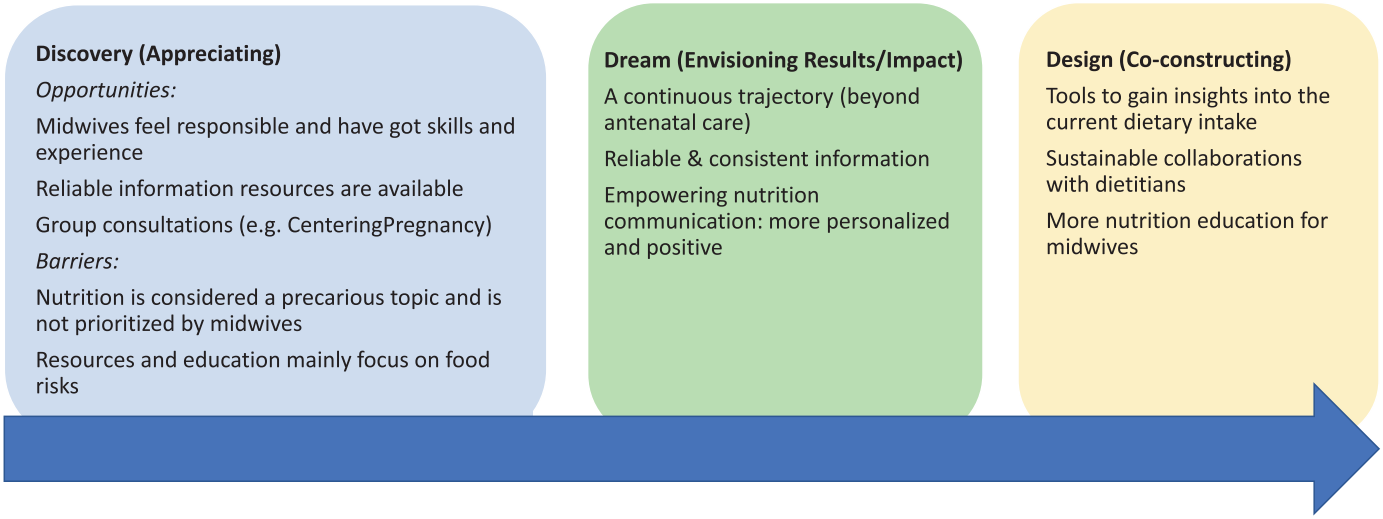

Fig. 1. Themes identified according to the components of appreciative inquiry (based on Cooperrider et al., 2005).

Discovery

The Discovery component of Appreciative Inquiry enabled midwives to appreciate "the best of what is". This led to the identification of various facilitators for providing nutrition communication, but inevitably also highlighted several (known) barriers to providing nutrition communication in their current practice.

All interviewees considered nutrition communication a midwife's task, most of all because they are pregnant women's primary caregivers (during a normal pregnancy). Nonetheless, several midwives critically reflected on the ownership of the topic. Five midwives specifically mentioned they would like to keep pregnant women themselves responsible to take care of themselves and of their baby, to adjust their lifestyle, and to seek help if needed:

> *"We also think that it is something that I, or that we as midwives, consider important. And not everyone wants you to interfere with what they are eating. So there is a bit of a tension field there, because you are touching their private choices. […] You also want to keep your treatment and trust relationship good, and not be the one who is going to shout down from the ivory tower what would be good for you." (M02)*

Midwives were generally confident about their health promotion skills. Important skills they identified included motivational, communication and social skills. Despite this confidence, most midwives considered nutrition a potential precarious topic to discuss in their practice. Especially with overweight and obese women, but also in general, they were worried about harming their trust-relationship with women if being too directive:

> *"You also have to keep their trust, because you have to support [women during] the pregnancy and support [women during] the delivery as well, of course [...] On the one hand, you have to be a little strict, because you really have to try to make them skip that [1.5L coke] bottle. But you shouldn't chase them out of your consultation room, because then they will not come back." (M01)*

Most midwives felt free to determine the content of their consultations themselves. This provided opportunities to spend more time discussing nutrition if needed, but also led to inconsistent nutrition communication practices. There was no standard protocol for nutrition communication in antenatal care for healthy pregnant women, and midwives did not structurally discuss the topic with colleagues. It was common practice to discuss nutrition at the booking visit, typically taking place around 8 weeks gestation. Some practices included the topic in a checklist for this visit. On average, however, only a small amount of time (2-10 min) was dedicated to nutrition communication. Midwives explained this was due to the limited time available and the range of other topics to discuss during the intake consultations, often perceived as more integral to the profession and therefore prioritized:

> *"We have to choose what we spend our energy on. And at this time, it already appears to be a challenge to keep our own profession and our own tariffs, and to assure those are proportional to all that we do. And that just has priority." (M03)*

Various resources were available to midwives to provide nutrition communication. The Netherlands Nutrition Centre (NNC) and the Royal Dutch Organization of Midwives (KNOV) were found to be midwives' main sources of information. The NNC translates evidence-based dietary guidelines (e.g. by the Dutch Health Council) to resources for professionals and the general public. The role of the KNOV is to support and connect midwives, and to represent their interests. Both organizations provide printed resources, such as flyers and magazines, as well as a website and newsletters. Especially resources by the NNC are commonly used, both by midwives themselves and to refer their clients to. Almost all midwives used the website of the NNC, or provided women with flyers and magazines. At the same time, midwives often considered the recommendations by the NNC too restrictive, so they tend to advise women to trust their common sense as well:

> *"I've had women who didn't eat apple pie throughout the whole pregnancy because it contained cinnamon, or who seriously wondered whether they were allowed to eat a pesto sandwich 'because it contains so much basil' […] Other than that I think that especially the website for pregnant women is a good website to look things up, also for me to secretly have a look, but those are just some examples […] I think that we [midwives] all have the same way of thinking. That we mostly stick to the NNC, but that we also try to let the woman use her common sense, think for herself, and especially follow her gut feeling." (M18)*

Midwives collaborated most with dietitians regarding nutrition communication. In total, fourteen midwives mentioned a collaboration with a dietitian. Some of these midwives organized a workshop together with a dietitian or collaborated in a program for obese pregnant women. Others participated in multidisciplinary meetings or had more informal contact to exchange ideas. Half of the midwives mentioned referring pregnant women to the dietitian. Overall, women were mainly referred in case of nutrition-related pregnancy complications (e.g. gestational diabetes, excessive gestational weight gain). Multidisciplinary health cen-

ters were found to facilitate more sustainable collaborations with dietitians and other health care providers:

> *"That's what I like about health centres, that you are not working in a fragmented manner anymore, but that you are setting up a program together, because everyone sees the same [issues] and everyone can fulfil their own task in it." (M05)*

Dream

The Dream component of Appreciative Inquiry is about envisioning "what might be". We asked midwives to imagine what nutrition communication would ideally look like, without limitations. In this ideal practice, they envisioned it as a continuous, reliable and consistent, and woman-centered trajectory.

According to midwives, nutrition should be an integral part of antenatal care and beyond, where nutrition communication 'beyond' antenatal care means that it should be discussed 1) not only during pregnancy, and 2) not only by midwives. Midwives would like to see nutrition communication as a trajectory, a continued effort, with multiple opportunities for themselves and/or other health care providers to provide guidance and to support women to eat healthily. This trajectory would preferably start in the pre-conceptional phase, as midwives felt that having the booking visit as the first opportunity for midwives to discuss nutrition was already relatively late to provide certain advice (e.g. folic acid intake). They also would like to see it being continued after delivery, for example in Dutch children's health clinics, which monitor the growth and development of babies and toddlers up to four years of age:

> *"So you're not just a voice in the wilderness, but that people are reminded and asked about it in different places. If you hear it often enough, it will come alive, I think." (M01)*

Midwives' wish for continuity also related to the second theme identified: reliable and consistent information, both for pregnant women and themselves. This theme mainly relates to the growing importance of the internet as a source of information, and the ambiguity of recommendations. In an ideal situation, midwives would like reliable online sources, for both women and themselves, to easily navigate to up-to-date recommendations and explanations:

> *"I notice that people read a lot on the internet and then want us to confirm it. […] So I think, in any case, that we should be kept more up-to-date, so that we can tell them whether it is true or not. […] In my opinion, we often have to go after it ourselves. And to be honest, I don't think we all give the same advices in practice. One has heard it through this way, the other through that way, and it would just be important that it's unambiguous." (M07)*

Last but not least, midwives would like to center their nutrition communication around women's specific needs. Rather than the current one-way advice, midwives would like to start a conversation and identify potential ways to (further) improve the dietary intake together with pregnant women. Moreover, they would like to focus less on risks and problems and keep dietary behaviours as normal as possible, to avoid making women feel like they are on a strict diet.

Design

The Design component is all about determining "what should be", to achieve the Dream described above. Awareness of the importance of a healthy dietary intake during pregnancy among midwives, other professionals, policy makers, and pregnant women was considered a first essential step towards nutrition as a standard topic in antenatal care and beyond. Several tools were suggested to create this awareness, and to provide their ideal nutrition communication.

Providing women with insights into their current dietary intake was commonly suggested for two reasons. Firstly, midwives believed such insights could create awareness and motivate women, if combined with information on why it is important to eat healthy during pregnancy. Secondly, it could be used by midwives or dietitians. A thorough assessment of the current dietary intake was believed to be helpful to provide more personalized nutrition communication:

> *"I think that the actual nutritional status at that moment should be discussed in all openness. Because from that starting point you can estimate what kind of information someone needs." (M08)*

Approximately half of the midwives would like a dietitian to be involved, to provide more reliable and personalized communication. Suggested involvement of the dietitian ranged from individual consultations for each woman, to workshops or group meetings. Financial resources for structural changes were considered a prerequisite, to lower the threshold to visit the dietitian. In addition, midwives suggested that nutrition should be integrated more into their own formal education, and that additional training should be offered post-graduation. Regarding the latter, midwives required that the organizing party should have no conflicts of interest, the costs and amount of accreditation should be proportionate, and timing (daytime or evening) should be adjusted to midwives' availability.

Group consultations were often seen as a helpful way of providing nutrition communication. Almost half of the midwives specifically mentioned CenteringPregnancy™. Four of them already offered this trajectory in their practice and two had followed the required training. They argued that group-based care provided more opportunities to invite other professionals, such as a dietitian, that women could learn from each other's questions, and that there was more time available than in regular consultations.

Discussion

Significance of the results

This study outlined midwives' perceptions on both current and preferred nutrition communication practices in Dutch antenatal care, and identified needs to achieve the preferred nutrition communication. Previous research explored nutrition communication in antenatal care and identified various barriers. The current study approached the topic from a new, positive perspective. It stimulated midwives to think of opportunities, and gave them a chance to reflect on how their current practice either supports or hinders the provision of their preferred level of practice (e.g. through identifying existing resources). To know what is important to midwives and understand how they could use resources that are already available is an important next step towards identifying effective nutrition communication strategies in antenatal care.

We explored midwives' perceptions of both current and preferred nutrition communication practices. We found that midwives currently mainly focus on assessing behavioural health risk(s) and related to this, providing behaviour change advice. Midwives' descriptions of preferred practices, on the other hand, very much revolved around selecting appropriate goals in collaboration with the pregnant woman, using behaviour change techniques, and arranging follow-up contacts to discuss nutrition. In the current situation, only women with pregnancy complications, overweight/obesity or excessive gestational weight gain, or those who asked for it themselves seemed to receive such extensive guidance regarding their nutrition during pregnancy. Our findings are in line with previous studies. Two Dutch studies among pregnant women, in which video recordings of antenatal visits and interviews were analyzed, also found that nutrition communication during normal pregnancy was limited (Baron et al., 2017b; Szwajcer et al., 2009): midwives provided little or no information about nutrition and in case they did, they provided oral and written information. A recent study, exploring midwife's experiences with online and mHealth applications, revealed that midwives referred to websites, a brochure and app of the NNC, but felt uncertain about other tools, because of trustworthiness, accessiblility,

user-friendliness, personalisation and scientifical soundness. Midwives require knowledge and guidelines to use online and mHealth applications (Wit et al., 2021).

Midwives' vision of the Dream component closely relates to two important concepts in antenatal care and health care in general: (midwife-led) continuity of care and woman-centeredness. Since "the experience of a co-ordinated and smooth progression of care from the patient's point of view" (Freeman et al., 2007) is central to continuity woman-centeredness is considered an important aspect in the delivery of continuity of care (Sandall et al., 2016). Three major types of continuity of care are generally defined: management, informational and relational/relationship (Freeman et al., 2007; Reid et al., 2002). Our theme *continuous trajectory* relates to management continuity. A group approach such as CenteringPregnancy™ may be regarded a means of providing this type of continuity during normal pregnancy. Midwives' wish for *reliable and consistent advice* may be linked to informational continuity, concerning the timely availability of relevant information both for pregnant women and themselves. And lastly, the theme *woman-centered* relates to relational continuity, as it recognizes the importance of an ongoing relationship between women and providers. It is argued that neither management nor informational continuity can compensate for lack of an ongoing relationship (Guthrie et al., 2008). The importance of midwifery continuity of care has been acknowledged in national (KNOV, 2020, 2018) and international (WHO, 2016b) guidelines and policy documents over the past decade.

Similar to relational continuity, woman-centeredness places a strong emphasis on the woman-midwife relationship (Fontein-Kuipers et al., 2018). Woman-centered care prioritizes the woman's individual needs, as defined by the woman herself, assigning to the woman's choice, control and continuity of care. This concept, in turn, relates to the concept of empowerment. Empowerment is about gaining mastery (control) over their lives and learning how to achieve goals that are meaningful to them. The role of the midwife in this empowerment process could be to support women by enabling reflection on barriers and opportunities for change and strengthening one's capacity to make those changes (Koelen and Lindström, 2005). Being woman-centred, providing safe and supportive care, and working in collaboration with others when necessary have been identified as key elements required of a midwife, by both midwives and pregnant women (Boer and Zeeman, 2008). Although the facilitator role suits midwives well, it should also be noted that empowerment needs to be understood within the socio-cultural-economic-political landscape of the individual woman whose internal belief in herself is the key to open up for the empowering experience (Nieuwenhuijze and Leahy-Warren, 2019).

In the Design component of the interview, midwives seemed to agree that nutrition should become a standard and recurring topic in antenatal care. However, coming up with practical steps towards filling the gap between the Discovery and Dream component proved difficult given the experienced barriers and limitations (e.g., time and finances) in midwifery practices to include more nutrition communication strategies. Most midwives did see a great potential in strengthening the collaboration with dietitians as this may level out some of these barriers. And indeed, a previous study conducted amongst dietitians and pregnant women with a low socio-economic status showed that there are great opportunities to support women in healthy eating as dietitians are trained and well-equipped to provide extensive support, especially when the complex interplay of barriers that pregnant women with a low socio-economic status experience for healthy eating needs to be addressed (Super et al., 2021). Four opportunities for supporting pregnant women in healthy eating could be discerned: 1) creating awareness of healthy and unhealthy patterns; 2) providing reliable and personally relevant information; 3) help identifying barriers and solutions for healthy eating; and 4) making healthy eating manageable. Previous studies have proved that interventions including dietitian-led activities can be beneficial for pregnant women (Di Carlo et al., 2014; Wilkinson and McIntyre, 2012). But as to date, dietitians are not yet part of standard antenatal care in the Netherlands.

Some of the main strengths of this study may be found in the methodology. Face-to-face interviews were conducted, using Appreciative Inquiry. Although originally Appreciative Inquiry was mainly used to create a positive conversation, it helped to identify embedded skills, relational resources, and strengths of other professionals. It enabled midwives to reflect on their experiences and resources available within their current practice, and to think ahead how to use or enhance those to move towards their preferred practices. Through using Appreciative Inquiry, the interviews did not only serve to collect data, but also enabled midwives to reflect and dream, and find a renewed energy to act. Several midwives mentioned they felt inspired and would discuss the topic with their colleagues in an upcoming meeting.

A limitation to be considered is the fact that midwives were not asked how they defined nutrition communication, and the interviewers did not define it at the start of the interviews, leaving the interpretation of the concept open.

Other aspects of the methodology added to the validity of the data. Most midwives were interviewed in familiar surroundings, which added to the ecological validity of this research. Multiple researchers were involved in coding and analyzing the data, leading to better consistency of the findings and adding to the reliability of the research. With regard to the external validity, the model of care must be taken into account. Midwifery in the Netherlands is an autonomous profession, midwives are not supervised by physicians or any other health professional. Moreover, it is possible that midwives who agreed to participate had affinity with the subject, potentially making them less representative of the population of Dutch midwives as a whole.

Overall, our results align with the salutogenic perspective (Antonovsky, 1979) as midwives are open to broaden their current focus on providing advice on food safety (risks) with communication practices that are continuous, woman-centered and that contribute to women's empowerment for a healthy dietary intake.

The findings of this study may be used to inform recommendations for health promotion policies and programs that empower midwives to facilitate a healthy dietary intake in pregnant women. Based on the findings, opportunities related to resources such as group consultations, multidisciplinary health centres and mobile applications may be further investigated. Such resources could potentially be used to efficiently integrate nutrition communication in antenatal care. Incorporating a dietary assessment tool may be helpful for pregnant women to formulate questions, and for the midwife to quickly gain insights into women's dietary intake, but it must be warranted that these insights do not induce stress. At an organizational level, financial resources are needed to incorporate support by a dietitian into antenatal care. Within the project 'Power 4 a Healthy Pregnancy', the authors of this paper and their project partners will aim for a strategy that is positive and that stimulates small steps to improve pregnant women's dietary intake.

Conclusion

Continuity of care of and woman-centeredness resonate with midwives but need further attention to be implemented properly with regard to nutrition communication. Opportunities to improve nutrition communication in antenatal care include innovative tools to support nutrition communication, more sustainable collaborations with dietitians, and better nutrition education for midwives. Midwives could act as facilitators and gatekeepers in nutrition communication, requiring limited time and expertise from midwives, and empowering pregnant women.

Ethical approval

This study has been approved by the Social Science Ethics Committee (SEC) of Wageningen University & Research. Written consent was obtained from midwives. All data collected were kept confidential.

Authorship statement

All authors listed meet the authorship criteria accourding to the latest guidelines of the International Committee of Medical Journal Editors, and all authors are in agreement with the manuscript.

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Declaration of Competing Interest

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CRediT authorship contribution statement

Yvette H. Beulen: Conceptualization, Formal analysis, Methodology, Investigation, Visualization, Writing – original draft. **Sabina Super:** Conceptualization, Formal analysis, Methodology, Investigation, Visualization, Writing – original draft, Writing – review & editing. **Auke Rothoff:** Conceptualization, Formal analysis, Methodology, Investigation, Visualization, Writing – original draft, Writing – review & editing. **Nalonya M. van der Laan:** Conceptualization, Investigation, Writing – original draft. **Jeanne H.M. de Vries:** Conceptualization, Supervision, Methodology, Writing – original draft, Writing – review & editing. **Maria A. Koelen:** Conceptualization, Supervision, Methodology, Writing – original draft, Writing – review & editing. **Edith J.M. Feskens:** Conceptualization, Supervision, Writing – original draft, Writing – review & editing. **Annemarie Wagemakers:** Conceptualization, Funding acquisition, Methodology, Visualization, Formal analysis, Project administration, Supervision, Writing – original draft, Writing – review & editing.

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