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ASSESSMENT OF RISK FACTORS AND BARRIERS OF POSTPARTUM WEIGHT CHANGES – A CROSS-SECTIONAL STUDY

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Abstract

Background: Postpartum weight retention (PPWR) is a critical public health concern, contributing to long-term maternal obesity and associated metabolic disorders. Excessive gestational weight gain (GWG), hormonal changes, and behavioural factors contribute to persistent weight retention, increasing the risk of chronic conditions such as cardiovascular disease and type 2 diabetes. This study aims to assess the risk factors and barriers associated with postpartum weight changes among women attending the SRM Medical College Hospital & Research Centre, providing insights into effective postpartum weight management strategies.

Methods: This cross-sectional study included postpartum women meeting the inclusion criteria. A structured 29-item questionnaire assessed demographic characteristics, obstetric history, weight perceptions, dietary behaviours, physical activity, and sleep patterns. Data were collected through face-to-face interviews and analysed using SPSS software. The chi-square test was used to determine significant associations between postpartum weight retention and various influencing factors.

Results: The study included 142 participants. The majority (68.79%) were aged 20-29 years, and 54.61% belonged to the middle class. Caesarean delivery (55.32%) was the most common delivery mode. Post-pregnancy BMI analysis revealed that 36.17% of participants were overweight, and 22.70% remained obese. Key barriers to postpartum weight loss included time constraints, stress, emotional eating, and lack of physical activity. Poor sleep quality was also associated with higher weight retention.

Conclusion: Postpartum weight retention is influenced by multiple interrelated factors, including socioeconomic status, delivery mode, dietary behaviours, physical activity levels, and sleep patterns. Addressing these barriers through comprehensive postpartum health programs focusing on nutrition, physical activity, behavioural interventions, and sleep hygiene is crucial for effective weight management and long-term maternal health.

Keywords: Postpartum weight retention, gestational weight gain, maternal obesity, physical activity, dietary behaviour, sleep patterns, postpartum health.

INTRODUCTION

Postpartum weight retention (PPWR) is a significant public health concern, contributing to long-term maternal obesity and associated health complications such as cardiovascular diseases, type 2 diabetes, and metabolic syndrome (1). Excessive gestational weight gain (GWG) and insufficient postpartum weight loss can lead to persistent weight retention, increasing the risk of chronic conditions. Given the rising prevalence of maternal obesity, understanding the risk factors and barriers to postpartum weight management is essential for developing effective interventions.

PPWR is influenced by a combination of biological, behavioural, and environmental factors. Excessive GWG is a primary contributor, as many women fail to return to their pre-pregnancy weight (2). Hormonal fluctuations during pregnancy and lactation, including insulin resistance and leptin regulation, further influence postpartum weight

changes. Socioeconomic determinants, psychological well-being, and lifestyle behaviours also play a crucial role in postpartum weight retention (3).

Globally, a significant proportion of women experience excessive PPWR, with long-term implications for obesity prevalence. Studies indicate that approximately 25–40% of postpartum women retain more than 5 kg of their pregnancy weight one year after delivery, with higher rates observed in women with obesity, lower socioeconomic status, and inadequate access to healthcare resources (4). The prevalence of PPWR is particularly high in low- and middle-income countries, where nutritional disparities and lack of postpartum care exacerbate weight retention issues.

The pathophysiology of PPWR involves complex metabolic and endocrine mechanisms. Pregnancy-induced insulin resistance, changes in adipokine levels such as leptin and adiponectin, and alterations in resting energy expenditure contribute to weight retention (5). Additionally, the postpartum period is marked by increased psychological stress, sleep deprivation, and altered energy metabolism, all of which can hinder weight loss efforts. The interplay of these factors leads to prolonged metabolic dysregulation, increasing the likelihood of obesity and related comorbidities.

This cross-sectional study aims to assess the risk factors and barriers associated with postpartum weight changes among women attending the SRM Medical College Hospital & Research Centre. By identifying these factors, the study seeks to provide insights into effective strategies for postpartum weight management and inform the development of evidence-based interventions to improve maternal health outcomes.

MATERIALS AND METHODS

Type of Study: A cross-sectional study.

Inclusion Criteria:

- Postpartum women willing to participate in the study.

Exclusion Criteria:

- Women unwilling to participate.
- Women with a history of postpartum depression or postpartum psychosis.

Sample Size Calculation: The sample size (n) was determined using the formula:

- $z(\alpha/2) = 1.96$ (standard normal variate for a 95% confidence level)
- $p = 73\%$ (prevalence of postpartum weight retention)
- $q = 27\%$ $(1 - p)$
- $\delta = 7.3\%$ (margin of error)

Thus, the required sample size was 142 participants.

Study Tool: A structured questionnaire comprising 29 items divided into four major domains to assess perceptions related to postpartum weight management. The questionnaire was administered through a face-to-face interview conducted in the local language.

Methodology: The questionnaire was structured into three main sections:

- **Section A:** Sociodemographic data (age, education, occupation, socioeconomic status).
- **Section B:** Obstetric variables (pregnancy history, delivery type, postpartum recovery).
- **Section C:** Risk factors and barriers to postpartum weight management (body weight perceptions, eating behaviour, physical activity, sleep patterns) as in table 1

Table 1 : Structured Questionnaire Items Categorized by Domain

Domain	Item No.	Question	Response Options
Weight Perception & Motivation	1C	How do you describe your current body weight?	Slightly less, Appropriate, Slightly more, Significantly more, Prefer not to comment
	2C	How would you describe your current motivation to start lifestyle changes (like healthy eating or exercise) to reach a healthy body weight?	Already initiated, Plan to start in 1–2 weeks, 1–2 months, 3–4 months, No intention
Eating Behavior	3C	How regularly do you eat three main meals and two to three small meals or snacks each day?	Not routinely, 1-2 days a week, 3-4 days a week, 5-6 days a week to Almost daily
	4C	How often do you include protein-rich foods (milk or milk products/pulses/egg/meat/fish/chicken) in every major meal (breakfast, lunch, dinner) of your daily diet?	Not routinely,1-2 days a week, 3-4 days a week, 5-6 days a week to Almost daily

Domain	Item No.	Question	Response Options
	5C	How often do you include 4-5 servings of fruits and vegetables in your daily diet? (1-2 seasonal locally available fruits 75-100gm each, 1 serving of green leafy vegetable, 1 serving of roots and tubers and 1 serving of other vegetables)	Not routinely, 1-2 days a week, 3-4 days a week, 5-6 days a week to Almost daily
	6C	How often do you consume HFSS (High in Fat, Salt and Sugar) food products such as namkeens, samosa, pakoras, mathri, kheer, halwa, sweets, puddings, cakes, pastries, sweet biscuits, chocolates, fast foods etc?	Once a month or less, Once in 15 days, Once in a week, 3-4 times in a week to Almost daily
Barriers to Healthy Eating	7C–13C	7C- My food intake has increased as I have to breastfeed my child. 8C- I don't have knowledge about food and dietary habits to be followed during this period for achieving appropriate body weight. 9C- I don't make/am unable to make conscious dietary efforts to reduce my weight. 10C- Managing house, child and work leaves me with little time and energy to focus on healthy eating behaviour. 11C- Mismatched eating habits of my family members make it difficult for me to follow healthy eating patterns for myself. 12C- I am bound to eat high calorie foods as per my family's advice. 13C- I tend to overeat or consume high calorie foods to make me feel better.	5-point Likert scale: Strongly Agree, Agree, Neither agree nor disagree, Disagree, Strongly Disagree
Physical Activity	14C	Household chores include cooking, dish washing, laundry, cleaning etc. To what extent do you perform household chores on an average per day?	Not at all, Up to 25%, 25-50%,50-75%, 75–100%
	15C	How often do you participate in household chores?	Not routinely, 1-2 days a week, 3-4 days a week, 5-6 days a week, Almost daily
	16C-17C	16C-Low-intensity exercises for the post-pregnancy period generally include walking slowly,pelvic floor exercises and gentle abdominal exercises. How much time do you currently spend doing low-intensity exercises in a day? 17C. Moderate-intensity exercises for the post-pregnancy period generally include brisk walking, yoga, low-impact aerobics, and light weight training. How much time do you currently spend doing moderate-intensity exercises in a day?	Not at all, Up to 15 minutes, 15-30 minutes, 30-45 minutes, 45 minutes or more to ≥45 mins
	18C	How often do you indulge in any physical activity (low intensity/moderate intensity)?	Not routinely, 1-2 days a week, 3-4 days a week, 5-6 days a week to Almost daily
	19C	How much time do you spend being sedentary [sitting, resting (other than sleep and naps), reading, watching television, using social media] in a day?	<2 hrs, 2-4 hours, 4-6 hours, 6-8 hours >8 hrs
Barriers to Physical Activity	20C–25C	20C. I don't have knowledge about physical activities to be followed during this stage that will lead to weight loss. 21C. I don't make/am unable to make conscious physical activity efforts to reduce my weight. 22C. I find it difficult to initiate/carry out physical activities due to excessive body pain/backache. 23C. Managing house, child and work leaves me with little time and energy to engage in physical activity.	5-point Likert scale: Strongly Agree to Strongly Disagree

Domain	Item No.	Question	Response Options
		24C. My family does not let me engage in physical activity during this stage. 25C. I have no access to parks, walking tracks and fitness centres.	
Sleep Pattern	26C	On average, how many hours do you sleep at night?	<5 hrs, 5–7 hrs, >7 hrs
	27C	On average, how much time do you nap during the day?	<30 mins, 30 minutes to 1 hour , >1 hour, Not applicable
	28C	How would you rate your current sleep quality?	Excellent, Good, Average, Poor, Very poor
	29C	How often do you get family support to meet high infant needs at nighttime so that you can have comfortable sleep?	Always, Mostly, Sometimes, Rarely, Never

Data collection was conducted using Google Documents for efficiency. The collected data were analysed using SPSS software, with categorical variables assessed through the chi-square test to identify significant associations between different factors influencing postpartum weight management.

RESULTS:

Demographic Characteristics of Participants

Table 2 summarizes the baseline demographic features of the 141 postpartum women included in the study. The majority (68.79%) were between 20 and 29 years of age, which is the typical reproductive age range. A notable proportion (29.08%) were aged 30–40 years, and only a small minority (2.13%) were under 20. In terms of socioeconomic distribution, over half of the participants (54.61%) belonged to the middle class, followed by the upper-middle class (29.08%), with fewer from the lower-middle (11.35%) and upper classes (4.96%).

Regarding obstetric factors, Lower Segment Caesarean Section (LSCS) was the most common mode of delivery, accounting for 55.32% of births, while 39.71% had normal vaginal deliveries and 4.26% underwent instrumental deliveries.

Table 2. Demographic Characteristics of Study Participants

Characteristic	Subcategory	No. of Cases	Percentage
Age Group	<20	3	2.13%
	20–29	97	68.79%
	30–40	41	29.08%
Socioeconomic Status	Lower Middle Class	16	11.35%
	Middle Class	77	54.61%
	Upper Middle Class	41	29.08%
	Upper Class	7	4.96%
Mode of Delivery	Instrumental	6	4.26%
	LSCS	78	55.32%
	NVD	57	39.71%

Pre- and Post-Pregnancy BMI:

A shift in BMI was observed from the pre- to post-pregnancy period. Before pregnancy, 31.21% of women were overweight (BMI 25–29.9), and 22.69% were obese (BMI ≥30). Following delivery, 36.17% were overweight and 35.46% were obese, with 1.41% falling into the morbidly obese category (BMI ≥40). The percentage of women with normal BMI (18.5–22.9) decreased from 21.99% to 14.18%.

BMI Category	Pre-Pregnancy	Post-Pregnancy
<18.5	3 (2.13%)	-

18.5–22.9	31 (21.99%)	20 (14.18%)
23–24.9	17 (12.06%)	20 (14.18%)
25–29.9	44 (31.21%)	51 (36.17%)
30–34.9	32 (22.69%)	32 (22.70%)
35–39.9	14 (9.90%)	16 (11.35%)
40 and above	0 (0%)	2 (1.41%)

Mean and Standard Deviation of Study Parameters:

Table 3 - The mean age of participants was 27.12 years. There was a statistically significant increase in BMI from pre-pregnancy (mean: 27.28) to post-pregnancy (mean: 28.85) with a p-value < 0.0001.

Table 3. Mean and Standard Deviation of Study Parameters

Parameter	Mean	SD	p-value
Age	27.12	4.19	-
BMI – Pre	27.28	5.27	<0.0001
BMI – Post	28.85	5.22	–

Risk Factors, Facilitators, and Barriers to Weight Management (Based on Questionnaire):

Perceptions and Motivation (Q1–Q2): Participants generally acknowledged their weight status and demonstrated a moderate to high level of readiness to manage their weight effectively.

Eating Behaviour (Q3–Q6): Poor dietary habits were reported, including frequent emotional eating, irregular meals, and lack of portion control.

Barriers to Healthy Eating (Q7–Q13): Common barriers included stress (Q8: 118 agreed), lack of time, and insufficient family support. Interestingly, most did not perceive healthy eating as unaffordable (Q9: 112 disagreed).

Physical Activity Behaviour (Q14–Q19): Low physical activity levels were prevalent. Lack of motivation (Q15) and fatigue were significant constraints.

Barriers to Physical Activity (Q20–Q25): The leading barriers were time constraints (Q20: 125 agreed), childcare responsibilities, and household duties. Few attributed it to lack of knowledge (Q24: 1 agreed).

Sleep Pattern (Q26–Q29): Poor sleep was widely reported. Over 70% experienced sleep disruptions, and 111 participants agreed that sleep quality negatively impacted their daily function (Q28).

Key Barriers Identified:

- Time constraints (Q20): 125 participants strongly agreed.
- Emotional/stress-related eating (Q8): 118 agreed.
- Lack of physical activity (Q18): 107 agreed.
- Sleep disturbances (Q28): 111 reported.

Statistical Associations: Chi-square analysis demonstrated statistically significant associations ($p < 0.05$) between postpartum weight retention and the following variables:

- Socioeconomic status
- Mode of delivery
- Physical activity
- Sleep quality
- Dietary behaviours

These findings highlight the multifactorial influences on postpartum weight changes and underscore the need for integrated postpartum care strategies focusing on nutrition, physical activity, and mental well-being.

DISCUSSION

Most participants (68.79%) belonged to the 20–29 age group, with a smaller proportion in the 30–40 age range (29.08%) and an even lower percentage in those under 20 years (2.13%). This aligns with findings by Nolan et al. (2024), who observed that most pregnant women fall within this reproductive age group where weight management concerns are prominent. Socioeconomically, most participants were from middle-class backgrounds (54.61%), followed by upper-middle (29.08%), lower-middle (11.35%), and upper-class (4.96%). Previous research by Iwu et al. (2024) suggests that socioeconomic status plays a crucial role in postpartum weight retention, as access to nutritional resources and healthcare services significantly impacts weight gain patterns.

Regarding mode of delivery, 55.32% of participants underwent Lower Segment Caesarean Section (LSCS), 39.71% had Normal Vaginal Delivery (NVD), and 4.26% had instrumental deliveries. High rates of LSCS are often associated with increased postpartum weight retention, as indicated by Sandsæter et al. (2024), who noted that surgical deliveries could lead to delayed postpartum weight loss due to reduced mobility and physical activity levels post-delivery.

A notable shift in BMI was observed between the pre-pregnancy and post-pregnancy phases. Before pregnancy, 21.99% of participants had a normal BMI (18.5–22.9), which reduced to 14.18% post-pregnancy, indicating an increase in weight among many participants. Similarly, the percentage of participants in the overweight category (25–29.9) increased from 31.21% to 36.17%, and those in the obese category (BMI 35–39.9) increased from 9.90% to 11.35%. This trend supports the findings of McLean (2024), who highlighted that postpartum weight retention is a common issue, particularly among women who experience excessive gestational weight gain.

Beyond demographics and clinical measures, the structured questionnaire provided insight into the perceptions, behaviours, and challenges faced by postpartum women. In terms of weight perception and readiness to manage weight (Q1–Q2), a majority recognized their current weight status and expressed willingness to adopt healthier habits.

However, behavioural factors such as poor eating patterns were common. Emotional eating, meal skipping, and portion control difficulties were frequently reported. Stress emerged as a significant barrier—118 participants agreed that stress influenced their eating habits (Q8), and 125 cited time constraints as the primary reason for reduced physical activity (Q20). These behavioural obstacles are supported by Bazzazian et al. (2023), who emphasized the role of caregiving responsibilities and psychosocial pressures in weight gain.

Physical inactivity was another major concern, with many participants indicating low levels of structured exercise. Sleep disturbances were widespread—111 participants reported poor sleep quality affecting their daily routine and ability to manage weight effectively (Q28), a factor linked to metabolic dysregulation according to Banafshe et al. (2024).

Importantly, while barriers were prominent, the questionnaire also revealed that many women were motivated to improve their health. The moderate-to-high readiness scores suggest that postpartum women are open to structured interventions if support is accessible and tailored to their context.

Interestingly, the proportion of participants with a BMI ≥40 increased from 0% pre-pregnancy to 1.41% post-pregnancy, indicating that a subset of women experienced substantial postpartum weight gain. This aligns with questionnaire responses highlighting emotional eating, time constraints, and disrupted sleep as common barriers to weight management. Nolan et al. (2024) similarly emphasized that behavioral and lifestyle factors, along with metabolic changes, significantly contribute to long-term postpartum weight retention.

CONCLUSION

This study reveals multifactorial contributors to postpartum weight retention, encompassing demographic, clinical, behavioural, and psychosocial dimensions. A notable rise in BMI post-pregnancy, particularly in overweight and obese categories, alongside high LSCS rates and socioeconomic disparities, emphasizes the need for individualized maternal care.

Importantly, the structured questionnaire illuminated key behavioural barriers - emotional eating, stress, disrupted sleep, and lack of time, hinder effective postpartum weight management.

Taken together, these insights advocate for the development of comprehensive, culturally appropriate postpartum interventions that integrate nutritional education, physical activity, mental health support, and sleep hygiene. Future studies should assess the long-term effectiveness of such strategies in reducing postpartum weight retention and improving overall maternal health outcomes.

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