Pregnant women and midwives are not in tune with each other about dietary counseling – studies in Swedish antenatal care

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“Oh, East is east, and west is west, and never the twain shall meet...”

Rudyard Kipling

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Abstract

Background During pregnancy, a healthy diet is beneficial for the expecting mother and her fetus. Midwives in antenatal care have an ideal position for promoting a healthy diet and thereby help women to not only lower the risks of pregnancy complications and adverse birth outcomes, but improve maternal health. The overall aim of this thesis was to describe diet and dietary changes during pregnancy from the women's and the midwives' perspectives with a focus on dietary counseling. The thesis comprises four studies. The specific aims in the respective studies were to: I) Describe pregnant women's attitudes to and experiences of dietary information and advice, as well as dietary management during pregnancy. II) Explore midwives' strategies in challenging dietary counseling situations. III) Describe how midwives' perceive their role and their significance in dietary counseling of pregnant women. IV) Describe women's food habits during pregnancy and up to six months postpartum.

Methods Studies I-III were qualitative. Study I included focus group interviews with 23 pregnant women. Study II included telephone interviews with 17 experienced midwives working in Swedish antenatal health care. Study III included the same 17 interviews from study II and supplemented them with four face-to-face-interviews. Qualitative content analysis was performed in all three studies. Study IV was a longitudinal study including a quantitative analysis of a questionnaire, which was given to

women at five occasions during and after pregnancy. It concerned their food habits and it was answered by 163 women. The quantitative data was analyzed using comparative and descriptive statistics.

Results The overall findings of the thesis were summarized as the main theme “Pregnant women and midwives are not in tune with each other about dietary counseling”. The main theme included the two themes ‘Pregnant women are concerned about risks for their child but fail to change to healthier dietary habits over time’, and ‘Midwives view themselves as authorities, though questioned ones’. In subthemes it was highlighted that pregnant women are well informed and interested in risk reduction for their child’s best and that they try to do their best to improve their diet during pregnancy. However, their diet did not reach levels of healthy eating recommendations and became even unhealthier after pregnancy. It was also highlighted that midwives experienced insufficient knowledge in dietary issues and related risks and that they had difficulties to give dietary support to pregnant women. Midwives were found to mainly focus on giving information and they lacked sufficient competence for challenging counseling.

Conclusion Pregnant women, on the one hand, experience a lack of support from the midwives when dealing with dietary changes. The midwives, on the other hand, feel exposed and express a need for both further education in dietary issues and training in counseling. Women’s food habits during, but in

particular after pregnancy need improvement, and dietary counseling could be more focused on healthy eating in a long-term perspective.

Key words Pregnancy, food habits, dietary counseling, counseling strategies, woman-centred care, antenatal care, qualitative methods, longitudinal studies, food frequency questionnaire.

Abbreviations

ANC Antenatal Care

ICM International Confederation of Midwives

FFQ Food Frequency Questionnaire

GDM Gestational Diabetes Mellitus

NBHW National Board of Health and Welfare

NFA National Food Agency

PHC Primary Health Care

VIP-FFQ The Västerbotten Intervention Program for health survey - Food Frequency Questionnaire

WHO World Health Organization

Definitions used in the thesis

Antenatal care: Refers to health care during pregnancy provided by primary healthcare centres. Antenatal is synonymous with prenatal.

Health promotion: Refers to the process of enabling people to increase control over and improve their health, defined by the Ottawa-declaration (1986).

Health education: According to the WHO definition (WHO, 2015), the learning experiences designed to help individuals and communities to improve health by increasing knowledge or influencing attitudes.

Counseling: According to the WHO definition (WHO, 2013 p. 4), counseling for maternal and newborn health is 'an interactive process between the skilled attendant/health worker and the woman and her family, during which information is exchanged and support is provided so that the woman and her family can make decisions, design a plan and take action to improve their health'. In this thesis I define counseling in antenatal care as an interactive process to identify problems and encourage the woman, and also her partner if agreed upon, to find a solution on these problems.

Health literacy: It refers to the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (WHO, 2009).

Empowerment: In a midwifery context and according to Hermansson & Mårtensson (2011) empowerment relates to a process of developing a trustful relationship. Empowerment initiates with reflection on changing situation. Furthermore,

empowerment is based on the woman's situation and is expressed in her (and her partner's) own terms, and thereby she gets involved and becomes able to make informed choices and confirms her own personal significance in becoming a parent. Empowerment leads to enhanced self-esteem and to an increased ability to set and attain goals; thereby promoting control over their life and the change process, and ultimately a sence of hope for the future.

Woman-centred care: The concept is quite the same as person-centred care. It refers to how health personnel initiate a relation with the woman, as to identify how she views her situation and condition. According to the NICE-declaration (2008), it means that women should always be treated with kindness, respect and dignity. Her views, beliefs and values about her care and that of her baby should be sought and always respected. Furthermore, the woman should have the opportunity to make informed decisions about the care and treatment in partnership with the healthcare professionals. Working in partnership with the woman means sharing information, shared thoughts and taking part in decision making. Lastly, woman-centred care implies to safeguard the partnership through documentation of the woman's preferences, beliefs and values.

Original Papers

The thesis is based on the following papers.

I. **Wennberg AL**, Lundqvist A, Högberg U, Sandström H, Hamberg K. Women's experiences of dietary advice and dietary changes during pregnancy. *Midwifery* 2013; 29(9): 1027–1034.

II. **Wennberg AL**, Hamberg K, Hörnsten Å. Midwives' strategies in challenging dietary and weight counselling situations. *Sexual and Reproductive Healthcare* 2014; 5: 107–112.

III. **Wennberg AL**, Hörnsten Å, Hamberg K. A questioned authority meets well-informed pregnant women – a qualitative study examining how midwives' perceive their role in dietary counselling. *BMC Pregnancy and Childbirth* 2015; 15:88. doi:10.1186/s12884-015-0523-2.

IV. **Wennberg AL**, Isaksson U, Sandström H, Lundqvist A, Hörnell A, Hamberg K. Swedish women's food habits during pregnancy up to six months post-partum – a longitudinal study. *Submitted.*

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Sammanfattning på svenska

Gravida kvinnor och barnmorskor möts inte i kostrådgivning – studier inom svensk mödrahälsovård

Bakgrund: En hälsosam kost under graviditet är gynnsam både för den gravida kvinnan och fostret och kan även leda till hälsosammare kostvanor för kvinnan och hennes familj längre fram. I svenska kostråd poängteras att den gravida kvinnan förutom att ha en hälsosam kost också bör undvika gifter, föroreningar, alkohol och andra ohälsosamma näringsämnen. Dessutom bör hon sträva efter en balanserad viktuppgång under graviditeten. Svenska kostråd under graviditet utgår från Nordiska Näringsrekommendationer (NNR, 2012) men eftersom såväl kostvanor, samt fokus i kostråd och betoning av risker varierar mellan länder kan kostråden upplevas tvetydiga. Barnmorskor inom mödrahälsovården är viktiga aktörer för att stödja kvinnan att uppnå hälsosamma kostvanor och därigenom inte bara minska risken för graviditetskomplikationer utan också förbättra hälsan på längre sikt. Kostrådgivning är ett komplext fenomen där barnmorskan tycks kämpa med att försöka stödja kvinnan att förbättra sin kost och den gravida kvinnan kämpar med att ändra kosten. Gravida kvinnors upplevelser av kostrådgivning och svenska barnmorskors kostrådgivning till gravida kvinnor är dock endast studerat i begränsad omfattning.

Det övergripande syftet med avhandlingen var att beskriva kost och kostförändringar under graviditet utifrån gravida kvinnors

och barnmorskors perspektiv med ett särskilt fokus på kostrådgivning. Avhandlingen omfattar fyra studier. De specifika syftena för respektive studie var följande: Studie I) Beskriva gravida kvinnors attityder till och upplevelse av kostinformation och råd samt hantering av kosten under graviditet. Studie II) Utforska barnmorskors strategier i utmanande kostrådgivningssituationer. Studie III) Beskriva hur barnmorskor uppfattar sin roll och betydelse i kostrådgivning till gravida kvinnor. Studie IV) Beskriva kvinnors matvanor under graviditet och upp till sex månader efter förlossning.

Metod: Studie I-III hade en kvalitativ ansats. Datainsamlingen i studie I bestod av fokusgruppsintervjuer med 23 gravida kvinnor som väntade sitt första barn och som var inskrivna vid fem mödrahälsovårdscentraler i Västerbotten. I studie II genomfördes telefonintervjuer med 17 barnmorskor verksamma inom svensk mödrahälsovård inom åtta olika landsting från norr till söder. Barnmorskorna var strategiskt utvalda med hjälp av samordningsbarnmorskor, lokala chefer och med hjälp av s k snöbolls-urval för att få en bred representation. I studie III bestod data av de 17 intervjuer som analyserades i studie II men kompletterades med individuella intervjuer av fyra barnmorskor från Västerbotten. Data analyserades med kvalitativ innehållsanalys i dessa tre studier.

Studie IV utgjordes av en longitudinell kvantitativ studie av enkätdata. Deltagarna rekryterades konsekutivt från fem hälsocentraler och utgjordes av gravida friska svensktalande kvinnor utan riskfaktorer. En validerad enkät, Västerbottens hälsoundersökningar (VHU), delades ut till kvinnorna vid fem tillfällen, tre gånger under graviditet (vecka 12-14, vecka 24-26 och vecka 34-36) och två gånger efter förlossning (vid efterkontroll och sex månader efter förlossning). De kvinnor (n=163) som besvarat enkäten minst fyra av fem gånger ingick i studien. Enkäternas kostdata analyserades med beskrivande och jämförande statistik.

Resultat: Det övergripande resultatet i avhandlingen är sammanställt i ett huvudtema; 'Gravida kvinnor och barnmorskor verkar inte mötas i kostrådgivning', med två teman; 'Gravida kvinnor bekymrar sig över risker för sitt barn men lyckas inte ändra till hälsosammare matvanor' och 'Barnmorskor ser sig som auktoriteter, om än ifrågasatta' med vardera tre underteman (tabell 1).

Tabell 1. Resultat presenterat som huvudtema (fet stil), teman och underteman (kursivt).

Huvudtema	**Gravida kvinnor och barnmorskor verkar inte mötas i kostrådgivning**	
Teman	Gravida kvinnor oroar sig över risker för sitt barn men lyckas inte ändra till hälsosammare matvanor	Barnmorskor ser sig som auktoriteter, om än ifrågasatta
Underteman	*Gravida kvinnor är välinformerade och villiga att undvika risker för sitt barns bästa*	*Barnmorskor har otillräckliga kunskaper om kostfrågor och framför allt om risk*
	Gravida kvinnor gör sitt bästa för att förbättra kosten under graviditet	*Barnmorskor har svårigheter att stödja gravida kvinnor att förändra sin kost*
	Gravida kvinnors kost når inte upp till rekommendationer om hälsosam kost och blir ännu sämre efter förlossningen	*Barnmorskor är mest fokuserade på att ge information och saknar kompetens för utmanande rådgivning*

Gravida kvinnor och barnmorskor verkar inte mötas i kostrådgivning

Huvudtemat beskriver hur perspektiv och positioner skiljer sig mellan barnmorskor och gravida kvinnor. Barnmorskorna är främst fokuserade på att förmedla Livsmedelsverkets kostrekommendationer medan gravida kvinnor är mer bekymrade över hur de ska tolka och tillämpa råden i vardagen.

I temat, *Gravida kvinnor oroar sig över risker för sitt barn men lyckas inte ändra till hälsosammare matvanor,* berättar gravida kvinnor hur de idogt strävar med att ta del av och följa alla rekommendationer. De läser i tidningar och broschyrer men framför allt söker de information på internet. De frågar och diskuterar med vänner som är eller som nyligen har varit gravida men även med sina egna mödrar (Studie I). Även barnmorskorna beskriver gravida kvinnor som ivriga informationssökare som scannar av internet (Studie III). Kvinnorna berättar att de känner oro och skuld att skada det ofödda barnet om de råkar äta något ohälsosamt eller ’förbjudet’ på grund av att de inte fått rätt information. Å andra sidan, beskriver de hur allt för mycket information kan leda till att de blir ’hyper-oroliga’ (Studie I). Barnmorskorna beskriver gravida kvinnor som känslomässigt styrda och som ibland kan sakna rationellt tänkande. Gravida kvinnors oro kan enligt barnmorskorna även leda till såväl överdrivet risktänkande som till ett obekymrat eller försummande beteende (Studie III). De gravida kvinnorna känner sig stressade och pressade på grund av krav att både välja och äta hälsosam mat. De upplever sig som lovliga byten för omgivningen, både vänner och bekanta men även hälsovården, att övervakas, ifrågasättas och kommenteras. De gravida kvinnorna har svårt att följa alla rekommendationer. Deras strategi blir därför att ’vara följsamma men med en nypa salt’ (Studie I). I kostenkätundersökningen (Studie IV) visade det sig att kvinnornas konsumtion av frukt och grönt var högre under graviditeten jämfört med efter förlossningen ($p=<0.001$) men

ändå lägre än kostrekommendationerna. Alkoholkonsumtionen under graviditet var låg och minskade signifikant efter första mättillfället. Majoriteten av kvinnorna åt en varierad kost och de flesta (93-97%) åt tre måltider (frukost, lunch och middag). Merparten av kvinnorna i studie I beskriver att de av och till hade gjort avsteg från kostråden. Detta ses som acceptabelt om avstegen inte skedde för ofta eller var för stora. Familjefester och speciella helger som julhelgen nämns som exempel på sådana tillfällen (Studie I). Det är uppenbart att de gravida kvinnorna är välinformerade och intresserade att undvika risker för barnets bästa och att de verkligen försöker äta hälsosammare under graviditeten (Studie I). Trots detta nådde inte de gravida kvinnornas kost upp till de nationella kostråden avseende hälsosam kost och matvanorna försämrades ytterligare efter förlossningen (Studie IV). Fisk- och skaldjurskonsumtionen var låg vid alla mättillfällen. Intaget av så kallad utrymmes-mat som snacks, bullar, kakor, glass, sylt, läsk, godis, ökade signifikant från första mättillfället till det tredje tillfället och båda tillfällena efter förlossningen ($p=<0.001$). Nästan två tredjedelar av de gravida kvinnorna rapporterade ett lägre intag av mjölkprodukter än det rekommenderade intaget av två gånger per dag. Kaffeintaget var lågt under graviditeten men ökade signifikant efter förlossningen.

Det andra temat: *Barnmorskor ser sig som auktoriteter, om än ifrågasatta,* har tolkats som att barnmorskor känner att de blir lyssnade på och uppskattade. Gravida kvinnor är enligt barnmorskorna oftast tacksamma för att få information men

barnmorskorna är samtidigt osäkra på om informationen alltid efterföljdes (Studie II-III). Det visade sig också att barnmorskorna i många fall upplever sig ha otillräckliga kunskaper i kostfrågor och framför allt om risker relaterat till kostvanor (Studie II-III). De uppger sig även sakna tid att söka information, till exempel på internet, vilket leder till svårigheter att besvara kvinnornas alla frågor och möta deras funderingar, men barnmorskorna anser sig ändå ge ’den korrekta informationen’. När kunskaperna inte räcker till för att besvara alla frågor hänvisar barnmorskorna de gravida kvinnorna till Livsmedelsverkets hemsida eller till officiella hemsidor från hälsovården. (Studie I-II). Kvinnorna uttrycker att de är tvungna att söka information på egen hand. De uppger sig för att följa kostråd i dagligt liv använda sig av sunt förnuft eller följa kroppsliga signaler (Studie I) medan barnmorskorna beskriver att de gravida kvinnorna behöver handgripliga råd för att kunna tolka all information, vilket de inte alltid kunde ge (Studie III). Vanligtvis har barnmorskornas kostråd fokus på livsmedel som gravida kvinnor bör undvika samt fokus på ohälsosamma matvanor generellt (Studie II). Kostrådgivning till exempelvis kvinnor med fetma eller ätstörningar, invandrarkvinnor, veganer eller kvinnor med låg socioekonomisk status beskrivs som särskilt utmanande (Studie II). I denna typ av rådgivning används fem olika strategier; ’bli bekanta’ vilket innefattar att knyta an till kvinnan och erbjuda hjälp och stöd, anpassa sig till henne och försiktigt nalka sig problemet som av barnmorskorna beskrivs som ’gå på ett minfält’. Den andra strategin ’försöka

stödja och motivera' innefattar att aktivt lyssna, försöka underlätta för reflektioner om vanor, och stödja att sätta upp mål. Den tredje strategin, 'övertyga att välja rätt' innehöll både att ge generell information om risker, och att både klargöra och upprepa budskapet om och om igen. Den fjärde strategin 'kontrollera och bemästra', där konfronterar barnmorskan kvinnan med sin dåliga livsstil. Barnmorskan försöker liera sig med partnern, skrämma kvinnan med medicinska risker och komplikationer inför förlossningen och för barnet samt även moralisera över hennes skyldigheter och förpliktelser för att uppnå 'det goda moderskapet'. Den femte strategin 'lämna ifrån sig ansvaret' används när varken kommunikation eller relation mellan barnmorska och den gravida kvinnan fungerar och när kvinnan anses vara helt ointresserad eller ovillig att följa råden. Strategin innefattar att antingen remittera kvinnan till andra professioner som dietist, läkare eller psykolog eller att lämna över ansvaret till kvinnan själv och därmed distansera sig från henne, vilket rubricerades som att 'ge upp och lämna över' (Studie II).

Slutsatser Trots att kvinnorna försökte äta hälsosamt nådde kosten under graviditet inte upp till de nationella kostrekommendationerna. Efter förlossningen försämrades kvinnornas kost ytterligare. Gravida kvinnor, å ena sidan, upplevde bristande stöd från barnmorskorna beträffande att hantera kostråd och kostförändringar. Barnmorskor, å andra sidan, kände sig ensamma men bevakade och uttryckte behov av ytterligare utbildning i kostfrågor samt träning i utmanande

rådgivning. Barnmorskorna använde i många situationer strategier som inte hör hemma i en modern vårdkontext som innefattar kvinnocentrerad vård. Exempel på sådana strategier är övertalning, kontroll och moraliserande kring ”den goda modern” (Studie III). Barnmorskor lyckades heller inte nå alla kvinnor. De socioekonomiskt utsatta kvinnorna med ohälsosamma matvanor och som verkligen behöver rådgivning riskerar att bli lämnade åt sitt eget öde. För att kunna nå och hjälpa gravida kvinnor att förbättra sina kostvanor behövs ett team av hälsovårdspersonal med olika utbildning som samarbetar för optimerad rådgivning och kvinnocentrerat stöd. Ibland kan rådgivningen vara handgriplig som om var man hittar bra livsmedel och hur man lagar hälsosam mat. Barnmorskor bör få yrkesmässig handledning och stöd för att kunna bedriva kvinnocentrerad vård och ge stöd till kvinnor kring hantering av kost under och efter graviditet, som bygger på autonomi och empowerment. En förändrad organisation, med ökat teamarbete och med en ledning av mödrahälsovården som understödjer kvinnocentrerad vård kan sannolikt understödja detta. Sist men inte minst, för att förbättra kvinnors kost, bör kostrådgivning fokusera mer på hälsosamma matvanor i ett längre livsperspektiv och inte begränsas enbart till graviditeten.

Preface

I have always appreciated good food. My mother, who was a housewife, was committed to providing healthy food for the family. The guiding principle she used during my entire childhood was 'eat what you are served and you will be strong and healthy' which I have usually followed. In my training to become a nurse I was fascinated of the impact of nutrition on patients' health. During my midwifery education, nutrition was hardly mentioned with the exemption for recommendations to avoid drinking alcohol.

My long and winding career as a midwife started in a small (about 300 births/year) midwifery led unit in northern Sweden where I became a more independent midwife. Thereafter I have attended births both in a high-tech delivery ward at a university hospital and in home-birth settings. I have experienced both controlled technological deliveries where risk was in focus and health care personnel were more or less in control; and in natural homebirth environment where my role as midwife was to support and assist the woman and her partner without unnecessary interruptions. During this period I became pregnant myself on three occasions, and gave birth to four lovely children in different delivery wards, both in midwifery-led units and a high-tech ward as my last pregnancy turned out to be a twin-pregnancy.

During my studies in nursing in the 1970th I became engaged in health promotion and health education. Therefore it was a

natural progress for me to work in antenatal care. I have met different women and their partners, before, during and after their pregnancies. I soon understood that the guiding principle 'eat what you are served and become strong and healthy' was not a general rule to work with in antenatal care. The alarming-reports about dietary issues gave rise to busy phone hours with questions I was unable to answer and worries I could not ease. The dietary recommendations changed in the early nineties to focus on risks and foods to avoid during pregnancy. How and what to eat became complex issue and of great concerns for many women. I was confronted with pregnant women's worries and confusion about dietary recommendations and despite my engagement and knowledge in food and nutrition I too became confused and uncertain about the various and changing recommendations. Increasingly, I realized that giving dietary advice seemed to be much more complicated than just handing out a brochure or telling a "truth".

Background

Becoming and being pregnant

According to the Swedish Pregnancy register (2013) 100 575 pregnant women were registered at antenatal care clinics and in 2013 a total of 112 952 children were born in Sweden. The mean age of the pregnant women were 30.7 years and majority (79%) of the women were born in Sweden or in the Nordic countries while 21% were born in countries outside these (Swedish pregnancy register, 2013).

Becoming and being pregnant has in literature been described as a life-opening event, both in terms of life affirming and suffering. A Swedish study reports that being in early pregnancy means living in the presence and thinking ahead (Modh et al. 2011). The women in that study viewed life in a wider perspective. They became more aware of their own life and that they were giving new life. In this, the report showed that there were also feelings of being lonely and lost. The women had to make many decisions, cope with constant changes in becoming a mother and prepare for delivery. A Greek study reports that pregnant women, who prefer caesarean section, view this as safe, organized and controlled, while women who prefer a vaginal delivery view this as not interfering with nature. Views of deliveries are influenced and closely related to the interaction with health care professionals. Psychological support, education and preparation are therefore factors that contribute to women's experiences of

health and for improved maternal services (Sapountzi-Krepia et al. 2011). A Swedish longitudinal study reported that a higher proportion of women would prefer caesarean section if asked one year after birth than during pregnancy, and this change in attitude can be related to a negative birth experience (Karlström et al. 2011).

Reproductive health is an important and desirable goal for antenatal care. All pregnant women though, do not feel healthy nor experience wellbeing during pregnancy. Obesity is common and during 2013, 38% of Swedish pregnant women entering antenatal care were overweight (BMI 25.0 – 29.9) or were obese and thereby at risk for complications and suffering (Swedish Pregnancy Register, 2013). Being pregnant and obese has been described as living with a constant awareness of the body and a constant exposure of close observations and scrutiny of others, causing negative emotions and discomfort (Nyman et al., 2010). Many obese women have previous negative experiences from health care to overcome (Mills et al., 2011) and have also experienced lacking continuity of caregives in antenatal care (Hildingsson & Thomas, 2012).

Most pregnant women and their partners in Western societies get pregnancy-related information from antenatal care services and other sources, such as information on the Internet (Huberty et al., 2013, Lagan et al., 2010). Pregnant women frequently use online discussion forums for communicating and getting support from other pregnant women (Bert et al. 2013). In Sweden, a

majority of pregnant women, 84%, search on the Internet to get pregnancy related information including dietary information (Larsson, 2009).

Pregnant women are reported more likely to change life-style (Bert et al. 2013). As an example, a Dutch comparative study reported that women in both early and late pregnancy had significantly higher nutrition awareness than non-pregnant women (Szwajcer et al., 2011). Despite this, pregnant women struggle to follow dietary recommendations, having on the one hand the best possible outcome of their child in focus, on the other hand simultaneously living a normal social life (Szwajcer et al., 2005). In a Canadian study of women with gestational diabetes mellitus (GDM), more than half of the women had problems with adaptation to the dietary recommendations. In order to cope with problems such as hunger, cravings or personal food preferences, they used family members, friends and Internet as consultants instead of health professionals (Hui et al., 2014). Another Swedish interview study among parents 18 months after delivery reported that both women and men tried to undertake lifestyle changes during pregnancy in order to secure the health of the foetus but the health promotion did not influence their habits after delivery (Edvardsson et al., 2011).

Antenatal care in Sweden

Antenatal care in Sweden is provided free of charge and is financed by the government. The care is provided by midwives

working in different settings, most commonly in primary health care centres in the public and private sectors, as well as at hospitals.

Antenatal care is initiated in early pregnancy where the woman and her partner are invited to participate in health counseling. A psychosocial profile and the occurence of domestic abuse are recorded. Dietary habits, physical activity and use of alcohol or nicotine should be covered and recorded. Antenatal care includes 8-10 visits during pregnancy and embraces support and counseling on psychosocial and lifestyle issues that include dietary advice. The visits also include physical examinations with measurements and registrations of uterine growth, screening to detect maternal and fetal complications, measurements of weight, blood pressure and laboratory tests. Antenatal care is completed with a post-partum check-up, 8-10 weeks after delivery, where experiences of the pregnancy and delivery are reflected on. Laboratory and physical examinations, such as weight registration, blood pressure and hemoglobin, vaginal examination are performed. Lastly, current lifestyle, health status, sexual life issues and anticonceptives are discussed with the woman (SFOG, 2008).

Becoming and working as a midwife in antenatal care

Midwives' education in Sweden leads to a postgraduate diploma in Midwifery Science and covers 90 higher credits education (ECTs credits), following a bachelor in Nursing of 180 credits. The Midwifery education is offered at twelve Swedish institutions of higher education. The Midwife curriculum follows the recommendations from the International Confederation of Midwives (ICM, 2011). Within the framework of the curriculum, Swedish midwife students are trained to assist women during pregnancy and labor and act upon complications. Furthermore the curriculum emphasizes the importance of women's sexual and reproductive health as well as their general health. The midwife students are furthermore educated and trained to counsel and prescribe contraceptives (National Board of Health and Welfare (NBHW), 2006).

In 2011, there were 7 964 practising midwives in Sweden (NBHW 2012). They work either at health care centres, at specialist prenatal clinics or at hospitals. In Sweden, midwives are independently responsible for the care of women in non-complicated pregnancies and deliveries. They are therefore in a favorable position to offer guidance and advice in lifestyle issues.

Midwifery is an old profession that has been highly respected for centuries. Midwives are viewed as trustworthy health professionals and many pregnant women value the midwife for their crucial support at deliveries and as an important and

reliable source of information (Nicols & Webb, 2006). A Swedish national survey in antenatal care reported that pregnant women (n=827) experienced their midwives as being competent in physical and medical care (Hildingsson & Thomas, 2007). The midwife was seen as a trustworthy partner, being competent in addressing psychological and emotional needs in a supportive, friendly, respectful and nonjudgmental way.

Although communication and counseling skills among midwives are very important to offer women-centred care (cf. Halldorsdottir & Karlsdottir, 2011), women-centred care in antenatal care is sparsely studied (Olander et al., 2015). In a study from the UK, midwives emphasized their importance in health promotion, but in practice they were only providing information with an emphasis on handing out brochures (Lee et al., 2012, Brown et al., 2013). In another British study, midwives described pregnancy as an ideal time for interventions to improve the health among pregnant women and particularly among minority ethnic women; however the midwives required support and better collaboration with other healthcare professionals and agencies, since the antenatal period is not an isolated event (Aquino et al., 2014).

Improving health and reducing risks

In Sweden, the National Food Agency (NFA) has published guidelines for dietary advice during pregnancy. The guidelines are based on general Nordic Nutrition Recommendations (NNR)

for a healthy population, where the emphazis is placed on dietary patterns. The diet on the whole, including various food groups and nutrients is combined with sufficient physical activity that is optimal for the human body and important for reducing risks for certain diet-associated diseases (NNR, 2012).

The importance of balanced weight gain

It is difficult to define limits for excessive weight gain in pregnancy, since it is individual and differ based upon pre-pregnancy weight. In normal prepregnancy weight (BMI 18,5–24,9) weight gain of 11,5–16 kg is advised, in prepregnancy overweight (BMI 25.0–29.9) 7–11.5 kg is sufficient and in obesity (BMI>30) a weight gain of 5–9 kg is advised (IOM recommendations, 2009). Physical exercise is correlated with decreased weight gain and is beneficial for women and safe for the foetus and therefore recommended during pregnancy (Nascimento et al., 2012, Thangaratinam et al., 2012).

A healthy diet during pregnancy reduces medical risks described below. It also reduces risks for obesity among pregnant women during pregnancy and in the future. A healthy diet also reduces risks for children during pregnancy, delivery and for future (McMillen et al., 2008, Olsen 2008, Kelly et al., 2013). A review reports that both under- and over-nutrition of women during pregnancy is associated with the children's increased risk of developing diabetes type II in adulthood (Nielsen et al., 2014).

Particularly, obese women and their foetus are at risk for diverse complications in pregnancy and delivery. Excessive weight-gain during pregnancy increases the risks for maternal and perinatal complications such as preeclampsia, gestational hypertension, GDM and large-for-date birth (Villamar & Cnattingius 2006; Federick et al., 2006, Hedderson et al., 2008). A systematic review of reviews showed that risk of developing GDM was four times higher among obese women and nine times higher among women with severe obesity compared with normal weight women. The prevalence of caesarean section was also increased (OR 2.1–2.36) (Marchi et al., 2015). In fetal macrosomia related to obesity, shoulder dystocia is more frequent in vaginal births (Ovesen et al., 2011). Furthermore, postpartum heamorraghia is slightly increased (OR 1.23) among obese women (Blomberg, 2013). Chu et al., (2007) reported in a meta-analysis of nine studies that the risk for stillbirth was d0ubled for overweight and obesity women compared with normal weight women. Independent of the prepregnancy weight an overall maternal weight gain of more than three BMI units has been reported as correlated with increased risk for stillbirth (Villamar & Cnattingius, 2006).

Nutritional balanced and healthy diet

According to NNR (2012) food patterns rich in vegetables, including dark green leaves, fresh peas and beans, cabbage, onion, root vegetables, fruiting vegetables (e.g. tomatoes, peppers, avocados, and olives), pulses, fruits and berries, nuts and seeds, whole grains are recommended. Fish and seafood are

recommended as main-course two or three times a week but fat fish such as fat herring, salmon or mackerel should be restricted to only one of the occasions. Chicken, meat and eggs are recommended but cured meat should be chosen with caution. Vegetable oils and vegetable oil-based fat spreads (derived from, for example, rapeseed, flaxseed or olives) are recommended as well as low-fat dairy products.

Plant food-dominated dietary patterns, such as Mediterranean-like diets, provide high amounts of micronutrients (essential minerals and vitamins), and the types of fats (including essential fatty acids) and carbohydrates in these diets are generally favourable to good health (NNR, 2012). A varied diet in pregnancy is generally recommended to include at least 500 g fruits and vegetable per day. The daily intake of dairy products such as milk or yoghurt is advised to be at least two glasses (Five decilitres equal to 500 mg). Water is recommended as thirst quencher and table drink. The intake of sweets and pastry is advised to be reduced (NNR, 2012).

Dietary supplements

In the northern countries, the following recommendations of daily intake of vitamins and micronutrients are pronounced: Folic acid 400 mcg, Vitamin D 10 mcg, Iron 18 mg and Calcium 900 mg (Cox et al., 2009, NNR, 2012).

Folic acid is a water-soluble B vitamin that occurs naturally in leafy green vegetables like spinach and in citrus fruits, dried beans and peas. In reality it is difficult to reach the needs for folic acid only by food intake, therefore women are recommended to start folic acid supplements three months prior to pregnancy and continue during the first trimester of pregnancy. Obese or overweight women have a higher risk for folate deficiency (Jensen et al., 2012, van der Meer et al., 2006). There is scientific support that low intakes of folic acid is related to an increased risk for an unfavorable pregnancy outcome like neural tube defects (NTD), repeated stillbirth, preterm birth and impediment in growth and mental development (Peña-Rosas & Viteri, 2009, Wolff et al., 2009). Sufficient intake (400 microgram a day) of folic acid is important for the closure of the neural tube in the fetus, which takes place between the second and third week of pregnancy as well as reducing the risk of small-for-date-gestational age (Hodgetts et al., 2014, Talaulikar et al., 2011).

Vitamin D is another important substance and where the main source is exposure to sunlight. Other sources of vitamin D are fat fish such as salmon and mackerel, cod liver oil, shitake mushrooms, egg yolk and D-vitamin fortified food (Holick,

2007). Vitamin D supplements and omega-3 fatty acids are recommended for certain cases like darkly pigmented or veiled women and persons living at high latitude locations (Andersen et al., 2012, Datta et al., 2002, van der Meer et al., 2006). Pregnant teenagers, vegans, smokers, multiparous women and non-western immigrants risk vitamin D deficiency (Jensen et al., 2012, van der Meer et al., 2006). Inadequate vitamin D levels may influence fertility. Vitamin D-deficiency may also be involved in preeclampsia since the highest incidence in the northern hemisphere is in the dark wintertime (Mulligan et al., 2010). Low levels of vitamin D may be a risk factor for gestational diabetes mellitus during pregnancy (Lewis et al., 2010).

Inadequate intake of iron but also folic acid and vitamin D has been reported among pregnant women in Western countries (Rodriguez-Bernal et al., 2011, Haggarty et al., 2009). Iron deficiency and anemia are common disorders among women in reproductive age and in pregnancy worldwide. Anemia can affect the brain development of the foetus and lead to low birth weight and risk for preterm birth (Kalaivani, 2009) and is also a risk factor for postpartum hemorrhage (Jaleel & Khan, 2010).

Avoidance of toxins, contaminants, alcohol and caffeine

Avoidance of toxins such as mercury, dioxin and PCB (Cox et al., 2009), contaminants e.g. listeria, toxoplasma (Cox et al., 2009), and alcohol is recommended in pregnancy (National Food

Agency, 2008). Pregnant and lactating women are recommended to avoid freshwater fish such as pike, perch, zander, burbot, eel and also saltwater fish as halibut in order to reduce exposure for mercury, dioxin and PCB since these species may content higher levels. Women in childbearing age and children are recommended to reduce the intake of fat fish from the Baltic Sea to only once or twice a year (NFA, 2008).

Prenatal exposure of mercury (Hg) is suggested to affect the neurological status such as reflex movements, tension and fine motor ability. Furthermore, decrease in brain auditory and visual evoked potential is suggested to be connected to mercury exposure (Steuerwald et al., 2000, Murata et al., 2004, Ronchetti, 2006). From studies on rats (Vorderstrasse et al. 2004) we know that dioxin and PCB are known to disrupt endocrine activities, where alterations in levels or actions of thyroid hormones, prolactin, oestrogen and epidermal growth factor have been described. PCB exposure is suggested to affect lactation and breast tissue development in humans.

Listeria infections are mainly associated with consumption of unpasteurized dairy products and processed so-called ready-to-eat (RTE) products (NFA, 2008). Pregnant women are estimated to have a 14 times higher risk for listeriosis than the normal population. In Sweden, during the years 2013 and 2014 the total number of cases of Listeriosis was reported to be 93 and 125 respectively. This is an increase, which was related to one specific outburst where listeria was found in a processed meat

product and caused 47 cases. In the years 2005–2012 cases of Listeriosis reached a mean of 58 cases (40–73) per year. Of the 125 cases in 2014, 52.8 % were women of which 7.2 % were between 20 an 39 years. None of the cases were pregnant or new born in 2013. Statistics is still lacking on pregnant or newborn listeria infected cases in 2014 (Public Health Agency of Sweden (PHAS), 2014). Listeriosis in pregnancy causes miscarriages or stillbirth and two-third of the infected newborn children develop clinical listeriosis, which leads to pneumonia, sepsis or meningitis.

Toxoplasmosis is closely related to an exposure of cats, which are the primary hosts, but mammals and birds, which are intermediate hosts for the parasite toxoplasma gondii. Toxoplasmosis is more common in southern Europe than in the Nordic countries and has decreased the last years. Unwashed vegetables, infected meat and cat litter are common transmitters. The parasite is transmitted through the placenta and the toxoplasma can be a potential risk for miscarriage, fetal damage or neonatal death, as well as blindness later in life (Ville & Leruez-Ville, 2014).

Alcohol exposure during pregnancy has been reported associated with major neurological and developmental birth defects (Swedish National Institute of Public Health, 2009). However, there are various estimations of risks related to so-called normal consumption of alcohol during pregnancy (Strandberg-Larsen et al., 2008). In Sweden, a total alcohol restriction is recommended,

but questioned by some researchers (Henderson et al., 2007, Kelly et al., 2013, Kesmodel et al., 2012).

High consumption of *caffeine* is suggested to increase the risk for miscarriage and low birth weight (Greenwood et al., 2014) and therefore a restricted intake of not more than 300 mg per day equal to three cups (1,5 deciliter) is recommended during pregnancy (NFA, 2008).

When getting deeper into international sources of pregnancy related dietary information, the recommendations are found to be inconsistent and vary between countries. In particular, the recommendations on fish, alcohol and soft cheese consumption differ. The guidelines differ even among the Nordic countries and Swedish dietary guidelines are generally more restrictive than other countries. In southern Europe, the guidelines focus immensely on the handling and preparation of food items, while for example the recommendation for alcohol intake is less restrictive (Oliver et al., 2014).

Dietary counseling – diverse effects on eating habits

Counseling originates from psychotherapy but has during the years got a broader meaning in different areas of health care as a process of listening to someone and giving support. Counseling and psychotherapy can sometimes be considered to be interchangeable since they overlap in a number of ways. By

looking at the key differences between councelling and psychotheraphy Martin (2015) defines councelling simultaneously. Firstly, counseling helps people to identify problems and encourages them to take positive steps to resolve them; psychotherapy helps people with psychological problems that have built up over a longer period of time. Secondly, counseling is a treatment for anyone who already has an understanding of wellbeing, and who is able to resolve problems; psychotherapy helps people to understand their feelings, thoughts and actions more clearly. Lastly, counseling is a short-term process that encourages a change in behavior; while psychotherapy is a longer-term process that includes identification of emotional issues and the background of problems and difficulties (Martin, 2015).

Counseling for maternal and newborn health is definied by WHO as 'an interactive process between the skilled attendant/health worker and the woman and her family, in which information is exchanged and support is provided so that the woman and her family can make decisions, design a plan and take action to improve their health' (WHO, 2013 p. 4). In this thesis I define counseling in antenatal care as an interactive process, which identifies problems and encourage the woman, and her partner if agreed upon to find the solution on said problems.

Consequently, I argue that food habits are often hard to change and dietary advice is difficult to transfer. Nevertheless, life style and dietary interventions may improve outcomes among women

and their children. A meta-analysis including 44 trials (n=7278 women) stated that dietary and lifestyle interventions in pregnancy reduced excessive maternal gestational weight gain and improved outcomes for both the mother and the baby. Among the interventions, those based on diet were the most effective (Thangaratinam et al., 2012). A current review has showed positive effects of dietary interventions during pregnancy in reducing low birthweight among populations with inadequate dietary habits (Gresham et al., 2014).

On the other hand, an American study among low-income women with an insufficient intake of calcium and iron reported that they did not change their habits during pregnancy despite information (Fowles & Gabrielson, 2005, Fowles & Murphey, 2009). In an English study, eating patterns changed only a little after information to women in early pregnancy and these changes mostly concerned a few food items that pregnant women should avoid such as liver and kidneys (Crozier et al., 2009). Nevertheless, the 'Healthy start' study in England, reported a significant increased intake of fruits, vegetables and milk, however only when information was complemented with food vouchers provided to low-income pregnant women. Consequently their families' diet became improved (Ford et al., 2009, McFadden et al., 2014). Similar findings were shown in a review of randomized controlled trials (RCT) that evaluated the effect of nutrition education in pregnancy on maternal and neonatal health reporting that nutrition education and counseling reduced the risk of maternal anemia, increased birth

weight and lowered the risks of preterm birth (Girard & Olude, 2012).

Dietary counseling – a challenging work task

From my point of view, eating and food habits are something more than filling up our bodies with sufficient nutrients. Food habits are culturally rooted and therefore we hold on to and guard our food patterns with, for example including traditional dishes, as 'mother's meatballs', regardless recommendations. Gathering around the dining table can in my eyes be seen as something like communion. A square meal facilitates interaction and communication between friends and family. In today's society food and eating have become existential and emotional issues. Discussions about what is or is not healthy diet often tend to lead to upsetting and emotional disputations. In our western society food is offered almost everywhere. Fast food is easy accessed and tempting even if we are not really hungry. Counseling in dietary habits that do not consider the multiple dimensions of culture and its context and complexity in decision making about food and eating may have limited effectiveness. The knowledge of the benefits of healthy eating alone is probably insufficient to motivate dietary change. Factors such as culture and social norms, taste preferences, attitudes and beliefs, availability and accessibility and socioeconomic resources influence peoples' food choices. In dietary counseling these factors have to be targeted in order to achieve behavior change in the long run. The inability to provide individualized dietary

advice and self-management training is reported as one of the most prominent barrier for dietary change (Kapur et al., 2008).

Weight counseling for pregnant women is seen as important among midwives, but training in counseling is either lacking or insufficient. A study from UK reported about how midwives viewed weight management advice for obese women. The study stated that the task was important to a majority, but confidence in counseling and knowledge about management of obese women was low (Macleod et al., 2013). Another study from the UK reported that health professionals, including midwives, were aware of pregnant women's need of counseling to decrease weight gain in gestational diabetes (GDM), but they lacked knowledge about how to transfer information regarding healthy weight gain to the women (Olander et al., 2011). How to communicate essential information to pregnant women in order to affect diet without worrying too much is sparsely reported in literature (cf. Lyerly et al., 2009).

The rationale

A healthy diet during pregnancy not only reduces medical risks for the foetus and the delivery, but it entails healthier dietary habits for the woman and her family later on. There is sparse literature on Swedish midwives' dietary counseling of pregnant women in antenatal care. Current literature on risks related to diet during pregnancy is convincing. The message is that women and their offspring benefit from changing to healthy diet,

recommendations that emphasize the avoidance of toxins, contaminants, drugs and other food safety topics and also strive to achieve a balanced weight-gain during pregnancy. However, many expecting mothers seem to struggle with dietary changes. Some recommendations are internationally controversial and counseling in dietary and weight restriction is described as complex. Midwives experience challenges to influence all pregnant women through dietary counseling.

Aims

The overall aim of this thesis was to describe diet and dietary changes during pregnancy from the women's and the midwives' perspectives with a focus on dietary counseling.

The specific aims of the four papers included in the thesis were to:

Paper I Describe pregnant women's attitudes to and experiences of dietary information and advice, as well as dietary management during pregnancy.

Paper II Explore midwives' strategies in challenging dietary counseling situations.

Paper III Describe how midwives' perceive their role and their significance in dietary counseling of pregnant women.

Paper IV Describe women's food habits during pregnancy and up to six months postpartum.

Methods

Methodological assumptions

Various kinds of knowledge are reached by using different methods for data collection and data analysis. In qualitative approaches in human research, descriptions and interpretations of various phenomena are usual. In study I pregnant women's experiences of dietary information and dietary changes during pregnancy were studied and in study II and III the midwives' experiences of dietary counseling were examined. The researcher becomes a co-creator of the findings, and several possible interpretations could be valid (Sandelowski, 1986; 1993). An inductive approach is common in the qualitative tradition where the purpose is to understand and sometimes to create theories (Polit & Beck, 2013, Krippendorff, 2004). Inductive research starts with observation followed by identification of patterns, which sometimes lead to the formulation of new tentative research questions that later could be integrated into a theory. Since the results from study I indicated that pregnant women felt that they did not get enough support in dietary struggles, it was natural to add studies including midwives' experiences (Study II and III) to get answers about questions generated from Study I. Furthermore, since Study I generated questions about how pregnant women really ate during and after their pregnancies, it was decided to evaluate this with a quantitative study. Quantitative research most often goes from theory to a hypothesis that can be tested and followed by confirmation. In a

quantitative approach, it is desirable to reach an objective truth or as close to an objective truth as possible. A deductive approach is common in the quantitative research tradition, which means that the purpose is to answer a hypothesis and to explain. Hypothesis testing is a method to evaluate if the results represents the entire population and thereby could be generalized (cf. Polit & Beck 2013). In Study IV we compared the women's food intake over time during and up to six months after pregnancy with the Swedish recommendations using the NFA-Healthy eating index (Becker, 2009). Our hypothesis was that women did change to healthier dietary habits after they had received dietary counseling from their midwives.

In this thesis, both a qualitative and quantitative approaches were used. Different research questions needed different methodological approaches. Experiences and perceptions were highlighted by collection and analysis of qualitative data such as different kinds of interviews (I-III), while dietary evaluations were highlighted by self-reports in a validated and reliable questionnaire (IV) analysed with statistics (cf. Polit & Beck 2013).

Design

The thesis has a descriptive design. A summary of the papers, their status, design, participants, data collection and analysis is given in Table 1.

Table 1. Summary of status, design, participants, data collection and analysis of the respective paper

Papers, status	**Design**	**Partici-pants**	**Data collection, year**	**Analysis**
I Published	Qualitative Descriptive	Pregnant women (n=23)	Focus groups (n=5) 2007	Qualitative content analysis
II Published	Qualitative Descriptive	Midwives (n=17)	Individual telephone interviews 2012	Qualitative content analysis
III Published	Qualitative Descriptive	Midwives (n=17+4)	Individual telephone and face-to-face interviews 2012-13	Qualitative content analysis
IV Submitted	Quantitative Longitudinal	Pregnant women (n=163)	Questionnaires x 5 2006-2009	Descriptive statistics Anova with Bonferroni post hoc tests, Friedmans Anova, Goldberg cut-off, BMR and syntax calculation

Settings

The setting for the four papers is Swedish primary health care. In paper I, pregnant women from five primary health care centres within the County Council of Västerbotten in northern Sweden were included. In paper II and III, midwives worked in antenatal care, either at public or private health care centres, from a diverse

sample of eight different counties or regions, from the north to south of Sweden, were included. In paper IV, pregnant women from five (not the same as in paper I) primary health care centres within the County Council of Västerbotten in northern Sweden were included.

Participants and recruitment

Paper I

Women expecting their first child were invited in mid-pregnancy. In Swedish healthcare, first time pregnant women and their partner are offered to attend antenatal classes and recruitment was made from these classes. Midwives at five health care centres were contacted. The healthcare centers were both rural (n=2) and urban in a small (n=1) and a midsize town (n=3). The midwives were asked to distribute written information about the study to the women in their ongoing antenatal classes. At the next meeting we visited the classes for further information and invited the women to participate in a focus group interview later on. In total 27 pregnant women accepted to participate but four of them did not show up at the interview session. The study therefore consisted of 23 pregnant women each participating in one of the six focus groups. None of the women smoked. Age and socioeconomic status as well as dietary preferences of the sample are presented in Table 2.

Table 2. Socioeconomic variables, dietary preferences and smoking habits

Socio-economic variables	**n**
Participants	23
Age median (range)	29 (19-41)
Marital status	
Living alone	2
Cohabitating	21
Residence	
Rural	7
Urban	16
Education	
University degree	16
High school	5
Compulsory school	2
Dietary preferences	
Lacto vegetarian	2
No dietary preferences	21

Paper II-III

Midwives (n=17), all women, who worked within Swedish maternal health care in eight counties (Norrbotten, Västernorrland, Jämtland, Dalarna, Värmland, Västra Götaland (Göteborg), Stockholm and Skåne) participated in Study II. The midwives were selected by strategic geographical sampling to reach a rich variation and recruited with help from local coordinating midwives, local managers, and through snowball sampling (Polit & Beck, 2013). In Study II, 22 suggested participants were contacted and informed by telephone and by letter. If interested, time for a telephone-interview was decided upon. Five midwives declined participation. The remaining 17

midwives were interviewed individually. In Study III, four additional midwives from the county of Västerbotten were contacted and all accepted to participate in face-to-face interviews. The participating midwives' work experiences in primary health care clinics varied from 6 months to 31 years with a median of 13 years. Eight midwives had other specialist nurse competencies or academic exams in addition to their midwifery exam. All 21 midwives had counseled immigrant women of which five had also counselled asylum-seekers. The socio-economic situation differed greatly among the clinics, six midwives reported high rates of unemployment among their patients. According to official statistics (SCB, 2014) the educational level among women in the included catchment areas of the clinics varied between 4-11 % had elementary school, 16-25% had upper secondary school and 20-45% had university level.

Paper IV

Pregnant women (n=226) without any risk factors for complications during pregnancy were invited by their midwives from five healthcare centers in the Umeå region to participate in the study, which included five data collections (three occasions during pregnancy and two occasions postpartum) using a Food Frequency Questionaire (FFQ). During pregnancy the data collection was done in connection with the ordinary antenatal visits and first time postpartum interviews was done at the ordinary postpartum visit with the midwife. For the final occasion the women booked an appointment at the primary

healthcare center. The sample size was based on a power calculation where significant differences in B_{12}, folate and homocystein (reported in unpublished PhD thesis) with at least 80% power, required 200 participants (Lenth, 2001). Those who had participated in at least four data collections were included in this study (n=163). Both verbal and written information and consent were given on their first visit in antenatal care. The participants were consecutively recruited and the clinics were viewed as being representative for a socio-economic and geographical cross-sectional sample. The exclusion criteria were major medical conditions and inability to attend the ordinary antenatal program, and insufficient competence in Swedish language.

Data collection and procedure

Paper I

Six focus group interviews were carried out at the health care centres in 2007. The second author, Anette Lundqvist, and I acted as either moderator or observer and conducted all interviews. The participants were acquainted with each other from previous parental education classes. The interviews lasted about 45 minutes and were recorded and transcribed verbatim. An interview guide with open-ended questions was used, covering areas such as sources of information about diet during pregnancy, reactions on dietary advice and coping with dietary advice. The initial questions were followed by probing and

follow-up questions like ‘could you please explain a little more about what you mean’, so as to make the discussions more fruitful and to activate conversation with those who were hesitant to talk.

Paper II-III

I conducted by telephone all the initial semi-structured interviews (n=17), which was seen as cost-effective and timesaving and meant that the survey could cover a large geographical area. Previous experiences of telephone interviews in the research group indicated that this was an efficient method for data acquisition that gave opportunities for a good dialogue and procurement of personal experiences despite the lack of "face-to-face contact" (Risberg et al, 2011). An interview guide was used contained eight questions that dealt with the kind of dietary advice that had been previously given and when it was given. The interview guide also contained examples of when dietary advice was perceived as successful or not and of challenges experienced in counseling. A few questions about socio-demographic aspects of the midwife’s background were asked. The telephone interviews lasted from 20 to 40 minutes. For the additional four interviews, which I conducted face-to-face at the midwives’ workplaces, the interview guide contained additional questions which focused on how they perceived their role and their significance in dietary counseling. The face-to-face interviews lasted for 30 to 45 minutes. All interviews were audio-recorded and transcribed verbatim.

Paper IV

Questionnaire data was collected in the first visit during the first trimester (pregnancy week 10–12), second trimester (week 19–23) and third trimester (week 34–38) of pregnancy and at two occasions (8–10 weeks and 6 months post partum) after delivery. Data collection consisted of blood samples, data from medical records regarding pregnancy and delivery parameters (used in another PhD-thesis), and questionnaire data. The instrument used in Study IV, was a food frequencies questionnaire (FFQ) that included a measure of frequencies and food choices, and was similar as the validated questionnaire used in the Västerbotten Intervention Program (VIP) for health survey (Johansson et al., 2002). All data was administered by the Northern Sweden Biobank in Umeå. Data collection was performed in 2006-2009.

Analysis

Qualitative content analysis

The transcribed text i.e. verbatim transcribed audio recordings from focus group interviews and interviews by telephone and face-to-face, was analyzed according to qualitative content analysis (Graneheim & Lundman 2004). The method includes systematical analysis of written communication (Krippendorff 2004), where a particular focus lies in focusing on differences between, and similarities within parts of the text labeled as meaning units, and interpreted codes, categories and/or themes (Graneheim & Lundman, 2004). The epistemology of qualitative

content analysis has been considered unclear (Lundman & Graneheim 2012). However, qualitative content analysis comprises different stages in the analysis process that can be referred to various scientific approaches (Lindgren et al., 2014, Schreier, 2012). Qualitative content analysis is suggested to be related to phenomenological descriptions concerning the manifest concrete content that is close to the subjects' experiences, while interpretations of latent and more abstracted messages are related to hermeneutics (Lindgren et al., 2014).

The analysis was performed in several steps. First, I listened to the interviews and compared to the transcribed text to catch non-verbal communication such as sighs and groans, laughs or breaks that may give another meaning to the written text. The reading and listening also provided an opportunity to gain a general view of what was highlighted and this was discussed in the entire research group. Then, the text was divided into meaning units corresponding to the aim. These meaning units could be single words, sentences, or paragraphs related to each other through their content and context. The meaning units were when necessary condensed i.e. shortened while still preserving their core meaning and labelled with codes. The codes were compared to each other based upon their similarities and dissimilarities and sorted into groups, labelled either as subcategories and categories at a manifest level or subthemes and themes with a higher level of interpretation (cf. Graneheim & Lundman 2004). Krippendorff (2004) has pronounced that a category answers the question "What?" Graneheim and Lundman (2004) though,

state that a category refers mainly to a descriptive level of content and could thereby be seen as an expression of the manifest content in a text. A theme could be more descriptive and often answers the question “How?” and is interpreted on a higher level of abstraction. The analytic process is never linear; it goes back and forth, since tentative categories are sometimes viewed as too wide and thereby divided into subcategories. Similarly, subcategories could be viewed as too narrow and are therefore merged into categories on a higher interpretative level. Themes could also be seen as threads of meanings. Codes and subcategories form various categories that can be reflected on. These themes can be identified and formulated at quite late phase of the analysis (cf. Graneheim & Lundman 2004).

There are various measures for achieving trustworthiness in qualitative research. Concepts frequently used in the quantitative tradition such as validity, reliability and generalizability are suggested to be replaced with concepts fitting better into a qualitative tradition, such as credibility, dependability, and transferability. Even if these concepts are three separate aspects of trustworthiness, they should be viewed as intertwined and interrelated (Graneheim & Lundman, 2004).

Credibility, which deals with the focus of a study, could be reached if data and the analysis process address the intended research focus. Selecting context, participants and data collection methods that fit into the focus of the study are important. If a variation of experiences is a goal, it is important

to choose participants who could shed light on the research question from various perspectives e.g. gender, age and other sociodemographic aspects. Credibility also deals with how well the presented result, categories and/or themes, cover data. Being sure that no relevant data is excluded and that irrelevant data not is included is important. Furthermore, credibility deals with the judgement of similarities within and dissimilarities between categories. Using representative quotes from the original text and to seek agreement among co-researchers and experts are ways to improve credibility (cf. Graneheim & Lundman, 2004).

Dependability, deals with reasons for instability and inconsistencies, for example the degree of which data, data collection and analysis change over time and the alterations the researchers decide about during the analytic process. Extended data collections and changed focus in interview guides can make the focus of the study instable and challenge judgements about similarities and differences of content and consistency over time. Graneheim and Lundman (2004) suggest open dialogues within the research team to manage questions about dependability.

Transferability lastly refers to the extent the findings can be transferred to other contexts or groups of patients. Graneheim and Lundman (2004) state that it is up to the reader's judgement to decide whether the findings are transferable. However, the authors could facilitate this judgement by giving clear and distinct descriptions of settings, sampling, participants, data collection and the analytic process. Furthermore, a clear and

distinct presentation of the findings supplemented with appropriate quotations enhance possibilities for transferability (Graneheim & Lundman, 2004). Hence, it is important to point out that it in qualitative research there are no truths and not one single correct interpretation of data. It rather concerns the most probable meaning from a particular perspective (cf. Graneheim & Lundman, 2004, Krippendorff, 1980).

The research process and design, including selection of context, participants and data collection methods have been thoroughly discussed in the research team and during PhD-seminars, which increased the credibility of the studies. I have used representative quotations from the original text in the entire thesis and sough agreement among co-researchers to improve credibility of analysis and findings. During all steps of the analysis, the members of the research group have discussed the interpretations until agreements about the findings and labelling of codes, categories and themes have been resolved.

To attain dependability, we have in Study III particularly discussed the mixed data collection method and changed the interview guide in the final interviews. However, this was planned and controlled and was seen as fruitful and suiting the focus of the study. Concerning transferability, I have tried to provide clear and distinct descriptions of settings, sampling, participants and data collection. The analytic process and the result presentations included exemplifying quotes to enhance the likelihood for transferability (cf. Graneheim & Lundman, 2004).

Statistical analysis

All statistical analyses were performed using SPSS version 22.0 (SPSS Inc. Chicago IL, USA). Descriptive data were presented as means ± standard deviations (SD), and medians and quartiles as applicable. When comparing differences over time, repeated-measures ANOVA with Bonferroni post-hoc test were used. When data was skewed, Friedman's ANOVA was performed. P-values below 0.05 were considered statistically significant. Internal missing values (8.2 %) were replaced by means of last observation carried forward (LOCF). The revised Goldberg cut-off equation (Black, 2000) was used to validate the reported dietary intake by assessing the levels of misreporting of energy intake at each time point. Low, acceptable and high energy reporters were identified by comparing reported food intake levels, i.e. energy intake divided by calculated basal metabolic rate (BMR), with plausible physical activity level for the age and sex, calculated as the ratio of standard energy expenditure levels divided with BMR. BMR was calculated using the syntax suggested by Henry (2005). As the mean age of the participants in paper IV were 30.5 ± 4.2 years, an average BMR value was calculated using Henry's syntaxes for 18–30 years old and 30–60 years old divided by two.

Results

The overall result in this thesis is presented in one main theme and two themes with three subthemes respectively (Table 3).

Table 3. Results presented as main theme (bold), themes, and subthemes (italics)

Main theme	**Pregnant women and midwives are not in tune with each other about dietary counseling**	
Themes	Pregnant women are concerned about risks for their child but fail to change to healthier dietary habits over time	Midwives view themselves as authorities, though questioned ones
Sub-themes	*Pregnant women are well informed and interested in risk reduction for their child's best*	*Midwives have insufficient knowledge in dietary issues and related risks*
	Pregnant women try to do their best to improve diet during pregnancy	*Midwives have difficulties to give dietary support to pregnant women*
	Pregnant women's diet does not reach levels of healthy eating recommendations and becomes unhealthier after pregnancy	*Midwives are mainly focused on giving information and lack sufficient competence for challenging counseling*

Pregnant women and midwives are not in tune with each other about dietary counseling

The main theme, 'Pregnant women and midwives are not in tune with each other about dietary counseling' comprises the overall finding of how the perspectives and positions in dietary counseling differ between midwives and pregnant women. The midwives are more focused on informing about the recommendations from NFA and the pregnant women are more concerned about how to sort and evaluate the information they come across and how to manage and change their eating habits. The pregnant women are concerned about the risks and they try to follow the recommendations for the best outcome. The midwives on the other side see themselves as authorities but their knowledge of dietary issues is sometimes inadequate. The pregnant women fail to reach the recommended healthy eating goal and the midwives fail to support the women.

Pregnant women are concerned about risks for their child but fail to change to healthier dietary habits over time

The first theme is a conclusion of the three subthemes "Pregnant women are well informed and interested in risk reduction for their child's best"; "Pregnant women try to do their best to improve their diet during pregnancy", and "Pregnant women's diet does not reach levels of healthy eating recommendations and becomes unhealthier after pregnancy". The subthemes are

described more in detail below and referred to the studies of the thesis.

Pregnant women are well informed and interested in risk reduction for their child's best

Pregnant women describe an eagerness to learn everything about pregnancy and to follow the recommendations. They read magazines and brochures and most of all search the Internet for information. They ask and discuss how to manage their pregnancy with friends, especially those who recently had been pregnant and also with their mothers (Study I). Midwives view pregnant women as eager information seekers, who scour the Internet for information (Study III). Feelings of fear and guilt of harming the unborn baby from accidently eating something unhealthy or 'forbidden' due to not having received the correct information are described by the women. However finding too much information lead to becoming 'over-worried' (Study I). The midwives generally describe pregnant women as being emotionally oriented and sometimes lacking rationality. The midwives describe how pregnant women's worries can lead not only to an exaggerated risk-related behaviour, but also to a seemingly unconcerned or negligent behaviour (Study III).

Pregnant women try to do their best to improve diet during pregnancy

The pregnant women describe how they feel stressed and pressured due to demands of choosing and cooking healthy food. They find themselves as legitimate targets for questions and

comments about their behaviour from people around them. To gain control over ingredients and the origin of food they check food content carefully. It is indicated that women living in larger communities prefer organic food in order to eat wealthy, while those living in the countryside express more concern about the geographical origin of products, as well as the possibility of controlling the food production chain (Study I). The pregnant women find complying with dietary advice quite difficult. Their strategy to manage the dietary advice was; 'being responsible with a pinch of salt' (Study I). When making entries of dietary habits in a food frequency questionnaire it was for example shown that their intake of fruit and vegetable was significantly higher during pregnancy compared to after delivery ($p=<0.001$). Their alcohol intake was low, and decreased further from first antenatal visit, in which dietary information should be included, to the second occasion in mid-pregnancy (Study IV). The majority were eating a mixed diet and most participants (93-97%) usually reported having three main meals a day (breakfast, lunch and dinner). In Study I most women now and then admitted making exceptions from the dietary advice, which was seen as acceptable if the exceptions seldom occurred or were 'minor'. Family events and special occasions such as Christmas were mentioned as events that interfered with their dietary ambitions (Study I).

Pregnant women's diet does not reach levels of healthy eating recommendations and becomes unhealthier after pregnancy

The women describe how they in early pregnancy tried to follow the dietary advice more strictly but later on in pregnancy became more easygoing. To follow every recommendation was hard to do in the long run (Study I). According to the NFA index of healthy eating, the study group had an inadequate diet and the total index median score was 4.0 (range 3.0–5.0) out of maximum 12 with one significant change in the total index score at the first measurement after delivery. The fruit and vegetable frequency of intake did not reach the recommendation of 500 mg/day, but was significantly higher during pregnancy compared to after delivery. The intake decreased from a combined median of just below three occasions per day to slightly more than two per day ($p<0.001$), The proportion of participants eating fruit less than once per day was 25%, 31%, 34%, 44% and 52% at the five measuring points. For vegetables, the frequency of intake was more stable and at all time points about one third of the mothers had vegetables less than once per day. The intake of fish and shellfish was low at all occasions with no significant difference over time. Furthermore, the intake of discretionary foods increased significantly both from the first visit to occasion three late in pregnancy, and occasion four and five after delivery ($p=<0.001$). The intake of sausage as a meal increased significantly from the first visit, to occasion four after delivery ($p=0.016$). Almost two thirds of the pregnant women reported

drinking some kind of milk or eating yogurt less than the recommended intake of twice per day (60%, 64%, 60%, 63% and 63%, respectively). The intake of caffeine was low during the pregnancy but increased significantly after delivery. The intake frequency of alcohol, decreased significantly from first visit to occasion two and three during pregnancy ($p=<0.001$), but increased significantly again after delivery ($p=<0.001$), albeit with 50% and 40% still abstaining at the two time periods (31%, 33%, 34%, 33%, and 34%, respectively) (Study IV).

Midwives view themselves as authorities, though questioned ones

The second theme is a conclusion of the three subthemes "Midwives have insufficient knowledge in dietary issues and related risks"; "Midwives have difficulties giving dietary support to pregnant women"; and "Midwives are mainly focused on giving information and lack sufficient competence in challenging counseling". Many felt that although they were listened to and they experienced that the pregnant women usually expressed gratitude for getting information and advice, they were doubtful of if the women adhered to it (Study II-III).

Midwives have insufficient knowledge in dietary issues and related risks

Midwives describe themselves as informative with regard to life-style issues and with ambitions to inform and counsel about dietary issues but they do not see themselves as experts in nutrition and, furthermore, not always updated with the latest recommendations. The midwives also describe that they lack time to search for information themselves, for example on the Internet (Study II). Instead they refer to recommendations from NFA and other medical authorities, which they find trustworthy. Other Internet sources are often seen as causing problems as the midwife cannot evaluate them (Study II).

Midwives have difficulties to give dietary support to pregnant women

The pregnant women expressed feelings of being left out in their search for information as they noted that the midwives handed out brochures and leaflets without any deeper counseling (Study I). The midwives on the other hand describe themselves as experts who can deliver the ”correct” information (Study III). To handle the information the women often use common sense or just follow bodily signals (Study I). Midwives on the other hand describe pregnant women as having problems in sorting and interpreting the information they get from various sources and thereby are in need of hands-on guidance (Study III). The midwives describe how they are usually working on their own and are responsible for counseling of pregnant women with many different problems, not only medical issues.

Midwives are mainly focused on giving information and lack sufficient competence for challenging counseling

Midwives describe how they commonly give pregnant women general and specific dietary information with a focus on prevention and the risks associated with unhealthy eating (Study II). Dietary counseling of women status is experienced as extremely challenging owing to the diversity of situations, for example with obesity, eating disorders, immigrant women, vegans or women with low socio-economic status. These challenges are addressed by applying five different strategies; 'Getting acquainted' includes relating to women and offering help and guidance, adapting to the woman and treading carefully when addressing the problem, sometimes described as "walking on a minefield". The second strategy 'Trying to support and motivate' included to listening actively, facilitating reflections about habits, and supporting goal setting. The third strategy 'Convincing about choosing correctly'– includes a transfer of general knowledge of risks, and a clarifying and repeating of the message on and on. The fourth strategy 'Controlling and mastering' confronts the woman with her bad habits and poor life-style, forming an alliance with her partner, frightening her with medical risks and complications for delivery and for the foetus, and even to moralizing about 'good motherhood obligations'. The fifth strategy 'Resigning responsibility' is used when neither communication nor relation between the midwives and pregnant women work and the women are seen as non-

adherent to advice. The strategy implies either to refer the women to other health care professionals such as dieticians, physicians or psychologists or transferring all responsibility to the women, and thereby distancing themselves, labelled as 'giving up - letting go' (Study II). Some midwives express how they discourage the women from seeking dietary information on the Internet to gain better control over women's information (Study III). The pregnant women describe this situation from another angle. They feel uncertain and confused when they cannot discuss with the midwife the conflicting information they have found (Study I).

Discussion

The overall aim of the thesis was to describe diet and dietary changes during pregnancy from the women's and midwives' perspectives, with a focus on dietary counseling. The results showed that pregnant women are concerned about risks for their child and eager to know about diets that would be beneficial for the baby, but they fail to change to healthier habits over time. Midwives on the other hand view themselves as authorities, though questioned ones. The main theme in my thesis is that pregnant women and their midwives are not in tune with each other about dietary counseling. Pregnant women experience insufficient support in dietary issues and midwives focus foremost on giving information but need more nutritional knowledge and competence in challenging counseling.

The women in our study (Study I) appeared to be eager information seekers. They read magazines, brochures and searched on the Internet for information. They also discussed how to manage their pregnancy, at forums and with friends and relatives. However, too much information sometimes made them 'over-worried'. I have judged that most of them had high health literacy.

The health literacy among pregnant women varies between countries but women in West- and Northern Europe are reported to have the highest literacy (Lupattelli et al., 2014). Health literacy is described as a person's capacity to acquire, understand and use information to achieve or maintain good health. There are three levels of health literacy. The basic level is functional literacy, which implies that a person achieves knowledge of health risks and complies with prescribed actions. A traditional, top-down health education is dominant at this level. The next level is interactive, or procedural health literacy and where the focus lies on developing personal skills to extract information from different sources and thereby increases options for changed habits. At the highest level is critical, or judgmental health literacy, where a person combines cognitive skills with social skills in order to critically analyze and use information to make own decisions about behavior in relation to various life events and situations. Modern woman centred health education should preferably support judgmental health literacy (cf. Nutbeam, 2000). Still, health literacy alone is not sufficient to change a person's habits. A health message has to be seen as relevant and

the person must have the competence and resources to make the change. One needs to understand and judge which impact that can be achieved by the change. All together it may end up in self-determination where the person aims to take control over and change behavior (Schulz & Nakamoto, 2012). In study I, the pregnant women described feelings of stress and pressure due to demands of choosing and cooking healthy food. Despite stress, in order to get control, they checked food content carefully but found complying with all dietary advices quite hard over time. They therefore used their judgmental health literacy to become 'responsible with a pinch of salt'. Many of them had university education and almost all were married or cohabitating. Altogether these aspects increase the options to be self-determined and to control behavior (cf. Nutbeam, 2000).

The majority of the women in Study IV lived a regular life with three main meals a day. Even if pregnant women tried to do their best, their diet did not reach levels of healthy eating recommendations. Only 4 out of 12 reached levels of healthy eating when comparing their dietary intake with the NFA-healthy eating index. Women (Study I) also described how they in early pregnancy followed the dietary advices more strictly than in late pregnancy. In a systematic review and meta-analysis of pregnant women's diet in developed countries, it was reported that they neither reached the national recommendations of energy nor fiber intake and simultaneously their total and saturated fat intake was above recommendations (Blumfield et al., 2012). The women in our focus group study (Study I) reported

that they tried to eat healthier during pregnancy, which is similar to findings from a retrospective Australian study, where pregnant women reported an increased fruit and vegetables consumption and a decreased intake of fast food compared with habits before pregnancy (Smedley et al., 2014). A large Spanish cross sectional study (Cuervo et al., 2014) however, reported unhealthy diet in prepregnancy, in pregnancy and as well during the lactating period. In all periods the participating women had an excessive intake of for example buns and pastries and they experienced dietary advices hard to follow in the long run.

The women's diet in our longitudinal study (Study IV) became even unhealthier after delivery. Their intake of alcohol and discretionary foods increased after delivery, while intake of fruits and vegetables decreased, something that in literature is reported as reasons for future overweight and obesity (Adegboye & Linne, 2013, Hillesund et al., 2014). A prospective cohort study of overweight and obese pregnant women in US also reported a less healthy diet during pregnancy and four months after delivery (Moran, 2013). They decreased their intake of milk, meat and unsaturated oils, while they increased intake of solid fat, alcohol and added sugars after delivery. Williams et al. (2014) in a systematic review highlighted the importance of intervening in dietary issues, not only in pregnancy, but also in the interpregnancy periods in order to help women to gain weight balance before next pregnancy. Getting rid of extra kilos and gaining weight balance after delivery can be challenging for women. Nursing and breastfeeding the newborn baby become

the main focus for many women. Their life situation is changed and they have fewer opportunities for putting time on personal needs for life-style changes. Busyness and fatigue make it hard to find time for exercise. In a phenomenological study of 23 women Montgomery et al (2011) described lack of time as a significant obstacle for life style change. Lack of time concerned more than food choices, since it also related to school, career, exercise, multiple children, and infant care responsibilities. Lack of motivation and lack of support were other prominent barriers for the women to lose weight after childbirth.

In my interviews with midwives, they appeared to be more focused on informing than on counseling. They described themselves as very informative and directive with regard to life-style issues in pregnancy (Study III). In order to promote changed behavior an active interaction between the woman and the midwife is needed in health communication, where the woman takes an active part instead of only receiving messages (Corcoran, 2013). A literature review by Arrish et al. (2014) reported that midwives' focus on the importance of nutrition in pregnancy but commonly lack basic nutritional knowledge. The midwives in our studies (Study II-III) informed about and quite unreflected repeated advice from the NFA and handed out brochures, which may be a compensation for insufficient knowledge in nutrition and counseling. This model of top-down health communication is previously reported to be an unsuccessful strategy among information seeking pregnant women. Schulz & Nakamoto (2012) have suggested using a

combination of supporting health literacy and empowerment in order to enable people take an active role in decision-making regarding their own health. While health literacy concerns the functional, procedural and judgmental skills, empowerment adds meaning/relevance, competence, impact and self-determination to women's abilities.

A Dutch observation-study of midwives' counseling about prenatal screening and diagnostic tests reported the client-counselor relation as sufficient and health education as well performed, while the decision-making support was inadequate (Martin et al., 2015). These findings correlates with the findings in my thesis where the midwives describe themselves as trying to adopt a woman centred relation (study II) but still seem to fail in their support of the women regarding how they should handle the dietary information in every day life (Study I). Further education and training in diet and dietary counseling is needed and preferably together with other health professionals for example child health nurses. A Swedish intervention including midwives and childhealth nurses used a process-oriented training program to promote breast-feeding reported positive results (Ekström et al., 2012).

In all interviews (Study I-III) information seeking on the Internet was highlighted. A majority of Swedish pregnant women and their partners have access to Internet and seek information and support on the net (Larsson, 2009, Johansson et al., 2010) where nutrition is one of the most searched topics (Huberty, 2013). The

vast majority of the midwives in the qualitative studies (Study II-III) in my thesis had concerns about how to relate to the pregnant women's questions or confusion raised from the information found on the Internet. They felt their authority and expertize were questioned as they could not answer every question (Study II-III). Similar to this, health professionals in Denmark and Norway expressed pregnant women's information seeking on the Internet as limiting and implying a risk for information overload (Johnsen, 2014) something that also was expressed in my interviews. A focus-group study among Australian midwives investigated potential factors that limited use of Internet in health education. These concerned e.g. lack of training in use of Information Technology, perceived legal risks associated with social media and risks of misunderstandings between midwife and client (Dalton et al., 2014).

We all live in a digital world and have to be prepared for its challenges. Midwives therefore need to acknowledge the digitalization and must get appropriate training. Pregnant women are reported to frequently search for information in addition to the antenatal visits (Lagan et al., 2009, 2011; Johnsen, 2014; Weston & Anderson, 2014). In Johnsen's study (2014) health personnel described that pregnant women use the Internet to prepare themselves before the visit with a midwife and they may also use Internet after a visit to get 'a second opinion', something that could be seen as questioning their professional expertize (Study III). When pregnant women use chat-rooms and blogs on the Internet for social support they

increase their health literacy and become empowered. The women thereby get increased possibilities to become more equal to the midwives in the antenatal visits. This circumstance, when the woman and the midwife have become more equal, is positive if striving for developing woman centred care. From a discourse analysis of parent's websites, Drentea and Moren-Cross (2005) identified three types of communication i.e. emotional support, instrumental support, and community building/protection. Drentea and Moren-Cross (2005) suggest that websites play a role in the de-professionalization of medicine and the strength of self-help social movements, moving the knowledge from science and professionals to women themselves. They state that these on-line communities and forums are self-help groups in the post-modern society, which women anonymous want to turn to rather than to family and health professionals. Women thereby get an opportunity to discuss mothering with other women, discussions that might imply a process of empowering eachother alongside the medical establishment. Because of the anonymity and the intimate nature of concerns associated with pregnancy and childbirth women could feel more free and open together with pregnant women and thereby receive better support than by their midwives (cf. Drentea and Moren-Cross, 2005).

A successful Swedish example of a healthcare forum (http://www.klamydia.se) on the Internet that serves persons with intimate problems is a site where young people anonymous can be tested for Chlamydia Trachomatis (Novak & Karlsson, 2006). Another successful Swedish website concerns urinary

stress incontinence (http://www.econtinence.se) where people can get internet-based treatment and support (Sjöström et al., 2013).

The midwives would benefit from becoming more woman-centred but there are many factors in Swedish antenatal care that can obstruct the development of woman-centred care. The interviews with midwives revealed that they (Study II) tried to adopt a woman centred approach, such as trying to get acquainted with, trying to support and motivate the woman. However, they also described how they used less woman centred strategies such as persuading, controlling, mastering and even resigning responsibility when they felt that they did not reach women with their advice about changed behavior. In my thesis, pregnant women and midwives often seem to have different agendas in dietary counseling. While midwives' agenda is about transfering NFA guidelines to the women, the pregnant women's agenda is about how to transfer the guidelines to everyday life. A prominent content in Swedish antenatal care is the screening for risk factors. This can affect the meeting between the midwife and the woman as the midwife is risking to becoming instrumental to a 'checklist-agenda', which is defined and monitored by a third governmental part. The pregnant woman's agenda will consequently risk to be ignored when the limited time for the antenatal visit is occupied with screening to fulfill the expactations from medical authorities (cf. Gentz, 2006).

The organization of care has a great impact on woman centredness. A study from UK among midwives in different settings e.g. hospital clinics, GP clinics and women's home, identified changes in midwives' communication patterns related to the care environment and organization. The meeting in the women's home was identified as more woman centred than in other settings. The less hierarchical and more conversational form, the more woman centred and supportive midwives, offering the women more choice and control (McCourt, 2005).

Woman centred care is a paradigm shift implying a changed professional role, and something professionals may need time to adopt to, similar to the ongoing shift to patient centred care including patient empowerment (Adolfsson et al., 2004). An Irish study (Hyde & Roche-Reid, 2004), among midwives in maternity services reported that despite beliefs in open dialogues and empowerment, which included respect for women's own choices and autonomy, the midwife's role in practice was to adhere the protocols of obstetrics and use of strategic communication, which turned pregnant women into the role of passive clients. Women in our study (Study I) also described that they experienced being monitored by the midwives, but did not get support in dietary issues until they developed symptoms on for example iron deficiency. In order to facilitate patient empowerment including making informed choices, midwives need to recognize communication and counseling as a two-way process. They need to put time on assessing patients' perceptions, needs and situations, which could pay off both in an

improved relationship and also being in concordance with recommendations on woman centredness and dietary change (cf. Alaszewski, 2005).

Michel Foucault discusses governmentality within the frame of the power of the medical profession. In his book “The history of sexuality” (1990), governmentality refers to how the state exercises control over, or governs the body of its population. The ideas of knowledge and power are central components in Foucault’s works (Foucault, 1994). Power is not a possession of particular social or professional groups. It is rather a relational strategy, which is invested in and transmitted through groups. The knowledge that becomes accepted as a ‘truth’ becomes a ‘dominant discourse’ and thereby has the power to shape the ways people recognize and take actions in their every-day life. In this way the concept of ‘biopower’ (‘power over life’) is explained to consist of two poles; the individual body, which is disciplined and integrated into systems of control by continuous observations and the second pole consisting of the hole population or ‘social body’ that is to be regulated (Foucault, 1979). Institutions and practices of social control are instances important in self-regulation of the bodies. In order to be disciplined the body must be receptive and accept the power that work on it, being willing to be shaped and trained. In the process of governing, the health system attempts to convince individuals to control their own behaviors and bodies and being responsible resulting in regulation of the social body. In Foucault’s book Punishment and discipline (1979) the self-regulating body is

labeled ‘the docile body’, which can be subjected, used, transformed and improved in order to improve health and to be useful. Within this phrame of interpretation, pregnant women become prime targets as they are not only taking care of themselves, they are also responsible for the foetus and thereby in double need to be governed by experts such as midwives (Lupton, 2012). Prenatal care consists of repeated risk factor screenings, controls and includes lifestyle advice directed to the pregnant woman and can thereby be seen as biopolitical technology of governance (Jette et al., 2014).

The pregnant woman is ideally seen by the society and the medical establishment as being responsible, acting and making the best choices for herself and her baby (Lupton, 1999 & 2012, Ruhl, 1999). This view also occurred in my studies, where the pregnant women (Study I) expressed how they in early pregnancy really tried to follow every dietary recommendation. The midwives (Study II) in challenging counseling situations were reported to use the strategy ‘controlling and mastering’ and to moralize about good motherhood, thereby also govern the women to behave ‘right’ and to be ‘good mothers’. According to findings in my thesis, the pregnant women could be seen as governed by the dietary recommendations executed by the NFA and by other guidelines from medical authorities. The midwives also (Study III) viewed themselves as authorities, which could be a role that has been put upon them in the organization of governmentality but could also be self-chosen. Despite the midwives’ experience of being an authority, they are in an

inferior position in the medical hierarchy and thereby also governed. In a panopticon perspective the assignment for the midwives is to govern women to healthy eating and avoiding excessive weight gain during pregnancy and thereby they become 'links in the chain', transferring prescriptions from authourities to pregnant women as well as surveilling the women. Midwives in their turn are also surveilled by medical governmental regulations. They tick boxes in the records to show that dietary information, advice about weight control, and not the least risks related to certain food items, are given. These records can later be evaluated and used for assessing quality of care. Authority may risk counteracting with woman centred care. If authority or power is used as domination, people are resisting, for example, through non-adherence and through cancellation of visits. Midwives could instead be seen as links of power-relations not of figures of domination, something that could be positive for both parts (cf. Crampton & Elden, 2007).

Risk was a concept frequently mentioned in all interview studies (Study I-III). Still in the interviews with midwives, (Study II-III) we did not find any example of how they communicated individual risks, i.e. translated general risks to the individual woman in a particular context, something I have interpreted as not being enough woman centred. In modern society, risk thinking has a prominent role since scientific knowledge is respected. New knowledge elucidates new risks to be managed by the society or by individuals (cf Lupton, 2013). In public health, population-level risk calculations are used to identify

individual risks for future disease. Individual lifestyle is thereby seen as a set of 'risk factors', which the individuals are expected to regulate in order to decrease them (Armstrong, 1995). The risk thinking has transformed the pregnancy from a 'natural' state to a risky situation, especially for the unborn baby, which should be medically monitored. The pregnant woman is expected to be responsible and take care of her own and the growing foetus' health, through help from the experts (Lupton, 2012). Restrictions due to risk-evaluation have increased over time, and are mentioned by the women in our study (Study I). They described conflicts due to the fact that their mothers during their pregnancies were allowed to eat foods that the interviewed women were adviced to avoid. The dietary recommendations have changed a lot over time, which creates conflicting feelings and uncertainty. Pregnant women's perceptions of risks are reported to be influenced by social constructs, prior life experiences and also influenced by health care professional (Jordan & Murphy, 2009). The women have to keep risk thinking active in their mind since they must make their own choices because scientific knowledge continuously needs to be reconsidered.

Diet is a modern and common discussion area that is and should be scrutinized since this knowledge in many ways is conflicting and controversial. Giddens (1991) in an early publication outlined that people are dependent to dare and have to balance between "risk" and "trust", something that was illuminated in our interviews with the pregnant women (Study I) who experienced

the dietary information as contradicting and the dietary messages unclear. The midwives (Study III) described pregnant women as being 'too worried and emotional' to deal with information, which had to be considered in counseling in order not to scare them. Midwives, according to Jordan and Murphy (2009), in effective risk communication, should translate theoretic and potential risk into a meaningful probability statement and determinate benefits and risks for the individual woman. Pregnant women's expectations on pregnancy risks are closely aligned with those of their care providers and the women may have difficulties to evaluate their actual risk by their own. To evaluate risks, a more equalize power balance between a pregnant woman and her health care provider is required in order to promote an open dialogue in a caring relationship. When a trusting relationship between the pregnant woman and her midwife is formed, she is more likely to open up, and get increased confidence to ask questions and make informed choices about the care, rather than simply being ''compliant'' (cf. Jordan & Murphy, 2009).

The gendered division of labor in health care reflects a subordination of women. Health matters and thereby also health risks are closely tied to women in caring. Their nurturing role however, do not imply having a high position in the medical hierarchy and the midwives thereby may experience obstacles for deviating from the norm and what is expected, which could be one explanation for their actions to focus on task completion

instead of building woman centred relationships (cf. Bilton et al, 2002).

Methodological considerations

Study I – The data collection was performed in collaboration with the second author. I had previous experience and was thereby familiar with the method. During the six focus-group interviews we changed the roles of moderator and assistant. We tried to compensate for various interview techniques and various qualities of data by trying to help each other and fill in gaps that the other interviewer did not remember (cf. Morgan, 1997). The data is quite old. The data collection was performed in 2007. Since then the antenatal care as well as the conditions for counseling have changed. eHealth and the digital areas have increased and also the official dietary recommendations have changed (Brembeck, 2011). Pregnant women's experiences and struggles to handle information thereby nowadays might have increased due to increased experience of information seeking over the years, and our findings should be discussed with such changes in mind.

Study II – My preunderstanding as a midwife in antenatal care may have influenced the data collection. For example, some questions or issues may have been insufficiently penetrated due to silent collegial agreement. On the other hand my experiences may also have added to the understanding and to the data

collection. If I had not been aquanted to the field I had probably not been able to lead the interviews forward in the same way. I furthermore experienced that being a midwife was a prerequisite for many participants to agree on an interview. Telephone interviewing was experienced as an efficient data collection method and the distance was even seen as an opportunity for a good dialogue in sensitive questions. To admit shortcomings and experienced problems might be easier if you are not too familiar and close to the interviewer (cf. Risberg et al, 2011).

My ambition was to recruit midwives from all six health care regions of Sweden, which was not succeeded since I did not reach any midwife from the southeast region. The organization of antenatal care differed between the regions, which may have influenced the conditions for the midwives to perform antenatal care. Nevertheless, the interviews were seen as quite representative for Sweden and represented both urban and rural areas. The interviewed midwives also worked in different settings and met women from different cultures, social backgrounds and with different educational levels. I made all the interviews, which probably strengthened the consistency of the data collection (cf. Granheim & Lundman, 2004).

Study III – The data consisted of all interviews from study II complemented with face-to-face interviews with a convenient sample of midwives in Västerbotten. Mixing data collection methods could be a hindrance as well as an opportunity to get richer data (Sandelowski, 2014). In this case I viewed it as

positive, since the meaning of the face-to-face interviews was to get deeper into the issues that were highlighted in analysis of the previous interviews. The face-to-face interviews were longer, 40-50 minutes compared to 20-40 minutes via telephone. The 17 telephone interviews from study II were used for a secondary analyse with a new aim. However, the data that were left for study III was very prominent in the analysis of study II, and was highlighted by all interviewees, i.e. their views of pregnant women and their views of themselves and their impact, but the aim of study II did not cover those areas. Consequently of the design, there was a time delay between the two data collections of about one year, something I don't believe have influenced the analysis negatively.

Study IV – As in study I, the data used in study IV was quite old. It was collected between September 2006 – March 2009. During this period, the recommendations from NFA were more restricted with a higher focus put on avoiding certain 'risky' foods and less on general healthy eating. In the analysis we have not regarded this bias since the newer recommendations were published in 2008 and we considered that the newer recommendations published on the Internet by NNR 2008 had only minor impact on the midwives dietary advice during the study time. The longitudinal data consisted of a Food Frequency Questionnaire (FFQ). A major concern when using a FFQ relates to the limitations associated with recording of diet intake in general and the use of a FFQ specifically (Willett, 2013). Both random and systematic errors may occur due to instrument

construction and accuracy of the information given by the respondents. The VIP-FFQ, which we used, is designed to cover the general Swedish food habits and is focused on risk factors for cardiovascular diseases and is not developed for use among pregnant women. One disadvantage by using this questionnaire was that we were unable to measure adherence to advice about avoiding listeria and toxoplasmosis and specific fish species and fish from the Baltic Sea as the fish intake was only defined as fat or lean fish. Cheese was also defined as fat or lean and no information of pasteurization was included. In our study the participants were asked to relate to their food intake in pregnancy or to the current situation but in the original VIP-FFQ the participants are asked to relate to their food intake in the last year. This could, in some cases, have influenced the reported intake. It cannot be excluded that some degree of recall bias exist among the pregnant women and especially so for alcohol and intake of unhealthy foods. Still the finding of less alcohol use accords with other studies (Skagerström et al., 2013) likewise intake of less vegetables and a tendency for more fat does and are not indicating any severe recall bias among the pregnant women (Johansson et al., 2001). Low-energy reporting in FFQ due to underreporting is common in FFQ studies (Olafsdottir et al., 2006) and our study was no exception. In this particular sample, a low food intake can also be explained by nausea in early pregnancy, in late pregnancy the space can be restricted due to the full-term uterus and after delivery women may try to lose weight. McGowan (2012) found high BMI (>25kg/m^2) as a

predictor of energy underreporting in early pregnancy. This can be an explanation in this study and correlates well with the background characteristics in early pregnancy, where 31 % of the participants reported BMI >25. The strength in this study was that it was quite a large longitudinal study (163 women answering the questionnaire at least four of five occasions), which is quite rare. Furthermore we had a small drop out rate.

Conclusions and clinical implications

Pregnant women are struggling with their dietary changes. Compared to recommendations, they do not eat healthy enough and it becomes even worse after delivery. Midwives are in a favourable position to counsel pregnant women and women at the postnatal visit in lifestyle issues. Midwives though, are not viewed as enough woman centred, which may relate to traditional attitudes and their view on the importance of information transfer and also to their role expectations. Organisation of the work and management in antenatal care could have an important impact on woman centredness. Preferably the midwives' work can be organized in a way, which increases options of working more woman centredness. According to my finding midwives do not reach all women. The disadvantaged women with insufficient dietary habits who really need counseling by the midwives are 'left on their own'. To reach and help pregnant women improve their dietary habits, a collaborating team of different healthcare personals is

needed to offer counseling and support. Sometimes the counseling may need to be 'hands on guidance' about where to find and how to cook healthier food. If midwives themselves get more education, training and support themselves they could possibly counsel these women better. Last but not least, pregnancy and eating during and after pregnancy could preferably be viewed in a life course perspective, not as a period defined and limited to pregnancy. If so, midwives have to cooperate in teams with other health care professionals.

For further research I recommend larger longitudinal studies of eating habits during pregnancy and after pregnancy since there are a shortage of them. For such studies there is a need to develop a healthy eating index for use in pregnancies in a Swedish context. Furthermore intervention studies including education in nutrition and training in counseling among midwives and child health care nurses are needed to evaluate women's diet during and after pregnancy. One last recommendation for future studies are qualitative and quantitative studies of the impact of eHealth for dietary habits among pregnant women and for midwives' counseling since it is sparsely studied.

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