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SHAME AND STIGMA IN WEIGHT MANAGEMENT DURING PREGNANCY AND POST BARIATRIC SURGERY

- PERSPECTIVES OF PATIENTS AND HEALTHCARE PROVIDERS

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Shame and stigma in weight management during pregnancy and post bariatric surgery

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THESIS FOR DOCTORAL DEGREE (Ph.D.)

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To Irma, my wonderful loving daughter.

Your personal strength and determination to pursue your greatest interests inspire me. Thank you for your patience and understanding during these six years, and for excellent everyday cooking! I love you endlessly, and more!

This too shall pass!

Medieval Sufi poetry

ABSTRACT

Background:

Body mass index (BMI) increases across the world, yet there is an alarming lack of obesity prevention and treatments that are effective, harmless and available for everyone in need. Stigmatizing attitudes towards people with obesity and discrimination are widespread, adding to the individuals' burden of medical risks. Achieving large and sustained weight loss by dieting and exercise alone, is extremely difficult. Bariatric surgery is the most effective method for long-term weight loss success, but even after weight loss surgery, weight regain may occur. Thus, there is a need to explore both how patients may be supported to obtain best possible surgery outcome, but also to explore how obesity may be prevented.

Excessive gestational weight gain (GWG) is associated with the development of obesity, both in women and offspring. In addition, excessive GWG increase the risk for adverse pregnancy events. Even with intervention programs developed to promote a healthy lifestyle and limit GWG, many pregnant women still gain excessively, indicating that there is room for improvement also in gestational weight management support.

The overall aim of this thesis was to identify potential areas for improvement in two different existing weight interventions (bariatric surgery and gestational weight limiting interventions) focusing on communication and social interactions between patients and their health care providers, family and friends. Specific aims were: to characterize women's perceived reasons for their excessive postpartum weight retention (I), to identify barriers and facilitators in communication about body weight in pregnancy from the perspective of midwives, and of women with obesity (II, III), and to explore perceived and preferred support in patients with weight regain after bariatric surgery (IV).

Methods: All four studies were qualitative and explorative and used semi-structured interviews. Study I contains data from 15 women with ≥10kg weight retention one year postpartum, about their perceived reasons for their unhealthy weight development. Study II explored how 17 midwives in maternity care initiate and discuss the topic of body weight with pregnant women. In study III, focus groups and individual interviews were used to collect data from 17 women of reproductive age with obesity, about their opinions and wishes regarding future weight management and treatment in maternity care. Study IV collected interview data from 16 patients who experienced weight regain after bariatric surgery, about how they perceived, and would have preferred to be supported by family, friends and health care. Qualitative data from study I and II were analysed using manifest and latent content analysis respectively. Thematic analysis was used to process the data from study III and IV.

Results: In study I, women commonly used eating as a way to relieve both psychological and physical discomfort, e.g., pain, nausea, stress or depression. Women perceived midwives as unconcerned about weight, and believed that own lack of knowledge about GWG recommendations, misconceptions about the feasibility of postpartum weight loss, barriers to

physical activity, and lack of weight management support, contributed to their excessive postpartum weight retention.

In study II, all midwives acknowledged obesity and excessive weight gain as important health risks that should be addressed in pregnancy. Meanwhile, several midwives found it hard to combine their professional tasks, i.e., talking about body weight with women with obesity, while also trying to attend to women's emotional needs. As a result, some midwives avoided the topic of body weight so as not to cause concern, induce shame or make pregnant women feel guilty. Midwives wished to receive education about obesity, training in communication skills, and access to supervision in complicated cases. Both midwives and women in study I and III desired access to dieticians, physiotherapists and psychologists/ counsellors.

In Study III, most women described that they wanted information about risks and recommendations regarding weight gain in pregnancy. However, it was emphasized that discussions about body weight need to be conducted in a respectful manner, and non-judgmental atmosphere, or else women may "close their ears" to advice and information. Women suggested that midwives should ask for permission to talk about body weight, assess women's previous knowledge, assess any need for psychological support, focus on positive health messages, use words like BMI and weight category (as opposed to obese or obesity), and offer individualized advice if women wanted it.

In study IV, patients with weight regain experienced the years following bariatric surgery as a lonely struggle, where unfavourable treatment or lack of support increased the feeling of abandonment. Other people were seen as both positive sources of acceptance, compassion and respectful treatment, as well as sources of external control functions (primarily health care providers) that may facilitate the maintenance of healthy habits. Participants commonly blamed themselves for the weight gain. Shame and fear of being judged affected patients' inclination to engage in social activities and seek medical care. Concrete actions (such as healthy eating or exercising together), empathetic treatment, pro-active healthcare and access to dieticians, physiotherapists and psychological support were desired.

Conclusions: The shame associated with obesity or excessive GWG may constitute a salient communication obstacle in gestational weight management. Efforts may be needed to ensure that weight discussions are not avoided by midwives due to lack of time, material, obesity knowledge or communication skills. Self-blame and fear of stigmatizing treatment may lead to reluctance to seek medical help among patients with post-surgery weight regain. Pro-active follow-up, and increased knowledge in health care providers about causes of obesity and weight loss surgery procedures may be beneficial. Access to a multidisciplinary team may improve weight interventions as well as midwives' work situation.

Keywords: bariatric surgery, gestational weight gain, gestational weight management, motivational interviewing, obesity management, postpartum period, shame, stigma, weight loss

LIST OF SCIENTIFIC PAPERS

I. Christenson A, Johansson E, Reynisdottir S, Torgerson J, Hemmingsson E. Women's perceived reasons for their excessive postpartum weight retention: a qualitative interview study.
PLOS ONE. 2016 Dec 9;11(12): e0167731

II. Christenson A, Johansson E, Reynisdottir S, Torgerson J, Hemmingsson E. Shame and avoidance as barriers in midwives' communication about body weight with pregnant women: A qualitative interview study.
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A lonely struggle: A qualitative study of perceived and preferred social support in patients experiencing weight regain after bariatric surgery.
Manuscript

CONTENTS

LIST OF ABBREVIATIONS AND CONCEPTS

Bariatric surgery	Surgery on the stomach and/or intestines for weight loss
BMI	Body Mass Index (kg/m^2)
CVD	Cardiovascular Disease
GBP	Gastric Bypass
Gestational	Pregnancy-related
GWG	Gestational Weight Gain (weight gain during pregnancy)
HBM	Health-Belief-Model
IMS	Information-Motivation-Strategy
IOM	Institute of Medicine (US)
LAGB	Laparoscopic Adjustable Gastric Banding
LGA	Large for Gestational Age
Macrosomia	An infant with >4 000 g birth weight (definitions vary between >4 000g and >4 500g)
MI	Motivational Interviewing
Nadir	The lowest weight measured after bariatric surgery
Parity	The number of times someone has been pregnant and carried the pregnancies to a viable gestational age
SGA	Small for Gestational Age
TTM	Transtheoretical model
WHO	World Health Organization
Y	Years
%EWL	Excess Weight Loss =[(Initial Weight) – (Postop Weight) / (Initial Weight) – (Ideal Weight)] (Ideal weight being the weight that corresponds to a BMI of 25 kg/m^2)

1 INTRODUCTION

Obesity is one of the leading causes of death and disability in the world [1]. However, the public knowledge level about the causes of obesity is generally low and misconceptions are common [2]. Stigmatizing attitudes towards people with obesity are widespread [3,4] and seem to be increasing [5].

During my over 20 years of clinical work with obesity, numerous patients have told me how they were bullied as children and/or have been met with disrespectful treatment as adults due to their size. Furthermore, patients have described how their repeated weight loss failures have led to self-blame and shame, adding to the individuals' burden of medical risks. The strong psychological pressure to lose weight, both from within themselves and from society has sometimes induced weight loss attempts that are extreme or even dangerous. To achieve and maintain a large weight loss by non-surgical interventions has proven difficult [6–8]. Bariatric surgery in turn, is an effective method, but not without risks, and some patients regain weight [9]. Thus, there is a lack of obesity treatments that are effective, harmless and available for everyone in need [2]. Improved ways of treating, as well as preventing obesity are urgently needed.

Many female patients have described to me how their child-bearing period was the start of, or contributed to their unhealthy weight trajectory. The association between excessive gestational weight gain (GWG) and subsequent higher Body Mass Index (BMI) has been confirmed by several scientific reports [10–12]. In addition, excessive weight gain during pregnancy is associated with increased risk for gestational adverse events, regardless of pre-pregnancy BMI [13]. Moreover, pregnant women's GWG and lifestyle may also increase the risk of obesity in the offspring [14,15]. Hence, successful health promoting interventions during pregnancy may possibly prevent obesity in two generations, as well as limit the risk for adverse pregnancy events. However, even with weight interventions during pregnancy, about 30-60% of women still gain excessively [16–18].

During my years of supervising midwives, and lecturing about obesity for health care providers, I have noticed that obesity knowledge and attitudes towards working with weight interventions vary considerably. A genuine will to help on the part of health care providers, is often coupled with frustration over a lack of effective weight loss tools.

So, to identify potential areas for improvement of existing weight interventions (bariatric surgery and gestational weight limiting interventions) this thesis sought to explore and illuminate factors and circumstances that act as barriers or facilitators in weight management interventions. Specific focus has been on communication and social interactions, bearing both the perspectives of patients and healthcare providers in mind.

2 LITERATURE REVIEW

2.1 OBESITY

Definition

Obesity is defined by the World Health Organization (WHO) as an abnormally large accumulation of body fat that may have a negative impact on health [19]. A commonly used measure for obesity is the body mass index (BMI) which is a way to adjust weight for height by dividing weight in kg by the square of height in meters (kg/m^2). A BMI of 30 kg/m^2 or above is classified as obesity (**Table 1**). There is ongoing research to establish differentiated BMI cut-offs for different ethnic groups. Asians for example have a different risk-profile, with increased risk for cardiovascular diseases (CVD) and diabetes type 2 at a lower BMI than Caucasians [20].

Table 1. *Classification of Body Mass Index according to the World Health Organization.*

Classification	**Body Mass Index (kg/m^2)**
Underweight	<18.5
Normal weight	≥18.5–24.9
Overweight	≥25.0–29.9
Obesity Class I	≥30.0–34.9
Class II	≥35.0–39.9
Class III	≥40.0

BMI has proven useful to estimate body fat in populations. Importantly, it is the excess *fat* that is the cause of comorbid conditions, and not just excess *weight* [21]. Thus BMI has been criticized and suggested to both under, and over-diagnose people with obesity [21]. However, studies that used more precise measures of body fat, e.g., bio-impedance, showed that there is a higher risk of under- than over-diagnosing people as obese [22]. Unfortunately BMI does not provide information about fat distribution, which is important since, e.g., abdominal fat is more associated with insulin resistance, hypertension, CVD and cancer, than fat located in the leg or gluteal region [23–25]. Despite these limitations, BMI remains clinically easy to assess, and the most used measure to estimate fat mass.

Prevalence

The prevalence of obesity is rising across the world [26], and has tripled since 1975 [19]. In Sweden the prevalence of obesity in adults (16-84 y) is 11-21% in men and 12-22% in women, depending on region [27]. Although the steady increase in BMI applies to the whole population, there is a strong association between obesity and educational level, with the highest prevalence among those with low education [28]. The proportion of obesity is also greater in rural municipalities than in large towns, and among people older than 45 years of age compared to younger [27].

Aetiology

Obesity develops over time when there is a consistent larger energy intake than energy expenditure. This common and simplified explanation is a potentially problematic narrative that may cause weight stigma, unless the underlying reasons for this imbalance are considered [29]. Explanations to why an individual may be eating more than planned or needed to maintain weight, are multifactorial and involve genetic, biological, societal/social and psychological factors, as well as certain critical life periods [30].

Genetic and biological factors

Genetic factors can make individuals susceptible to unhealthy weight gain, as they affect hunger, satiety and energy expenditure [31]. Parental obesity is associated with subsequent obesity in the offspring, with an even higher risk if both parents have obesity [32]. Biological factors, such as monthly hormonal fluctuations [33] or sleep deprivation [34] have been shown to increase appetite, and thereby weight gain.

Even dieting can make a person more susceptible for weight gain as the homeostatic control system for body weight is "triggered" [35]. A study of contestants from the TV-dieting show "Biggest Loser" revealed that resting metabolic rate decreased following weight loss, and remained low (a mean of 704 kcal/day below baseline) even after participants had returned to nearly their pre-contestant weight 6 years later [36]. Moreover, dieting or fasting for 10 weeks, altered appetite hormone levels (increased hunger and decreased satiety) and these changes remained for at least a year [37,38]. These biological responses to weight loss act together to maintain the highest sustained body weight (often referred to as the "set-point"-theory), and may preclude long-term success of behavioural weight loss [6,39].

Societal and social factors

Compared to some 60 years ago, vast changes in society have created an obesogenic environment [38,40]. A decline in everyday physical activity coupled with increased availability to cheap, palatable and calorie-dense food, makes maintaining energy balance a challenge [38]. Ultra-processed food is often blamed for the obesity epidemic and suggested to induce an irresistible pathological eating behaviour [41]. Children in socioeconomic adverse environment have been found to be particularly vulnerable for developing obesity, with junk food self-medication as a mediator to cope with emotional turmoil [42]. This illuminates a possible need to change society, rather than expecting individuals to be able to control their eating behaviours [43].

Eating is also associated with social events, and may serve other functions, e.g., helping the night shift worker to stay awake, or aiding the parent to keep a child occupied.

Psychological and emotional factors

There is a suggested bidirectional link between depression and obesity [44,45]. Emotional eating, e.g., eating to avoid psychological or emotional discomfort, has been suggested as a pathway

between depression/anxiety and obesity [46]. This is particularly important since the stigma of obesity, or failed weight loss attempts may induce sadness, shame or frustration, and thus reinforce emotional eating [47]. Accordingly, a decrease in emotional eating has been associated with greater weight loss success in interventions [48]. Furthermore, there is an increased risk for adult obesity among those who were exposed to maltreatment or abuse as children [42].

Critical life periods

Childhood and adolescence are vulnerable periods for weight gain [42,49,50], as is the pregnancy period, which may contribute to obesity in both mothers and offspring. In a Swedish study, three out of four female patients enrolled at a specialist obesity clinic, indicated that their child bearing period contributed to their obesity by retaining around 10 kg from each pregnancy [51]. Another Swedish study showed that of women with a normal pre-pregnancy weight at their first pregnancy, 6,4% have moved up to overweight at the beginning of their subsequent pregnancy [52]. By the same token, a UK study of 19 362 women showed that the percentage of women with obesity increased with each pregnancy, i.e., 13.0% with obesity at first pregnancy and 31.6% at their fifth pregnancy [53].

The pregnancy period may also contribute to obesity by making the offspring more vulnerable for obesity later in life [31]. This is attributed to epigenetics, meaning that maternal BMI, lifestyle and weight gain affect which genes are activated in the foetus [54]. In the light of these findings, the pregnancy period is a highly interesting period with potential to tackle the risk for developing obesity in both mothers and offspring [55].

2.1.1 Consequences of obesity

The impact of obesity is found in all aspects of healthcare as it increases the risk for a number of secondary diseases [1], such as cardiovascular diseases [56], hypertension, diabetes type 2 [57], obstructive sleep apnoea, musculoskeletal pain, osteoarthritis, Polycystic Ovary Syndrome (PCOS), and several forms of cancer [19]. Furthermore, each five-point increase in BMI over 25 kg/m^2 is associated with a 30% increase in all-cause mortality [58,59]. Anxiety, depression, social phobia and lower levels of self-esteem are more common in the obese population compared to normal weight individuals [60]. Moreover, it is estimated that the obesity-related economic burden for the Swedish society is between 25 and 70 billion SEK per year [27,61].

2.1.2 Weight stigma

The effect of obesity however, goes far beyond the medical consequences, as for many people, the negative impact on psychosocial well-being may be of greater relevance than obesity-associated medical comorbidities [62]. Stigma is defined as the situation of individuals who are not fully socially accepted [63]. Weight stigmatizing behaviours may include labelling someone as unintelligent or lazy, or involve discrimination, such as offering less health services [64]. The phenomenon has also been referred to as fat-phobia or obesity bias, with negative attitudes towards people with obesity manifested by social exclusion or prejudice.

Weight discrimination occurs in workplaces, at school and also in medical settings [4,65,66], where stigmatizing behaviours have been reported among nurses, psychologists and dietitians [4]. The concept of obesity bias in health care has been described as *"conscious or unconscious negative behaviour by the healthcare provider that elicits distress from the patient with obesity and potentially affects patient care and healthcare outcomes*" [67]. Many patients with obesity report feeling criticized or dismissed by healthcare professionals, and often perceive that their weight-related concerns are not taken seriously [68].

Weight stigma has also shown to have serious impacts on medical care as patients' symptoms may be over-attributed to obesity, and thus relevant referrals or appropriate examinations are sometimes not carried out [69]. Additionally, people with obesity are less likely to attend screening programs such as mammography [4], for fear of being judged by their weight.

The attribution-value theory [70] suggests that people are prejudiced against groups of individuals that they feel have some negative attribute which the individuals are responsible for themselves. Accordingly, the degree to which obesity is perceived as controllable by the individual has been positively associated with anti-obesity attitudes [71]. The severity of obesity stigma may be further illuminated by a study where up to 30% of respondents said they would rather endure a divorce, lose 10 years of life, or be unable to have children, than to have obesity [72].

The impact of perceived obesity stigma on the individual is often profound and sustained, and may include low self-esteem, depression, anxiety, avoidance of physical activity, self-harm, substance abuse, and suicide [3]. Increased risk remains after controlling for variables such as BMI, sex, and age, suggesting that psychological consequences are not associated with obesity per se, but rather with the experiences of stigmatization [73].

2.1.3 Obesity treatments

Behavioural interventions

Obesity treatments aim to support people in making profound and sustained lifestyle changes that optimizes diet quality and exercise level, as well as attend to obesity-related comorbidities. Because of the increased demand of obesity treatment it has been suggested, e.g., in the UK that all health professionals are trained to identify patients at risk for unhealthy weight gain, and skilled in the initial management of obesity [74]. For patients who already have obesity, the European Association for the Study of Obesity (EASO) suggests that obesity interventions should include a multidisciplinary management team to tackle different aspects of the condition [1]. Obesity behavioural treatment generally include regular meetings with a health care provider who helps the patient identify problematic habits, set goals, formulate a food and physical activity plan, tackle ambivalence, identify barriers, offer advice and provide encouragement and support [75]. Thus, the social support, interaction and communication between patients and health care providers may be seen as the core of weight interventions [74–76]. Medical interventions, including Very Low Calorie Diets (VLCD), traditionally achieve a weight loss of 5-10%, which is enough to show a risk reducing effect

[77,78]. In fact, merely limiting further weight gain may be an important accomplishment for health [1]. Moreover, the treatment of obesity is not only about weight loss, as risk reduction and health improvement may be achieved by improved diet quality, and even modest increases in physical activity [1].

Psychological interventions

Several Cognitive Behaviour Therapy (CBT) interventions, have shown positive outcomes regarding emotional well-being, self-esteem, and healthy behaviours [79], with up to 10% weight loss after 18 months [80,81].

Weight loss medication

Larger weight loss is derived when behaviour modification interventions are complemented with weight-loss drugs. Studies show that a significant risk reducing weight loss (≥10%), is achieved by about 30-40% of participants after 56 weeks of treatment (Liraglutide [82], Naltrexone/Bupropion [83], Orlistat [84]). However, even with weight loss medication, long-term maintenance is difficult and at the 4-year follow-up of the Xendos-study (Orlistat), only 26% of participants had achieved ≥10% weight loss [84].

In summary, several medical interventions can improve health and some have managed to induce a significant short-term weight loss. However, maintaining large weight loss for a longer period seems difficult [7] .

2.1.4 Bariatric surgery

Bariatric surgery has shown large long-term weight loss results [85], improved obesity-related co-morbidities and increased overall life expectancy [9]. Both Gastric Bypass (GBP) and sleeve gastrectomy affect the gut-hormones involved in appetite-regulation which in turn reduces food intake [38,86]. The majority of patients undergoing bariatric surgery are women, of which up to 80% are of reproductive age [87]. The surgery cost is suggested as an investment well spent, as for example patients with diabetes type 2 may need less medical drugs resulting in an overall lower healthcare cost in the long run [88,89]. Bariatric surgery is however not suitable for all patients, e.g., patients with a medical condition that makes surgery too risky, or unstable mental health, and even after surgery some experience insufficient weight loss (%EWL <50 at 18 months after surgery) [90], and weight regain occurs [91].

2.1.5 Weight regain after bariatric surgery

The exact prevalence of weight regain is unclear, both due to variation in how weight regain is defined [90,92,93], and to lack of follow-up [94]. Gaining back between 5-10% of the lost weight is common after 10 years [92]. Gaining >10kg from nadir has been found in up to 64% of patients, and any weight regain has been reported in up to 79-91% of patients [92,93,95].

The mechanisms behind weight regain are multi-factorial, involving dietary, psychological, medical and surgical factors [9]. Apart from time elapsed from surgery being the main factor

associated with weight regain, lower resting energy expenditure [96], lower consumption of fruit [97], recurrence of excessive calorie intake, snacking, fatty food consumption, and sedentary behaviours [98] seem to contribute to weight regain. However, changes in eating habits may be partially a secondary effect of unfavourable changes in appetite hormones [37].

Weight regain is associated with recurrence of obesity-related co-morbidities [9], but also with psychological suffering. Regaining weight has been found to be perceived as a "double failure" [99], referring to initially the inability to stay normal weight, and then the failure of managing weight after surgery treatment. Beneficial social support have been suggested to influence weight outcome in a positive way after bariatric surgery [100,101], while lack of healthcare support has been associated with weight regain [95,98,102].

Gaps in knowledge

As existing medical and surgical obesity treatments and interventions are insufficient or suboptimal, there is clearly room for studies of how they may be improved.

2.2 PREGNANCY AND BODY WEIGHT

In line with the overall increase of obesity, the prevalence of pregnant women with obesity is also on the rise. In USA, the prevalence of obesity in pregnancy is between 18-34% [103]. In European countries, obesity prevalence in pregnancy varies between 7-25% [104], and in Sweden it has more than doubled in the last 25 years to the current 15%, with a regional variation between 12% and 22% [105]. Including overweight women (BMI $\geq$25 kg/m^2), the prevalence in Sweden is 42% with a regional variation between 36-51% [105]. In Sweden, the prevalence of overweight/ obesity in Swedish-born women is approximately 40%, compared with 50% in women born outside Europe [105]. Meanwhile, Swedish-born women generally gain more weight during pregnancy than non-European women [105].

Gestational weight gain

Healthy GWG is comprised of the growing foetus, placenta, uterus, amniotic fluid, expansion of maternal blood volume, mammary glands, and maternal adipose tissue, summing up to around 8-11 kg [106]. Any weight gain above this is likely to be either adipose tissue or possibly an unhealthy retention of water. About 5 kg is lost by giving birth (baby, placenta, amniotic fluid, blood). During pregnancy, women's resting metabolic rate increases, but as there is usually a simultaneous decline in physical activity, the estimated need for extra calorie intake is none in the first trimester, only an extra 350 kcal/day during the second, and no more than 500 kcal/day in the last trimester [107].

In 2009, The Institute of Medicine (IOM) updated their GWG recommendations (**Table 2**).

Table 2. *Recommendations for gestational weight gain from 2009 by The American Institute of Medicine.*

Pre-pregnancy weight category	Body Mass Index (BMI)	Recommended total weight gain (kg)
Underweight	<18.5	13-18
Normal weight	≥18.5-24.9	11-16
Overweight	≥25.0-29.9	7-11
Obesity (class I-III)	≥30.0	5-9

The pregnancy period is associated with the development of obesity, but also as a period where obesity, as well as excessive GWG may contribute to adverse pregnancy events. The GWG recommendations are based on pre-pregnancy BMI [108], and observational studies confirm that women who stay within the recommended weight span are more likely to give birth to normal weight babies [109].

The earlier guidelines from 1990 used different BMI cut-offs, categorizing more women as underweight or obese and fewer as normal-weight or overweight. Women with obesity were advised to gain at least 6 kg. The new guidelines are not stratified for different obesity classes, which may be unfortunate considering that the risk differs substantially between obesity class I and III [110]. A recent review, including Swedish data, suggests weight gain spans of 0-5 kg for women with BMI ≥35 kg/m^2, and a goal of zero weight gain for women with BMI ≥40 kg/m^2 to achieve best possible pregnancy outcome [111].

Though IOM's recommendations are mainly based on European data, they appear to apply well to ethnically diverse populations [112], as well as for women post bariatric surgery [113]. However, the recommendations are based on observational studies, and hence causal relationships remains unproven. The fact that some intervention studies have succeeded in limiting weight gain without significantly improving outcomes, e.g., gestational diabetes [114], imply that there is more to gestational health than just body weight alone.

There are at least five challenging areas regarding body weight and pregnancy.

- Women with fertility problems due to high BMI
- Women who enter pregnancy with high BMI
- Pregnancies in women after weight loss surgery
- Women who gain excessively during pregnancy (regardless of initial BMI)
- Women who retain excessive weight postpartum/ inter-pregnancies

The populations may vary in the areas mentioned above. A woman with obesity may be able to follow weight gain recommendations, while a normal weight woman may gain excessively, and regardless of initial BMI and gestational weight development, any of them may be unable to lose weight postpartum, and end up with a higher BMI in subsequent pregnancies.

Risks with inadequate (low) weight gain during pregnancy.

A large meta-analysis of 437 512 women with obesity showed that GWG below the IOM recommendations increased the risk of having a small for gestational age (SGA) baby [115]. However, another large cohort study of 46 595 Swedish women with obesity found that women with obesity class II and III, who not only gained less, but lost weight during pregnancy, showed that though the risk of having a SGA baby was 3.7%, it was only slightly above the overall 3.6% prevalence of SGA births in Sweden [116]. Meanwhile, the risk of foetal macrosomia and caesarean delivery were even lower with weight gain below the IOM recommendations [116]. Yet another study showed that losing weight during pregnancy in women with obesity class III, improved pregnancy outcome with no adverse events reported [110]. Nevertheless, it is still under discussion what the optimal weight gain range is for women with different obesity classes, depending on what outcome is measured.

Preconception care

Several studies found that excessive weight gain, particularly in the first trimester was correlated with adverse pregnancy outcomes and offspring obesity [117,118]. This means that by the time of the first encounter with maternity care, interventions may be too late [114]. The Royal College of Obstetricians and Gynaecologists in the UK suggests that ideally the topic of bodyweight in relation to pregnancy would be addressed earlier, during preconception counselling or contraceptive consultations, to all women [119].

Predictors of excessive gestational weight gain

Around 47-74% of pregnant women (including all BMI-classes) gain above IOM recommendations [109,120,121]. Pre-pregnancy BMI as a predictor for excessive GWG has been thoroughly examined, however sometimes with conflicting results. Some studies suggest that overweight/obesity at the time of conception is associated with excessive GWG [122], while others report that excessive GWG is more common in normal/overweight women, than in women with obesity [123]. Meanwhile, overweight women in the Swedish SPAWN-study, did not gain more weight during pregnancy than normal weight women [11].

Within obesity classes, class III women commonly gain less weight than class I. As an example, approximately 60% of women in obesity class I, 50% in class II, and 40% in obesity class III gained equal or more than 9 kg in a study of 32.991 women in Sweden [116]. Worth noticing is, in general, obese women tend to have a lower absolute weight gain in kilos than women in other BMI-categories, but because of a narrower weight gain span they are more likely to exceed recommendations [121].

While parity is a risk factor for high pre-pregnancy BMI [53], an association between number of pregnancies and GWG has not been established [124]. For other predictive factors, Gaillard studied 6 959 mothers and found that European ethnicity, nulliparity, and smoking during pregnancy were associated with an increased risk of excessive GWG [117]. Other suggested predictors are: low socioeconomic status, low education, low level of physical activity [125],

and young maternal age [121]. In addition, being unaware of the own BMI [125], underestimating the own BMI [126], overestimating the minimum GWG recommended [127], and expecting oneself to gain excessively predicted excessive weight gain [127].

The relation between psychosocial factors and GWG has proven very complex, to some extent due to a potential bidirectional effect [128]. A cohort study including 13 314 pregnant women found no association between depression and excessive GWG [129], while a systematic review found significant associations [128]. The review in turn found no relationships between anxiety or stress, and excessive GWG. A study of pregnant women with gestational diabetes further adds to the complexity, as stress did not predict excessive gestational weight in either overweight or obese women, but was associated with a weight development either over, or below recommendations for women of normal weight [130].

While pregnancy may trigger body image concerns and fear of losing control, symptoms of eating disorders often show improvement or remission during pregnancy [131–133]. However, women with bulimia nervosa or binge eating disorder are at higher risk of excessive weight gain compared to women without eating disorders, also when adjusted for pre-pregnancy BMI [134].

In conclusion, there is yet no way to fully predict who will, or who will not gain excessively during pregnancy, though altogether it seems as if overweight women may be more at risk to exceed recommendations [122,135].

2.2.1 Weight related risks in pregnancy

Pre-gestational BMI ≥30 kg/m², as well as excessive GWG, regardless of initial BMI, have been shown to independently contribute to adverse pregnancy outcomes [136]. It is a challenge to determine or separate the relationship between excessive GWG and adverse outcomes, as pre-pregnancy obesity may confound the results. However, several large epidemiological studies and meta-analysis show an adverse effect of obesity on maternal, perinatal and offspring complications [104], and gaining excessively seem to add to the burden, as some of the highest risks are found in women with both obesity and excessive GWG [108,137,138].

Maternal risks

In 2018, 14,6% of Swedish pregnant women with BMI ≥40 kg/m^2 were diagnosed with gestational diabetes mellitus, compared to only 1,3% of normal weight women[105]. Women who develop gestational diabetes are in turn at increased risk of complications during pregnancy and delivery [19]. With increasing BMI, the incidence is higher for gestational hypertension, and preeclampsia [119,139,140]. Maternal adverse outcomes may be related to the metabolically unhealthy status that is more prevalent in women with obesity, such as insulin resistance, inflammatory changes, and vascular impairment [114]. Furthermore, excessive GWG in normal weight women, is associated with an increased risk for postpartum weight retention and subsequent obesity [11,12].

Perinatal risks

Several studies show that GWG greater than the IOM recommendations is associated with higher risk of having a LGA baby or foetal macrosomia [109,136,141]. This in turn includes the risk for complications such as prolonged delivery, need of a suction bell, birth injury from shoulder dystocia, and caesarean delivery [117,139]. In case the woman has a caesarean section, a subcutaneous fat layer >2cm increases the risk of wound separation and wound infection [119]. Furthermore, for the mother there is an increased perinatal risk for venous thromboembolism, postpartum anaemia, infections [142], and maternal death [119]. However, according to two Swedish studies, there are less cases of sphincter lacerations in women with obesity compared to women of normal weight [143,144].

Short and long-term risks for the offspring

A Swedish study showed that infant mortality rates increased from 2.4/1000 among normal weight women to 5.8/1000 among women with obesity grade 3 (BMI $\geq$ 40.0 kg/m^2) [145]. Obesity is the highest ranking modifiable risk factor for stillbirth [146], and increases the risk for preterm delivery [147]. Observational studies found evidence for the effects of maternal obesity on the offspring's risks of obesity, coronary heart disease, stroke, type 2 diabetes, and asthma [148]. Babies born LGA, have an increased risk for the development of diabetes type 2 [149]. In addition, higher maternal BMI increases the risk for congenital malformations, such as cleft palate, anorectal atresia, hydrocephaly, neural tube defects, and spina bifida [150].

Exceeding the IOM recommendations, independent of BMI, is associated with increased risk of having a child who develops overweight/obesity [14]. The largest effect of excessive GWG on childhood obesity has been found in women with under- [15] or normal pre-pregnancy BMI [14]. This raises a concern since GWG interventions often only target women with overweight or obesity.

Postpartum weight retention

Retaining weight after pregnancy is common, with almost 25% of women retaining ≥5 kg, and almost 10% retaining ≥10 kg between pregnancies [151]. An American study found that approximately 75% of women weighed more one year postpartum than pre-pregnancy, and of those with normal pre-pregnancy weight, one third had become overweight or obese one year postpartum [152]. Some women even gained weight during the first months after delivery [153].

Compared to women with stable BMI between pregnancies, stillbirth, gestational hypertension, gestational diabetes, and preterm delivery risks increased linearly with increased BMI [154]. These associations seem more pronounced in women who were normal weight in their first pregnancy [154]. In overweight women, weight loss before a subsequent pregnancy reduced the risk of neonatal mortality [155], and inter-pregnancy weight loss in overweight and obese women was associated with a decreased risk of GDM and pre-eclampsia in the subsequent pregnancy [156]. Based on these findings it is strongly advocated

that women with normal weight should avoid postpartum weight retention and women with overweight/obesity should lose weight before subsequent pregnancy [155].

Breast feeding and weight loss

Obesity is associated with low breastfeeding initiation and low maintenance rates [119]. At the same time, women with obesity receive less of pro-breast feeding interventions from hospital staff compared to women of normal weight [157]. Breastfeeding has shown to have either no [158,159], or a small positive effect on postpartum weight loss, with a difference of -0.4 kg [160], up to -4.1 kg [153] between non breastfeeding and exclusively breastfeeding women.

2.2.2 Maternity healthcare in Sweden

Swedish antenatal care is tax funded, free of charge, and takes place within the primary healthcare system, or at privately run clinics [161], with a midwife as the primary caregiver [162]. Normally, midwives work independently, but in complicated pregnancies they work in collaboration with an obstetrician. Almost all pregnant women in Sweden attend maternity care, and 90% already during their first trimester [116]. Standard care for nulliparous, pregnant women includes about ten visits at an antenatal clinic (appointment frequency may vary between regions). The first visit(s) occur around week 8-12, followed by an ultrasound in week 18-20, and then regular follow-up visits every other week from week 25 until delivery [161]. Maternity care also includes a follow-up visit at 6-12 weeks postpartum. Weight assessment is suggested at the first visit, at week 25, 36 and at the postpartum visit [161].

Midwives play an important role in promoting health behaviours in women both during and after pregnancy. Pregnancy in women with obesity is increasingly considered as complicated, and may therefore be offered extra attention and resources [161], e.g., extra visits early in pregnancy to discuss lifestyle, or in some regions, special weight intervention programs.

Midwife roles and assignments

As the BMI of the pregnant population is increasing, so are their medical needs. Midwives are faced with new demands to actively intervene regarding unhealthy habits, while resources such as time, competence or treatment options, may be lacking [163]. Obesity is described as a chronic disease [164], and a heavier pregnant population requires clinics to be sufficiently equipped [165] and midwives to be skilled in discussing lifestyle and providing adequate and up-to-date advice regarding obesity.

The care for women with obesity affects midwives' practical work as examinations, e.g., external palpation, monitoring foetal heart tracing and ultrasound may be more difficult to perform [119]. Screening and diagnostic tests for structural anomalies in the foetus are both more difficult and less accurate in pregnant women with obesity [166]. Women with a BMI greater than 35 kg/m^2 are more likely to have inaccurate symphysis fundal height measurements and may therefore need ultrasound to assess foetal size [119].

The increase in obesity in the pregnant population as well as the high number of women who exceed the IOM recommendations, is acknowledged in a document from 2018 by The Swedish National Board of Health and Welfare *"National guidelines for the prevention and treatment of unhealthy life habits"* [167]. They define pregnant women with an unhealthy lifestyle as a risk population, and emphasize the importance of qualified support. In the document it is presumed that maternity healthcare providers *"...are trained in the method of use and are sufficiently knowledgeable within the topic"* [167]. Furthermore, in the so-called "Blue book" from 2016 [161], a national report suggesting what lifestyle topics should be addressed in the beginning of pregnancy, midwives are called upon to weigh women, discuss food habits and provide information about risks and recommendations regarding GWG. In addition, the document by the Swedish Midwives' society*, "A sustainable lifestyle*" from 2018, suggests that pregnant women with unhealthy food habits should receive highly qualified and individually tailored information [168]. The information is suggested to be structured, theory-based and provided via a 60 min visit with several follow-up visits. These duties require a health-care provider with a broad and deep knowledge of nutrition, behaviour change processes, and motivating strategies [168].

To perform tasks you feel you lack adequate resources to do, e.g., specific knowledge, skills, or time, may impair the working environment and fuel stress. Studies have shown that about one third of the midwives have considered leaving the profession due to stress and lack of resources [169]. Since some pregnant women are dissatisfied when midwives focus on their weight [170], whilst others desire such discussions [171,172], this may also put midwives in a difficult dilemma during patient meetings. In qualitative studies midwives have reported perceiving weighing and gestational weight management of pregnant women with obesity difficult, and adding to their workload [173]. Thus, it is important to consider midwives' work situation, when implementing new policies or weight intervention programs.

2.2.3 Women's awareness and need for support

At their first visit to antenatal clinics, many pregnant women do not know, or underestimate their BMI [174,175]. In addition, women commonly lack knowledge about GWG recommendations, and are unaware of the risks associated with obesity in relation to pregnancy [175]. This is unfortunate since women's awareness of their BMI and beliefs about how much they should gain, seem associated with GWG [174].

Pregnant women want and seek information and support, particularly nulliparous, and women with obesity [176,177]. Meanwhile, in an Australian study from 2015, less than 10% of the women recalled having received any antenatal weight gain advice. In addition, only half of the given advice was consistent with the IOM recommendations [177].

Some women with obesity carry a constant fear of being judged by their body size. Findings suggest that the approach of healthcare providers has the power to increase or decrease the feelings of discomfort around weight gain in pregnant women with obesity [170]. Pregnant women with obesity have reported feeling discriminated and de-personalized, as if they were

just “a number on a scale” [178], and a study from 2012 found that Swedish women with obesity reported a less positive experience of pregnancy, and more fear of childbirth than non-obese women [179].

2.2.4 Interventions to limit GWG and postpartum weight retention

So far, the overall results from weight interventions during pregnancy, are inescapably disappointing as the majority has shown no significant successful weight outcome [135,180–185]. A large meta-analysis of 12 526 pregnant women showed a small (0.7 kg) difference in favour of the intervention group, but no effect on other outcomes besides a reduced incidence of caesarean section [186]. Other interventions managed to lower GWG but had no effect on adverse outcomes [17,187,188]. A review of 12 randomized controlled studies also found a small (1.25 kg) difference favouring the intervention group, but this time without any positive effect on GDM, incidence of caesarean section or foetal macrosomia [189]. Some studies could see positive effects on dietary quality [190], or a smaller decrease in the level of exercise during pregnancy [183], but with no effect on GWG [188].

Metformin, a drug normally used for diabetes treatment, has been tested as a way to reduce the risk for adverse pregnancy events, with some promising [191,192], but often non-significant results [193]. Some intervention programs successfully lowered GWG with a difference in kg between treatment group and controls of 1.1-3.4 kg [18,194]. However differences were not sustained 12 months postpartum [195,196].

A few positive examples exist, e.g., a Belgium intervention by midwives with training in MI who presented four sessions of lifestyle coaching, which resulted in a 4 kg lower GWG and significantly lower levels of anxiety in the intervention group [197]. Another example is the Swedish “Mighty mums” study [198] where women were provided extra midwifery visits with weighing and follow-up of lifestyle. Women were offered prescribed physical activity (FaR), walking poles, and individualized dietary advice and food group discussions with a dietician. Before the intervention, midwives received education on obesity and training in MI. The intervention resulted in a 3.9 kg lower GWG than in the control group.

Gaps in knowledge

In summary, lifestyle interventions initiated during pregnancy may reduce excessive GWG in some women, and if GWG is limited, it may in turn reduce the incidence of caesarean sections. However, lifestyle interventions have not been successful in reducing GDM or pre-eclampsia in obese women, and even in intervention groups, 30% - 60% of women still gain excessively [16–18], indicating that there is room for improvement. Also, non-obese women are seldom the target for interventions, and postpartum weight loss support seems rare.

2.2.5 Pregnancy after bariatric surgery

Bariatric surgery commonly leads to rapid and substantial weight loss, and increased fertility [199]. In Sweden, approximately 1 200 out of 110 000 pregnancies per year are in women who

have undergone bariatric surgery (unpublished data from the Scandinavian Obesity Surgery Register and the Medical Birth register). It is recommended to postpone pregnancy after bariatric surgery until weight stabilization (after about 12 months). In a large meta-analysis of 14 880 pregnancies post-bariatric surgery and 3 979 978 controls, post-surgery pregnancies were associated with an increased risk for delivering a small for gestational age baby [200], and cases of malnutrition have been found [201]. Inconclusive results have been reported regarding the risk of obesity in children born before or after the mother had bariatric surgery. Kral et al. found significantly lower prevalence of obesity in the offspring born after the mothers' surgery [202], while a Swedish study was unable to demonstrate any significant differences [203].

Gaps in knowledge

As pregnancy and the postpartum period is a potential contributor for both women and their offspring for unhealthy weight gain, this period presents itself as another important area where knowledge is lacking regarding why some women experience unhealthy pregnancy-related weight development, and in what way gestational weight management may be improved.

2.3 HEALTH BEHAVIOUR CHANGE THEORIES

Pregnant women, as well as patients undergoing bariatric surgery are expected to undertake or modify several health behaviours in relation to their pregnancy or surgery procedure. Vitamin supplementation, healthy eating, exercising, smoking cessation, alcohol intake adjustment, medication, et cetera needs to be considered.

However, weight interventions or campaigns that rely solely on providing information, seldom lead to substantial and sustained weight loss as they may not consider people's capabilities or motivation to change these behaviours. Research regarding what influence people to engage in, and maintain sustained healthy behaviours have resulted in several theories and concepts, some of which will be presented briefly here.

The Health Belief Model (HBM) is used to predict patient behaviour. The model is based on the social-psychology truism that motivation is required to lead to action [204]. The Health belief model suggest that motivation depends on: a) the patient's perceptions of susceptibility to a condition, "Could it happen to me?" b) perceived severity of the condition, "How dangerous is it?", and c) the barriers and benefits of implementing behaviours to prevent the condition "What would I have to do, and how would this affect my risks?". Additionally, a trigger is needed to set off the action [204].

The *Information–Motivation–Strategy Model* (IMS) [205], explains that the components needed for an individual to adhere to treatment recommendations, are 1) information, 2) motivation and 3) ability to overcome barriers (behaviour skills).

These theories together suggest that behaviour change cannot be expected if only one of the necessary components is provided, e.g., information, as people may not possess the rest. On the other hand, if the other components are in place (motivation and skills), it may take only one factor, e.g., information, to induce behaviour change.

In summary, to achieve behaviour change three necessary components, described in slightly different ways, seem present in most of these models and theories regarding health behaviour change; a) knowledge/awareness of *why* a change is necessary, and b) *what* it is that needs to change, c) competence/skills/ability to perform the necessary action. Motivation is in turn affected by a, b and c, and include perceived relevance for the individual and perceived self-efficacy.

Person-centred care is described as when power, responsibility and control are shared between the patient and the caregiver [206]. It is an approach that acknowledges that while medical staff may be experts in their field, patients are equally experts on their own preferences, needs, values and social circumstances. Putting people at the centre of decisions and seeing them as experts working in partnership with professionals, have shown better adherence and improved health outcomes, as demonstrated by a meta-analysis of 48 studies [207]. The underlying philosophy suggests it is favourable to assess patients' life stories, goals and values, and do things with people, rather than 'to' them [208] The American College of Obstetricians and Gynaecologists propose that person-centred counselling is used when addressing the medical risks associated with obesity [209]. Moreover, Swedish law states that patients should be involved in the planning and execution of their own treatment as far as possible [210]. However, little is known regarding person-centred care in pregnant women with obesity to conclude if it may improve GWG outcomes [211].

The transtheoretical model of change (TTM) formulated by Prochaska and DiClemente, describes change as an ongoing process that involves pre-contemplation, contemplation, preparation, action, maintenance, and relapse [212]. Behaviour changes often involves a certain amount of ambivalence. The task for healthcare providers is to elicit and support patients' motivation to move from one stage to the next.

Motivational Interviewing (MI) evolved from Carl Rogers' work regarding the importance of the therapeutic relationship in therapeutic processes [213]. MI is not a persuasion tool, but a person-centred, collaborative and compassionate communication method for eliciting behaviour change. It helps people explore and resolve ambivalence and strengthen their motivation for change in an empathic and non-judgmental atmosphere [208]. The health care provider uses open questions, reflections, affirmations, and summaries that helps display a persons' own reasons that may motivate a behaviour change. MI has the intention to empower people and support self-efficacy, and it is strongly recommended for use in weight interventions [76]. MI and TTM are compatible and complementary [214].

Health literacy is a concept that include an individuals' skills to obtain and use information to maintain or improve one's health [215,216]. Low health literacy is related to poorer health and

higher risk of death, and is more common in people with lower education [217], and in immigrants [218]. In Turkey, a lower level of health literacy have been associated with poorer outcome after bariatric surgery [219].

Though solely providing advice seems far from effective in large meta-analysis, some individuals may still be helped by it. In an intervention study where pregnant women were provided with one single dietary education session, women with higher levels of education significantly lowered their GWG, while mothers with low education responded poorly [220]. The exact mechanisms behind the differences between the lower and higher educated women remained unclear, but may be explained by the concept of health literacy.

These results illuminate what is referred to as the information paradox, meaning that unfortunately, the people who may be in most need of health information may sometimes be the ones least capable of accessing it [221].

Cognitive behaviour therapy (CBT) is based on the cognitive model that proposes a relationship between thoughts, feelings and behaviour, where distorted or dysfunctional thinking may influence a persons' mood and actions [222]. CBT is defined as a structured, short-term, present-orientated psychotherapy directed to solve current problems by modifying dysfunctional thinking and behaviour [222].

Gaps in knowledge

The health behaviour change theories suggest that if patients gain or retain unhealthy weight, one or more components needed to induce change may be missing. Though behaviours associated with unhealthy weight gain has been found (such as excessive eating or physical inactivity) there is still a lack of knowledge regarding what patients themselves perceive as the underlying reasons to why these behaviours occur and how interventions and support could be improved to optimize the outcome.

3 BACKGROUND SUMMARY AND RATIONALE

To summarize, the aims of this thesis were formulated based on the following knowledge:

- Obesity is one of the leading causes of death and disability.
- The BMI of the Swedish population is increasing.
- Weight stigma and discrimination of people of obesity is widespread.
- Pregnancy may contribute to obesity in two ways, 1) in women, via postpartum weight retention, and 2) in offspring, via genetics/epigenetics.
- Obesity in pregnancy, as well as gaining excessive gestational weight, is associated with increased pre-, peri-, and post-natal health risks for mother and child.
- Even with gestational weight management interventions, many women gain excessively and retain unhealthy weight postpartum.
- Though bariatric surgery is an effective weight loss method, some patients experience substantial weight regain.
- A person-centred approach and the use of motivational interviewing is considered beneficial in the treatment of obesity.
- Social support may have a positive impact on psychological well-being and weight development.

Hence, there is an urgent need, and considerable room for improvement in both medical and surgical weight management interventions.

To identify how gestational weight gain interventions may be improved, knowledge is needed regarding: i) what women perceive as reasons for their unhealthy pregnancy-related weight development, ii) what women consider to be important aspects in gestational weight management, and iii) how midwives approach and perceive discussions about body weight with pregnant women.

To find areas where post bariatric surgery supporting functions may be improved, there is a need to explore how patients with weight regain have perceived the post-surgery social support and interactions with family, friends and health care providers.

4 AIMS

The overall aim was to gain a deeper understanding of how weight interventions during pregnancy, as well as post bariatric surgery may be improved by identifying factors and circumstances that act as barriers or facilitators (**Figure 1**). As a result of the findings from study I, study II and III focused specifically on the communication between pregnant women and maternity healthcare providers.

Specific aims

Study I

To explore and characterize women's perceived reasons for their excessive postpartum weight retention

Study II

To explore how midwives perceive and approach communication about body weight with pregnant women, and to characterize communication barriers and facilitators

Study III

To explore what women of reproductive age with obesity regard to be the most important and relevant aspects when discussing gestational weight management in a future pregnancy

Study IV

To explore how patients with substantial weight regain after bariatric surgery perceived, and had preferred to be supported by family, friends and healthcare providers following surgery

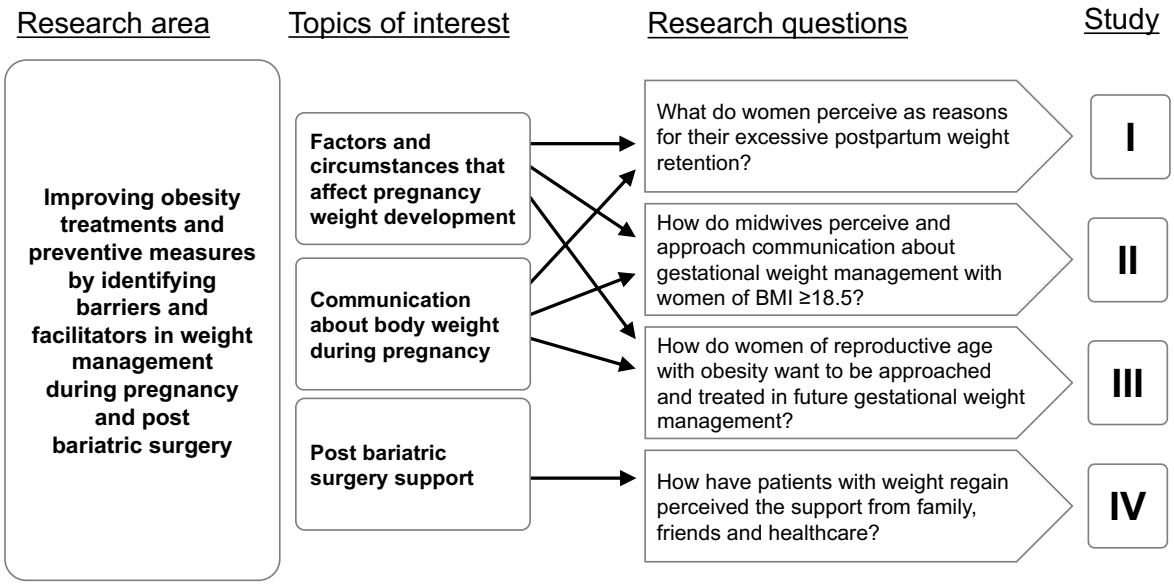

Figure 1. *Illustration of how the studies cover the research area.*

5 METHODS

This thesis comprises four studies using qualitative methodology (**Table 3**). The following section will present the general aspects of the qualitative approach relating to all four studies, followed by descriptions of the specific methods used for each study.

Table 3. *Overview of aims, design and participants for study I-IV.*

Study	Aims	Type of study	Study participants and context	Data collection method	Analysis
I	To explore and characterize women's perceived reasons for their excessive postpartum weight retention.	Qualitative, explorative, interview study	n=15 Women who gained ≥ 12kg during pregnancy, and weighed ≥10kg more 1 year postpartum compared to pre-pregnancy weight	Individual interviews	Manifest content analysis
II	To explore how midwives perceive and approach communication about gestational weight recommendations with women of BMI ≥18.5, (i), and to characterize communication barriers and facilitators (ii).	Qualitative, explorative, interview study	n=17 Midwives with experience from maternity care	Individual interviews	Latent content analysis
III	To explore what women of reproductive age with obesity regard to be the most important and relevant aspects when discussing gestational weight management in a future pregnancy	Qualitative, explorative, interview study	n=17 Women with obesity who are planning to become pregnant	Three focus groups and six individual interviews	Thematic analysis
IV	To explore how patients with post-surgery weight regain, experienced, and had preferred to be supported by family, friends and healthcare following bariatric surgery.	Qualitative, explorative, interview study	n=12 women and n=4 men with a BMI ≥35 kg/m^2 and >10% weight regain from nadir*	Individual interviews	Thematic analysis

* The lowest weight measured after bariatric surgery

General aspects on methodology

All research methods are tools to facilitate understanding [223]. The purpose of this thesis was to explore peoples' thoughts, feelings, and subjective meanings of experiences [224,225]. For this reason, a qualitative approach was chosen [224]. The interviews aimed to obtain rich and in-depth data, while acknowledging that a full truth is inaccessible. Qualitative methodology includes systematic collection, organization, and analysing of data, while the design is allowed to emerge, depending on what the data collection and analysis reveal [226].

The qualitative researcher is actively engaged in interpreting the data through the lens of her cultural context and pre-existing assumptions [224]. Therefore, it is important to describe the researchers' background, the setting and circumstances in which the study was performed, as well as the data collection and analytic processes. It increases dependability [227], and enables readers to follow the decision-making trail, as well as determine whether results may be transferable [227] to their own context. To pursue trustworthiness, i.e., confidence in the 'truth' of the findings [224,227], the following section will therefore present the research procedures.

Participants

The selection of study participants in all four studies was based on the iterative process referred to as *purposeful sampling* to maximize the depth and richness of the data by including participants with experience or knowledge of the key issues of the research questions [224]. All four studies also sought to attain *maximum variation sampling* [224], i.e., a wide range of other factors that were considered relevant for each study purpose, i.e.:

Study I: Age, pre-pregnancy BMI (≥18.5 kg/m^2), and ethnicity

Study II: Year of midwifery degree, years of work experience, sociodemographic area of maternity clinic, and earlier participation in obesity intervention study

Study III: Obesity levels, age (within the span 18-39 y), and ethnicity

Study IV: Sex, age, ethnicity

Ethnicity was not irrelevant in study II, but of lower priority as 90% of midwives are of Swedish origin [228].

How to determine a suitable sample size in qualitative research is an area of conceptual debate [229]. Accuracy, or complete reliability cannot be achieved since data are highly related to the context, setting, interaction etc. Instead, to produce valid findings, Malterud et.al [230] suggest that the concept of "information power" is used, determined by certain factors instead of number of participants such as the aim of the study, sample specificity, and quality of dialogue [230]. Thus, the quality and validity of data collected via interviews and focus groups, is not necessarily about the number of participants but about the researchers' interview skills, knowledge and biases [231], combined with the informants' ability and willingness to share information that include rich descriptions of the phenomena of interest [227]. Deciding the

sample size in qualitative studies is also about balancing the chance of rendering new discoveries if one more interview is added, with the risk of spending unnecessary resources for participant and researcher.

In this thesis, all four studies used the same approach to determine whether enough data was collected, which was to transcribe, read through, and commence the analysis immediately after the first interview. The analysis continued in parallel with data collection. This allowed the researchers to continuously determine i) whether the composition of the population was varied enough regarding age and gender etc. ii) whether the so far gathered material was rich and in-depth enough [227], and iii) whether, data rendered from the last interview brought any new concepts, surprises, or salient information compared with previously collected data [226]. Participants were recruited and interviewed until it was decided in the research group that the data content was rich and in-depth enough to answer the research questions, the sample characteristics were varied enough, and no new aspects or salient information had appeared in the last three interviews.

Data collection

Though self-reported surveys with open-ended questions may be used to assess qualitative data, interviews were chosen for these studies as they provided the possibility to ask participants to clarify or elaborate on their answers when new or unexpected aspects surfaced [224].

Interview data can be collected via focus groups or individual interviews and both methods have pros and cons. Individual interviews comes with the practical advantages to book appointments when and where it suits the participant. However, while individual interviews may produce more items [232], sensitive subjects may surface more easily in focus groups [232]. In focus group discussions, participants focus collectively on a topic selected by the researcher. The topic may be presented as a story (vignette), or in a set of questions [233]. The interaction between group participants may inspire members to come up with new thoughts or relate to aspects that surfaces from other members' comments. This data collection form is therefore suitable for exploratory and interpretive research questions as it may produce insights that would otherwise be less accessible [224]. However, not all people feel comfortable with talking about sensitive issues in a group-format, and among people with obesity, social phobia is more common [234]. In addition, the focus group format may not be feasible when participants live far away from each other (as in study I and II) or have difficulties in attending certain dates or times. For these reasons, each study used the data collection method that fit the research purpose best, and were feasible for participants.

Performing qualitative semi-structured interviews involves being engaged, flexible and open to new findings and unexpected turns. The interviewer needs to establish rapport in a very short time so that interviewees dare to be honest about personal experiences. Furthermore, it is important for the interviewer to be skilled in asking open-ended questions and to be self-aware enough so as not to steer participants by words or body language in a biased direction,

while making sure the discussion stays within the research topic, as well as picking up on participants' input to probe when necessary. As psychotherapy skills include these traits, using interviewers with psychotherapy background was deemed suitable for the data collection process.

All participants received oral and written study information, and signed informed consent before the interview. Interviews were recorded and transcribed verbatim.

Analysis

For study I and II, manifest [235] and latent (thematic) content analysis (CA) [235–238] was used respectively, and for study III and IV thematic analysis (TA) as described by Braun and Clark [239] was used to process the data. The analysis methods resemble each other in the first main steps [238,240], which include immersing oneself in the data by reading through the entire text material several times to get a sense of the whole. The analyst highlighted text passages that were relevant for the research questions and labelled them with a code that captured the essence of the content. For study I and II the meaning units were condensed (shortened) before the coding. Initial reflections and ideas of categories or themes were written down, and there was a process of constant comparison to decide if new codes fitted into the preliminary categories/ themes, else new ones were created. All analysis began as inductive and problem-driven, initially aiming to identify as many different angles, factors, circumstances and descriptions as possible regarding the research area, and be open to surprising or contradictory statements. Towards the final stages of the analysis, the process was more iterative where themes or categories were compared and validated against the raw data [241].

The methods are distinguished by their level of interpretation. Manifest CA (study I) meant grouping the condensed and coded manifest content into categories, with descriptions that stayed close to the text [235]. Study II went a step further and included interpretation of the latent meaning to identify and formulate themes [224,236]. In TA (study III and IV) the search for the latent meaning and preliminary themes began right from the start of the analysis, using thematic charts as dynamic tools [239]. Interpretation is about finding out what the data mean and making sense of it [224]. Constructing a theme has been described as a way of organizing and unifying implicit repeating ideas into a description that have a high degree of generality regarding the subject of inquiry [242].

Qualitative analysis includes looking for, and interpret the meaning behind words and finding patterns and themes across stories [239]. Prolonged engagement from the field of obesity and psychotherapy skills in the researcher, may have been beneficial for the analysis and quality of the findings. Meanwhile, a background as a cognitive therapist could cause focus to lie on psychological factors more than on other aspects. The analysis and interpretations in all four studies were therefore done in collaboration with co-researchers, who represented different domains of knowledge, such as nursing and medicine, to allow for interdisciplinary critique and reduce researcher bias [224]. There was a recurrent dialogue until agreement were met regarding how the data were labelled, interpreted or categorized.

5.1 STUDY I

Study participants and recruitment

Study I included 15 Swedish-speaking women, who had gained at least 12 kg during their pregnancy, and retained ≥10 kg one year postpartum. Women were recruited between May 2015 and May 2016 via leaflets in gyms, children's healthcare centres, maternity units, the Center for Obesity, and via a monthly email from a company selling weight loss products.

The study was approved by the Research Ethics Vetting Board in Stockholm, Sweden (no. 2015-605-31/5).

Data collection

Semi-structured individual interviews were used to assess women's perceived reasons for their excessive postpartum weight retention**.** Interviews were carried out by a female cognitive therapist/physiotherapist with >20 years of experience of working with patients with obesity. Prolonged engagement within the field of the research area can increase the understanding and enhance trustworthiness [227], as well as facilitate for patients to feel comfortable and understood. Participants could choose what interview setting they preferred which was either at the Center for Obesity (n=8), at their home (n=2), at a café/workplace (n=4) or via video call (n=1). Interviews lasted on average 44 min (15-60 min). During the interviews, the interviewer used open questions and probed, i.e., asked for details and clarification) when needed. An interview guide was used to ensure that the research areas were covered, i.e., weight development, knowledge of GWG recommendations and risks, breast feeding, psychological factors, and own ideas about what may have influenced their weight retention. Pilot interviews were conducted, but as no revision was deemed necessary, data were included in the study.

Analysis

Inductive content analysis, as described by Graneheim & Lundman [235], was used in the process of analysing the manifest data and condensing women's stories into fewer content-related categories. Although the article by Graneheim & Lundman is not a method article, but a secondary source of information, the paper is widely referred to, as it aim to present an overview of the area, and establish clarity of terminology and definitions commonly used in manifest and latent content analysis [235].

After the initial text processing (see methods, section 5) codes were clustered together in preliminary categories. Categories were compared regarding similarities and differences and merged and renamed until final sub-categories and five main categories were formulated. The analysis was performed in co-operation with two other researchers of which one had extensive experience from qualitative research. The personal interests, views, or intellectual constructions of the researcher may affect the development of categories [243]. The first authors' pre-understanding was her knowledge about different theories of health behaviour

change (previously mentioned under section 2.3) which suggests that change is affected by knowledge, ability and motivation.

5.2 STUDY II

Study participants and recruitment

Study II included 17 midwives with experience from antenatal care. Participants came from twelve clinics from different parts of Sweden which varied in sociodemographic structure. For recruitment, the head of each clinic was contacted, who in turn asked midwives if they wanted to participate after having been informed about the purpose of the study. Nine of the clinics had been previously involved in weight intervention programs, of which some had been in the control group. No clinics in the Stockholm region were contacted, as about one third of midwives (n≈300) had heard the interviewer lecture about obesity, psychological aspects and communication as part of an earlier regional educational intervention. It was considered a risk that midwives would recognize the interviewer and feel obliged to provide answers in line with what had been lectured, instead of sharing their actual thoughts and opinions.

According to The Stockholm Research Ethics Vetting Boards decision (no. 2016/1278-31/5), no ethics approval was needed since no patients participated in the study.

Data collection

Individual semi-structured interviews were conducted between November 2016 and February 2017. Each midwife chose a convenient location, which was either at their clinic (n=9), at a hotel (n=1), or via video call (n=7). An interview guide was constructed based on the findings from study I, as well as on previous literature. The guide covered: midwives' knowledge of GWG risks and recommendations, experiences of communicating about GWG, and how they believe weight interventions may be improved. The interview guide certified that all pre-planned subject areas were covered, while allowing participants to speak freely and elaborate on whatever aspects they associated with the subject of research interest.

Analysis

Latent (thematic) content analysis was used to process the transcribed data in search for recurrent patterns and themes [224,236–238]. A "pattern" has been described as a descriptive finding, while a "theme" attempts to interpret the meaning of the finding [224]. During the text processing (see methods, section 5) the codes were clustered together into groups that formed the basis for the latent analysis. Three researchers, of which one has extensive experience from qualitative research, participated in the analysis discussions regarding how codes fitted into categories, how the categories related to each other, and how the underlying meaning of the data was interpreted and formulated into themes [237] .

5.3 STUDY III

Study participants and recruitment

Study III involved 17 Swedish-speaking women of reproductive age with obesity, recruited from the Center for Obesity in Stockholm, Sweden. Participants were planning to become pregnant in the future, and three of them had children since before. Women volunteered to participate, either after reading a flyer in the waiting room of the clinic, or after being asked by their caregiver at regular visits. They were scheduled to participate in either a focus group or an individual interview depending on their preference.

The study was approved by the Research Ethics Vetting Board in Stockholm, Sweden (no. 2017/2279-31/5).

Data collection

Three focus groups (n=11) and six individual interviews were used to collect data. Focus groups were chosen to benefit from participants' interactions to facilitate and inspire the discussion, and thereby enhance data quality. Meanwhile, individual interviews were offered to facilitate for participants who were unable to attend the focus group dates, or felt reluctant to speak in a group, to choose the time and setting they felt most comfortable with. This alternative allowed for voices to be heard from participants who may otherwise have been excluded. The choice to use two different data collection methods was also based on research that suggest data collected in these two ways may render different content and thus may complement each other [244,245].

As awareness about risks with excessive GWG in the general population may be low [175], and speculation about a future event can be difficult [246], a short (3 min) vignette was used to provide women with a brief overview of risks and recommendations regarding gestational weight development and benefits of a healthy lifestyle. The vignette was used in both focus groups and individual interviews. It also included a scenario based on findings from study II (that some midwives occasionally avoid talking about weight gain recommendations and risks for fear of inducing guilt and shame in pregnant women). The use of introductory vignettes or scenarios can facilitate the opening up of a discussion and may be perceived as a non-threatening way of exploring sensitive topics [246–248]. Women's reactions to the scenario were explored along with their wishes regarding how they would like to be treated in future antenatal care.

A second researcher were present, besides the interviewer, during focus groups. She had previous experience from focus group discussions and among her tasks was to make notes about group interaction and to ensure that no topics were left un-probed. After the recordings had been transcribed, it was ensured that her notes were added before the analysis began.

Analysis

Thematic analysis, as described by Braun & Clarke [239] was chosen to look for recurrent patterns and themes across the sample. During the initial text processing (see methods, section 5), the data set was searched for recurrent patterns and responses regarding aspects that seemed important in relation to the research questions. To determine what would count as a theme, the researchers considered factors such as, the emphasis that participants put on a response, as well as the prevalence of a certain aspect across the sample. To ensure that all relevant material was included and that one researchers' early ideas had not steered the subsequent analysis into a deductive process, the first and last transcribed interview were analysed by another researcher independently (analyst triangulation) [224]. She highlighted text passages that she considered relevant for the research questions and when comparing notes, any discrepancies were discussed and resolved. Coded text material from both data collection methods were merged. After preliminary themes were formulated they were reviewed by going back to the coded data extracts from the entire data set to determine how the codes fitted, and whether themes needed to merge or be renamed. Preliminary themes were discussed within the research group until three themes were formulated that captured the meaning of the participants stories.

5.4 STUDY IV

Study participants and recruitment

Study IV assessed data from Swedish-speaking patients at the Center for Obesity with weight regain after bariatric surgery. Inclusion criteria were: ≥18 years, BMI ≥35 kg/m^2, and ≥10% weight regain from nadir after any bariatric surgery method, except laparoscopic adjustable gastric banding (LAGB). Weight regain is especially common after LAGB, and the method is no longer used in Sweden [249]. Of 19 patients who were asked, 16 patients were included. One was willing to participate but unable to attend any interview date, and two declined participation.

The study was approved by the Research Ethics Vetting Board in Stockholm, Sweden (no. 2018/294-31/1).

Data collection

Participants were interviewed at the Center for Obesity between April 2018 and December 2019. An interview guide was used to ensure that all topics were covered, i.e., experiences of weight regain and post-surgery support from healthcare professionals, family and friends. One pilot interview was conducted to test the interview guide (data not included) which confirmed that wording and disposition were understandable and relevant. Though the collected data were deemed rich and seemingly sufficient after thirteen interviews, three more interviews were conducted to ensure this, as well as to increase the sample variation in terms of gender and age (more males and younger participants).

Analysis

Interview data were analysed with TA [239] (see study III). Two researchers conducted the same initial analysis process separately of the first thirteen interviews, after which suggestions of codes and themes were compared and discussed to ensure that all relevant data extracts were assessed and represented in the themes. Codes were grouped regarding similarities and differences, and themes and sub-themes were formulated in co-operation and discussion within the research group.

5.5 ETHICAL CONSIDERATIONS

As a researcher I have taken on the responsibility to make justice to the voices of the 65 participants who have shared their stories and experiences in these four studies. All studies retrieved approval from The Regional Ethical Review Board in Stockholm, Sweden, and were conducted in line with the Helsinki declaration [250]. Bioethics includes respect for human dignity and human rights, and the four ethical principles; *autonomy*, *beneficence*, *non-maleficence* and *justice* [251], have guided the decisions in the research process regarding the way that study I-IV were designed, conducted and presented.

Autonomy include viewing another person as an individual and respecting her right to make own informed choices. In all four studies, participants received information about the nature of the study in writing as well as orally, and informed consent was obtained from all participants before data was collected. Respecting the person also include protecting the interviewee's information and treating collected data with confidentiality [252]. Interview data was particularly sensitive since informants shared personal details. To preserve privacy for research participants, data were kept locked in and personal identification kept separate from the transcripts. Data-sets were not made publicly available when submitting articles to journals, and only de-identified quotes were used in the text. To attain confidentiality between group members in the focus group discussions, every session begun with the explicit wish that all that was said in the group were to stay in the group, and with a reminder that it was voluntary to speak, and that one could remain silent if anyone so wished.

The *beneficences* for participants in all four studies were to be given the opportunity to put their feelings and thoughts into words and tell their stories to someone who listened attentively with interest and a non-judgmental attitude, which in itself may have a beneficial effect both psychologically and physically [253]. For focus-group members, discussing important issues with women with similar key aspects was perceived as beneficial by participants. The collected data will supposedly benefit a larger group of people in the long run as it aims to improve weight management interventions.

To reduce the risk of unanticipated harm, *non-maleficence,* current pregnancy was an exclusion criterion in study III. This was to avoid the risk of worrying already pregnant women by informing them about the risks with unhealthy weight development. Precautions were taken so that women would not be left with lingering worries or anxiety after interviews, by setting aside time at the end of each interview for any remaining questions.

In study III and IV participants could bring up any remaining questions regarding their weight with their healthcare provider at the Center for Obesity, and had access to a cognitive therapist if necessary. Participants in study I and II were informed that they could contact the interviewer if needed, who in turn could refer the women to relevant psychological or medical support.

Furthermore, the concept of *justice* may be translated into how results are presented to make justice to participants' stories [252], and in what context and purpose the findings are shared. The findings in study I-IV have been (or will be) published as scientific reports with the intention of improving the care for patients during pregnancy and post bariatric surgery. The reports may also be used to illuminate how midwives' work situation may be improved. Quotes were used to illustrate how findings were grounded in raw data, and researcher triangulation during the analysis, and co-writing further reduced the risk for biased interpretation or personal exploitation of participants data [252].

6 RESULTS

6.1 STUDY I

Study I explored women's perceived reasons for their unhealthy weight development resulting in postpartum weight retention.

Of the fifteen participants, five were normal weight, three overweight and seven had obesity at the beginning of their pregnancy. Five of them were born outside Sweden. Mean age at pregnancy was 31 years (19–40 y), and mean time elapsed between the end of the postpartum year and the interview was 2.5 years (0-7 y).

Five categories were formulated that covered aspects and circumstances that may have contributed to women's postpartum weight retention.

Lack of knowledge

By the time of their pregnancy women were unaware of risks with excessive weight gain for adverse pregnancy events or for postpartum weight retention. They reported no, or inaccurate knowledge of GWG recommendations, and none of them knew that obesity or excessive weight gain could have a negative impact on the health of the baby. Some women recalled having received vague weight advice from their midwife, or numbers that did not comply with the IOMs' recommendations. Some received no weight gain advice and were not weighed. Some women lacked knowledge of what to eat or how to exercise during pregnancy.

Misconceptions

Some women had believed that any extra weight they put on during pregnancy would automatically be lost when breastfeeding. This misconception allowed women to consciously eat excessive calories both during and after pregnancy, and were sometimes reinforced by midwives.

"*[woman quoting her midwife] Do not worry! It will all melt away when you breast feed!*"
Woman no 7

Furthermore, some women believed that GWG was inaccessible by lifestyle, which made women less inclined to try to adhere to a healthy diet.

Eating for relief

Eating were commonly mentioned as a way to provide relief of psychological, emotional or physical discomfort, such as sadness, anxiety, tiredness or morning sickness. Women reported being aware that they ate unhealthy types or amounts of food, but possessed no other strategies to cope with their discomfort.

"I found it hard and the transformation to become a mother, and it was [hesitates]… Interviewer: It was a tough period? Yes, and then this happened… that I ate sweets. /…/ It was my way of relaxing…to reward myself… to enjoy something. " Woman no 5

Lack of support

Women perceived midwives as unconcerned about weight, and thus women felt they had no reason to restrain their eating. Some women had been told by their midwives not to worry, when women had expressed concern about their fast or large weight gain. With one exception, there were no postpartum weight loss support. Some reported insensitive treatment from their midwives.

"I met a horrific midwife at first but then I swapped, but the first one was no good // She was like…she really pulled me down. I came out crying. I:-What happened? Everything, I was constantly told I did everything wrong and it was also about my weight. I was told to 'Absolutely not gain any weight' and that I was grossly overweight." Woman no 9

Women suggested there should be exercise groups during the year after delivery. Some said they were too ashamed to show other people how depressed they felt or to seek professional psychological help. There was a recurrent wish to have more pro-active interventions with psychological support from healthcare, also postpartum.

Barriers to physical activity

Swollen feet, painful hip joints or doctors' orders to remain in bed were some barriers to physical activity. Feeling depressed or ashamed would also affect physical activity.

" …at least after the pregnancy it… probably because I became pretty depressed really./…/ I had no urge to go out and socialize because I had gained a lot of weight and it felt like everyone stared at me and sort of 'Oh my god, just look at her'." Woman no 15

Women expressed no efforts to adjust calorie intake to the lower physical activity level. As several factors, such as lack of information and misconceptions, may be modified by the communication with midwives, these findings inspired the formulation of the research questions for study II.

6.2 STUDY II

Study II explored how midwives approached and perceived communication about body weight and gestational weight recommendations with women of BMI ≥ 18.5.

Participants (n=17) took their midwifery degree in between 1982–2015 (median 2001), and had between 1-30 years of working experience (mean 12.5 y). Fifteen midwives had received some form of training in MI. Nine midwives reported having received no education about risks and recommendations regarding GWG.

Midwives' empathy and awareness of weight stigma affected their communication and clinical practice with regard to body weight discussions. The main theme was perceived as a consequence of the two sub-themes (**Figure 3**).

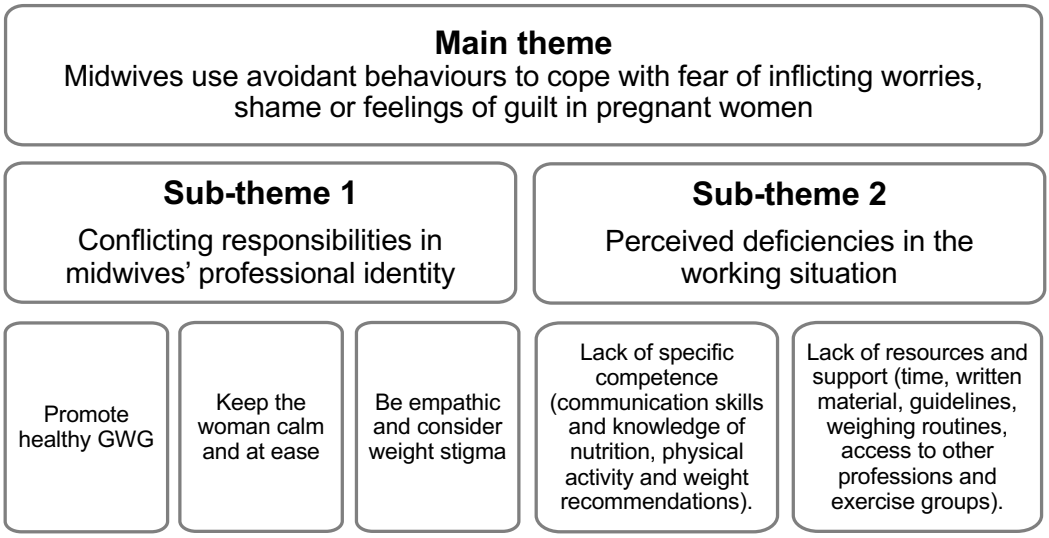

Figure 3. *Main theme, two sub-themes and underlying categories regarding factors that sometimes make midwives avoid the topic of body weight.*

Conflicting responsibilities in midwives' professional identity

All midwives acknowledged obesity and excessive weight gain as important health risks that should be addressed in pregnancy, at least in women with obesity. Midwives also agreed that body weight and obesity are sensitive issues that need to be approached with care to ensure a good midwife-patient relationship. Many midwives had experienced how women were saddened or ashamed when discussing body weight, and how this negatively affected the communication. Some found it hard to balance their professional roles of being the one who should make women feel happy and at ease with their pregnancy, while discussing weight and BMI-related risks, and consider weight stigma (**Figure 4**).

Figure 4. *Illustration of midwives' struggle in managing different roles and assignments.*

Fear of inflicting shame or worries in women made some midwives adjust recommendations (allowing for higher weight gain), tone down risks, or sometimes avoid the subject. In comparison, midwives found it easier to bring up the topic of alcohol or domestic violence, than obesity or excessive weight gain. Feelings of frustration and shame were present when some midwives explained how they felt unsatisfied with their own accomplishments in weight interventions, and how they struggled to accomplish their task.

However, midwives identified several factors that could potentially facilitate their work, such as sufficient time, obesity education, training in communication skills, and written material in different languages. Furthermore, they believed that access to a dietician, physiotherapist and psychological counselling could both improve interventions, as well as ease their work burden.

"*When eating is a compensation for something else or you are comforting yourself with food...We have no tools when it comes to psycho-emotional problems."* Midwife no 8

Though some avoided body weight discussions, midwives most often assessed lifestyle habits, and some provided food advice and strategies for how to handle cravings.

"...ask about food habits, if they have regular mealtimes, what they eat, are there plenty of vegetables in their meals, how large are the pasta portions..." Midwife no 10.

"If they do have to eat something unhealthy, a pastry or something, I may suggest eating a large carrot just before, so then they may eat only half of the pastry." Midwife no 8

Normal weight women were often expected to have a healthy GWG, and thus rarely the target of weight interventions. As a result, midwives were sometimes caught by surprise when normal weight women ended up having gained excessively. Furthermore, a large body size in a midwife was mentioned as a facilitator in communication with women with overweight, as they may feel more understood.

6.3 STUDY III

Study III explored how women of reproductive age with obesity would like their future encounters with maternity care to be, regarding discussions about body weight.

The study population (n=17) had a mean age of 26.9 years (19-39 y), and a mean BMI of 40 kg/m^2 (33-53 kg/m^2). The majority were nulliparous, Swedish-born and in a relationship.

The first two themes: 1) *Importance of obtaining vital medical information*, and 2) *A wish to feel understood and treated with respect*, captured what women wished to obtain regarding medical and emotional aspects from a maternity care meeting. The third theme: 3) *Midwives' approach is crucial in sensitive key situations*, concerns details about how women want to be approached and treated by their midwives (**Figure 5**).

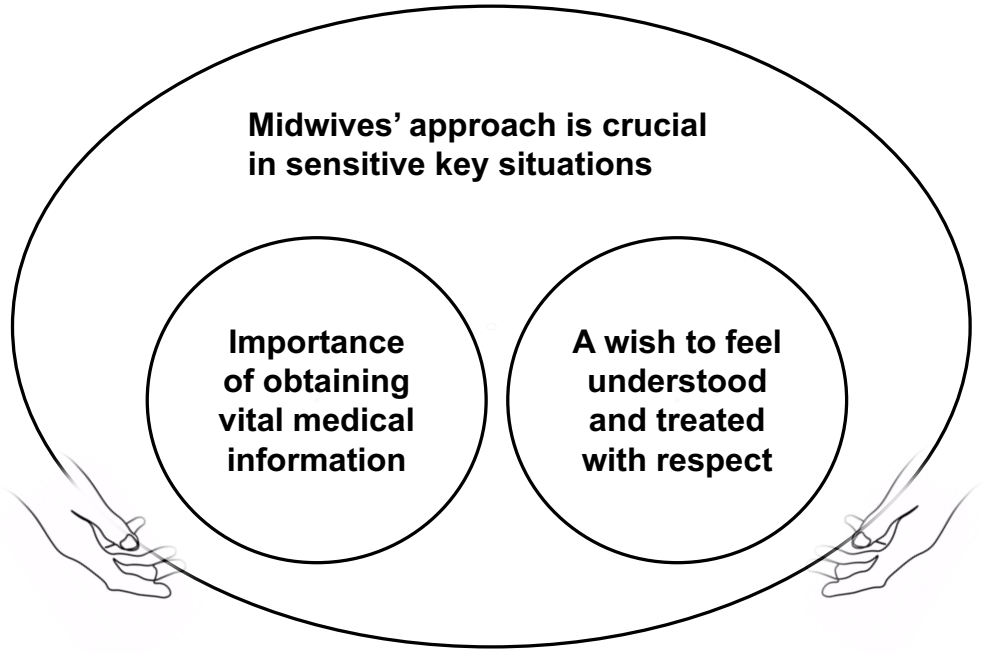

Figure 5. *Three themes representing what women wish to obtain from a maternity care meeting, how they wish to feel and the importance of midwives' approach to achieve this*.

Importance of obtaining vital medical information

Several women were unaware of risks and recommendations regarding weight gain in pregnancy. Their response to the vignette (see data collection 5.3), where mixed. Most women said they would like risk information as it concerns the health of their child, and believed that the knowledge would affect their motivation to change their habits. However, three women would prefer not to discuss weight-related risks as they believed GWG to be uninfluential by lifestyle anyway, and thus would only be worried.

A wish to feel understood and treated with respect

All women had experienced weight stigmatization in previous encounters in healthcare settings. Women wished to feel understood, respected and met by warmth, interest and a non-judgmental attitude at future maternity care visits. Some predicted that being met with wrongful assumptions or unsolicited advice could make them less receptive to information and advice.

"Or else it is like 'I'm not going to listen to you now' [illustrates by covering her ears with her hands], almost as if you push away what she said. I close my ears" Focus group no 1

Midwives' approach is crucial in sensitive key situations

Six situations during maternity care meetings were recurrently mentioned across the interviews. They were perceived as sensitive occasions where the actions of midwives could be crucial for the midwife-patient relation: 1) Bringing up the subject of body-weight, 2) Weighing, 3) Providing weight-related information, 4) Coaching lifestyle modification, 5) Dealing with women's emotional reactions, and 6) Ending a conversation (about weight).

Women suggested that if these situations are handled well they may facilitate a good working alliance. Women wished that midwives would ask for permission before talking about body weight or weighing. Furthermore, they wished that scales should be placed in private and they should not have to see the numbers if they preferred not to. Midwives should assess woman's weight history and her previous knowledge on obesity to allow more understanding of her current situation and awareness. Women wished that midwives should acknowledge emotional reactions and evaluate any need for psychological support. Individually tailored information and advice should be offered if the woman wants it, and any risk information should be accompanied by a treatment plan.

"Every time I meet a health care provider, they measure my weight and height and calculate my BMI, but no one has asked me if I have any weight loss support. // I have always been expected to deal with it [obesity] myself." Focus group no 3

Participants wished that midwives would use words like BMI, weight category and weight change, talk about positive health messages, and encourage any positive change. If needed, midwives should be able to refer women to a physiotherapist, dietician, or to psychological support. Finally, at the end of a body weight conversation midwives should ask how the woman perceived the meeting. Women emphasized that midwives should not fear women's emotions, and that if emotionally charged situations are handled well, it may actually enhance the patient-midwife relation.

Women believed that the following behaviours could appear offensive and possibly counterproductive:

- Bringing up the subject of body weight and risks without asking for permission
- Making assumptions about eating and exercise habits based on BMI
- Providing unsolicited advice
- Using the words fat, obese or obesity (tjock, fet, fetma in Swedish)
- Using risk talk to scare women to motivation, i.e., *"If you don't…"*.

"..because you cannot scare a weight problem away. It is not a good method! It doesn't work! Unfortunately! Or else we would have been very thin (laughs)." Individual interview no 1

In several cases women's expectations were that midwives should be able to detect if and how the woman would like to be informed.

"Don't just tell it straight // Be attentive to the mood. Interviewer: So what would that mean for the midwife, what should she do instead of 'telling it straight'? IP: Talk a little bit first and then maybe…I mean you can sense if someone enters the room and…I mean you have to try them out a bit.. Interviewer: How do you mean? IP: God, I realize this may sound really weird [laughs]. I'm not sure what I mean. I mean I would not like… tell something to someone if I did not know that the person could cope with it. // Interviewer: And how can the

midwife tell if the woman can 'cope' with the information or not? IP: You can just tell, right? You have to be able to do that and if they [midwives] have studied these things they must have learnt it. It is about body language and everything…Now I can hear that this sounds very hokey [laughs]." Individual interview no 6

6.4 STUDY IV

This study explored how patients with obesity and weight regain after bariatric surgery perceived, and would have preferred social support.

The sample contained mostly female (75%), middle-aged (mean 49y) patients born in Sweden, with a mean of 36% weight regain from nadir. All participants (n=16) had undergone bariatric surgery in Sweden between 2004 and 2016 and had a BMI >35 kg/m^2 (after weight regain). Most patients (n=13) were employed or studied, marital status varied, and twelve participants had children. Several patients reported multiple problems with depression, pain, addiction and serious illnesses, either through-out life, or post-operative.

Two main themes, and seven sub-themes, (**Figure 6**), were formulated.

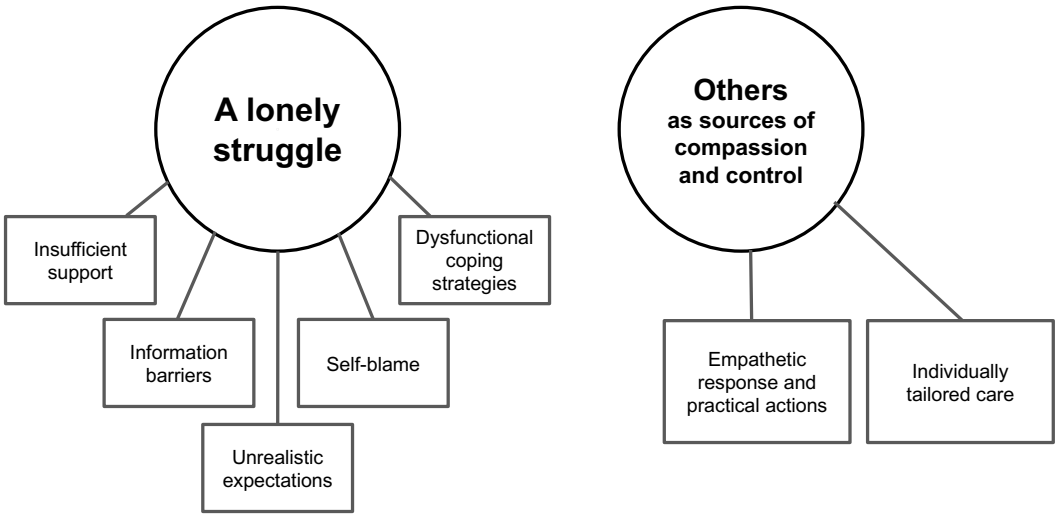

Figure 6. *Two main themes, and seven sub-themes regarding patients' perceived and preferred post-surgery social support.*

The first theme: *A lonely struggle*, illuminates participants' feelings of abandonment when lack of support or unfavourable treatment added to their struggle during weight regain.

Insufficient support

All but one participant perceived the post-surgery support from healthcare as insufficient. Some participants who looked for help when weight regain began, were referred back and forth between medical facilities, and some explained they had to beg for help. Some did not know where to turn and felt abandoned. For others, visits were perceived as unhelpful or lacking substance.

"[Describes what the doctor said at a follow-up visit]'Now you have started to gain weight, so you better restrain eating a bit', and I said 'yeah yeah'. You know, that was it, and not much more." Participant no 13

Some primary health care providers were perceived as lacking knowledge about bariatric surgery procedures, and one participant experienced that gastrointestinal side effects had been ignored by her general practitioner.

"I do not find my general practitioner helpful because I tried to speak to her about a month ago to tell her that I am not feeling well, but she replied "there are people with much worse side effects than you have". Participant no 12

Some participants explained that family or friends would comment, nag or complain about participants' eating and weight which had a negative impact on psychological well-being and sometimes had a counterproductive effect on eating.

Information barriers

Though most participants recalled having received pre-surgery information about diet etc., some found it hard to understand or to remember it. Dietary advice were sometimes perceived as contradictory and recommendations varied between hospitals. One participant claimed to have received plenty of pre- and post-surgery information but were, as a busy teenager, unable to comprehend and make use of it.

Unrealistic expectations

Participants said they had been unaware of the risk of poor weight loss or substantial weight regain, and unprepared for how hard it would be to comply with the post-operative lifestyle. The weight loss in the beginning also gave a false impression that it would continue to be easy. It was common to have expected the operation to provide more of an external control than it did.

Self-blame

Participants commonly blamed themselves for regaining weight, and shame made some of them reluctant to engage in social activities or to seek medical care.

Dysfunctional coping strategies

In response to weight regain, some applied old diet strategies, of which some were dysfunctional. Even vomiting was considered an option. Comfort eating was used to avoid emotional discomfort, while some drank alcohol as a way to cope.

The second theme, *Others as sources of compassion and external control*, covers what participants had experienced to be helpful, and what support they would prefer.

Empathetic response and practical actions

Participants explained that when they felt respected, accepted, and understood by family and friends it had a positive impact on their psychological well-being. Participants had appreciated concrete actions, such as eating healthily or exercising together, or family members who helped them remember to take their vitamins. Others suggested that family members should be offered education when someone undergoes bariatric surgery, to enable a more supportive home environment. Several participants believed that detailed and individualised dietary advice would have made them more careful with food choices. To be able to share experiences with peers (live or online) were both appreciated and desired.

Individually tailored care

Participants desired individualized, more frequent, and in some cases life-long support. They wished that health care providers should be more responsible for pro-active follow-up. Furthermore, access to dieticians and psychological support were desired.

7 DISCUSSION

This thesis has explored and identified barriers and facilitators in weight management interventions during pregnancy and after bariatric surgery. The studies focused on how weight related support and communication have been perceived, and could be improved, taking both the perspectives from patients and midwives into consideration. Below, the main findings will be put in context as to how they address the research aims, relate to previous research, and could be used to improve clinical work.

7.1 WOMEN'S PERSPECTIVES ON GESTATIONAL WEIGHT MANAGEMENT

Knowledge as a motivational factor

The awareness of risks and recommendations regarding obesity and excessive GWG seemed low in women, and some had perceived midwifes as unconcerned about weight development. We cannot know whether information was provided or not. However, four of the women in study I were pregnant just before or during 2009 when IOM released the new guidelines. At the time, less attention to weight gain, or a confusion of old and new recommendations may explain the lack of information. Another reason could be that eight of the women had a BMI <30 kg/m^2 and weight interventions often only target women with obesity. In previous studies from other parts of the world pregnant women had poor knowledge about GWG recommendations [127], received no, or inappropriate GWG advice [176,254], and perceived care providers as unconcerned about weight gain [176]. Other studies found a discrepancy between what advice care providers claim to have provided, and what advice pregnant women reported having received [255]. Considering the findings of study II, there is also the possibility that some women were met by midwives who refrained from weighing or talking about body weight to spare women from worries or shame.

Nevertheless, women displayed several misconceptions and dysfunctional beliefs. One was that breast feeding always leads to easy postpartum weight loss, which allowed for women to eat more than needed without worrying about the consequences. Another belief that appeared among women in study I and III, was that GWG is inaccessible by lifestyle. Pregnant women's perception of risk has been described previously as affecting their inclination to engage in healthy behaviours [256]. In the same way, believing that weight gain is beyond the control of the individual may decrease motivation and inclination to engage in healthy behaviours and has been associated with less weight reduction in weight loss interventions [257,258].

The health of the baby have been described as an even stronger motivational factor to maintain a healthy lifestyle, than the mothers' own health [259]. Women in study I believed that if they would have known that excessive weight gain could have harmed the baby, or how hard it would be to lose weight postpartum, they would have been more careful with their diet during pregnancy. Although these are speculations, they are plausible, considering that the

perception of ones' susceptibility to a negative outcome is a key component in behaviour change [204].

Women's perceived reasons for their unhealthy weight development aligned with previous studies which also reported lack of support, lack of knowledge, tiredness and mood among barriers to making healthy lifestyle changes during pregnancy [260]. These reasons may affect postpartum weight retention (and subsequent obesity), taking earlier mentioned health behaviour change models into consideration. **(Figure 7).**

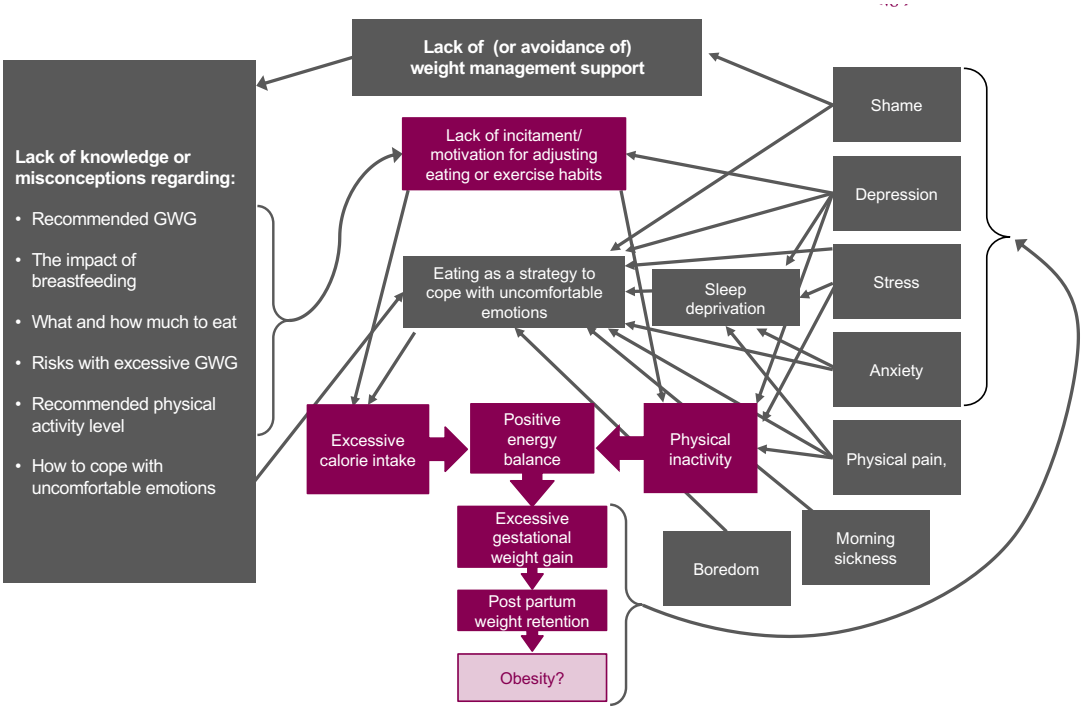

Figure 7. *Conceptualization of how women's perceived reasons (grey) may have contributed to postpartum weight retention via previously suggested pathways (purple), which in turn could lead to obesity.*

The importance of increased knowledge about GWG risks, recommendations and treatment options, is often stressed to enhance motivation [171,261]. Though most women in study III said they would want risk information some women expressed a reluctance towards discussing body weight and risks in pregnancy, fearing it would make them worried. Similar opinions were reported by Olander et al. where one of the reasons to decline participation in a gestational weight intervention program was that women wanted to enjoy pregnancy without having to worry about weight or healthy eating [262]. Meanwhile, BMI is increasing in the pregnant population and young Swedish women (18-30 y) have a more unhealthy diet than other age groups [263]. This puts forward a dilemma where womens' preconceptions may make them decline participating in interventions or receiving information, while they might have considered it if they had been aware of the risks for their child.

At the same time, other qualitative studies report that women who are made aware of obesity-related risks experienced anxiety or fear for complications throughout their pregnancy [256]. Considering that around 35% of women with obesity experience uncomplicated pregnancies

[264], several women may thus endure unnecessary worries if risk information is given indiscriminately. Thus, meeting the needs of this heterogeneous group may be challenging.

Women's wishes for how to be approached and treated

A key notion from study III was that women emphasized that becoming sad or upset may actually be inevitable when talking about risks, but that *how* information is communicated and how emotional reactions are met may be crucial. If midwives are able to respond to women's emotions with understanding, time, and appropriate referrals to other support functions, women predicted that such situations could potentially enhance the midwife-patient relationship.

Findings from study I-III revealed that several aspects of women's wishes regarding gestational weight management, aligned with what midwives believed could make their weight-related work easier.

Both women and midwives acknowledged the subject of obesity as sensitive and had the common goal of making women feel treated with empathy, understanding and respect. They believed that the patient-midwife encounters could be facilitated if midwives had good knowledge about obesity. These wishes for a non-judgmental support from a caregiver who is well familiar with the topic of obesity have been reported in previous studies [265,266], and are in agreement with findings from large quantities of qualitative data (n=827) where participants appreciated midwives who were good listeners, non-judgmental, and treated the woman with respect. Hildingsson et al. also found that desired qualities in Swedish midwives were: up-to-date knowledge and psychological skills [267]. Lack of time has been reported earlier as associated with dissatisfaction with pre-natal care [268], and both women and midwives wished there would be sufficient time allocated for providing information. Moreover, women in Study III suggested that any weighing and risk information should be accompanied with relevant support. Thus, factors like time, obesity education, and training in communication skills in midwives may be key focus areas for improvement of weight management during pregnancy.

The use of eating as a way to relief psychological and physical distress appeared common among participants. The pregnancy period may be emotionally stressful [269], and up to 15% of women experience postpartum depression [270]. To decrease the risk of "self-medicating" by eating, both women and midwives wished to have access to dieticians, physiotherapists and particularly psychological support functions that women could be referred to.

Women's wishes of how to be approached and treated regarding gestational weight management, seem to agree in several aspects with a person-centred approach and the communication style used in MI [208]. This approach has been suggested earlier in both studies of women's and of midwives' perspectives on maternity care services [173,211,267].

7.2 MIDWIVES' PERSPECTIVES

Balancing professional roles

Some midwives seemed to struggle with their professional roles in weight management, and several strategies were employed to avoid causing distress in women. Avoidant behaviours is common in humans when trying to control or escape from uncomfortable thoughts or feelings [271]. Though midwives had the best intentions when avoiding the topic, it has been questioned whether women are allowed to make fully informed choices, if all relevant information is not provided [261]. Accordingly, some midwives felt guilty, accusing themselves for acting un-professionally when they avoided the subject or adjusted recommendations.

These findings align with reports from midwives in the UK, who described a conflict between their perceived role as advocates for women with obesity, while concurrently having to provide information about risks and limited birth choices [163]. Midwives perceived such discussions having a negative impact on the emotional well-being in both women and midwives [163]. Other studies confirmed that both midwives [272] and healthcare providers in general [273] felt uncomfortable about bringing up the subject of body weight, and midwives have previously reported feeling powerless and frustrated when caring for pregnant women with obesity [272]. Likewise, Atkinson et al. found avoidant behaviours in midwives who refrained from bringing up the subject of obesity treatment if they anticipated a negative reception from the pregnant woman [261].

Midwives in study II found that neglecting to inform and discuss GWG recommendations with normal weight women early in pregnancy, could end up in a difficult situation later on if women had gained weight excessively, being unaware of the risks. Similar findings were reported in a large qualitative review where both women and healthcare professionals commonly avoided discussing complications in pregnancy, which sometimes later resulted in women feeling shocked when complications occurred [256].

Stress and work situation

Midwives related their avoidant behaviours to deficiencies in resources such as time, written material, and lack of psychological support functions. Equally important, they mentioned their own lack of specific competence. In the UK, healthcare providers also reported lack of training in person-centred communication, limited access to multidisciplinary teams, and low obesity knowledge [274]. Likewise, midwives in the UK have reported feeling ill-equipped to assist women with weight interventions, especially regarding their own obesity knowledge and training in communication skills [163].

In a way, the role and assignments for midwives may be undergoing a change, where "lifestyle coaching" is added to ordinary medical assignments. In addition, new and wider diagnostic criteria for gestational diabetes have recently been implemented in Sweden [275]. This means more pregnant women whose metabolic profile demands special attention

including oral glucose tolerance tests and close monitoring of blood sugar levels, which may further increase the work burden for midwives.

When midwives compared talking about body weight with other topics, like alcohol or domestic violence, they found the latter easier to discuss, due to higher pre-conceptual public awareness, available written material, and access to supporting functions and resources. For the same reasons, midwives in the UK found talking about other health-related issues easier than talking about body weight [163]. Being faced with this dilemma on regular basis may potentially affect the psychosocial work environment for midwives, as a functional relationship with the pregnant women is highly important for job satisfaction [276]. Herein lies a risk that caring for women with obesity becomes something less desirable, if midwives feel inadequate, insecure, or stressed.

Two midwives in study II stood out from the rest as they presented themselves as confident in talking about body weight. They reported having received education about obesity, as well as extensive MI-training, including follow-up supervision for several months. Correspondingly, several studies have found that midwives who received MI-training became more confident in bringing up the subject of obesity, improved their competence in talking to pregnant women with obesity, and reduced their work-related stress [163,173,277–279]. As women's wishes regarding how they want to be approached and treated in discussions about body weight agrees with a person-centred communication style [75], it is plausible that an increased level of communication skills may be beneficial for both midwives and women.

However, though own perceived skills may boost confidence, it may not necessarily mean that you have obtain the actual skills. An MI-intervention targeting Swedish nurses, showed that when their communication skills were assessed objectively, no improvement was achieved even after a three-and-a-half-day workshop, systematic feedback and four sessions of supervision [280]. Current midwife education often includes MI-training, but the level of communication skills amongst Swedish midwives is unknown.

In study II it was mentioned that being a midwife with a high BMI may facilitate discussions of body weight with women with obesity. This is an interesting and underexplored aspect as it has been shown that health care providers' satisfaction with the own body contribute to the ability to counsel around obesity issues in pregnancy [281].

Additional health professionals' support

With higher prevalence of obesity in the pregnant population, as well as pregnancies after weight loss surgery, an increasing number of risk pregnancies may follow. These demands may be too great to be met by midwives' resources only and both women and midwives in study I-III wished for access to a multidisciplinary team.

Dieticians can aid women with obesity to balance a limited calorie intake with pregnancy nutritional needs. In addition, pregnant women who have had bariatric surgery may need professional nutritional surveillance. Physiotherapists could treat pain and help women

maintain optimal physical activity during and after pregnancy. Women in both study I and III wished for psychological support and assessment of mental well-being in maternity care. At the same time some midwives avoided sensitive topics in fear of making women worried or upset, partly due to a perceived lack of time or professional support. As managing psychological aspects may strongly influence treatment success, particularly in individuals with severe obesity [76], access to psychological support functions may be beneficial.

Other resources

Though barely mentioned in the interviews, new alternative digital information channels are under development. These may possibly constitute important aids in gestational weight management. The Canadian app "Smart Moms" offers accessible guidance to pregnant women [282]. The Swedish app "Alltid Öppet" (always open) [283] provide online midwifery contact, and "Sund start" (healthy start) allow for web-based education for pregnant women. [284]. Assessing information via an app or website may reduce the risk of women feeling judged, as well as facilitate access to multidisciplinary support for women who live in areas far away from necessary professional help.

Complementary outcome measurements

Given the many uncertainties regarding the effect of limiting GWG [188], along with the lack of consensus about optimal GWG in women with obesity, it may be beneficial to complement weight with other measurements and behaviour goals. Weighing during pregnancy as a stand-alone weight management strategy has not proven effective in limiting GWG [285]. In addition, dieting with weight loss as primary target has been associated with the onset of eating disorders, or weight cycling [165].

Other approaches such as "Health At Every Size" (HAES) has been suggested [165]. These approaches put more emphasis on healthy behaviours, e.g., increased vegetable intake, physical activity, or improving sleep, without weight outcome as primary focus [165]. A Swedish study showed that women who complied to an intervention, improved their nutrition, physical activity and psychological well-being and had a favourable effect on pregnancy outcome though they failed to meet the weight goal [16]. Furthermore, following women's glucose levels seem crucial as it is a key determinant of foetal growth [286], and improved glucose control is associated with lower birth weight [287].

Some midwives in study II avoided weighing, discussing body weight, or recommending weight gain spans. However, they often still addressed and discussed healthy lifestyle habits. As most studies contain weighing and has weight as one of the outcome measures, data about how interventions without weighing or any weight focus, would effect pregnancy health, is lacking.

Prejudices regarding non-obese women

Eight of the women in study I who ended up with an unhealthy weight development, were normal- or overweight at the beginning of their pregnancy. Currently in Sweden, all women are supposed to have their lifestyle habits and weight assessed at the beginning of pregnancy [161], but non-obese women are less likely to be included in weight interventions. Previously, non-obese participants in a Swedish study attributed their lack of information to that they were not obese and presented themselves as healthy in questionnaires [259]. Pre-conception BMI is not a clear predictor of excessive GWG, thus following the weight trajectory in women of all BMI-categories may enable midwives to discover unhealthy weight gain in normal weight women, who are otherwise rarely a target for interventions, but nevertheless at risk for pregnancy related complications such as gestational diabetes, preeclampsia, hypertension, foetal macrosomia, caesarean delivery [106], stillbirth [146] and postpartum weight retention [288]. In fact, excessive GWG particularly increases the risk for LGA infants in non-obese women [289]. Furthermore, it may possibly reduce the risk of women with obesity to feel singled out and thus lessen the stigma. In addition, the weighing situation provides an opportunity to detect situation bound anxiety and possibly reveal eating disorders which are otherwise hard to discover.

7.3 PATIENTS' PERSPECTIVES ON POST BARIATRIC SURGERY SUPPORT

All participants but one felt they had received too little post-surgery support, and several were unprepared for how hard the lifestyle change after surgery would have to be. Previously, individuals with obesity have described successful weight loss as requiring an enormous amount of mental and emotional investment, and that searching for support was *"a struggle"* [272]. Meanwhile, dropout rates are high in existing follow up after bariatric surgery, with attrition rates up to 89% after 3 years [290]. In a Brazilian study of patients with weight regain after GBP, 60% had never undergone nutritional follow-up, and 80% had not undergone psychological follow-up [291]. The lowest follow-up attendance were found among patients <40 years of age, unemployed, or those with psychological causes, e.g., depression [290].

During the time for surgery in the participants in study IV, Swedish guidelines for long-term nutritional follow-up were lacking [292]. In 2010, The Scandinavian Obesity Surgery Registry (SOReg), (founded in 2007) reported that follow-up rate of patients for the stipulated registry-visits were unacceptably low already after 1 year, with regional variations from 93% down to 39% [293]. The current (2017) Nordic guidelines for follow-up after obesity surgery [292] suggest at least annual, life-long follow-up with blood tests to assess nutritional status as well as assessment of post-operative adverse events. However, follow-up recommendations that specify psychological or psychosocial follow-up seem to be lacking.

It is unknown what information has actually been provided, or what follow-up have been available to patients. However, considering that health literacy may be low, and that patients sometimes forget information about complications, even if they received pre-operative information [294], there may be a need to repeat and provide information in various ways. Of

particular importance may be to convey the message that weight regain is a treatment failure and not a personal failure. Among reasons for not attending follow-up appointments patients have mentioned: feeling ashamed for not meeting the post-operative expectations, visits not enough focused on psychological aspects, and a strong belief that weight control was completely up to the individual anyway [295].

While struggling alone, some patients tried to control their weight in dysfunctional ways, such as eating too little, and even vomiting was considered. Similar desperate attempts have been mentioned earlier where intense fears of regaining the weight lost from surgery induced too restrictive eating behaviours [296]. Several participants in study IV wished they had received more psychological support. A recent systematic review found that CBT may improve eating pathology and psychosocial functioning among bariatric patients [297], and suggested treatment should be initiated early in the post-operative period. However, the effect of psychological interventions on weight outcome remained mixed.

Similar to the women in study I, patients with weight regain claimed to have received no, not enough, or confusing information regarding weight gain. Being unaware of the possibility of weight regain, as well as of existing add-on treatment options, may have increased patients' level of self-blame and delayed their seeking of support. In addition, they experienced that health care providers in primary care lacked knowledge about bariatric surgery procedures. The same issues has been reported from Canada where patients felt their family doctor lacked clinical knowledge to manage many of their post-surgery issues [298].

Participants desired individualized follow-up both regarding extent and content. This has been previously reported where patients wished that follow-up visits would focus on addressing patients' specific needs rather than collecting standard follow-up data [298], and multidisciplinary care may need to be available when needed, without termination dates. Identifying individual beliefs and expectations may also be crucial in the growing population of migrants, as cultural differences and ethnicity may play a role in what patients expect from, and how they interact with healthcare [299].

Although no causal effects can be concluded from this exploratory study, participants themselves suggested that lack of support may have worsened their weight development. Their feelings of abandonment and self-accusations were aggravated by negative comments or misunderstandings, and the psychological and emotional stress may have induced comfort eating, or deflated motivation to engage in lifestyle changes. People seeking bariatric surgery have been described previously as having a heightened vulnerability to weight stigma [300]. The shame-induced reluctance to seek healthcare may also mean that they have not been offered add-on treatments like CBT, or weight loss drugs. Whether providing patients with the support they desire would lead to a different weight outcome remains to be explored.

7.4 SHAME AND STIGMA AS BARRIERS IN WEIGHT MANAGEMENT

As mentioned by participants in all four studies, shame strongly affected people's actions in relation to weight management. For example, midwives who avoided discussing the topic of

body weight (study II), patients who were reluctant to seek help and support (study I and IV), or women who felt they would "close their ears" if they felt stigmatized (study III).

The affect shame is a critical regulator of human social behaviour [301]. When faced with a (potentially) shameful situation humans commonly react by using one of four typical behaviours to avoid the discomfort [302] (**Figure 8**).

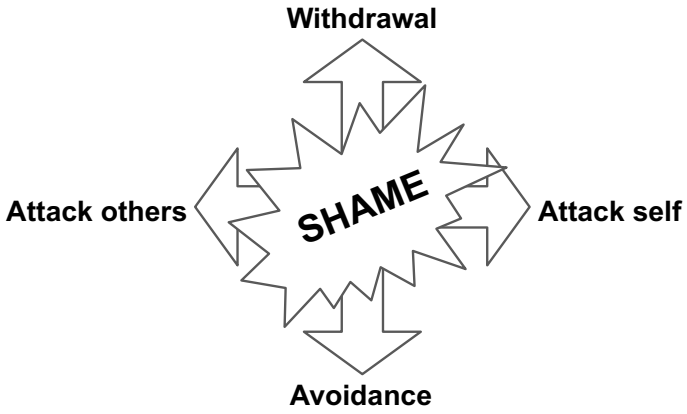

Figure 8. *The compass of shame adapted from Nathanson* [302].

In the context of weight management, *Withdrawal* may include not attending a follow-up visit, avoiding sensitive discussions, or not revealing your true weight. *Attack self* may include self-blame or self-harm, e.g., conscious over-eating. *Attack others* may include lashing out verbally or blaming others. *Avoidance* may include denial, focusing excessively on other issues, or distracting oneself by eating or drinking alcohol.

Feelings of being alone, disconnected from others, and in need of rescue but with no one there to help are central to the shame experience, as are situations where attention is focused on bodily functions [303]. Such factors were commonly mentioned by participants with weight regain in study IV. In pregnant women with obesity, several studies have reported that an insensitive or stigmatizing approach by healthcare professionals led women to feel ashamed [256]. Women in study III explained that perceived weight stigma in the form of feeling judged, disrespected, or not listened to could make them feel shamed, and thereby less honest or receptive for discussions about body weight.

Counterproductive effects of perceived weight stigma

Not only could stigmatizing communication lead to disrupted patient-caregiver relationship and missing information, but it could ironically be counterproductive. Van Strien et al. showed a strong correlation between inability to cope with negative feelings, and emotional eating and weight regain [304]. Multiple studies suggest that exposure to obesity stigmatization is positively associated with overeating, binge-eating, increased desire for food [300,305–309], and less interest in physical activity [310]. As an example, participants with overweight or obesity who were exposed to a video about the health risks of obesity, increased their psychological stress, cortisol levels, and ate more afterwards compared to controls who watched a neutral (nature) program [47]. Perceived weight stigmatization among pregnant women with obesity

was also associated with higher level of emotional eating and postpartum weight retention [311]. Moreover, another study found that experiencing weight discrimination increased the mortality risk with 60%, independent of BMI [312].

This further emphasizes that communication about body weight needs to be done in a non-judgmental and person-centred way [171,300], and accompanied by relevant support to avoid unanticipated harm (**Figure 9**).

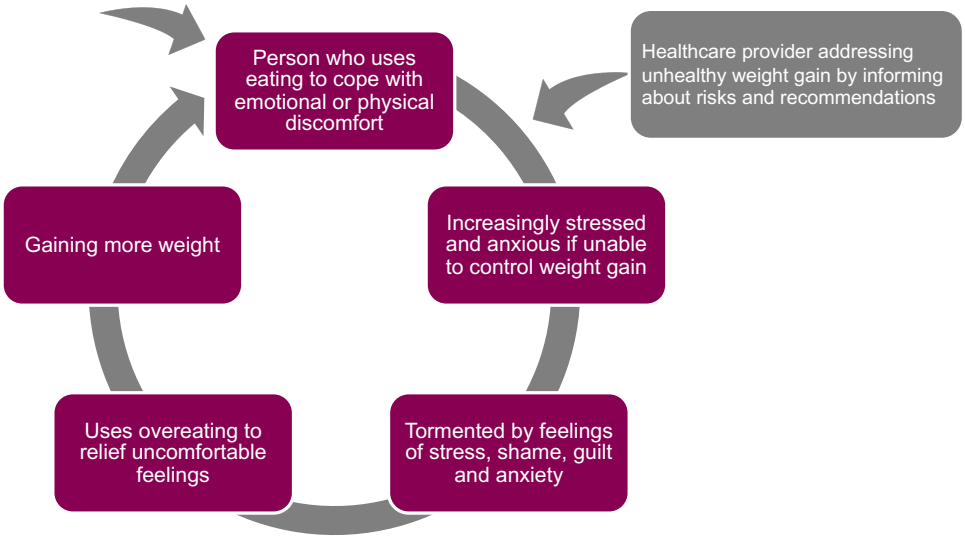

Figure 9. *A potentially vicious circle where weight interventions may have a counterproductive effect.*

All women in study III reported having experienced earlier stigmatizing treatment in medical settings. Their statements are supported by numerous reports from all over the world [4,178], including Sweden [170]. Pregnant women with obesity have been suggested to be particularly vulnerable for so called "mother blame" as almost all health problems experienced by foetuses and children may be blamed on the mothers' behaviour [313]. The women in study III explained that stigmatizing experiences affected their expectations on future maternity care meetings. These findings align with other qualitative findings where women described how negative experiences had made them more defensive when discussion their body weight [68].

Just like women in study III, participants in study IV had experienced unfavourable weight related treatment and reported feeling reluctant to seek healthcare support for fear of being judged or stigmatized. Likewise, a study of non-attenders to follow-up after LAGB, reported that feeling a sense of failure or shame regarding weight outcomes made patients cancel or postpone their appointments [295]. Avoiding to seek health care due to earlier negative experiences, i.e., experiential avoidance [271], may be a dysfunctional solution, but has been frequently reported, e.g., from primary care where increasing BMI was associated with increased delay/avoidance of visits [314]. Reasons for avoidance were: fear of having to be weighed, of showing weight loss failure, or of being told to lose weight [314]. Due to treatment avoidance, patients with obesity have been more likely to end up with a more advanced disease process when they finally seek help [315]. In recently (2020) revised American

guidelines for post-surgery support, it is acknowledged that patients with weight regain after bariatric surgery may experience shame and guilt leading to a reluctance to attend follow-up visits [316].

Women in study III, as well as in other studies preferred using the words "overweight" or "BMI" compared to "fat" or "obese" [68,317,318]. As preferences has shown to vary between patients [319], care providers may need to consider the emotional impact of weight based terminology, and ask patients about their wording preferences.

However, shame and blame may also be inflicted from within patients themselves, as seen in patients in study IV. Officially, obesity is increasingly being described as a chronic relapsing progressive disease process [320,321], demanding skilled and continuous health care support. However, participants in study IV felt fully responsible for their weight regain, and similar views were found in a qualitative study where 82% of treatment seeking patients with obesity believed that losing weight was completely their own responsibility [273]. This was also shown in a study of pregnant women with obesity who's inability to control their weight on their own induced immense feelings of guilt and shame [272], and among patients after LAGB who felt ashamed when failing to maintain their weight loss, as they perceived it exclusively their own fault [295].

This thesis found that participants differed in their beliefs about to what extent obesity is controllable by the individual. Earlier studies suggest that cultural background may be one factor involved, as for instance pregnant women from the middle east have expressed more of external locus of control compared to Swedish women [322]. Health literacy also tend to be lower among migrants [218]. The small sample in this thesis could not reveal any such tendencies. However, as 25% of pregnant women in Sweden [162], and part of the bariatric surgery population is of non-Swedish origin, individual beliefs about lifestyle, health and risk awareness in patents may need to be assessed. If done early in health care encounters, it may enable more individualized care, as well as reduce the risk of perceived stigmatization.

Thus, the implementation of weight interventions may need to include education of both patients and health care providers regarding genetic, physiological and environmental influences on obesity to reduce negative attitudes towards obesity and possibly relieve patients from part of the guilt burden[69,76,323]. An intervention study where health care students had to follow a calorie-restricted diet for one week significantly reduced their weight biased attitudes and increased their respect for patients with obesity [324]. However, so far, interventions to reduce weight bias in care providers have often rendered mixed results [325].

A problematic key point is that while midwives expressed a deep concern and wish to help women without stigmatizing them, findings indicate that some women may be offended or ashamed by the topic of body weight itself, regardless midwives' intention. In addition, a study of nurses' attitudes and treatment of patients with obesity suggests that busy work situations and lack of necessary resources were some of the main reasons reported for perceived weight discrimination, besides weight biased attitudes [326]. Thus it is possible that

some stigmatizing behaviours or perceived stigmatization, may reflect a lack of tools, resources or communication skills, and not a lack of sympathy or compassion. Still interventions to reduce stigmatization often only focus on reducing negative attitudes in care providers [325].

What can be done about shame and stigma in weight management?

Unfortunately, the presence of stigmatizing attitudes seems to be on the rise in society [5]. In the Lancet initiative on nutrition (2019) , counteracting the development of weight stigma is stressed [40]. The EASO's guidelines for obesity management (2019) also highlight the importance of avoiding stigmatization in health care settings [76].

Besides long-term interventions that may be needed to reduce weight stigma in society, this thesis illuminate many factors that could be targeted in the health care setting, as well as in the individual meeting. Ensuring that patients are met by an obesity-friendly environment, both regarding the way the clinic is equipped, (e.g., scales placed in privacy), as well as how care providers communicate in a shame-reducing way are important steps against perceived weight stigmatization. Some American health-services label themselves as "size-friendly" as a way to ensure overweight patients that they will be met with respect and understanding. This way patients may potentially be less reluctant to seek help, and feel more relaxed in relation to their care provider, knowing they are not at risk of being judged. In Europe, the EASO offers Obesity accreditation, but so far only specialized obesity centres may apply [327].

An additional way to mitigate the effects of perceived weight stigma and improve quality of life, may be to increase body weight acceptance and psychological flexibility in people with obesity. This was tested in a randomized controlled study where a one-day workshop of acceptance commitment therapy (ACT), showed positive effects on participants perceived distress, stigma, and quality of life [328], as well as augmented their weight control efforts.

Though weighing may not be an effective weight management intervention, it may still be an important screening tool to detect adverse pregnancy outcomes. With this in mind, one of the women who believed that GWG was uninfluential by the individual said she would be offended if a midwife wanted to assess her weight, or talk about risks with obesity. For this reason it may be beneficial to increase women's preconception knowledge of the medical benefits of following gestational weight trajectory.

In summary, perceived weight stigmatization in weight management may be seen as a complex phenomenon containing several possible targets for interventions. One is the attitudes and opinions in care providers, another the interaction and communication during care visits. A third target is internalized weight stigma in patients, and preconceptions that may affect how care providers' behaviours are interpreted. And finally, the resources and equipment at clinics.

7.5 METHODOLOGICAL CONSIDERATIONS

Lincoln and Guba [227] have formulated four widely used concepts: *credibility*, *transferability*, *dependability*, and *confirmability,* which may increase *trustworthiness* in qualitative research findings. Below, these aspects will be discussed as to how they have been taken into consideration during the research process.

Researcher bias

The author of this thesis has a prolonged engagement in the field of obesity (>20 y), as well as years of experience from supervising midwives regarding weight management. This has provided a thorough understanding of the concepts, terminology and setting of the participants that may have made it easier to build rapport, and increase *credibility*. However, pre-understanding may simultaneously pose a risk for researcher bias. In addition, using a therapist as interviewer could have affected both the interviewer and interviewee by steering the conversation towards more psychological issues than to other aspects. To avoid this and increase *dependability*, investigator triangulation was used in all studies, allowing for other researchers with different backgrounds, to be actively engaged in commenting on the research decisions, the collected data and in discussing the interpretations. In addition, the interviewer in study I-III also had a background as physiotherapist, and as a dietician (study IV) which may have enabled a more holistic approach.

Settings and recruitments

Both study I and II contained participants and antenatal clinics from different regions in Sweden. Meanwhile, all patients in study III and IV were recruited from the same Obesity clinic in Stockholm which may limit applicability of the findings to other settings or areas. There are no registries based on BMI from which women could have been recruited to study III, but future studies could use the option of advertising for participants. However, regarding study IV, the Center for Obesity is one of few Swedish specialist clinics that accept patients with weight regain after weight loss surgery, and of 19 eligible patients, 16 were interviewed. Thus, the findings may apply at least for treatment seeking patients with weight-regain.

As person-centred communication is used at the Center for Obesity, participants in study III and IV may have more experience of that approach compared to other patients with obesity, which may have affected the results. This may however also be seen as a strength as it adds to their lived experiences of various kind of treatment and support, and thereby broaden their ideas of how they may want to be approached.

Participants' characteristics varied according to relevant factors such as age, BMI, ethnicity, work experience etc. (see method section 5) which contributed to transferability. However, though 33% of women in study I were born outside Sweden, only 18% of women in study III were of non-Swedish origin. This may limit transferability of the results, as approximately 25% of women of reproductive age (20-39y) have foreign background [329], and cultural differences may be important [330].

In study II, midwives who volunteered for the interview may have been particularly interested in the research area, which could have affected the constitution of the studied population, e.g., made them less likely to experience communication hinders, or more aware of weight stigma than the general midwife population. Still, participants provided a rich material and many examples of barriers as well as suggestions for improvements, and the findings aligned well with similar studies [317].

Data collection

In study I, women's weight and height were mainly self-reported, as for some participants in study IV. This means that women's pre-pregnancy weight and/or weight one year postpartum may be incorrect and thus, in theory, women may have been included without matching the inclusion criteria of having a weight retention of ≥ 10 kg one year postpartum. However, when it comes to reporting of BMI it has been shown that women recall and report maternal data with fair to excellent accuracy compared with objective data [331], or with only small magnitude of error [332,333]. Furthermore, when self-reported and actual data was used for BMI categorization the concurrence were 85% [334]. Equally important, even when self-reported weights have been reported as being underestimated in both men and women, it is usually only with around 2 kg compared to the actual weight [335,336]. In study I it was further assumed that any tendency to underreport would be the same for both weights within the same woman.

The time elapsed between the end of the postpartum year, or from bariatric surgery date, and the interviews in study I and IV may have affected participants' memories of circumstances and factors concerning their weight development and must be taken into consideration when interpreting the findings. However, pregnancy, as well as undergoing bariatric surgery are intense and life-changing experiences, and it appears that emotionally charged events are remembered better than neutral ones [337]. Furthermore, women perceived their excessive postpartum weight retention as negative and frustrating, as did patients with weight regain, and negatively charged events have shown to be harder to forget [338]. In addition, weight regain after bariatric surgery, generally does not occur until after a few years to a decade, which means a delay between initial event and data collection was inevitable. Furthermore, the aim was to explore participant's perceptions rather than objective events.

The setting for study III and IV (the Center for Obesity) may also be seen as a strength since the study was performed at an obesity friendly and, to several participants, familiar location which may have allowed patients to feel particularly comfortable and safe. This may have facilitated for participants to talk honestly about negative experiences as well as their hopes and wishes about health and weight management.

Regarding midwives in study II, individuals may feel social norms or pressures to respond in socially desirable ways [72]. However, interview data contained a considerable amount of data regarding participants own shortcomings and revelations of work deficiencies, suggesting the interview atmosphere allowed for honesty. In addition, the interviewer was not a maternity care professional, and this may have reduced the risk for steering the interviewees towards

own opinions, and it allowed for women in study I and III to speak freely about maternity care providers and their work.

The interviews were transcribed immediately after the interview or focus group discussion, by the interviewer, which may be considered a strength in processing the data [339]. This reduced the risk for misunderstandings or mishearing, and enabled the interviewer to recall what and how things were said.

Analysis

This thesis have used analysis methods ranging from descriptions of the manifest content to higher levels of abstraction including themes that reflect the latent meaning of the text [236,340]. To increase the quality of the findings, researcher triangulation was used in different stages of the analysis. The research group included various professional backgrounds and different levels of experience from qualitative analysis. This may have enhanced the quality, as interpretations were challenged and thoroughly discussed. Studying the topic of body weight discussions both from the perspectives of midwives as well as from patients, was also a way of data triangulation. Findings regarding shame, weight stigma and the desire for accessible multidisciplinary teams were noted across all four studies. This consistency across perspectives may be seen as a strength. The published studies have also gone through a peer-review process.

With this in mind, it is acknowledged that other researchers may have interpreted the data in another way, presented the findings in a different fashion, or labelled some of the procedures differently. There is a considerable overlap among some qualitative approaches in terms of procedures, methods, and techniques [240], and a review of reports of qualitative studies found a frequent discrepancy between the stated and the actual method used [340]. However, Sandelowski and Barroso also found that research may still have been conducted in a scientifically sound fashion and produced valid results, despite how the method was labelled [340], and the research question, and the characteristics of the material should have the priority when choosing how to use, or adapt, a method [243].

Transparency

In qualitative interviews, the context, setting and interaction between interviewer and participant play an active part in what data can be retained and how it may be interpreted. Though it is impossible to fully reproduce the research process in words, this thesis strived to provide a detailed description of the setting, context, participants and the researchers' preunderstandings and assumptions as well as the analytic process, to enable the reader to follow the *audit trail.* To increase transparency and trustworthiness, all four studies used quotes to confirm the findings by relating them to the raw data.

8 CONCLUSIONS AND CLINICAL IMPLICATIONS

The findings in this thesis is derived from a small sample, and inferences derived from subjectively perceived and described phenomena. Thus, the following suggestions should not been viewed as conclusive [241]. With this in mind, this thesis illuminated several areas where weight management may need improvement.

A synthesis of the findings from all four studies reveals that shame and stigma regarding obesity or failure to control one's body weight, strongly affected several aspects of weight management interventions.

In patients, weight-related shame, self-blame and fear of stigmatizing treatment affected their health care expectations, follow-up attendance, approachability for information, and in several cases acted as barriers to seek or accept professional help. For this reason, health care providers may need to be more pro-active by initiating contacts, assess psychological well-being, and ensure that patients are met with a non-judgmental and compassionate approach.

Midwives' empathy and awareness of weight stigma sometimes made them avoid discussions about body weight or tone down weight-related risks, for fear of inducing shame or worries in pregnant women. This phenomenon may leave midwives unsatisfied with their work and women uninformed of recommendations. Avoiding a subject may sometimes be a correct decision. However, efforts are needed to ensure that such decisions are based on the medical and psycho-social needs in pregnant women, and not on lack of resources, confidence, obesity knowledge, or communication skills in healthcare providers. Equally important, to decrease the risk of perceived stigmatization in health care settings women may need to be made aware of why keeping track of weight change can be medically appropriate.

Pregnant women's motivation and inclination to pursue a healthy lifestyle was negatively affected by low risk awareness, by misconceptions about the impact of breastfeeding on weight loss, and by believing that weight gain during pregnancy does not respond to lifestyle changes. Along with the seemingly common strategy to relieve psychological, emotional or physical discomfort by eating, these may be factors to target with weight interventions during and after pregnancy.

To optimize the effect of bariatric surgery, patients may need individualized and life-long support. Concrete actions from friends and family, e.g., exercising or eating healthy together, empathetic and non-judgmental treatment from health care providers, and peer-support groups may be beneficial for psychological well-being. Offering information and education to patients' family and friends may enable a more supportive home environment.

A key finding pervading all studies, was a wish for a person-centred treatment and access to additional health professionals, i.e., dieticians, physiotherapists and psychological support functions, as a way to improve weight management, and to support midwives in their work.

9 FUTURE RESEARCH

The findings of this thesis illuminated the following topics that could be further explored:

- **Individualized post-surgery follow-up plans**. Examine the effect of letting patients undergoing bariatric surgery formulate their own ideal individually designed follow-up schedule in cooperation with health care providers (in comparizon with standardized plans). Evaluate follow-up attendance, medical outcomes and psychological well-being The plan may include access to a multidisciplinary team, and more pro-active follow-up.

- **Communication skills and obesity knowledge** in midwives may help both to meet women's wishes about treatment, as well as possibly increase midwives' confidence and inclination to bring up the subject of body weight. Intervention studies could evaluate how obesity education, training in communication skills and supervision affect midwives' confidence, as well as patients' satisfaction regarding body weight discussions.

- **The ethnical diversity** in the Swedish population is increasing, and these demographic changes are important to consider. Approximately 25% of pregnant women are of non-Swedish origin [162], and patients of non-Swedish origin rate lower scores on health related quality of life after gastric bypass surgery [217]. Intercultural barriers and facilitators may therefore need exploration both in regard to gestational weight management as well as to post-surgery support needs.

10 SVENSK SAMMANFATTNING

Bakgrund

I Sverige har över en miljon personer fetma (BMI ≥30 kg/m^2). Förutom ökad risk för följdsjukdomar och för tidig död, innebär fetma ofta ett stort psykosocialt lidande på grund av den stigmatisering och diskriminering som finns exempelvis inom skolan, arbetslivet, och även inom sjukvården.

Andelen gravida kvinnor med fetma i Sverige är 11- 21% (regional variation). Fetma ökar risken för allvarliga graviditets- och förlossningskomplikationer, i synnerhet i kombination med stor viktuppgång (> 9 kg). Att gå upp mer graviditetsvikt än rekommenderat kan också bidra till utveckling av fetma hos kvinnor med normal- eller övervikt. Begränsad viktuppgång kan därmed förebygga fetma hos mamman samtidigt som det främjar en frisk graviditet, och möjligen också förebygger fetma hos barnet. Tyvärr är kunskapsnivån om viktrelaterade risker vid graviditet ofta låg bland unga kvinnor. Tillgången på viktinterventioner under graviditet varierar i landet och är inte alltid effektiva.

Idag saknas effektiva fetmaförebyggande insatser, liksom medicinska behandlingar som är tillräckliga, ofarliga och tillgängliga för alla som behöver det. Magsäckskirurgi är den mest effektiva metoden för viktnedgång och görs på ca 5 000 patienter/år i Sverige. Dock lämpar sig inte operation för alla, omfattar risker, och en del patienter går upp i vikt igen. Orsakerna till viktrecidiv är otillräckligt utforskade och man vet därför inte hur det optimala stödet efter kirurgi ser ut. Behovet både av förbättrade medicinska behandlingsmetoder och av att förbättra stödet för patienter för att få bästa möjliga post-operativa resultat är uppenbart.

Syfte och metod

Denna avhandling syftade till att utforska faktorer och omständigheter som kan hindra eller underlätta kommunikation och sociala interaktioner vid viktinterventioner under och efter graviditet, samt efter magsäckskirurgi för viktminskning.

I studie I intervjuades kvinnor som behållit minst 10 kg av sin graviditetsvikt ett år efter förlossningen, om vad de själva upplevde som orsaken till deras ohälsosamma viktutveckling. I studie II intervjuades barnmorskor om hur de initierar och diskuterar ämnet kroppsvikt med gravida kvinnor. I studie III intervjuades kvinnor med fetma om hur de vill bli bemötta av barnmorskor vid en framtida graviditet. Studie IV fokuserade på hur patienter med viktrecidiv efter magsäckskirurgi har upplevt det postoperativa stödet från vänner, familj och sjukvård.

Fynd

Bland kvinnors skäl till ohälsosam viktutveckling kring graviditeten, framkom en generell brist på kunskap om risker med stor viktuppgång, missuppfattningar om att viktuppgång under graviditet inte går att påverka av individen, samt en övertro på att man lätt går ned i vikt av amning (och därför kan äta och gå upp i vikt under graviditeten utan att oroa sig för

konsekvenserna). Det var också vanligt att använda ätande som ett sätt att lindra både psykiskt och fysiskt obehag (t.ex. smärta, illamående, stress eller depression).

Det framkom att barnmorskorna var väl medvetna om hur känsligt vikt och vägning kan vara, men att det kan vara svårt att balansera de professionella rollerna av att vara den som ska lindra oro samtidigt som man är ålagd att mäta vikt och informera om risker. Det hände att barnmorskorna hoppade över vägning, tonade ned risker, justerade viktrekommendationer eller undvek att prata om vikten för att inte orsaka oro, skam eller skuldkänslor hos den gravida. Detta undvikande sker med goda intentioner men kan potentiellt begränsa gravida kvinnors motivation till att leva hälsosamt, och möjlighet att fatta välinformerade beslut.

En del barnmorskor uppgav att de saknade resurser för att kunna bemöta och behandla gravida kvinnor med fetma på bästa sätt. Dels i form av tid och informationsmaterial, men också gällande egna kunskaper om fetma och kommunikationsförmåga. Barnmorskor efterfrågade därför utbildning om fetma, träning i samtalsteknik, samt handledning vid komplicerade fall. Både barnmorskor och kvinnor önskade viktnedgångsstöd året efter förlossning.

De flesta kvinnor i studie III ville få ta del av information om viktuppgång vid graviditet även om den kan vara oroande, men poängterade samtidigt vikten av att diskussioner kring kroppsvikt och fetma förs på ett sätt så att kvinnorna känner sig förstådda och tagna på allvar. De flesta hade upplevt tidigare kränkande behandling i vården, och uppgav att stigmatiserande bemötande kan göra att man ”stänger öronen” för råd och information. Kvinnornas önskemål om bemötande motsvarar det sätt man förespråkar vid person-centrerat förhållningssätt och i motiverande samtal. Några kvinnor ville slippa diskussioner om kroppsvikt, då de hyste uppfattningen om att man ändå inte kan påverka vikten under graviditet och därför ville slippa onödig oro. Att barnmorskor ber om lov att lyfta ämnet samt efterfrågar kvinnornas önskemål kan vara ett sätt att handskas med heterogeniteten.

Patienter med viktrecidiv i studie IV upplevde åren efter operationen som en ensam kamp, där ogynnsamt bemötande eller brist på stöd gav en känsla av övergivenhet. Andra personer sågs både som positiva källor till acceptans, medkänsla och respektfullt bemötande, samt även som möjliga externa kontrollfunktioner (främst sjukvården) som kan underlätta vidmakthållande av goda vanor. Många deltagare anklagade sig själva för viktuppgången och kände skam, vilket gjorde dem mindre benägna att delta i sociala aktiviteter och att söka medicinsk vård. Istället försökte man lösa vikthanteringen själv, ibland med dysfunktionella bantningsmetoder. Det kan därför vara viktigt att betona att viktrecidiv innebär att behandlingen, inte patienten, har varit otillräcklig. Patienterna önskade konkret stöd (t.ex. att man åt nyttigt eller motionerade tillsammans), empatiskt bemötande, och proaktiv uppföljning från sjukvården.

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