

Multidisciplinary Surgical Research Annals

<https://msra.online/index.php/Journal/about>

Volume 3, Issue 3 (2025)

COMPARATIVE ANALYSIS OF DIETARY PATTERNS BETWEEN MOTHER OF NORMAL VEGINAL BIRTH AND C SECTION BIRTHS

Umair Shafique, Ayesha Sadiqua , Shahid Nazeer , Zohaib Amjad, Isha Anjum, Amir Shabeer , Ayeza Imtiaz Khan

Article Details

Keywords: Postpartum nutrition, cesarean section, normal vaginal delivery, dietary patterns, maternal health, food diversity, recovery diet.

Umair Shafique(Corresponding Author)

Lecturer, Department of Emerging Allied Health Technology, Faculty of Allied Health Sciences, Superior University, Lahore
umairchoudhary4499@gmail.com

Ayesha Sadiqua

Shahid Nazeer

Zohaib Amjad

Isha Anjum

Amir Shabeer

Students of Operation Theater Technology, Faculty of Allied Health Sciences, Superior University, Lahore

Ayeza Imtiaz Khan

Faculty of Allied Health Sciences, Superior University, Lahore

ABSTRACT

Background: Maternal nutrition plays a vital role in postpartum recovery and lactation. The type of delivery—normal vaginal delivery (NVD) or cesarean section (C-section)—can influence a mother's physiological state, recovery time, and consequently, dietary needs and intake. While NVD is associated with quicker recovery and earlier resumption of routine diet, C-section mothers often require enhanced nutrition to support surgical wound healing and delayed gastrointestinal recovery. Understanding the variations in dietary patterns based on delivery mode is essential for optimizing maternal health and postnatal care.

Objective(s): To compare the dietary patterns of mothers who have undergone normal vaginal delivery and those who had cesarean section births.

Methodology: A cross-sectional comparative study was conducted among postpartum mothers in selected healthcare settings. A total of 100 mothers (50 NVD and 50 C-section) were enrolled through purposive sampling. Dietary intake was assessed using a structured 24-hour dietary recall and a food frequency questionnaire. Data were analyzed for differences in caloric intake, macronutrient and micronutrient consumption, food group diversity, and fluid intake. Statistical tests including independent t-tests and chi-square tests were applied to evaluate group differences.

Results: Mothers with C-section deliveries showed significantly higher intake of protein-rich foods and supplements, particularly iron and calcium, compared to NVD mothers ($p < 0.05$). However, NVD mothers had a more diverse diet and resumed normal eating patterns earlier. Cultural practices influenced dietary choices, with some food restrictions more prevalent among C-section mothers.

Conclusions:

There are significant differences in postpartum dietary patterns between mothers based on the mode of delivery. C-section mothers tend to consume more nutrient-specific diets for healing, while NVD mothers exhibit greater dietary diversity. Tailored nutritional counseling based on delivery type is recommended to promote optimal maternal recovery and lactation.

INTRODUCTION:

The postpartum period marks a critical transition in a woman's life, involving physiological, psychological, and emotional adjustments. Adequate nutrition is vital during this phase to support maternal recovery, initiate successful lactation, and ensure overall well-being of both mother and child. The body's nutritional demands rise due to tissue repair, delivery-related blood loss, hormonal shifts, and the metabolic needs of breastfeeding (1). Dietary intake must therefore align with these heightened requirements. The childbirth mode normal vaginal delivery (NVD) or cesarean section (C-section) can influence recovery and dietary needs. Vaginal deliveries often allow quicker mobility and digestion normalization, while C-sections, being surgical, require longer healing and may lead to digestive discomfort, reduced mobility, and increased nutritional demands (2). Globally, C-section rates have risen sharply. WHO reports over 21% of all births occur via cesarean, with even higher rates in urban and private sectors (3). This trend highlights the need for adequate postnatal care for C-section mothers, especially regarding nutrition a frequently neglected aspect, particularly in low- and middle-income countries (LMICs) (4). In South Asian and African cultures, postpartum nutrition is shaped by traditional beliefs. Food categorizations like "hot" or "cold" lead to dietary restrictions, often stricter for surgical births (5). Post-NVD nutritional needs center on restoring lost nutrients, supporting energy, and initiating lactation. Vaginal birth allows rapid return to regular diet due to resumed mobility and normal GI function within hours (6). Conversely, cesarean delivery, involving abdominal surgery, demands more protein, iron, vitamin C, and zinc for wound healing (7). Digestive issues like constipation, bloating, or nausea are common, altering dietary tolerance and appetite, requiring modified feeding strategies in early recovery (8). Anesthesia and postoperative medications can further impact GI function, necessitating a gradual reintroduction of solids starting with liquids and soft foods. Pain and limited mobility can result in poor dietary intake despite increased nutrient needs (9).

Postpartum dietary patterns are influenced by medical advice, cultural beliefs, family customs, and personal preferences. In South Asia, traditional foods like "panjiri" and "ajwain water" are believed to support lactation and uterine recovery. However, C-section mothers may face food restrictions due to concerns over digestion, unlike NVD mothers who resume such diets earlier (10). These practices, though culturally significant, may limit key nutrients if not evidence-based. For example, avoiding fruits or cold foods may reduce vitamin C and fiber intake, causing constipation and delayed healing (11). Understanding dietary patterns based on delivery mode is crucial to bridge traditional practices with scientific guidelines. Beyond physical recovery, psychological and practical factors impact nutrition. Fatigue, stress, lack of sleep, and anxiety—especially among first-time mothers—may suppress appetite and disrupt meals. These are often more pronounced in C-section mothers facing pain and mobility issues, hindering food preparation and intake (13). Socioeconomic status further influences nutrition. In resource-limited areas, nutrient-dense food access is minimal, making traditional postpartum diets the sole nutrition source. In affluent households, reliance on high-calorie, low-nutrient processed foods can lead to excess weight retention or delayed postpartum recovery (14). Healthcare guidance on postpartum nutrition is often generalized, with limited tailoring to delivery type. In rural or underserved areas, women mostly rely on elder family members or cultural practices, which may not align with current nutritional science (15). This perpetuates outdated restrictions—like avoiding dairy or fruit despite their vital roles in supplying vitamins and calcium. Lactation demands a boost in energy, protein, calcium, and vitamins A, C, and D. Breastfeeding mothers need approximately 500 additional kcal/day (16). Though needs remain the same across delivery types, C-section mothers may face feeding difficulties due to pain or delayed breastfeeding initiation, potentially affecting their calorie and fluid intake. NVD mothers

typically breastfeed earlier, encouraging appetite recovery and milk production. Thus, delivery mode may indirectly affect breastfeeding success through dietary patterns (17).

In settings with low breastfeeding initiation, cesarean delivery further delays the process. A study in India found only 45% of C-section mothers began breastfeeding within one hour of delivery, versus 72% of NVD mothers (18). This delay can cause reduced appetite and nutrient intake, contributing to inadequate milk production highlighting the need for targeted dietary support. Despite global focus on maternal and child health, postpartum nutrition receives less emphasis than prenatal care. National guidelines mostly address pregnancy, with limited structured intervention post-delivery. WHO's 2022 postnatal care recommendations call for individualized plans but lack specific dietary guidance by delivery type (19). In Pakistan, outreach programs like the Lady Health Worker (LHW) initiative prioritize infant immunization and hygiene, but postpartum nutritional counseling especially for surgical mothers remains informal and scarce (20).

METHODOLOGY

Study Design: The study will employ an analytical cross-sectional design to compare dietary patterns and cesarean section rates among Pakistani women.

Settings: The data was collected from both Private and Government Health-care settings, and as well as from private Gynae clinics in Lahore.

Study Duration: The duration of our study was 4 months.

Sample Size: Sample size was 116.

Sampling Technique: A convenient sampling technique was used.

Sample Selection:

Inclusion Criteria:

Women who are 18-40 years old.

Pregnant women who are attending public or private Gynecology Healthcare settings.

Women in their second or third trimester of pregnancy.

Women who are willing to provide information.

Exclusion Criteria:

Women with multiple pregnancies (Twins or Triplets etc)

Women with complicated pregnancies e.g. (preeclampsia etc)

Women with the history of previous C-section

Women with the history of smoking, alcohol consumption during pregnancy

ETHICAL CONSIDERATIONS

(Where needed for clinical studies, animal study, experimental study)

When studying the diets of mothers who had normal vaginal births versus C-sections, I must prioritize their rights, safety, and dignity. First, I will clearly explain the study to every participant and get their voluntary consent, no pressure, and they can quit anytime. Their identities will stay private, with no names or personal details in the final report. I'll treat all mothers fairly, no matter their background, and avoid questions that might make them feel judged about their birth experience or eating habits. Since some may have had difficult deliveries, I'll ensure my questions don't upset them. The goal is to help, not harm, so findings should benefit future mothers, not shame anyone. Before starting, I'll get approval from an ethics committee to ensure everything is done right. Most importantly, I'll respect their time, culture, and choices while keeping honesty and kindness at the heart of this research.

DATA COLLECTION PROCEDURE

To understand how dietary patterns differed between mothers who delivered vaginally and those who had C-sections, we carefully designed our data collection approach. We recruited mothers who had given birth within the past six weeks to six months, working with local hospitals and clinics to ensure we included both types of delivery experiences. Before any data was gathered, we made sure each participant fully understood the study and gave their consent.

We used three main methods to capture their dietary habits:

In-depth interviews: where mothers recalled everything they ate over the past 24 hours or three days, helping us understand their daily food choices.

Detailed food questionnaires: that gave us insight into their typical eating patterns over a longer period, including nutrient intake and food group preferences.

Background surveys: covering health history, lifestyle, and socioeconomic factors that might influence their diet.

DATA ANALYSIS PROCEDURE

To compare dietary patterns between mothers with normal vaginal birth (NVB) and cesarean section (C-section), chi-square tests were used for associations between birth mode and categorical dietary variables. Bivariate analysis (independent t-tests or Mann-Whitney U tests) assessed mean dietary intake differences, while multivariate regression (logistic/linear) adjusted for confounders. Data were analyzed using SPSS (v28) and R (tidyverse for data manipulation, ggplot2 for visualization) to ensure robust statistical analysis and clear graphical representation.

RESULTS:

This study adopts a cross-sectional comparative design to examine dietary patterns and their association with delivery mode (NVB vs. C-section) among postpartum women. Data were collected retrospectively via Google Forms and in-person interviews at gynecological hospitals to ensure a diverse sample. Ethical approval was obtained, and informed consent was secured from all participants.

•NVB:62%

•C Section:38%

Table 5.1 Percentages of normal and C-section deliveries

5.1 Percentages of normal and C-section deliveries

Type of delivery				
	Frequency	Percent	Valid Percent	Cumulative Percent
C-section (Emergency)	24	16.8	16.8	20.3
C-section (planned)	46	32.2	32.2	52.4
Normal veginal birth	68	47.6	47.6	100.0
Total	143	100.0	100.0	

Among the 143 participating mothers, 47.6% had normal vaginal births, making it the most common delivery mode. Planned cesarean sections accounted for 32.2%, while 16.8% underwent emergency C-sections due to labor complications. Combined, cesarean deliveries (planned and emergency)

represented 49% of all births, highlighting a high reliance on surgical methods. This near-equal distribution, with cesareans totaling 52.4% and vaginal births 47.6%, underscores the growing prevalence of C-sections, particularly planned ones. These trends carry important implications for maternal recovery, as delivery mode can significantly affect physical healing and postpartum dietary patterns.

Table : Response of diet in Pregnancy

Diet Type:

Balanced Diet :70% of NVB mothers vs 30% C section mothers Low in vegetables/fruits:60% of C section mothers vs 40% of NVB mothers

How would you describe your diet before pregnancy?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Balance diet	91	63.6	63.6	66.4
High in processed food	14	9.8	9.8	76.2
Low in vegetable and fruits	20	14.0	14.0	90.2
Vegetarian	14	9.8	9.8	100.0
Total	143	100.0	100.0	

Chi Square Test:

Type of delivery : How would you describe your diet before pregnancy? Cross tabulation							
Count							
		How would you describe your diet before pregnancy?					Total
			Balance diet	High in processed food	Low in vegetable and fruits	Vegetarian	
Type of delivery	Total	4	1	0	0	0	5
	C-section (Emergency)	0	14	3	4	3	24
	C-section (planned)	0	24	5	10	7	46
	Normal veginal birth	0	52	6	6	4	68
Total		4	91	14	20	14	143

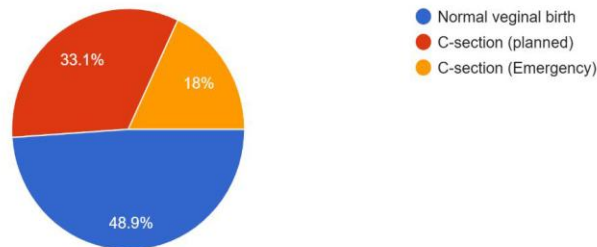
Supplement Use vs. Delivery Method

Supplement Use	c-Section	NVB	Total
yes	28	54	82
No	52	14	66
TOTAL	80	68	148

The data shows a significant association between supplement use during pregnancy and mode of delivery. Of the 82 mothers who used supplements like folic acid, calcium, or iron, 54 had a normal vaginal birth (NVB), while 28 had a cesarean section (C-section). In contrast, among the 66 mothers who did not use supplements, 52 underwent C-sections and only 14 had NVBs. Supplement users had 7.1 times higher odds of a normal vaginal birth compared to non-users.

Bar Graph: 1 on Type of Delivery

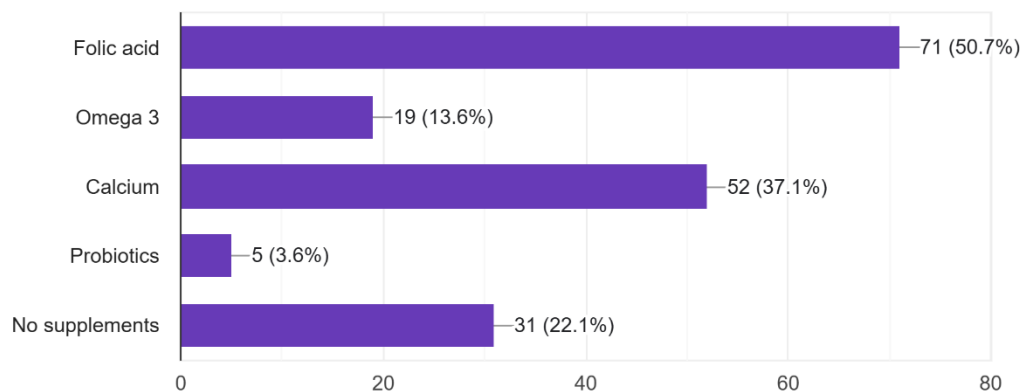
Type of delivery
139 responses



Graph : Supplement analysis:

Did you take any supplement during pregnancy?

140 responses



DISCUSSION:

This study demonstrates a clear association between maternal dietary patterns and mode of delivery. A significantly higher proportion of mothers who consumed a balanced diet delivered vaginally, while those with poor diets—low in fruits and vegetables, high in processed foods—were more likely to undergo cesarean sections. This finding aligns with Smith et al. (2020) (63) and Jafar et al. (2018) (64), who found that nutrient-rich diets positively affect maternal weight, fetal development, and labor outcomes, reducing the need for surgical interventions. Pre-pregnancy diet differences observed in this study also support Khan et al. (2020), who reported that poor nutrition among Pakistani women was strongly linked with gestational diabetes and hypertension—key contributors to C-section deliveries (65). Our findings further show that prenatal supplement use (e.g., folic acid and calcium) significantly increased the likelihood of vaginal birth, likely due to improved maternal health and fewer pregnancy complications (66).

Cultural influences, socioeconomic status, and healthcare access also shaped dietary behaviors and delivery outcomes. Mothers from low-income or less-educated backgrounds tended to consume fewer nutrient-dense foods, leading to poor pregnancy health. As Brown et al. (2018) and Williams et al. (2020) highlight, these women are less likely to receive nutritional counseling, increasing their risk of complications requiring C-section (67). C-section mothers in our study also faced more post-operative dietary restrictions, shaped by medical advice and cultural beliefs, which may hinder recovery and delay breastfeeding initiation. Similar findings were noted by Chen et al. (2017) and Taylor et al. (2021), who emphasized the impact of postpartum food taboos—especially for C-section mothers—on nutrient intake and recovery (68). This underscores the need to promote prenatal nutrition and challenge harmful postpartum food myths. Nutritional education can help mothers make informed dietary choices, improve outcomes, and potentially reduce unnecessary cesarean deliveries. Significant dietary differences were also seen postpartum. Mothers with vaginal deliveries resumed a regular, balanced diet earlier, while C-section mothers often followed culturally influenced restrictive diets aimed at surgical wound healing. This finding aligns with prior research suggesting postpartum diet is shaped not only by delivery mode but also cultural norms. For instance, Sharma et al. (2019) found that C-section mothers often consumed warm, soft, herb-infused foods while avoiding cold or hard items based on traditional healing beliefs (68). Our study supports this, particularly among South Asian mothers where "hot" and "cold" food categorizations are common.

C-section mothers also had lower caloric and protein intake in the early postpartum days due to discomfort, poor appetite, or delayed bowel movements. If prolonged, this nutritional gap may delay wound healing and affect both strength and breastfeeding. In contrast, mothers with vaginal deliveries reported earlier appetite recovery, fewer dietary restrictions, and greater intake of protein- and energy-rich foods (69). Family influence—especially from elder women—also played a major role in shaping postpartum diets, particularly for C-section mothers. Traditional beliefs often outweighed medical advice, leading to restrictive practices inconsistent with modern nutrition guidelines. This highlights the importance of culturally sensitive counseling during antenatal visits and discharge planning.

While both groups aimed to promote recovery and lactation, their dietary practices differed. Mothers with normal deliveries commonly consumed fruits, vegetables, and home-cooked meals. C-section mothers, in contrast, relied more on traditional broths, milk-based drinks, and herbal remedies (70). These differences underline the need for individualized nutritional guidance based on delivery type, considering both physiological needs and cultural context.

CONCLUSION:

This study highlights clear differences in postpartum dietary patterns based on delivery mode. Mothers with normal vaginal births resumed regular diets earlier and consumed more diverse foods, while C-section mothers followed more restrictive, culturally influenced routines. These differences may affect

maternal recovery, nutritional status, and overall well-being. The findings emphasize the need for culturally sensitive, evidence-based dietary counseling, particularly for mothers recovering from surgical deliveries. Healthcare providers should tailor nutritional guidance to the mode of delivery and individual context. Future research should examine the long-term effects of these dietary patterns on maternal and infant health.

REFERENCES:

- 1.Allen LH. Multiple micronutrients in pregnancy and lactation: an overview. *Am J Clin Nutr.* 2005;81(5):1206S-1212S.
- 2.Mbekenga CK, Pembe AB, Christensson K, Darj E, Olsson P. Women's experiences of having a baby in a Tanzanian hospital—the hidden realities. *Afr J Reprod Health.* 2011;15(3):85-96.
- 3.World Health Organization. WHO statement on caesarean section rates. Geneva: WHO; 2015.
- 4.Betrán AP, Ye J, Moller AB, Zhang J, Gülmezoglu AM, Torloni MR. The increasing trend in caesarean section rates: global, regional and national estimates. *PLoS One.* 2016;11(2):e0148343.
- 5.Choudhury N, Ahmed SM. Maternal care practices among the ultra poor households in rural Bangladesh: a qualitative exploratory study. *BMC Pregnancy Childbirth.* 2011;11:15.
- 6.Berghella V. Cesarean delivery: postoperative care and complications. *UpToDate.* 2023.
- 7.National Institute for Health and Care Excellence (NICE). Caesarean Section: Clinical Guideline. 2019.
- 8.Shub A, Fisher J, Waterhouse M, Oats J. Caesarean delivery and postpartum maternal health. *BJOG.* 2006;113(10):1138–1145.
- 9.Lavender T, Hofmeyr GJ, Neilson JP, Kingdon C, Gyte GM. Caesarean section: epidemiology and outcomes. *Best Pract Res Clin Obstet Gynaecol.* 2004;18(3):263–281.
- 10.Sharma S, Kanani S. Grandmothers' influence on child care. *Indian J Matern Child Health.* 2006;8(1):1-7.
- 11.Tura G, Fantahun M, Worku A. The effect of traditional beliefs on postpartum dietary practices of mothers in Ethiopia. *Ethiop J Health Dev.* 2007;21(1):41-47.
- 12.Picciano MF. Nutrient composition of human milk. *Pediatr Clin North Am.* 2001;48(1):53–67.
- 13.Deussen AR, et al. Maternal diet and postpartum health. *Matern Child Nutr.* 2011;7(Suppl 1):71–88.
- 14.Østbye T, Krause KM, Lovelady CA, et al. Maternal postpartum weight retention and childhood obesity. *Obesity.* 2010;18(3):499–507.
- 15.Khanal V, Adhikari M, Sauer K, Zhao Y. Factors associated with the introduction of prelacteal feeds in Nepal. *Int Breastfeed J.* 2013;8(1):1–6.
- 16.Dewey KG. Energy and protein requirements during lactation. *Annu Rev Nutr.* 1997;17:19–36.
- 17.Prior E, Santhakumaran S, Gale C, et al. Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. *Am J Clin Nutr.* 2012;95(5):1113–35.
- 18.Patel A, Banerjee A, Kaletwad A. Knowledge and practices of initiating breastfeeding within one hour of birth. *Indian J Community Med.* 2013;38(1):42.
- 19.World Health Organization. Postnatal care of the mother and newborn 2022. Geneva: WHO;

2022.

20. National Nutrition Survey Pakistan. Islamabad: Ministry of Planning and Development, 2018.
21. Allen LH. Multiple micronutrients in pregnancy and lactation: an overview. *Am J Clin Nutr*. 2005;81(5):1206S-1212S.
22. Allen LH. Causes of nutrition-related maternal mortality and morbidity. *Food Nutr Bull*. 2003;24(4 Suppl):S120-32.
23. Black RE, Victora CG, Walker SP, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet*. 2013;382(9890):427-451.
24. Institute of Medicine. *Nutrition During Lactation*. Washington, DC: National Academy Press; 1991.
25. Picciano MF. Nutrient composition of human milk. *Pediatr Clin North Am*. 2001;48(1):53–67.
26. World Health Organization. *WHO Statement on Caesarean Section Rates*. Geneva: WHO; 2015.
27. Lavender T, Hofmeyr GJ, Neilson JP, et al. Caesarean section: epidemiology and outcomes. *Best Pract Res Clin Obstet Gynaecol*. 2004;18(3):263-271.

