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Satisfaction with women's body image after childbirth and its relation with eating disorders: A cross-sectional study in Silesia Province, Poland

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Summary

Aim: To assess the potential increased risk of eating disorders among women during the first year after childbirth.

Methods: In this study involving 288 women between the ages of 21 and 45, the SCOFF questionnaire was used. This tool was used to evaluate and analyse the collected responses, using a predetermined dataset. After data collection, in-depth statistical analysis was performed using Statistica 13.3 software. Analytical techniques included the $\chi 2$ test, Kruskal-Wallis rank ANOVA and Mann-Whitney *U* test.

Results: The results were considered statistically significant at a threshold of $p \leq 0.05$. The results underscore that most women have concerns about their postpartum weight. The infant feeding method showed a clear correlation with satisfaction with current body weight. Women who chose to breastfeed were more likely to report satisfaction with their body weight. Interestingly, about 50% of female respondents showed a predisposition to developing an eating disorder.

Conclusions: This propensity appears to depend on variables such as the chosen method of feeding the baby, weight satisfaction and body mass index (BMI). To ensure the well-being of both mothers and infants, a comprehensive study of eating disorders in the perinatal phase is necessary. There is therefore an urgent need for educational initiatives that include mental well-being and nutritional knowledge, targeting pregnant and postpartum women.

Key words: body image, pregnancy, eating disorders

Introduction

Pregnancy induces profound changes in the mother's body, requiring adaptation to various biological and psychosocial changes involving body composition, nervous system responses, dietary patterns, and levels of physical activity [1]. These physiological changes during pregnancy serve to support foetal development and prepare the mother for labour and the postpartum phase. However, it is important to distinguish between normal physiological changes and potentially pathological indications [2].

Research over the years has highlighted the expanding spectrum of postpartum complications following both natural childbirth and caesarean section. Previously, attention focused on obvious conditions such as anaemia, infection and haemorrhage. However, recent studies have looked at areas such as sexual well-being, back pain, perineal discomfort, constipation, and especially postpartum depression [3–5].

The chosen mode of delivery can significantly affect a woman's psychological well-being, fuelling debates from both a professional and personal perspective. The increase in preference for caesarean section reflects not only improved mortality statistics and a reduction in postpartum complications but also a global trend in which more and more women are opting for caesarean section to avoid labour pain or to exercise control over their delivery date. However, few studies have been conducted to comprehensively assess the overall postpartum quality of life of young mothers depending on the method of delivery [4].

The perinatal period can be both a positive and negative experience for a woman [5]. Mental well-being is an integral aspect of overall health, entailing biochemical, hormonal, psychological, and social changes that make women vulnerable to mood disorders [6]. Consequently, issues regarding perceptions of one's body image can arise as a postpartum complication. Multifaceted factors, including physical, interpersonal and cultural dimensions, contribute to body image. This self-perception significantly affects psychological and social functioning, as well as self-esteem. A positive body image promotes both well-being and self-esteem [7]. Concerns about body shape and weight are common among postpartum women and can accelerate the development of unhealthy eating patterns [8].

Eating disorders are among the most common psychiatric disorders in young women, along with affective and anxiety disorders. The lifetime prevalence of eating disorders is about 6% [9], and about 5% of women experience some form of eating disorder during pregnancy [10]. A history of eating disorders has been linked to higher rates of miscarriage [11]. These disorders include anorexia, bulimia and binge-eating disorder, classified based on DSM-5 diagnostic criteria [12]. Eating disorders can adversely affect pregnancy outcomes, contributing to preterm delivery, low birth weight, reduced Apgar scores, and even perinatal mortality. Moreover, maternal eating disorders can interfere with the feeding process and have lasting effects on the physical and mental health of the offspring [13, 14]. A significant obstacle to supporting women during the perinatal period is the underdiagnosis of mental health issues.

Accordingly, widespread screening programmes are being implemented to identify potential disorders and improve maternal mental health during the perinatal period, recognising this as a global imperative [15]. As such, identifying eating disorders in both young women and mothers is crucial to preventing psychological complications in subsequent pregnancies.

Aim

This study was conducted to assess the potential increased risk of eating disorders among women during the first year after childbirth. The study's basic premise assumed that the women in the study have different susceptibility to eating disorders, a variation attributed to perinatal variables, including method of delivery, chosen infant feeding method, postpartum weight, and overall body perception.

The study formulated the following research hypotheses: (1) Satisfaction with current body weight depends on factors such as the method of delivery, chosen infant feeding method and body mass index (BMI); (2) The propensity to develop eating disorders is influenced by variables such as mode of delivery, infant feeding method, satisfaction with current weight, and BMI.

Materials and methods

Study group

The study included a total of 288 women aged 21–45. The selection of female participants was done randomly. The study used a researcher-initiated online survey method. The reliability of the survey was assessed by examining the time required to complete it. As an incentive, participants were offered a free e-book on the topic of expanding a child's diet. After completing the survey, these women were given access to the guide.

To determine the required sample size, a formula developed for finite populations was used. The calculations were adjusted to the context of the Silesian region in Poland. Given the estimated population of 34,736,000 women who gave birth in 2021, the survey was designed to obtain a representative sample. For the population of postpartum women in Silesia Province (Poland), the minimum sample size of 142 was calculated using $\alpha = 0.95$, $f = 0.9$ and $e = 0.05$. Therefore, the collected group of 288 participants was considered representative based on these calculations.

Inclusion criteria

A total of 306 women participated in the study and were fully informed of the study's objectives and its inherent scientific nature. Voluntarily and with informed consent, the respondents chose to participate in the study, retaining the right to withdraw at any time without explanation or consequence. It should be noted that the omission

of responses regarding the date of the last delivery and the method of delivery (natural or caesarean section) led to exclusion from the study. Moreover, women who indicated a duration of more than one year since their last delivery were not included in the study. As a result, the statistical analysis was based on the results of 288 questionnaires.

Ethics statement

The survey was meticulously conducted in strict accordance with the guidelines set forth in the Declaration of Helsinki, as amended. Before taking part in the study, each participant gave written informed consent, which was a prerequisite for inclusion in the study. All participants were thoroughly informed of the study's objectives and maintained anonymity throughout the research process. The introduction to the questionnaire included a clear explanation of the nature and objectives of the study, emphasising the principles of informed and voluntary participation.

The study was conducted with the official approval of the Bioethics Committee of the Medical University of Silesia in Katowice. This approval was granted based on relevant regulations, in particular the Law on the Profession of Physician and Dentist of December 5, 1996. This legal framework includes a precise definition of a medical experiment, which further confirms the ethical integrity of the study's methodology. The assigned identifier for this consent is ID. PCN/CBN/0052/KB/127/22.

Research tool

The research questionnaire developed by the authors underwent meticulous validation to establish its reliability, validity and relevance. The focus of this study was the assessment of eating disorders among postpartum women, facilitated by the author's questionnaire in conjunction with the SCOFF (Screening Scale of Eating Disorders) questionnaire.

Anthropometric measurements provided by participants included their height and current body weight. These measurements were then used to calculate body mass index (BMI), with interpretations adapted from World Health Organisation's recommendations. They were categorised as follows: underweight <18 kg/m^2; normal 18–24.99 kg/m^2; overweight 25–30 kg/m^2; and obese >30 kg/m^2 [16].

The SCOFF questionnaire serves as a validation tool crucial for the screening assessment of eating disorders. It enables the initial identification of potential risk factors underlying the psychopathological symptoms associated with anorexia or bulimia, effectively pinpointing the onset of these conditions at an early stage. Consisting of five food-related questions, the SCOFF questionnaire delves into the basic aspects of anorexia and bulimia. The questions sequentially address issues such as inducing vomiting due to uncomfortable satiety, fears of losing control over food intake, distorted and subjective perceptions of one's weight, experiencing weight loss of more than 6 pounds in three months, and the degree to which eating dominates daily life.

An affirmative answer to at least two of these questions resulted in a finding of risk for developing an eating disorder in the sample. This analytical approach served as a subjective way to verify the propensity to develop an eating disorder [17,18].

Test procedure

The study was conducted in three separate phases. A pilot study was conducted with 30 randomly selected women. This group was tasked with completing a questionnaire to assess their understanding of each question. Questions that were not deemed understandable by at least 2 respondents were eliminated or rephrased. This iterative process improved the clarity of the questionnaire.

In the second stage, the questionnaire was validated by administering it twice to a randomly selected group of 30 women, two weeks apart, to allow evaluation of the consistency of responses. The consistency of responses to identical questions was examined, with a consistency of 95.0% achieved using the Kappa coefficient. The assessment of response consistency was based on method agreement, achieving a Kappa coefficient score of 0.95.

The final phase involved the actual implementation of the survey. In this phase, the author's questionnaire was put into practice. The questionnaire demonstrated high reliability (Cronbach's $\alpha = 0.82$). Due to the ongoing COVID-19 pandemic, the survey was conducted using a computer-assisted online interview (CAWI) technique. The questionnaire was distributed to women in parenting groups via the popular social networking site Facebook. This method of distribution was adapted to the prevailing circumstances and allowed for remote participation.

Statistical analyses

After the questionnaires were collected, a detailed analysis of the collected data was conducted. This phase was preceded by a rigorous analysis of the results to obtain meaningful insights. The entire range of calculations was performed using Statistica 13.3 software, a product of TIBCO Software Inc. based in Palo Alto, CA, USA.

The normality of the data distribution was assessed using the Shapiro-Wilk test, a key step in ensuring the adequacy of subsequent statistical analyses. Various statistical methods were used according to the nature of the data and the research objectives. A Chi-square test was used to compare two different independent qualitative groups. Meanwhile, for three or more groups, such as different breastfeeding modes, Kruskal-Wallis rank ANOVA was used. On the other hand, the Mann-Whitney *U* test was used to evaluate the effect of body mass index (BMI) after pregnancy.

The threshold for statistical significance was set at a *p*-value less than or equal to 0.05, which reflects the standard level of significance in the field of statistical analysis. This criterion was used to determine whether observed differences or relations were statistically significant.

Results

The age distribution of the study group was divided into 5-year ranges, yielding the following distribution: 21–25 years (11%); 26–30 years (39%); 31–35 years (38%); 36–40 years (10%); 41–45 years (2%). Noteworthy, the largest segment consisted of women living in cities with more than 100,000 residents (45%), while the remaining respondents indicated living in smaller towns (55%). The average weight of the respondents before pregnancy was 61.3 kg (standard deviation *SD* = 10.2), showing an increase to 64.8 kg (*SD* = 12.4) after pregnancy. In addition, the respondents had an average height of 166.9 cm (*SD* = 5.9).

The initial part of the questionnaire focused on perinatal experiences and infant feeding practices. Most female respondents indicated having given birth between 2 and 6 months before participating in the study (66%; *n* = 191). A significant proportion of the surveyed women reported that this was their first delivery (68%; *n* = 195). Of the various methods of feeding, breastfeeding proved to be the dominant choice, comprising 61% of respondents (*n* = 177) (Table 1).

Table 1. **Characteristics of the group in terms of date of delivery, number of pregnancies and feeding method used (N = 288)**

	Category	n	%
Date of last delivery	up to 2 months earlier	32	11
	2-6 months earlier	191	66
	7-12 months before	65	23
Method of delivery	Natural	130	45
	Caesarean section	158	55
Number of children born	One	195	68
	More than one	93	32
Feeding method	Artificial formula	61	22
	Partial breastfeeding	50	17
	Breastfeeding	177	61

Considering established guidelines that integrate anthropometric data including body weight and height, body mass index (BMI) was meticulously calculated, thus facilitating categorisation into different levels: underweight, normal weight, overweight, and obese. Overwhelmingly, the study participants were of normal weight (*n* = 192; 67%). An increased percentage of overweight and obese participants was observed in the 30–35 age group: overweight (*n* = 22; 41%) and obese (*n* = 10; 45%). On the other hand, in the under-30 age group, the highest frequency of normal-weight women was observed (*n* = 77; 40%). Table 2 shows the number of female survey participants (*n* = 288; 100%) by body mass index (BMI).

It is noteworthy that most of the surveyed women expressed a desire to reduce their weight after pregnancy. On average, respondents indicated a desire to reduce their weight by about 5 kg from their current value, with their BMI within the normal range (*n* = 254; 82%).

Table 2. **Number of subjects according to BMI (N = 288)**

Body mass index	Value after pregnancy[1]		Expected value[2]	
	n	%	n	%
Underweight	21	7	31	11
Normal weight	192	67	246	86
Overweight	53	18	10	3
Obese	22	7	1	0

[1] Post-pregnancy weight declared by survey participants; 2 Expected body weight indicated by study participants

An in-depth analysis was conducted to assess women's satisfaction with their postpartum weight. The results showed that most female respondents expressed dissatisfaction with their current body weight (*n* = 198; 69%). It is noteworthy, however, that more than half of the participants viewed their bodies positively (*n* = 151; 52%), while a smaller subgroup, comprising one in five respondents, viewed their bodies negatively (*n* = 63; 22%). The surveyed women declared various changes they noticed in their bodies after giving birth. These changes included: the presence of stretch marks on the abdomen (49%), changes in the characteristics of hair and nails (26%), the occurrence of discoloration and inflammation on the face (14%), and the appearance of new wrinkles (11%). Most respondents attributed the above changes to their pregnancy experiences (*n* = 252; 87%), emphasising the clear link between the observed changes and the pregnancy process.

The evaluation of satisfaction with weight included a comparative analysis in relation to the type of delivery and the chosen method of feeding. It is noteworthy that a statistically significant difference (p=0.031) emerged about the type of infant feeding and perception of weight. The detailed results are meticulously summarized in Table III, offering a detailed overview of the relationship between the type of delivery, feeding method, and participants' satisfaction with weight.

Table 3. **Mode of delivery and method of feeding the child vs. satisfaction with weight (N = 288)**

Variable		Satisfaction with weight		*p*-value
		Yes	No	
Method of delivery	Natural	53 (34%)	105 (66%)	p = 0.351* NS
	Caesarean section	37 (29%)	93 (71%)	
Feeding method	Breastfeeding	65 (37%)	112 (63%)	**p = 0.031****
	Partial breastfeeding	13 (26%)	37 (74%)	
	Artificial formula	12 (20%)	49 (80%)	

* χ^2 test; ** Kruskal-Wallis rank ANOVA

Based on the results of the SCOFF questionnaire, responses were analysed in terms of susceptibility to developing eating disorders, including anorexia nervosa, bulimia nervosa or binge-eating disorder in the study population. Almost half of the surveyed women showed a risk of developing an eating disorder (n = 132; 45%). Interestingly, a slightly increased risk was noted among women who underwent caesarean sections (n = 67; 52%) and partially breastfed (n = 27; 54%).

A statistically significant correlation was observed among women who expressed dissatisfaction with their current body weight (p <0.05). These respondents showed an increased risk of developing eating disorders. Other correlations are presented in Table 4, considering variables such as method of delivery, method of feeding and satisfaction with current body weight.

Table 4. **Risk of eating disorders (ED) on the SCOFF scale among subjects (N = 288)**

Variable		Risk of ED on the SCOFF		p-value
		Yes	No	
Method of delivery	Natural	65 (41%)	93 (59%)	p = 0.08 NS*
	Caesarean section	67 (52%)	63 (48%)	
Feeding method	Breastfeeding	74 (42%)	103 (58%)	p = 0.11 NS**
	Partial breastfeeding	27 (54%)	23 (46%)	
	Artificial formula	31 (51%)	30 (49%)	
Satisfaction with weight	Yes	22 (24%)	68 (76%)	**p = 0.001***
	No	110 (56%)	88 (44%)	

* χ2 test; ** Kruskal-Wallis rank ANOVA

The relation between the potential risk of developing an eating disorder and body mass index (BMI) in the sample seems worth noting. It is noteworthy that the highest

percentage of young mothers showing a propensity for eating disorders was recorded among those who were overweight (n = 33; 11%) and obese (n = 13; 4%).

Importantly, the association between SCOFF questionnaire score and body mass index showed statistical significance (p = 0.016) (Table 5). These findings clarify the key relationship between BMI value and predisposition to eating disorders among female study participants.

Table 5. **Relationship between SCOFF and BMI (N = 288)**

SCOFF	BMI: underweight	BMI: normal	BMI: overweight	BMI: obese
YES	8 (6%)	78 (59%)	33 (25%)	13 (10%)
NO	13 (8%)	114 (73%)	20 (13%)	9 (6%)
		p = 0.016*		

* Mann-Whitney U test

Discussion

The complex interaction between physiological changes during pregnancy and body image after childbirth has been highlighted in various studies. A psychological perspective highlighted the role of social support, particularly from the family, in mitigating negative emotions associated with body image changes during the transition to both motherhood and working life [19]. A study by Coker and Abraham [20] revealed that body weight dissatisfaction persisted up to 12 months postpartum in women both with and without an eating disorder diagnosis, indicating a lasting impact on body image perceptions. It is noteworthy that approximately one-third of women reported destructive body image perceptions attributed to anxiety, mood disorders, postpartum depression, and emotional issues [21].

The complex relationship between body weight, body image and eating disorders has resonated in comparable studies. One Polish study found a high risk of eating disorders among young women, manifesting itself in various forms, such as probable susceptibility or symptom manifestation [22, 23]. A global study conducted between 2013 and 2022 found a prevalence of eating disorders in young women ranging from 5.5% to 17.9% [24]. A 2017 study found that 33% of women of childbearing age showed symptoms of eating disorders [25].

The complex interaction of psychosomatic factors, self-acceptance, the desire to change the appearance of the body and taking actions related to it influences the subjective evaluation of body image, combining physical and psychological aspects. Recognising the interdisciplinary nature of this issue, a comprehensive approach to the subject is recommended, which should include medicine, clinical dietetics and clinical psychology. Multidisciplinary care, including cognitive behavioural therapy (CBT), has been identified as a key therapeutic tool in the treatment of eating disorders in the

pre-conceptual and perinatal phases. CBT has shown promising remission rates and prevention potential [27–32].

Considering the results obtained from the SCOFF questionnaire assessment, it was found that approximately 50% of the study group had a high risk of a subsequent eating disorder diagnosis after pregnancy. This risk was significantly associated with low weight satisfaction ($p = 0.001$), and factors including postpartum weight gain and BMI above 25 kg/m^2 significantly correlated with increased development of disorders such as anorexia, bulimia and binge-eating disorder ($p < 0.05$).

Eating disorders, particularly anorexia and bulimia, disproportionately affect overweight and obese women postpartum due to weight dissatisfaction and inappropriate eating behaviours, potentially leading to drastic weight loss [33, 34]. This study highlights the complex links between physiological changes, body image and eating disorders during the transition of pregnancy and the postpartum period.

Research on the relation between breastfeeding and susceptibility to eating disorders has yielded conflicting results. Some studies suggest that the duration of breastfeeding remains consistent among women with and without psychopathology [35–37]. In contrast, other literature suggests that mothers with eating disorders tend breastfeed for a shorter period due to factors such as insufficient milk supply or negative breastfeeding experiences [38, 39]. This phenomenon may also be due to medical issues causing insufficient breastfeeding.

Moreover, the decision to stop breastfeeding is often influenced by psychological aspects and not solely by nutritional issues. The maternal interpretation of the infant's hunger and satiety signals may not always be in line with the infant's actual needs. Psychological factors, family and partner support, work situation, cultural values, and social environment contribute to the wider context of breastfeeding behaviour [40]. In our study, women who exclusively breastfed showed greater satisfaction with their weight compared to those who partially breastfed or used modified milk. A likely explanation for this observation may be rooted in the accelerated trajectory of weight normalisation among breastfeeding mothers. The increased caloric requirements associated with lactation may play an important role in accelerating the return to pre-pregnancy weight, potentially contributing to better satisfaction with self-image perception. No significant correlations were observed between eating disorders and the type of child feeding.

Recognising the interrelationship between susceptibility to eating disorders before conception and their potential exacerbation in the perinatal period, it is necessary to introduce psychological and nutritional education in combination with comprehensive screening. This holistic approach should begin before the planned pregnancy and continue until at least 12 months after pregnancy [41, 42].

Interestingly, research suggests that post-pregnancy body satisfaction may be inversely related to physiological weight loss [43]. Pregnant women often experience mixed feelings about their changing body prognosis. The complex dynamics of postpartum body image include dimensions of autonomy-symbiosis with the newborn, as

well as a complex interaction between body perception and mental representations of the child, partner and parent.

Recent studies have highlighted the influence of gut microbiota on women's health at different life stages and in different settings, emphasising its potential impact on subjective image assessment [44–46]. This highlights the multifaceted nature of factors shaping body image and eating behaviour during the perinatal period.

Study strengths and limitations

Our study fills a significant research gap by addressing the rarely explored topic of eating disorders in women after pregnancy. Its importance stems from growing concerns about the impact of contemporary appearance standards and societal pressures on the self-esteem and mental health of new mothers.

The study's strengths include a substantial sample size, comprising a cohort of 288 participants, and its procedure was adapted to contemporary standards. A limitation, however, was the reliance on computer-assisted online interviewing (CAWI) for questionnaire distribution. However, this was mitigated by a rigorous pilot and validation process, which minimised potential researcher bias.

Future iterations of this research path aim to examine the prevalence of postpartum depression among new mothers and correlate it with manifestations of unhealthy eating behaviours. Current approaches to assessing body satisfaction using questionnaires can be unreliable. Future research may benefit from using more comprehensive methods, such as face-to-face interviews, body image comparisons, anthropometric measurements, etc., as individuals often misinterpret their body measurements [47].

The use of body mass index (BMI) to categorise anthropometric data requires scrutiny, as it can lead to misinterpretation of the obtained parameters. Presenting raw data (weight and height) without descriptive matching of categories can lead to misunderstandings.

Further work is planned to explore sociodemographic dimensions more broadly. Variables such as family status (e.g. married, civil partnership, single), social welfare use and economic indicators such as income will enrich the overall understanding of the study group.

The inclusion of breastfeeding was also an important element of our project. The multifaceted role of breastfeeding as a factor that increases body satisfaction and, at the same time, potentially serves as a predisposing factor for eating disorders highlights the complexity of this relationship.

In summary, this study fills a critical gap in the general understanding of postpartum eating disorders. By illuminating the complex interaction between body image, eating behaviours and factors such as breastfeeding, it paves the way for further exploration of the diverse dimensions of women's perinatal health.

Conclusions

In the realm of post-pregnancy experience, dissatisfaction with weight is prevalent among most women. However, there is a relationship between the infant feeding method and postpartum weight satisfaction. Women who chose to breastfeed showed a significantly higher tendency to be satisfied with their weight compared to respondents who relied on artificial formula to feed their babies.

An intriguing aspect revealed by the above study is the prevalence of potential indicators of eating disorders detected in nearly half of the surveyed women. This finding highlights the seriousness of the problem and points to the critical need for targeted interventions and awareness campaigns. It is worth noting that factors such as the feeding method used and body mass index (BMI) have a noticeable impact on weight satisfaction. These complex interactions between feeding practices, BMI and body image satisfaction could potentially serve as contributing factors to the development of eating disorders.

The findings of this study open the way for more focused research on post-pregnancy experiences and their potential repercussions. The importance of factors such as breastfeeding and BMI influencing weight satisfaction and potentially shaping the trajectory towards eating disorders warrants further exploration. Ultimately, uncovering these intricate connections holds the promise of improving interventions, enhancing maternal well-being, and contributing to a broader understanding of women's health in the postpartum period.

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