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Fighting obesity during pregnancy

A qualitative study of women's experiences of making lifestyle changes during pregnancy

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Abstract

Background: Obesity among women of childbearing age is a rising public health concern due to risks of adverse outcomes and long-term obesity for the mother and child. Addressing maternal obesity through effective lifestyle interventions is important and understanding the challenges that accompany successful behaviour change may assist in ensuring long-term health benefits.

Aim: To explore obese women's experiences of making lifestyle changes in pregnancy.

Method: Semi-structured in-depth interviews with eight mothers with a BMI≥30, purposively sampled from previous participants in a lifestyle intervention at Hvidovre Hospital in Denmark. Data was analysed using manifest and latent content analysis.

Findings: Three themes emerged from the analysis. The key findings showed that changing health behaviour in pregnancy is an ambivalent endeavour involving various individual challenges and facilitating aspects. Engaging in lifestyle changes requires personalised care and a comprehensive support system involving family, peers and professionals at various levels to motivate behaviour change. The postpartum period is an especially challenging period for women. Without professional support, health behaviours become increasingly difficult to maintain as motherhood and caring for the newborn child takes precedence over health concerns.

Conclusion: The findings showed that women are susceptible to receiving lifestyle intervention during pregnancy because of their overall health goals for themselves and their family; however, the mode of care delivery needs to be personalised to the individual's context. Special attention must be given to the underlying issues of overweight. Weight stigma should be addressed when targeting obese pregnant women to avoid potentially discouraging women from participating in preventative lifestyle interventions. It is recommended that a comprehensive support system, involving partners, peers and professionals, be ensured during pregnancy and extends to the postpartum period. Women may then in turn be more motivated to resume a healthy lifestyle after birth.

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1. Introduction

As a result of the global obesity epidemic, obesity among women of childbearing age is an increasing public health concern in low-, middle- and high-income countries (WHO, 2011). Obesity is recognised as a risk factor for several non-communicable diseases (NCDs), including cardiovascular diseases, stroke, type-2 diabetes and certain types of cancers (WHO, 2011). NCDs constitute the largest burden of disease worldwide and the World Health Organization (WHO) estimates that 3.4 million deaths among adults are attributed to being overweight or obese (Skolnik, 2012, WHO, 2013). Obese women are at greater risk of pregnancy-related complications such as preeclampsia, gestational diabetes mellitus (GDM), emergency caesarean delivery, macrosomia (birth weight greater than 4,500 grams) and intrauterine death (Sebire et al., 2001, Cedergren, 2006, Ovesen et al., 2011, Jensen et al., 2005, Guelinckx et al., 2008). International studies indicate that high gestational weight gain (GWG) is associated with postpartum weight retention and long-term obesity, affecting both the mother and the offspring (Schack-Nielsen et al., 2010, Mannan et al., 2013). Children of obese mothers are at higher risk of becoming obese persisting through adulthood, possibly due to genetics or the intrauterine environment affecting the foetus, thus programming adult disease (Lawlor et al., 2007, Godfrey and Barker, 2000). This may exacerbate the obesity epidemic in future generations and highlights a need for urgent preventative efforts. Addressing maternal obesity and excessive GWG through effective interventions is therefore of great public health relevance to prevent adverse obstetric outcomes and reduce the burden of obesity and NCDs (Darnton-Hill et al., 2004, WHO, 2014b).

The health systems in high-income countries are especially burdened by the obesity epidemic and Denmark has experienced a dramatic increase in prevalence during the last decades (Bendixen et al., 2004). Preventing obesity is of high public health priority for the Danish Ministry of Health. It is estimated that the annual cost attributed to obesity exceeds 14 billion DKK (€1.9 billion). Recent self-reported data indicate that 14% of the population are obese (Danish Health and Medicines Authority, 2014). The increasing prevalence is most significant among the younger population and women in the reproductive ages of 16 to 44 (Kjøller, 2007). In 2008, one out of three Danish pregnant women were overweight and 12% were obese (Danish Health and Medicines Authority, 2013). Improving maternal health is deemed

important for long-term obesity prevention and in 2011, the Danish Board of Technology recommended that preventative strategies targeting obese mothers be implemented in Danish maternity care units, for example through targeted lifestyle interventions (The Danish Board of Technology, 2011).

Obesity results from an imbalance between calories consumed and expended. Determinants of obesity include biological factors (i.e. sex, age and genetics), environmental factors (i.e. availability and access to healthy/unhealthy foods) as well as behavioural factors (i.e. intake of energy-dense diets and physical inactivity). Overweight and obesity are defined as abnormal or excessive fat accumulation presenting a risk to health (WHO, 2014a). Maternal obesity is classified from the pre-pregnancy weight or the first measured weight during pregnancy (Rasmussen et al., 2009). Body mass index (BMI) is the common measure for classifying the association between weight and height among adults and is calculated as weight in kilograms divided by the square of height in metres (kg/m^2). BMI does not necessarily correspond to the same degree of fatness in all populations, however it is considered the preferred population-level measure (WHO, 2013, Danish Health and Medicines Authority, 2014). In this study the WHO classification of BMI has been applied with the following cut-off points: underweight BMI<18.50 kg/m^2, normal weight BMI 18.50-24.99 kg/m^2, overweight BMI 25-29.99 kg/m^2 and obesity BMI≥30 kg/m^2 (WHO, 2014b).

Maternal obesity is usually managed through recommendations of appropriate GWG. In 2009, The American Institute of Medicine (IOM) published an updated version of their evidence-based guidelines for clinicians in relation to weight gain during pregnancy (Rasmussen et al., 2009). These provide the basis for the Danish GWG guidelines with some demographic adjustments. The recommended GWG for obese pregnant women ranges from 6 to 9 kg (Danish Health and Medicines Authority, 2013).

1.1. Lifestyle intervention during pregnancy

It is increasingly recognised that targeted lifestyle interventions focusing on especially two areas have a positive effect on weight outcome, potentially reducing short- and long-term risks for the mother and child. First, optimum dietary intake, for example higher intake of fruits and vegetables and decreased intake of salt and foods high in saturated fat, and secondly

increased physical activity in pregnancy (Sattar and Greer, 2002, Skolnik, 2012). Pregnancy has been recognised as a *window of opportunity* as women are in regular contact with healthcare providers and improving the health of the unborn child is perceived to be a powerful motivational factor (Phelan, 2010).

A recent meta-analysis of international interventions focusing on dietary and/or physical activity in pregnancy concluded that lifestyle interventions were able to significantly reduce GWG among overweight and obese women (Thangaratinam et al., 2012). This is supported by a randomised controlled trial by Renault et al. (2013) involving 389 Danish obese pregnant women. Results showed that pedometer-assessed physical activity intervention (PA) with and without receiving dietary counselling significantly reduced GWG compared with the control group (PA plus D vs. control, $P = 0.01$, and PA vs. control, $P= 0.042$). Furthermore lifestyle interventions have indicated positive effects on postpartum weight retention (Phelan et al., 2014) and obstetric outcomes such as reductions in the occurrence of GDM (Quinlivan et al., 2011), pre-eclampsia, gestational hypertension, preterm delivery, intrauterine death and birth traumas (Thangaratinam et al., 2012).

Hvidovre Hospital is carrying out a prevention project where pregnant women with a BMI≥30 receive lifestyle intervention. The aim of the overall project is to prevent adverse outcomes in relation to maternal obesity (Hvidovre Hospital, n.d.). The project also aims to reduce GWG while establishing and maintaining long-term healthy eating and physical activity behaviours for the benefit of the mothers and their families during pregnancy and postpartum. The target group is all pregnant women with a BMI≥30 scheduled to give birth at Hvidovre Hospital. Potential participants receive an invitation to participate at 12 to 14 weeks into their pregnancy. The lifestyle intervention is being offered between November 1st 2012 and December 31st 2014.

The intervention consists of free-of-charge dietary counselling sessions during pregnancy with a certified dietician every two weeks, oscillating between physical meetings at a health centre and phone calls, and self-monitored pedometer-assessed physical activity.

The dietary counselling sessions are based on the Danish national recommendations of a healthy diet in pregnancy (Olsen et al., 2005). The counselling consists of individualised recommendations of a hypo-caloric diet corresponding to a Mediterranean-style diet. The

women are advised to gain no more than 9 kg as recommended in the Danish GWG guidelines. The method follows the 'Small Steps' method ('Små Skridt'), recognised as an evidence-based intervention by the Danish Health Authority (Danish Health and Medicines Authority, 2011). The intention is to achieve sustainable weight loss through small lifestyle changes that are considered manageable, motivating and realistic (Danish Health and Medicines Authority, 2011). Additionally, participants are encouraged to walk 11,000 steps/day using a pedometer. If voluntary collaborations between the hospital and municipalities are established, women can receive up to one-year follow-up during the postpartum period through the primary healthcare services in the municipalities, mainly conducted by general practitioners and health visitors. This does not apply to all the municipalities in the hospital's catchment area (Hvidovre Hospital, n.d.).

Several barriers and facilitators have been reported in relation to changing lifestyle during pregnancy among overweight and obese mothers. Sui et al. (2013) found that barriers to healthy eating and exercise during pregnancy included physiological and emotional barriers as well as barriers related to lack of knowledge, lack of support and availability of healthy choices, for example exercise classes. Several studies reported that the unborn child's health was the main motivator to engage in health services and lifestyle change (Heslehurst et al., 2013a, Mills et al., 2013). A meta-synthesis of qualitative international studies focusing on the maternity experiences of obese women concluded that pregnancy was the ideal period for health professionals to target weight management, as women perceived their weight to be more acceptable during pregnancy and showed awareness of the benefits of a healthy lifestyle. They further reported that lifestyle changes were contemplated during pregnancy, as weight gain was perceived to be inevitable, and planned to be carried out postpartum (Smith and Lavender, 2011).

The intervention at Hvidovre Hospital is eventually being evaluated quantitatively. Nevertheless, it was considered essential to capture the women's perspectives qualitatively to gain a deeper understanding of what inhibits and facilitates successful lifestyle change during pregnancy. The topic was deemed important to explore in order to inform and potentially improve the current intervention as well as provide valuable knowledge for maternity units to support obese women through their pregnancy. Maternal obesity is a public health concern and by increasing the effectiveness of targeted interventions it is possible to prevent adverse

outcomes for the mother and child. The research will increase the existing pool of knowledge on the effect of behavioural interventions on maternal obesity. Additionally, little knowledge exists on how obese women experience maintaining healthy behaviours during postpartum when no longer receiving support. This aspect of the study will provide an understanding of the women's motivation during postpartum and the likelihood of the behaviour change having long-term effects, which could potentially contribute to the prevention of obesity in future generations. Thus, qualitative methodology using in-depth interviews was applied to obtain knowledge about the experiences of women participating in the lifestyle intervention at Hvidovre Hospital.

The aim of the study was to explore obese women's experiences of making lifestyle changes during pregnancy.

The specific objectives were:

- To investigate their attitude towards making healthy lifestyle changes during pregnancy
- To elucidate how they experienced participating in the lifestyle intervention at Hvidovre Hospital
- To understand their attitude towards maintaining a healthy lifestyle during postpartum

2. Method

2.1 Study setting

Denmark is a high-income country with universal health coverage where residents, regardless of socioeconomic group or ethnicity, have free access to a wide range of healthcare services, including antenatal and delivery care (Olejaz M, 2012). Healthy pregnant women are recommended three consultations with their general practitioner (GP) and between four and seven midwife consultations during pregnancy. Generally, the first visit at the GP occurs during weeks six to 10 and at the midwife during weeks 13 to 14. During postpartum women receive follow-up care in the municipalities, predominantly from a health visitor and the GP (Danish Health and Medicines Authority, 2013). The study is nested in a lifestyle intervention at Hvidovre Hospital. The hospital provides comprehensive medical care to approximately 460,000 citizens. It is situated in an urban area and has the largest maternity ward in Denmark, performing nearly 7000 deliveries annually (Hvidovre Hospital, 2014, SSI, 2012).

2.2 Sampling and recruitment of informants

All informants had given birth at Hvidovre Hospital and participated in the intervention as a result of their obesity. The study was approved by the Department of Obstetrics and Gynaecology at Hvidovre Hospital. A gatekeeper, who held a key position in the intervention, facilitated the recruitment of informants. A purposive sampling strategy was used to select informants who could inform an understanding of the research problem and the phenomenon being studied (Creswell, 2013). Purposive sampling was believed to increase the likelihood of findings that captured nuanced perspectives of the women's experiences. To illustrate variations within the study area, the informants were selected from different ages, educational backgrounds, occupations and ethnicities. All the informants were obese and inclusion criteria were: 1) primiparous, 2) 18 years or older, 3) able to read and speak Danish. Furthermore, 4) only informants who had given birth a minimum of three months prior to the interviews were selected, as it was assumed they would be less overwhelmed with their new role as a mother and thereby more comfortable reflecting about their experiences. Due to ethical reasons, such as avoiding any harm, women assessed by the gatekeeper to be unsuitable for participation given their emotional and/or physical wellbeing as well as women having given birth to children with severe diseases, were excluded from the sample. Letters from the Department of Obstetrics and Gynaecology were sent to women who met sampling criteria with information about the study purpose, including an invitation to participate in the interviews (n = 12) (see appendix I). Subsequently participants received a phone call from the principal investigator (PI) explaining the details of the interviews. One declined, two could not be reached, and one cancelled due to illness resulting in the final selection of informants (n = 8). The women were of predominantly Danish origin between the ages of 28 and 40. Educational level and occupation were also disclosed. Characteristics of the informants are summarised in Table 1.

2.3 Data collection

Eight interviews were conducted in Danish by the PI between February 20th and March 6th 2014. The interviews ranged between 42 and 91 minutes and were based on a topic guide developed for the purpose of the study. Semi-structured questions were used with flexibility to allow for informants to elaborate on issues as required. The PI covered all topics in each interview to ensure consistency (See appendix II). Informants were asked to describe and reflect on their experiences. The first topic was specifically related to informants' experiences

with receiving the intervention, hereunder experiences with changing dietary and physical activity behaviours and with the health personnel. The second topic was about the importance of social support and the third was about the informants' experiences of transitioning into the postpartum period. The fourth topic dealt with their overall experiences with making lifestyle changes in relation to pregnancy. The intention of the interview was to allow for reflective and explorative conversations. In accordance with Kvale and Brinkmann (2008), introductory and descriptive questions were applied to help establish rapport and allow the informants to steer the conversation towards phenomena of specific interest. An example was *Can you please describe to me as detailed as possible how you've experienced receiving the offer from Hvidovre Hospital?* Probing was used to follow-up on information provided by the informants, for example *How did that make you feel?* The use of silence and active listening facilitated more unprompted answers and allowed the informant time to reflect on their experiences.

The interview setting was intended to allow for a calm ambiance where the women felt comfortable sharing their thoughts and experiences and hence informants were encouraged to decide the location of the interviews. Seven interviews were conducted in the informants' homes and one was conducted at Hvidovre Hospital in a private meeting room. Before the interviews, informants were briefed about the purpose and context of the interview and the use of an audio recorder. Written consent was obtained prior to the interviews and the use of an audio recorder was agreed upon. The information letter they had received by mail was explained, together with possible questions they had. After the interview all informants agreed to provide background information about their age, educational level, occupation, marital status and ethnic background. Time was allocated for final comments and questions. Notes and preliminary analytical accounts were documented by the PI following each interview to assist in the subsequent analysis process. The interview guide was continuously reviewed and few changes were made based on the interview experiences. Interviews were transcribed and translated into English by the PI with focus on ensuring that phrases and metaphors were kept as close to their Danish origin as possible.

2.4 Data analysis

Data analysis followed the methodological approach of qualitative content analysis based on Graneheim and Lundman (2004). The method uses an interpretive process that enables the researcher to move from the manifest and visible content of the data to the latent content by interpreting the underlying meaning of the findings. Following the method, the transcribed text was divided into meaning units, which were condensed and coded to form sub-categories and categories presenting different experiences and perspectives revealed in the data. The categories were then reviewed to ensure that no phenomenon were described in overlapping categories. Through further interpretation themes were revealed that corresponded to the latent meaning of the women's experiences. Excel and Word were used as the main analysis tools. An example of the analytical process can be seen in table 2.

2.5 Ethical considerations

Undertaking research has moral and ethical considerations. In accordance with the ethical principles of the Helsinki Declaration (World Medical Association, 2013), in order to be justified a study involving human subjects must be beneficial to the informants or the human condition, respect informants' autonomy and avoid causing any harm (Kvale and Brinkmann, 2009). Ethical precautions were made during the design of the study and informants were asked to sign an informed consent form before each interview (see appendix III). In order to ensure anonymity informants were de-identified in the analysis and the written report by assigning them an identity code. A confidentiality agreement between the PI and Hvidovre Hospital was signed before initiating the study to avoid any disclosure of personal information that could reveal informants' identities. The intent of the interviews was to promote a positive and enriching experience and the informants were clearly made aware of their rights to stop the interview at any time if they felt uncomfortable sharing personal experiences (Kvale and Brinkmann, 2009). The interviews were not considered harmful but it was arranged that informants could contact a key person in the intervention in case they felt the need to talk to a professional about thoughts encountered during or after the interviews.

3. Findings

Analysis of the individual interviews rendered six categories and 14 adhering sub-categories from which the following three themes emerged: 1) *The ambivalent endeavour of fighting obesity during pregnancy,* 2) *The importance of involving professionals, peers and own self in lifestyle changes* and 3) *The challenges of maintaining lifestyle changes after birth*. An overview of themes, categories and sub-categories can be seen in table 3. They are presented below with the interpretive text validated by quotations from the informants. The themes represent the latent meaning. Each theme is presented first followed by categories (in **bold**) together with sub-categories (in *italics*), which represent the manifest findings. Informants used the words 'overweight', 'obese' and 'fat' interchangeably to describe having a BMI≥30, so the findings will not differentiate between the concepts. In the context of the intervention the dietician was the caregiver and will therefore be referred to as such throughout.

The ambivalent endeavour of fighting obesity during pregnancy

The women recalled a strong desire to improve their lifestyle and gain control over their health. Previous negative experiences of attempts to do so, related to long-term weight struggles, contributed to the women's attitude to change. Despite increasing their own and their child's wellbeing, the women reported feeling sensitive about their weight being addressed by others, which continuously challenged their confidence and motivation during the intervention. The theme *'The ambivalent endeavour of fighting obesity during pregnancy'* illustrates the perceived emotional ambivalence of making healthy lifestyle changes in pregnancy when struggling with obesity. Furthermore the theme demonstrates what factors were reported to facilitate or inhibit the women's endeavour of improving their dietary and physical activity behaviour in pregnancy. Three categories form the theme**: i)** ***Facing ambivalent emotional responses to pregnancy and obesity,*** **ii)** ***Accepting lifestyle intervention to gain control over family's health*****,** and **iii)** ***Battling to achieve a healthy lifestyle during pregnancy.***

Facing ambivalent emotional responses to pregnancy and obesity

The informants reported facing various, and at times conflicting, emotions during pregnancy. They attributed these feelings to their situation of being pregnant and obese. Both positive and negative feelings were conveyed and this category describes how these emotions affected the women's attitude towards improving dietary and physical activity behaviour. The women were s*truggling to rejoice in pregnancy,* explained as wanting to display a positive attitude towards their pregnancy while simultaneously being subjected to facing their obesity during the intervention. In relation to their pregnancy, the informants frequently expressed enjoying being pregnant, however reported emotional challenges such as the initial difficulty of fully comprehending their situation, which was perceived to be *"abstract"* (Informant 1). This was related to the uncertainty of becoming a first-time mother, which presented challenges to the informants' focus in the intervention:

> *"I think it was difficult to relate to the fact that I had to take care of this thing inside me because I hadn't met him! I didn't know exactly what it would mean the thing about having a child. It's not until you lie there with this child on your chest that it appears to you what you've been responsible for! (...) I lost a bit of the focus when it started to kick inside of my stomach. And then I just thought the thing about losing weight was perhaps not as important anyways!"* (Informant 7)

The women's joy of being pregnant was diminished when they received the invitation to participate in the intervention by mail. Combined with the noticeable focus on weight in antenatal care, the women experienced the initial mail-based approach as impersonal and they requested more sensitivity towards enrolling participants in the intervention:

> *"We've identified that you're overweight! It was presented again and again! Both when you had to make the appointment for the nuchal scan but also in the material you got. I thought it was a bit overwhelming. Instead of congratulation you're having a baby it was a bit like you were seeing a problem instead!"* (Informant 5)

The women conveyed the idea of s*uccumbing to obesity* during their participation and displayed sensitivity towards their body image. They reported having struggled with weight issues for longer periods in their lives, sometimes since childhood. These experiences were often associated with defeat or with negative influences by societal expectations of body ideals. Thus, informants reported feeling sensitive towards healthcare providers inquiries about their overweight, both in general and in antenatal care, which was described as being

"put in a box" (Informant 5). This influenced the informants' attitude towards the intervention and the women recalled having concerns about receiving lifestyle intervention, particular in the beginning:

> *"I've always weighed a bit more than the curve said I was supposed to. Because of that I feel like doctors always need to talk about weight and stuff (…) I've also heard and read about people who thought they were treated really bad because of their overweight and so on. Those things combined, then I had an idea. I also prepared my boyfriend for if someone [in the intervention] was really unfriendly or something, then he needed to help me or say something. But it wasn't like that, it was more my idea that there were all these raised fingers at me"* (Informant 2)

Despite feeling sensitive about their weight being addressed by others, the women reported an *improved self-image* throughout their participation in the intervention. The women conveyed a strong desire to improve their physical appearance, which was an important and often controlling motivator in their endeavours to change health behaviours. One explanation shared by the informants was that immediate concerns about physical appearance were easier to relate to than long-term health consequences:

> *"… It's a bit depressing, but the vanity fills quite a lot in relation to overweight. It's much more controlling than the perspective that I'll possibly once develop type-2 diabetes. And perhaps it should be this that scared me. But it scares me more if I become all fat to look at"* (Informant 1)

The pregnancy itself was perceived to provide an increasing sense of relief from perceiving themselves as *"just fat"* (Informant 3) throughout their pregnancy and the women experienced their body as more acceptable, both personally and socially:

> *"It's almost like it takes responsibility from you, well I can't actually help that my stomach is bursting out and it's supposed to do that. Well ironically I had a lot of dresses lying around that I hadn't used because I thought I looked too fat in them, which I used a lot while I was pregnant. So, it's about the stomach being ok and legitimate. And people praise your stomach. I also made a lot of jokes about that they damn well didn't do that when you're not pregnant. You are allowed that, it's very legitimate to look like that in a period."* (Informant 1)

Accepting lifestyle intervention to gain control over family's health

This category describes the informants' considerations about participating in the lifestyle intervention during pregnancy. Informants expressed *knowing what to do* in relation to making healthy changes and obtaining the appropriate knowledge was seen as minor part of the intervention. They expressed a need for support and motivation rather than knowledge-acquisition. One aspect that motivated their involvement in the intervention was that dieting and weight loss was no longer the main focus:

> *"I wanted to lose the kilos that I weigh too much! And it's not a diet, and that was also appealing, that it's just to, in reality, to be told the things that I know already. But to talk about it and be told that it's great what I do, when I started, that you are on the right track, and everything will be fine. So the support was great to have during pregnancy. And I needed that!"* (Informant 4)

Seeking health for the sake of the family was one of the main motivators for joining the intervention as well as during the intervention. The women experienced the timing of the intervention to coincide with their increasing concerns about their overweight. They perceived the intervention to be a good opportunity to improve health and avoid detrimental outcomes of their pregnancy. In regards to their own health, fear of birth complications was of high concern:

> *"One of the things that I was really worried about when I got pregnant was that, since you hear about all these horror stories, that is, all the complication you could get when you're overweight. So I wasn't in doubt whether I wanted to accept it."* (Informant 2)

In addition, the women expressed a desire to gain control over their health in order to avoid additional postpartum weight struggles. The health of the unborn child was emphasised to provide the greatest influence on motivation during pregnancy:

> *"That was clearly the thing that sort of weighted the heaviest! Because you could say that if it was your own health you would probably have done something about it before! So it was definitely because a baby entered the picture that you wanted to try a bit harder than what you otherwise would have done. If it was only for my own sake I would probably not have put as much emphasis on it."* (Informant 5)

Ensuring a healthy family life was one of the main outcomes the women hoped to achieve with the intervention. They expressed discovering serenity in doing something good in

pregnancy that would benefit themselves and the child in later life. One of the concerns that motivated their effort was a fear of providing an inferior childhood:

> *"I also think that it's important that you can be an active parent! When we have to race each other and bike together and all those thing you do with your kids! Go to the playground and those kinds of things. Well it's just the thing about being a role model I think!"* (Informant 7)

The informants further expressed concerns about causing the child to struggle with overweight in the future if they did not manage to resume control over their lifestyle prior to giving birth. This gave rise to concerns about potential negative psychosocial consequences on overweight children. For these reasons, being a role model for their child was emphasised, as indicated in the quotation above, in order to pass on healthy habits to their offspring.

Battling to achieve a healthy lifestyle during pregnancy

The women reported how they met both challenges and motivators in translating the advice received in the intervention into action. This category describes how the informants experienced these efforts while being pregnant. *Facing tangible results* were considered motivational throughout their participation. The informants expressed satisfaction with the 'small steps' method in the intervention where small and modest goals in relation to diet and physical activity were formed based on the individual's situation:

> *"... we talked a lot about that it was the small things that I had to change. Something that was manageable for me. And then we just dealt with it from one time to the other when I went to [the caregiver], whether we had to make new goals."* (Informant 7)

One example was the experience of using the pedometer to track step counts. The device was perceived to be motivating and the simplicity and visual nature increased awareness about activity levels:

> *"It's so simple, it really made me aware about how much you need to walk if you want to maintain your weight!"* (Informant 7)

> *"Give people a pedometer, and then you feel, there's always this kind of newsworthy thing about it, then you get going"* (Informant 1)

Negative experiences with the pedometer were mainly technical, for example if it had a defect or it fell off during use and thereby was not experienced to be manageable.

Reaching goals in relation to diet and physical activity as well as a sense of successfully reducing weight gain were reported to empower the women and motivate their further efforts in changing their lifestyle. This added to their overall sense of accomplishment. However, the informants reported a sense of defeat if they failed to reach their goals. For that reason making small goals was appreciated, as it was perceived to increase the likelihood of success:

> *"... it was a bit important for me to do it in a way I found realistic so I would keep doing it! So I didn't 'break my neck' too fast! It was like, ok so I will do it good as I can and as much as I can and at the same time it has to fit with my everyday life."* (Informant 4)

Nevertheless, it was recalled that, despite successful change, difficulty was experienced with increasing the ambition level above that of the 'small step' method. One opinion shared by the informants was that greater results could have been achieved had this been possible:

> *"I think I could have almost lost a bit of weight. Or at least have achieved a routine even more in relation to eating healthy and then it would have been easier when I'd given birth. That is, I could have achieved even more in relation to getting a good routine. They [the intervention] could have pushed a bit more. But that's not necessarily the intention of the project."* (Informant 1)

Succumbing to physiological constraints presented itself as a main challenge to changing dietary and physical activity behaviours in pregnancy. In relation to dietary changes, informants expressed struggling with either decreased or increased appetite, nausea and emotional eating, which made it difficult to follow dietary advice. Cravings, especially for sugary foods, were perceived to conflict with the intervention's focus on limiting such foods. One view presented by the informants was the perceived discrepancy between trying to avoid such foods in pregnancy and coping with emotional stress:

> *"Those things I used to do, well it's been a bad day now I can have a Pepsi max and a cookie. It was just out of the question. (...) It becomes your comfort blanket, and it's just pulled away from you in period that's actually, I don't know if you can call it stressful, but you are definitely under a certain pressure, both mentally and physically."* (Informant 1)

In relation to exercising the women experienced physical challenges as a result of their pregnancy such as pain and discomfort that limited their activity levels. They reported taking preventative measures to avoid straining activity that could put them or the unborn child at risk:

> *"... I couldn't exercise as much; I took care of the stomach and just walked. Perhaps I was too careful. In a gym class I felt a pinch in my stomach, then I just stopped going to the gym and walked instead. Probably I shouldn't have, probably you are too careful when you're ignorant about what you're allowed to do as pregnant."* (Informant 7)

According to the informants, facilitating aspects paired alongside demotivating aspects were part of the process of *balancing intervention and daily life* and improving their dietary and physical activity behaviour. One issue was struggling to find the needed energy and time, for example to eat when being at work:

> *"I think sometimes at my job that it can be cumbersome because I can't necessarily sit down and eat just because I'm hungry right now. And she [the caregiver] talked a lot about trying to introduce more snacks, so you don't have time to get really hungry for the bigger meals in the same way. I think that's pretty difficult when it's out of your hands because of your job for example"* (Informant 5)

Nevertheless, a busy job was reported to improve physical activity and the women found it easy to reach their step count goal if parts of their job required them to be active. Situational aspects highly influenced motivation and being in proximity of unhealthy foods at home or when visiting friends and family was reported to challenge self-control. Moreover, being of non-Danish origin presented challenges related to food preferences, as the intervention was not adapted to accommodate non-Danish culinary traditions:

> *"... you're not used to eat as much rye bread and so on. Just by looking at it, you don't really feel like it but you did it just because you had to. That was hard but I tried (...) Also because you had to eat crackers and almonds and so on and it's just not part of my diet. It's always been traditional food, rice and pasta and bread and so on. So there were quite a lot to think about."* (Informant 6)

The logistics and frequency of attending appointments with the caregiver was perceived both as facilitating and inhibiting depending on the individual's situation. For example, how far the informants had to travel, if they were attending other antenatal care appointments, or if they had to make specific arrangements:

> *"I think it was a lot that you had to run around to all the time! I have to say! And even though it was every fourth week you had to go to her [the caregiver] then with everything you also had to go to, I think that was a bit strenuous! To run to everything all the time! I also think that I cancelled a couple of times because it didn't fit in.* (Informant 8)

Furthermore, the combined focus of having to change diet and exercise in pregnancy was experienced as overwhelming. The women tended to direct more attention to improving either diet or exercise, or they simply adjusted their effort to their individual daily challenges:

> *"I thought [the combined focus] was a bit much! It was also much to just be pregnant! There were so many new things! You had to relate to go to appointments and midwife. For me it was my first child, so it was a new world for me. (...) I didn't go running for example or didn't go to the public swimming pool. So I did it as I thought it made sense in relation to my every day life. Otherwise I don't think I would have kept doing it!"* (Informant 4)

The importance of involving professionals, peers and own self in lifestyle changes

This theme emerged from informants' descriptions of receiving care and support during their participation. The informants expressed a need for a comprehensive support system that was able to accommodate the aforementioned practical and emotional challenges. The women reported using the intervention to get professional guidance and accountability throughout their pregnancy and expressed individual need for support. The theme reflects how the women experienced being part of the intervention at Hvidovre Hospital and comprises the two categories: **i)** ***Participating in the intervention is an individual experience*** and **ii)** ***Appreciating social support.***

Participating in the intervention is an individual experience

One of the main determinants for satisfaction with their participation in the intervention was facilitated by the experiences of care and support. The category describes how the women experienced receiving care in the intervention and how they felt it reflected their individual

needs for support. The informants were *expressing comfort in continuity of care* as they faced the same healthcare professional during the course of the intervention. The women conveyed their participation to be an individual experience rather than a generalised course of treatment as experienced elsewhere, for example in antenatal care. The caregiver was a certified dietician and a midwife, which was reported to be an important combination that facilitated a greater understanding of their situation. The on-going interpersonal relationship was highly valued due to the perceived sensitive nature of discussing their overweight:

> *"...I have this idea that I escaped that all the other [healthcare professionals] needed to talk about [overweight]. All of them would probably not be admonishing and so on, but some might have been. Well, I guess people are not, but it's the way you experience it being said. So I thought that was nice, that it was with her [the caregiver], because then it's someone I know, instead of all these different people you face who you only meet once in your pregnancy."* (Informant 2)

The informants described building rapport with the caregiver throughout the intervention, which provided them with a sense of encouragement, involvement and comfort in sharing their thoughts and feelings:

> *"... I'm also just a person who feeds on praise! And [the caregiver] was really good at that. I was very motivated by that! To be told that things were going well."*
> (Informant 5)

A main aspect reported to facilitate motivation and behaviour change in the intervention was the feeling of being accountable to a professional:

> *"... The thing about standing in front of someone and get weighed. Then you have something to look forward. I don't care what [the caregiver] thinks about me, but the thing about standing in front of someone and show that you have gained too much, I'm a bit proud. That thing about you wanting to prove that you can do it.. perhaps a bit of competitiveness! It kept you motivated that you had to go there every time. (...) It kept me close to the fire."* (Informant 3)

During their participation the informants felt they were *remaining on the surface of the problems* and they expressed a need for more professional attention to the individual's underlying problems related to their overweight. Diet and physical activity were experienced to be *"just a fraction of losing weight"* (Informant 8). Women expressed different reasons for

their overweight and a deeper understanding of the psychological aspects was perceived to be essential for positive outcomes to extend beyond the scope of the intervention:

> *"(...) in the long run it would have been good if you could talk about the things in your head instead of just the food, I think. Because in my situation it's not the food in itself, there has probably been other stuff that I don't actually know! But which have made me weigh too much. Because I haven't always been like that."* (Informant 4)

The informants reflected upon different possible solutions. Examples included more sessions with the caregiver, fewer but longer sessions and/or sessions with a psychologist.

Appreciating social support

The involvement of a social support network in making lifestyle changes in pregnancy was perceived to be crucial. This category describes the various experiences with social support described by the informants to be important for making lifestyle changes. *Valuing family support* communicates that the informants considered support from their partner, relatives and friends to be of high importance Ensuring a healthy child was perceived to be a *"joint project"* (Informant 1) between the women and their partners. The informants reported feeling emotionally and practically supported, for example when their partner adopted a similar healthy eating behaviour, cooked healthy meals or encouraged physical activity. Nevertheless, the informants reported individual needs for partner support, some inviting more involvement than others:

> *"He knows me well so he knew that if he pushed me too much it would have the complete opposite effect. I think he knew that he also shouldn't interfere too much! But I think that he has supported it because it's also in his interest that me and the baby would be as healthy as possible."* (Informant 5)

Despite feeling emotionally supported in their choice to participate in the intervention, the informants reported difficulties in adhering to a healthy diet when their partner deviated from the dietary guidelines:

> *"It's a bit easier when you only have yourself to be responsible for. When he's also there he brings temptations or he just bought something that he felt like. And then it's sitting there and then you have to be really steadfast and I'm not so good at that."* (Informant 7)

For that reason it was also conveyed that being alone facilitated healthy eating, for example when the partner was away or being a single mother. Relatives and friends were predominantly used for emotional support, such as receiving encouragement throughout the intervention:

> *"I told my parents and my family that I had accepted this offer, in order to talk things through. I just felt the need for saying, I think this is pretty annoying but listen there's this offer, which I had accepted. And they were just like, what a great idea and you should do it. So they have also been a big part of it, the family around me."*
> (Informant 4)

In the interviews, the women spontaneously expressed *requesting intervention peer group support* during the intervention as well as postpartum. They reflected on the effect of sharing and discussing their situation with other women in the intervention or with others struggling with weight issues. An example was exercising with others:

> *"I think you would also have the sense of community about it. That if you went to an exercise class that was for people in the project or for overweight pregnant women. Then it would be a bit more like, you would go to the public swimming pool together, to get a bit motivated to go. I think that would have been good for me in order to increase the exercise."* (Informant 2)

Another example included emotional support through supervised peer group sessions, which were perceived to have a positive influence on motivation and to provide the women with a stronger social support network with whom they could share some of their concerns. This aspect was perceived to be missing in the intervention.

The challenges of maintaining lifestyle changes after birth

The intervention was discontinued after the birth and the informants reflected upon how they experienced maintaining lifestyle changes during postpartum. The informants reported struggling with motivation and they experienced losing control of the healthy habits they had formed during their participation. One crucial aspect was no longer being accountable to someone and no longer receiving support from a professional. Despite the intention of the overall project to encourage follow-up in the municipalities, the women did not receive any support that focused on lifestyle. Based on the category ***Motherhood takes precedence over***

health during postpartum and the adhering sub-categories, this theme illustrates the women's experiences during postpartum in relation to maintaining their motivation now and in the future.

Motherhood takes precedence over health during postpartum

Becoming a mother was perceived to be a huge life transformation that required various adjustments. A great challenge encountered was *adjusting to the postpartum life* and facing the emotional and physical changes of motherhood. At the time of interview, the women were approximately three months postpartum and on maternity leave. The women reported being sleep deprived and overwhelmed with their maternal role and therefore struggled to find time and energy for anything but caring for their newborn child. For that reason they experienced difficulties in consciously eating healthy and exercising. Being able to breastfeed was perceived to facilitate weight loss and women reported having successfully lost weight after birth without much effort. However, the effortlessness seemed to decrease motivation to eat healthy and informants expressed concerns about weight gain when breastfeeding stops:

> *"It's a focal point when I will stop breastfeeding at some point, because you know that's when there are a lot of calories that disappear, so you can eat a lot more now than I will be able to in two months. And that will be a challenge! It's probably smart to gear down beforehand so you don't have to gear down a lot at that point. I'm thinking that will be a challenge!"* (Informant 1)

The informants who were not able to breastfeed also expressed decreased motivation, as they no longer influenced the newborn child through direct transmission. Additionally, caring for the child and coping with physical pain and discomforts from caesarean section or other birth related injuries limited women's possibilities for keeping up activity levels:

> *"Well the exercise is a town in Russia! Because I still have problems with my pelvis so I can hardly do anything! I can take a walk. But I can't walk very fast and I can't walk very far! It's pretty challenging and it's pretty annoying I think. Because now you had an opportunity for creating new habits!"* (Informant 5)

One opinion viewed maternity leave as being a temporary state perceived to demotivate any current lifestyle efforts. For that reason informants chose to postpone efforts until they had retrieved more structure in their lives by returning to work or school:

> *"I think it's difficult to create habits when you're on maternity leave because it will end again! (...) So I think it's a bit difficult to create an everyday life, because it's not an everyday life!"* (Informant 5)

Routines, planning and social support were described to facilitate the likelihood of eating healthy and exercising postpartum. Examples included online grocery shopping, pre-made food and setting up arrangements with their partner or family to find time to exercise and cook. Moreover, women described rejoicing in motherhood and they experienced walking with the baby carriage as enjoyable, manageable and to facilitate physical activity. Fear of complications in their second pregnancy and physical appearance were perceived to facilitate future motivation:

> *"Well, [motivation] will probably come from this vanity thing again. The thing about being so close to your goals (...) then I wouldn't be especially overweight and would also look fairly good in most of my clothes and so on."* (Informant 1)

Given their new role as a mother and facing new challenges as described above, the informants spontaneously expressed *wanting professional support during postpartum*. Lacking accountability to a professional and struggling with motivation were issues perceived to dominate their current situation. The women reflected upon the positive influence that sessions with the caregiver could have provided postpartum, such as emotional support and practical suggestions for how to eat and exercise during postpartum. An overall shift in focus from the health of the mother to the wellbeing of the newborn child was conveyed. Informants put their own needs aside for the sake of their infant and also experienced the focus in the health sector changed, especially with the health visitor:

> *"Even though you have the health visitor that comes visit you, that's different. She is thinking more about the child, if there is anything and so on. But the mothers themselves, they are also important!"* (Informant 6)

For that reason, the women struggled to maintain the healthy habits they had gained during their pregnancy without the needed support and motivation to guide them.

4. Discussion

This study explored obese women's experiences of making lifestyle changes in pregnancy. The key findings showed that changing health behaviour in pregnancy is an ambivalent endeavour involving various individual challenges but also several facilitating aspects. Engaging in lifestyle changes requires personalised care and a comprehensive support system involving partner, relatives, friends, peer groups and professionals at various levels to motivate behaviour change. The postpartum period is an especially challenging period for women. Without professional support, health behaviours become increasingly difficult to maintain as motherhood and caring for the newborn child takes precedence over health concerns.

Are lifestyle interventions during pregnancy justified?

The main rationale for conducting interventions during pregnancy is that women are more susceptible to health messages because they want to ensure the health of their baby (Mills et al., 2013, Phelan et al., 2014, Smith and Lavender, 2011). Similarly, the findings from the current study found that the women perceived the timing of the intervention to be appropriate. The unborn child strongly motivated the women to engage in dietary and physical activity change. The study further found that women responded well to tangible goal-setting, for example, by using a pedometer to assess physical activity. Believing in one's capability to achieve goals is recognised as an important part of perceived self-efficacy to exercise control over health actions and change behaviour (Green and Tones, 2010). Self-efficacy is highly dependent on past experiences with success and failure. The intervention's innate focus of making small goals was perceived to enhance success and empower the women to continue their efforts to change.

Barriers for making lifestyle changes in pregnancy frequently referred to are physiological constraints such as changes in appetite and physical discomforts in pregnancy (Sui et al., 2013, Johnson et al., 2013). The women reported similar challenges and further shared that they struggled with finding time and energy in their daily lives to concentrate on eating healthy and exercising as well as attend the regular counselling sessions. They reported difficulty with the combined focus on diet and physical activity, as it was perceived to be an

overwhelming endeavour. Achieving nutritional balance during pregnancy is a challenge for any woman, particularly when facing hunger changes such as cravings for certain foods. Being obese might enhance this aspect and the women shared that food was often used as a remedy for seeking comfort or pleasure, which was sometimes perceived to conflict with the focus on healthy eating. It is therefore crucial that dietary and physical activity interventions are adapted to each woman's capacity and interests to achieve maximum motivation and adherence, including accommodating diverse culinary traditions. This is assumed to support the women in their endeavour to improve their lifestyle and increase success with reducing GWG during pregnancy.

The importance of personalised care in lifestyle interventions

Women reported that they experienced an improved self-image during pregnancy as well as greater personal and societal acceptance towards their body. Previous research has documented similar findings and pregnancy has been reported as a special time where perceptions of health and weight differ from perceptions prior to pregnancy (Sui et al., 2013). It is widely established that obesity is stigmatised in the general public (Sikorski et al., 2011). Apart from negative psychosocial influences, Mulherin et al. (2013) found that women with a higher BMI reported more negative experiences with maternity care than women of lower weight. The current study findings brought to light the importance of addressing weight stigma when designing lifestyle interventions, especially at the initial contact. Research focusing on care delivery in pregnancy has highlighted the need for healthcare professionals to address obesity in a sensitive manner to avoid weight stigma (Heslehurst et al., 2011, Johnson et al., 2013). The women in the actual study perceived that their weight was addressed in an insensitive and impersonal manner when they received the mail informing them about participation, which conflicted with their desire to rejoice in their pregnancy and made them question their participation in the intervention. This raises concerns about women opting out from participating in a much-needed intervention for fear of being looked upon in a condescending manner. According to Amy et al. (2006), overweight people often perceive weight stigma in healthcare and are reported to delay their engagement with medical appointments. Given the public health importance of preventing maternal obesity it is of high priority to ensure that women are not discouraged from participating in targeted lifestyle interventions.

Findings from an intervention study in the UK emphasised the importance of continuity of care and further identified the lack of continuity as main reason for drop-out (Baker, 2011). The current study revealed that facing the same caregiver throughout participation was highly appreciated among the women as it reportedly reduced anxiety of being stigmatised and instead encouraged adherence and motivation to change behaviour. Further, findings from this study, as well as in past research, show that a personalised approach can have positive outcomes for obese women participating in a lifestyle intervention (Nyman et al., 2010, Smith et al., 2012). In contrast, Sui et al (2013) found the involvement of healthcare professionals to be of lesser importance and instead highlighted the meaning of family and peer group support. While this aspect was also emphasised in the current study, in particular support from partners and peer groups, the findings demonstrated that motivation and adherence to behaviour changes were mainly facilitated by the caregiver. The women shared that they felt more obligated to make an effort when facing a healthcare professional. The observed difference may be explained by variations in individual preferences and needs for care and support.

The current study suggests that much effort is needed from healthcare professionals working with lifestyle interventions to identify and understand the individual's daily challenges in order to provide targeted support. Studies focusing on healthcare professionals' views on caring for obese pregnant women imply that communicating and discussing obesity-related issues can be challenging both in terms of providing the appropriate information and avoiding posing judgment on the women in a vulnerable situation (Heslehurst et al., 2013b, Smith et al., 2012). Women in the actual study highlighted lack of attention to the reasons behind their overweight, which may relate to a reluctance to address issues that are potentially perceived to offend the women. Integrating psychological components in maternity care of obese women has previously been suggested by Furber et al. (2011) to increase the understanding of the complexity of being obese. In the pursuit of improving lifestyle interventions to encompass the ambivalent emotional challenges faced in pregnancy, specialised training or the involvement of a psychologist could benefit both the women and the caregivers.

Ensuring long-term health benefits is a challenge

Smith and Lavender (2011) state that the postpartum period is the most appropriate time for weight management, as women generally want to lose weight after birth. In the postpartum period the women no longer received support through the intervention at Hvidovre Hospital.

However the women identified the period as a critical point in time. Women shared that they would have preferred support to be available during this period as they were overwhelmed with the new role of motherhood and struggled to focus on health behaviour, lacking both time and energy to engage in healthy cooking and exercise. The maternity leave was furthermore perceived to be a temporary state where caring for the newborn child was prioritised. Therefore women postponed weight management until they gained more structure and routine in their lives, for example returning to work or school. These findings are in accordance with a study focusing on motivational counselling targeting obesity-related behaviour, which further concluded that returning to work provided a opportunity for targeting dietary and physical activity behaviours (Price et al., 2012).

Focusing on weight management during the postpartum period is of high relevance to public health as studies show that weight retention increases the risk of long-term obesity (Schack-Nielsen et al., 2010, Mannan et al., 2013). Efforts could be made to avoid the adverse risks of obesity in subsequent pregnancies to benefit both the mother and the offspring. The objectives of the intervention at Hvidovre Hospital involved ensuring short- and long-term health benefits for the mother and child. Nevertheless, concerns arose from the interpretation of the findings whether the women would be motivated to maintain long-term health behaviours when no longer receiving professional support through the intervention. Additionally, none of the women reported receiving follow-up on their lifestyle changes from the primary health sector in the municipalities.

The findings can be viewed in the light of the Self Determination Theory (SDT), originally developed by Deci and Ryan (1985). The basic processes of the SDT define motivation as the main predictor of successful health behaviour change. The theory is often used in weight loss interventions to increase motivation and achieve sustained behaviour change (Teixeira et al., 2012). Personal autonomy is a central concept in the SDT. It determines whether behaviour change is self-determined: if a person engages in a behaviour based on personal choice and pleasure as opposed to changing behaviour because of feelings of pressure, guilt or obligation. In that case the motivation becomes controlled and behaviour is highly regulated by external influences.

For health behaviours to become self-determined, they have to be considered important for the individual and in accordance with ones core values, such as overall health goals. In the current study, the women conveyed that physical appearance and ensuring a healthy life for their family were their main motivations to engage in the lifestyle intervention during pregnancy. In the context of the SDT, physical appearance is highly influenced by social constructs about body image and thus considered a less autonomous motivation to change. Nevertheless, ensuring family health, and in particular the health of the unborn, can be considered overall health goals that will enhance the likelihood of behaviour change being self-determined. This may add to an explanation of why the women face difficulties after birth, as becoming a mother changes the nature of one's goals. The women still reported wanting a healthy family life, however their overweight no longer directly imposed an immediate risk to the health of the child. Instead the women assigned much of their motivation during postpartum to losing weight in order to improve own physical appearance and thus postponed lifestyle changes, potentially creating a less autonomously regulated situation.

Motivational counselling sessions, as experienced in the intervention, offer the possibility to define goals for behaviour change that are coherent with overall values and health goals. However, Teixeira et al. (2012) argue that there is a risk to any treatment that patients will internalise the message that their disorder is under the responsibility and *steering* of an external expert. This is in accordance with the women's descriptions of using the intervention to be *accountable* to a health professional. This further highlights the importance of extending intervention support to the postpartum period to help the women set new goals in light of facing new challenges with making healthy lifestyle changes in motherhood. Assigning importance to the underlying issues, as requested by the women, could also help uncover reasons for weight management that could provide more permanent motivation to change behaviour. Lastly, emphasising the involvement of partners and peers in lifestyle interventions may be crucial as the findings show that social support help facilitate and demotivate change during pregnancy and postpartum.

4.1 Methodological considerations

According to Dahlgren et al. (2007) the strengths and limitations of a qualitative study are assessed by the trustworthiness of the findings, including criteria such as *credibility, transferability, dependability* and *conformability* of the findings. *Credibility* refers to the study's ability to capture the multiple and subjective realities of the informants. This was enhanced through purposively sampling the informants with as much variation as possible in relation to age, educational background, occupation and ethnicity to capture nuanced experiences of the same phenomenon. The PI had an academic background in public health nutrition and therefore a pre-knowledge in regards to the subject of maternal obesity that enhanced the understanding of the informants' contextual descriptions of the phenomenon. Research is normally discontinued when saturation is reached. Saturation occurs when no substantial information about the phenomenon being studied is generated by further interviews (Dahlgren et al., 2007). All informants who agreed to participate were included in the sample, which raises concern about whether findings were saturated and new aspects could have arisen if more informants had been included. The PI assessed that the final interview was in accordance with the information provided in the previous interviews and that it added very few new aspects to the research problem. It was for that reason assessed that the amount of interviews was considered sufficient to provide a rich understanding of the phenomenon being studied.

A possible limitation was that the gatekeeper played a key role in the intervention as well as in the sampling of the informants. This could have biased the selection of informants, for example only reflecting positive cases in the interviews. Furthermore, recruitment could also have biased findings if the informants perceived the PI to be affiliated with the intervention and thus felt uncomfortable sharing negative experiences. To minimise these limitations, the role of the PI as a Masters student from Lund University was thoroughly emphasised in the information letter and in beginning of the interviews. Additionally, the informants were encouraged to share both positive and negative experiences. Recall bias could also have been an issue as informants reflected upon experiences in pregnancy, which may be perceived in a different light after becoming a mother. While some informants occasionally struggled to recall certain experiences, most shared detailed and rich descriptions. Credibility could have been further enhanced through *member checking* where informants

verify interpretations (Creswell, 2013). *Transferability* explores the applicability of the findings (Dahlgren et al., 2007) and was increased by thoroughly describing the study setting and by clearly displaying the data collection and analysis process in the final paper. *Dependibility* is the ability for the researcher to account for the changing conditions of the phenomenon being studied and *confirmability* of the findings refers to the neutrality of the data (Dahlgren et al., 2007). Both was enhanced by keeping memos throughout the research process and by recording and transcribing the interviews as well as by discussing preliminary findings throughout the research process with the supervisor (Dahlgren et al., 2007).

5. Conclusion

The findings showed that women are susceptible to receiving lifestyle intervention during pregnancy because of their overall health goals for themselves and their family; however, the mode of care delivery needs to be personalised to the individual's context. Special attention must be given to the underlying issues of overweight. It is important that weight stigma is addressed when targeting obese pregnant women to avoid potentially discouraging women from participating in preventative lifestyle interventions. The postpartum period is an especially challenging period and without professional support, health behaviours become increasingly difficult to maintain. It is recommended that a comprehensive support system, involving partner, peers and professionals, be ensured during pregnancy and extends to the postpartum period, Women may then in turn be more motivated to resume a healthy lifestyle after birth. This is of great public health importance to prevent obesity and adverse outcomes for the mother and child.

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Table 1: Characteristics of the informants

Identity code	Age	Educational level*	Occupation	Partner	Ethnicity
Informant 1	30	Higher	Unemployed	Yes	Danish
Informant 2	36	Higher	Unemployed	Yes	Danish
Informant 3	28	Medium	Healthcare worker	Yes	Danish
Informant 4	40	Higher	Civil servant	No	Danish
Informant 5	28	Medium	Healthcare worker	Yes	Danish
Informant 6	28	Medium	Healthcare worker	Yes	Non-Danish
Informant 7	30	Lower	Student	Yes	Danish
Informant 8	30	Medium	Healthcare worker	Yes	Danish

*Based on the indexing of the central authority on Danish Statistics: lower educational level = primary education (9-10 years); medium educational level = upper secondary education (10-12 years); higher educational level = tertiary education (13-20 years) (Fribert Jacobsen, 2004)

Table 2: Example of the manifest analytical process

Unit of analysis	Condensed meaning unit	Codes	Sub-category	Category
But when he can start to eat then he.. he mirrors us, and I would be really sad if was to become an overweight child. I don't think there's any to reason for that to happen. To have that challenge with you, right. Ehm... so.. so I hope that will be some kind of.. motivation to get started, right. To eat healthier when he has to sit and eat the same food as us! something, there's just some soup in the fridge that has to be heated in the microwave, right. So that's probably also something, we also talked quite a lot about that!	When he starts to eat, mirror us, I would be sad if he became an overweight child. There's no reason to have that challenge. I hope it will motivate to get started, eat healthier when he eats the same food as us.	Fearing overweight child Fearing psychosocial implications of child's overweight; Taking responsibility of healthy family life;	Seeking health for the sake of the family	Accepting lifestyle intervention to gain control over family's health

Table 3: Themes, categories and sub-categories

Categories and sub-categories describing the manifest meaning	Themes interpreting the latent meaning
Facing ambivalent emotional responses to pregnancy and obesity • Struggling to rejoice in pregnancy • Succumbing to obesity • Improved self-image ***Accepting lifestyle intervention to gain control over family's health*** • Knowing what to do • Seeking health for the sake of the family ***Battling to achieve a healthy lifestyle during pregnancy*** • Facing tangible results • Succumbing to physiological constraints • Balancing intervention and daily life	***The ambivalent endeavour of fighting obesity during pregnancy***
Participating in the intervention is an individual experience • Expressing comfort in continuity of care • Remaining on the surface of the problems ***Appreciating social support*** • Valuing family support • Requesting intervention peer group support	***The importance of involving professionals, peers and own self in lifestyle changes***
Motherhood takes precedence over health during postpartum • Adjusting to the postpartum life • Wanting professional support during postpartum	***The challenges of maintaining lifestyle changes after birth***

Appendix I: Information letter

(In Danish)

Oplevelsen af at være en del af Hvidovre Hospitals projekt omhandlende livstilsændringer i forbindelse med graviditet

Jeg læser en kandidat i Folkesundhedsvidenskab på Lund Universitet, og jeg skriver mit speciale i samarbejde med Hvidovre Hospital. Specialet handler om kvinders oplevelse af at deltage i Hvidovre Hospitals projekt omhandlende livstilsændringer i forbindelse med graviditet.

Din deltagelse
Du er inviteret til at deltage i et interview, da du er deltager i projektet på Hvidovre Hospital, og det er minimum tre måneder siden du har født.
Dine erfaringer er værdifulde i forhold til at forstå hvilke faktorer, der spiller en rolle i forhold til succesfuldt at opretholde motivationen til en sund livstil under og efter graviditet. Jeg er interesseret i dine erfaringer og din personlige fortælling, både positivt og negativt. Denne viden vil kunne bidrage til en fælles viden omkring at ændre livsstil under graviditet samt være med til at forbedre projektet fremadrettet. På baggrund af dit og andre interviews vil de samlede pointer blive analyseret, og resultaterne vil blive brugt udelukkende med videnskabelig interesse.

Information vedrørende tavshedspligt
Din deltagelse er fuldkommen **frivillig og anonym** og interviewet kommer ikke til at betyde noget for dit forløb i forbindelse med projektet. Informationen fra interviewet er **fortroligt** og dit navn vil blive anonymiseret, så det ikke kommer til at fremgå nogen steder.

Om interviewet
Selve interviewet tager omtrent 40-50 minutter og vil med din accept blive optaget til brug i analysen. Interviewet vil foregå enten hos dig eller et andet sted, du finder behageligt.

Hvis der forekommer spørgsmål under interviewet, som du ikke ønsker at svare på, kan du blot give besked, og jeg vil fortsætte med det næste spørgsmål.

Kompensation
Som studerende har jeg desværre ikke mulighed for at yde nogen kompensation for din deltagelse, men jeg tilbyder hellere end gerne kaffe/te og forfriskninger, alt efter hvad der er praktisk i forhold til hvor interviewet kommer til at foregå.

Kontakt
Såfremt du har nogen spørgsmål, kan du altid kontakte mig på telefon +45 2161 6143 eller Annette Weisleder på telefon +45 2128 6235. Hvis du ønsker at kontakte Lund Universitet, kan du altid gøre det gennem uddannelsessekretær Maria Scherling på mail: maria.scherling@med.lu.se.

Jeg takker dig fordi jeg måtte kontakte dig, og såfremt du accepterer at deltage, beder jeg dig sammen med mig gennemgå en samtykkeerklæring, og udfylde den før vi går i gang med interviewet.

Venlig hilsen

Mette Mølgaard Pedersen
Kandidatstuderende i Folkesundhedsvidenskab ved Lund Universitet

Appendix II: Topic guide

(Translated from Danish)

Time of interview:
Date:
Place:
Interviewer: Mette Mølgaard Pedersen
Informant:
Age:

Other info (education, job, marital status, ethnicity):

Short introduction:

I am a MSc student in Public Health from Lund University. As part of my master thesis, and in collaboration with Hvidovre Hospital, I am carrying out interviews with participants from the lifestyle intervention who wish to voluntary partake. I am not informed about your individual course at Hvidovre Hospital but I would like to get to understand your personal experiences as described by you as this might provide valuable information for understanding what facilitates lifestyle change during and after pregnancy. Furthermore results might help improve the intervention in the future.

- No right or wrong answers – I am interesting in positive, negative, different accounts – please describe your experiences as detailed as possible – I will be taking notes during our conversation
- Accept of recoding and subsequent
- Assure anonymity
- Right to interrupt interview at any time
- Any questions before we start?

Topics:

1. Experiencing the intervention

1.1 Participation

- Can you describe as detailed as possible your experiences with participating in the lifestyle intervention at Hvidovre Hospital?
- What considerations did you make before accepting to participate?
- What made you accept?

1.2 Dietary changes

- Can you describe as detailed as possible your experiences with changing dietary habits? (probe: in general, in relation to the guidance, etc.)
- What challenges did you face in relation to following guidelines? (probe: resources: economy, time, energy; cravings, etc.)
- What helped motivate you in relation to following the dietary guidelines?

1.3 Physical activity

- Can you describe as detailed as possible your experiences with changing physical activity? (in general, in relation to the guidance, activity level before pregnancy, etc.)
- Can you describe what challenges you faced in relation to the guidelines? (probe: resources, physiological, psychological, support, availability, etc.)
- What helped motivate you in relation to following the dietary guidelines?
- Experience with self-monitoring (voluntary use of pedometer, registration, etc.)

- How did you experience focusing both on diet and physical activity?

1.4 Healthcare personnel

- Can you describe as detailed as possible your experiences with meeting healthcare professionals in relation to your pregnancy? The intervention?
- How did you experience the information received in the course?
- How did you experience the communication?

2. Significance of social network

- Can you describe as detailed as possible how your relatives was involved? What did this mean to you?
- How did you experience support in the course?
- (If suitable, influence of media, tv etc)

3. From pregnancy to postpartum

Can you describe as detailed as possible your experiences with coming home and being on maternity leave?

- How did you experience maintaining dietary habits and exercise?
- Can you describe the challenges you have faced?
- What has helped motivate you?
- Have you received any offers from the health visitor/GP/ health centre etc.?
- If so, what did you think about it? How was the transition from Hvidovre to this? (content, quality, design)

4. Overall

- When you look back what was the best/worst experiences?
- How did the offer live up to your expectations? Anything you wanted done differently?
- Any suggestions for improvements?

5. Closing remarks

Any questions – any closing remarks?

(Gather background information if agreed upon)

Thank you for your participation! (turn off audio)

How did you experience the interview?

LUND UNIVERSITY
Faculty of Medicine

Appendix III: Informed consent form

(In Danish)

Informeret samtykke til deltagelse i en kvalitativ interviewundersøgelse

Oplevelsen af at være en del af Hvidovre Hospitals projekt omhandlende livstilsændringer i forbindelse med graviditet

Erklæring fra deltageren:

Jeg er inviteret til frivilligt at deltage i en interviewundersøgelse med fokus på oplevelsen af at være en del af Hvidovre Hospitals projekt omhandlende livsstilsændringer i forbindelse med graviditet.

Jeg har fået skriftlig og mundtlig information, og jeg ved nok om interviewundersøgelsen til at kunne sige ja til at deltage. Jeg er bekendt med, at deltagelse er anonymt, forstået på den måde at mit navn ikke kommer til at fremgå nogen steder og jeg kan til enhver tid trække samtykket tilbage. Jeg har haft mulighed for at stille spørgsmål og fået tilfredsstillende svar derpå.

Jeg giver samtykke til at deltage i interviewundersøgelsen, og jeg har fået en kopi af dette samtykkeark samt en kopi af den skriftlige information om undersøgelsen til eget brug.

Deltagerens navn

_____

Deltagerens underskrift

_____

Dato _____
Dag/måned/år