

# Incidence and Risk Factors of Chronic Pain after Cesarean Delivery- An Observational Study

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## Abstract

**Background:** Chronic pain following cesarean delivery (CD) is a recognized postoperative complication affecting a notable proportion of women. The incidence and risk factors for chronic post-surgical pain in CD are influenced by physical, psychological, and procedural variables. **Aim of the study:** The aim of this study was to evaluate the incidence and risk factors of chronic pain after cesarean delivery. **Methods:** This cross-sectional observational study was conducted in Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from March 2023 to February 2024. Total 100 women undergoing cesarean delivery were included in this study. **Result:** In our study, majority (46%) were in the age group of 18-24 years. About 53% participants with chronic pain reported preoperative anxiety ( $p = 0.015$ ), and 47% reported depression compared to 9% in the non-chronic pain group ( $p < 0.0001$ ). Chronic pain was present in 50% of anemic and 83% of malnourished participants ( $p < 0.0001$  for both). Spinal anesthesia was associated with higher chronic pain (83%) than epidural ( $p < 0.0001$ ). Surgery duration, intraoperative excessive bleeding (OR = 4.9,  $p < 0.0001$ ) and wound infection (OR = 3.8,  $p < 0.0001$ ) as well as postoperative wound infection (OR = 3.8;  $p < 0.0001$ ) and excessive physical activity (OR = 4.2;  $p < 0.0001$ ) also significantly increased chronic pain risk. **Conclusion:** This study highlights a significant incidence of chronic pain after cesarean delivery, with socioeconomic status, psychological factors, anemia, malnutrition, intraoperative complications, postoperative wound infection and excessive physical activity as strong predictors.

**Keywords:** Incidence, Risk Factors, Chronic Pain, and Cesarean Delivery.

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## INTRODUCTION

Cesarean delivery (CD) rates have been on a steady incline globally, making it one of the most commonly performed surgical procedures worldwide, especially in countries experiencing rapid modernization and urbanization. The World Health Organization (WHO) recommends a cesarean section rate of 10–15% for optimal maternal and neonatal health outcomes, but many countries exceed this threshold, particularly those in developing countries [1]. Following this trend, the rate of cesarean section in Bangladesh has also increased alarmingly during the last two decades [2]. Factors contributing to this increase include medical recommendations, socioeconomic status, and personal preferences, particularly among women in urban areas and those with access to private healthcare [3]. In Bangladesh, the high cesarean delivery rates are influenced by unique factors, including the healthcare

infrastructure, which is marked by disparities between urban and rural areas [4]. Despite the popularity of cesarean delivery, it is not without risks, with chronic pain being a significant postoperative complication for many women. Chronic pain following cesarean section is typically defined as pain persisting for three months or longer after surgery, affecting approximately 18% of women at three months, with a gradual decline to 6.8% at twelve months post-surgery [5]. This condition is of particular concern due to its debilitating effects on women's quality of life, including limitations in physical activity, mental health issues, and reduced social participation [6]. Chronic pain after cesarean has been shown to have a profound impact on daily functioning, with women often reporting difficulties in carrying out routine activities, which, in turn, affects their overall well-being and ability to care for their newborns [7]. Psychological factors such as preoperative anxiety and

depression also play a role in chronic pain outcomes, highlighting a complex interaction between physical and mental health in cesarean-related pain [8]. The incidence of chronic pain following cesarean delivery is notably influenced by demographic and clinical factors, with studies identifying several risk factors such as pre-existing chronic pain, smoking, longer surgery duration, and higher acute pain intensity in the early postoperative period [9]. For instance, in a cohort study, women who reported high levels of postoperative pain in the first 48 hours were significantly more likely to develop chronic pain, suggesting that immediate postoperative pain management may be key to reducing long-term pain [10]. Other studies emphasize the role of preoperative mental health, with depression and anxiety identified as independent predictors of pain persistence, underscoring the importance of a biopsychosocial approach to cesarean delivery care [11]. Chronic pain after cesarean delivery has broader implications, as it affects not only the immediate postpartum period but also long-term maternal health and quality of life, necessitating comprehensive strategies to address risk factors before, during, and after delivery [12]. Research indicates that proactive management of modifiable risk factors, such as reducing smoking during pregnancy and managing anxiety, may significantly lower the incidence of chronic pain after cesarean delivery [7]. These findings align with international recommendations for improving pain management protocols, suggesting that targeted interventions for at-risk populations could alleviate the chronic pain burden following cesarean delivery [13]. Overall, the high prevalence of cesarean deliveries in Bangladesh, coupled with the underappreciated burden of chronic pain, highlights a pressing need for focused research and policy intervention.

## II OBJECTIVES

To evaluate the incidence and risk factors of chronic pain after cesarean delivery.

## III METHODOLOGY & MATERIALS

This cross-sectional observational study was conducted in Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from March 2023 to February 2024. Total 100 women undergoing cesarean delivery were included in this study. Women aged 18 or older undergoing cesarean delivery, who were willing to provide informed consent, without a prior history of chronic pain, and who were available for follow-up, were eligible to participate. Those with pre-existing chronic pain conditions, unrelated significant surgical complications, or limited follow-up potential due to relocation were excluded to ensure the reliability of findings. In the preoperative phase, participants will complete a baseline questionnaire capturing demographic information and medical history, including mental health status through tools such as the Hospital Anxiety and Depression Scale (HADS) to measure

anxiety and depression. Intraoperative data collection will include anesthesia type (spinal, epidural, or general), duration of surgery, classification of cesarean (emergency or elective), and any intraoperative complications. The postoperative phase will involve repeated pain assessments using the Visual Analogue Scale (VAS), where pain is rated from 0 (no pain) to 10 (worst pain imaginable). Immediate postoperative pain will be assessed within 24 hours, followed by subsequent assessments at 7 days, 1 month, and 3 months post-surgery. Chronic pain will be defined as pain persisting at or beyond the 3-month mark following surgery. Consent of the patients and guardians were taken before collecting data. After collection of data, the data were entered into computer and statistical analysis of the results being obtained by using windows-based computer software devised with Statistical Packages for Social Sciences version 22. P value of less than 0.05 was considered statistically significant.

## IV RESULT

The demographic characteristics of the study subjects, summarized in Table I, show a distribution across various age groups, socioeconomic statuses, and health-related factors. Among the 100 participants, the majority (46%) were aged 18-24 years, with 34% aged 25-29, and 20% aged 30 or above, though the age distribution did not reach statistical significance ( $p = 0.145$ ). Socioeconomic status varied, with 30% of participants in the low-income category, 40% in the middle-income, and another 30% in the high-income category, with socioeconomic status being significantly associated with outcomes ( $p = 0.032$ ). A notable urban-rural divide existed, with 65% of participants residing in urban areas and 35% in rural settings, showing statistical significance ( $p = 0.021$ ). Psychological factors were also prevalent, with 35% of participants reporting preoperative anxiety ( $p = 0.014$ ) and 20% preoperative depression ( $p = 0.039$ ), both of which were statistically significant predictors in this study. Health conditions such as anemia and malnutrition were significant among the participants, with 18% diagnosed with anemia ( $p < 0.0001$ ) and 37% identified as malnourished ( $p = 0.0002$ ). Smoking was notably low in this population, with only 2% of participants identifying as smokers, a statistically significant factor ( $p < 0.0001$ ). Statistical analyses for this table were conducted using the Chi-square test, with a significance threshold of  $p < 0.05$ , indicating that several demographic characteristics, including socioeconomic status, residence, anxiety, depression, anemia, malnutrition, and smoking status, were significantly associated with outcomes in this study. Table II presents the clinical and intraoperative characteristics of the study population. The type of cesarean section was split between elective (60%) and emergency (40%) cases, though this variable did not show statistical significance ( $p = 0.224$ ). Anesthesia type was predominantly spinal, administered to 90% of participants, while 10% received epidural anesthesia. The type of anesthesia was statistically significant ( $p <$

0.0001), indicating a potential link between anesthesia type and study outcomes. Duration of surgery was another significant variable, with 55% of procedures lasting less than 1 hour and 45% lasting an hour or more, reaching significance at  $p = 0.043$ . Intraoperative complications were reported by 16% of participants, with 10% experiencing excessive bleeding and 6% reporting other organ injuries; excessive bleeding was a statistically significant complication ( $p = 0.008$ ). For postoperative outcome, wound infection was noted in 7% ( $p = 0.061$ ), while 12% reported issues due to excessive physical activity during the puerperium period. While these postoperative factors did not reach statistical significance, they highlight important aspects of patient recovery following cesarean delivery. Overall, the clinical and intraoperative characteristics reveal critical variables that contribute to understanding the complexity of cesarean delivery outcomes. Table III shows the progression of postoperative pain intensity using the Visual Analogue Scale (VAS) at various time points. The mean pain score immediately postoperatively was 6.8 ( $\pm 2.0$ ), reflecting moderate to severe pain levels. By 7 days postoperative, the mean pain score decreased to 4.5 ( $\pm 1.8$ ), with a significant reduction compared to the immediate postoperative period ( $p = 0.032$ ). At one month, the mean pain score further declined to 3.2 ( $\pm 1.5$ ), showing continued pain relief over time, with statistical significance ( $p = 0.018$ ). Finally, at three months postoperative, the mean pain score was 2.0 ( $\pm 1.2$ ), indicating a persistent but lower level of pain, with a significant reduction from previous time points ( $p = 0.006$ ). This trend highlights the gradual decline in pain over the postoperative period, although some patients still reported low levels of persistent pain at the three-month mark. Figure 1 demonstrates the pain status at 3 months post-cesarean delivery. In this study, the pain status of the participants at 3 months post-cesarean delivery revealed that 30% experienced chronic pain, while 70% did not report chronic pain. In this study, the incidence of chronic pain three months post-cesarean delivery was analyzed based on various demographic and clinical factors, as shown in Table IV. Of the 100 participants, 30 reported chronic pain while 70 did not. Age was not significantly associated with chronic pain, although participants aged 18-24 years showed a slightly higher incidence (30%) of chronic pain compared to those aged 25-29 (33%) and  $\geq 30$  years (27%) ( $p = 0.112$ ). Socioeconomic status, however, demonstrated a notable association with chronic pain. Half of the participants in the low socioeconomic group reported chronic pain, whereas only 33% and 17% from the middle and high-income groups, respectively, did so, which was statistically significant ( $p = 0.026$ ). Psychological factors were strongly associated with

chronic pain. Preoperative anxiety was present in 53% of those with chronic pain compared to 27% of those without ( $p = 0.015$ ). Preoperative depression showed an even stronger relationship, with 47% of those reporting chronic pain having had depression preoperatively, while only 9% of the non-chronic pain group reported preoperative depression ( $p < 0.0001$ ). Physical health conditions, particularly anemia and malnutrition, were significant predictors of chronic pain. Half of the anemic participants and 83% of the malnourished participants reported chronic pain, both showing high statistical significance ( $p < 0.0001$  for both). Smoking status also reached significance, as all participants who reported chronic pain were non-smokers ( $p < 0.0001$ ), though only 2% of the total sample were smokers. In terms of anesthesia type, 83% of those with chronic pain had spinal anesthesia, whereas 27% had epidural anesthesia, a statistically significant difference ( $p < 0.0001$ ). Surgery duration also showed some impact, with 50% of those with chronic pain having surgeries lasting one hour or more ( $p = 0.041$ ). Intraoperative complications, such as excessive bleeding (27%) and other organ injuries (17%), were more common in the chronic pain group, with excessive bleeding reaching statistical significance ( $p = 0.003$ ). In postoperative period, wound infection was reported in 23% study subjects and excessive physical activity in 33% study subjects of the chronic pain group, all significantly associated with chronic pain ( $p < 0.0001$  for each). Table V provides a multivariate logistic regression analysis of these risk factors for chronic pain three months post-cesarean. Low socioeconomic status was associated with a 2.5-fold increased risk of chronic pain (OR = 2.5; 95% CI = 1.2–5.1;  $p = 0.028$ ). Preoperative anxiety and depression both showed significant predictive value, with odds ratios of 2 (95% CI = 1.1–3.7;  $p = 0.02$ ) and 2.1 (95% CI = 1.2–3.4;  $p = 0.031$ ), respectively. Anemia (OR = 2.4;  $p = 0.023$ ) and malnutrition (OR = 4.1;  $p < 0.0001$ ) also significantly increased chronic pain risk. While smoking was a significant factor (OR = 1.4;  $p = 0.042$ ), epidural anesthesia was also associated with a 2.2-fold increase in chronic pain risk (OR = 2.2;  $p = 0.046$ ). Prolonged surgery duration ( $\geq 1$  hour) had an odds ratio of 1.7, indicating increased risk ( $p = 0.041$ ). Intraoperative complications such as excessive bleeding (OR = 4.9;  $p < 0.0001$ ) and other organ injuries (OR = 4.1;  $p < 0.0001$ ) were strong predictors. Postoperative wound infection (OR = 3.8;  $p < 0.0001$ ) and excessive physical activity during puerperium (OR = 4.2;  $p < 0.0001$ ) were also significant contributors to chronic pain incidence. This analysis highlights that chronic pain after cesarean delivery is influenced by a multifactorial interplay of socioeconomic, psychological, clinical, and postoperative factors.

**Table-I: Demographic characteristics of study subjects (N = 100)**

Variable		Number of Patients	Percentage (%)	p-value
Age (Years)	18-24	46	46%	0.145
	25-29	34	34%	
	≥30	20	20%	
Socioeconomic Status	Low	30	30%	0.032
	Middle	40	40%	
	High	30	30%	
Residence	Urban	65	65%	0.021
	Rural	35	35%	
Preoperative Anxiety	Yes	35	35%	0.014
	No	65	65%	
Preoperative Depression	Yes	20	20%	0.039
	No	80	80%	
Anemia	Yes	18	18%	<0.0001
	No	82	82%	
Malnutrition	Yes	37	37%	0.0002
	No	63	63%	
Smoking Status	Yes	2	2%	<0.0001
	No	98	98%	

Statistical analysis was done by Chi-square test  
p value < 0.05 indicates significant

**Table-II: Clinical characteristics and intra-operative characteristics of the study subjects (N = 100)**

Variable		Number of Patients	Percentage (%)	p-value
Type of Cesarean	Elective	60	60%	0.224
	Emergency	40	40%	
Anesthesia Type	Spinal	90	90%	<0.0001
	Epidural	10	10%	
Duration of Surgery	<1 hour	55	55%	0.043
	≥1 hour	45	45%	
Intraoperative Complications	Excessive Bleeding	10	10%	0.008
	Other organ injury	6	6%	
Post-operative outcome	Wound infection	7	7%	0.061
	Excessive physical activity during puerperium	12	12%	

Statistical analysis was done by Chi-square test  
p value < 0.05 indicates significant

**Table-III: Postoperative pain intensity using Visual Analogue Scale (VAS)**

Time Point	Mean Pain Score (±SD)	p-value
Immediate Postoperative (24h)	6.8 (±2.0)	-
7 Days Postoperative	4.5 (±1.8)	0.032
1 Month Postoperative	3.2 (±1.5)	0.018
3 Months Postoperative	2.0 (±1.2)	0.006

Statistical analysis was done by Chi-square test  
p value < 0.05 indicates significant

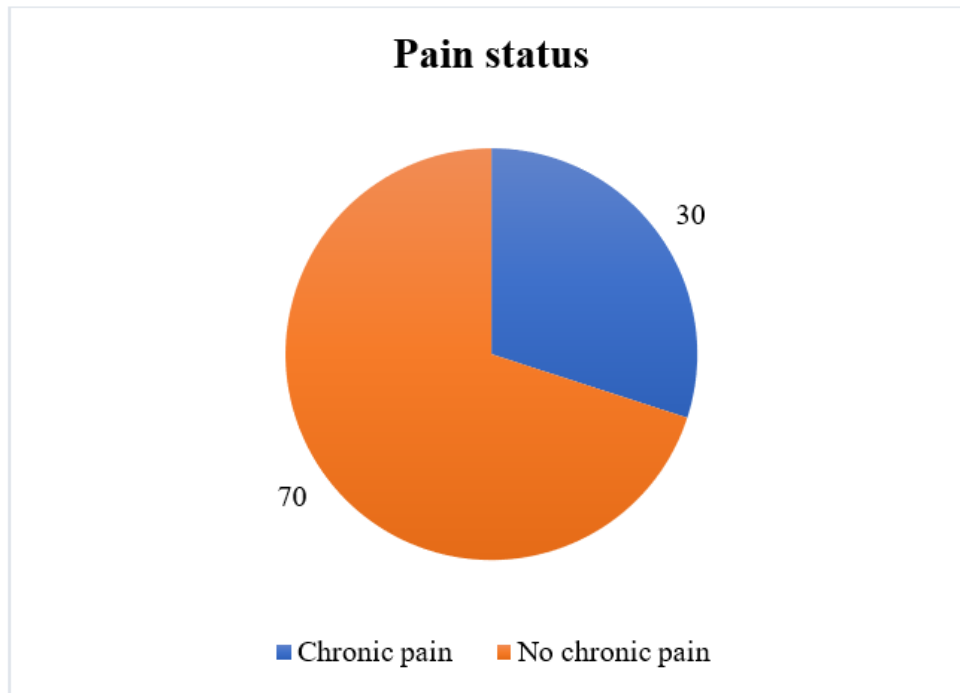


Figure-1: Pain status at 3 months post-cesarean delivery (N=100)

Table-IV: Incidence of chronic pain at 3 months post-cesarean delivery by demographic and clinical factors (N=100)

Variable	Chronic Pain (n=30)		No Chronic Pain (n=70)		p-value	
	n	%	n	%		
Age (Years)	18-24	9	30%	37	53%	0.112
	25-29	10	33%	24	34%	
	≥30	8	27%	12	17%	
Socioeconomic Status	Low	15	50%	15	21%	0.026
	Middle	10	33%	30	43%	
	High	5	17%	25	36%	
Preoperative Anxiety	Yes	16	53%	19	27%	0.015
	No	14	47%	51	73%	
Preoperative Depression	Yes	14	47%	6	9%	<0.0001
	No	16	53%	64	91%	
Anemia	Yes	15	50%	3	4%	<0.0001
	No	15	50%	67	96%	
Malnutrition	Yes	25	83%	12	17%	<0.0001
	No	5	17%	58	83%	
Smoking Status	Yes	2	7%	0	0%	<0.0001
	No	28	93%	70	100%	
Anesthesia Type	Spinal	25	83%	65	93%	<0.0001
	Epidural	8	27%	2	3%	
Duration of Surgery	<1 hour	15	50%	40	57%	0.041
	≥1 hour	15	50%	30	43%	
Intraoperative Complications	Excessive Bleeding	8	27%	2	3%	0.003
	Other organ injury	5	17%	1	1%	
Post-operative outcome	Wound infection	7	23%	0	0%	<0.0001
	Excessive physical activity during puerperium	10	33%	2	3%	

Statistical analysis was done by Chi-square test  
p value < 0.05 indicates significant



**Table-V: Multivariate Logistic Regression Analysis of Risk Factors for Chronic Pain at 3 Months**

Risk Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Socioeconomic Status (Low)	2.5	1.2–5.1	0.028
Preoperative Anxiety (Yes)	2	1.1–3.7	0.02
Preoperative Depression (Yes)	2.1	1.2–3.4	0.031
Anemia (Yes)	2.4	1.4–4.0	0.023
Malnutrition (Yes)	4.1	1.7–5.3	<0.0001
Smoking Status (Yes)	1.4	1.6–3.3	0.042
Epidural Anesthesia	2.2	1.0–3.9	0.046
Duration of Surgery ( $\geq 1$ hour)	1.7	1.0–2.9	0.041
Excessive Bleeding	4.9	1.8–6.1	<0.0001
Other organ injury	4.1	1.9–5.6	<0.0001
Wound infection	3.8	1.5–4.8	<0.0001
Excessive physical activity during puerperium	4.2	1.8–5.6	<0.0001

Statistical analysis was done by Chi-square test  
p value < 0.05 indicates significant

## V DISCUSSION

This cross-sectional observational study was conducted in Department of Obstetrics and Gynaecology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from March 2023 to February 2024 to evaluate the incidence and risk factors of chronic pain after cesarean delivery. Total 100 women undergoing cesarean delivery were included in this study. Our analysis of demographic characteristics revealed a nonsignificant difference in chronic pain incidence across age groups, with 9% of participants aged 18-24, 10% aged 25-29, and 8% aged 30 and above reporting chronic pain ( $p = 0.112$ ). This nonsignificant relationship between age and chronic pain aligns with previous research that does not consistently link age to increased postoperative pain after cesarean delivery [7]. However, socioeconomic status emerged as a significant factor in our study, with women from a low socioeconomic background having 2.5 times higher odds of chronic pain (OR 2.5, 95% CI: 1.2–5.1;  $p = 0.028$ ) than those from middle or high socioeconomic groups. This finding is corroborated by Daly *et al.*, [14], who also observed higher chronic pain incidence among socioeconomically disadvantaged women, suggesting that economic stressors and limited access to resources may exacerbate physical recovery challenges after surgery. The literature highlights that socioeconomic factors are deeply interwoven with pain experiences, as financial stress can heighten physiological stress responses and limit access to adequate care, potentially increasing pain persistence [14,15]. Anxiety nearly doubled the odds of chronic pain in our cohort (OR 2.0, 95% CI: 1.1–3.7;  $p = 0.020$ ), which is supported by the findings of Gorkem *et al.*, [16], who demonstrated that high anxiety scores correlated with increased pain severity and analgesic consumption. Similarly, Richez *et al.*, [17] observed that preoperative anxiety and depression play significant roles in predicting postoperative pain intensity and persistence. Health conditions such as anemia and malnutrition were significantly associated with chronic pain. Half of the anemic participants and 83% of the malnourished

participants reported CPSP ( $p < 0.0001$  for both). The high rates among malnourished and anemic patients may reflect the compounding effect of weakened immune response and slower recovery rates, exacerbating pain persistence [18]. In contrast, the low smoking prevalence in this study population (2%) did not contribute significantly to chronic pain, although Mehdiratta *et al.*, [8] identified smoking as a significant predictor of postoperative pain in a separate cohort, indicating that smoking may be a more variable risk factor influenced by other demographic factors. Anesthesia type and surgery duration were significant predictors of chronic pain. In this study, spinal anesthesia was associated with a lower incidence of CPSP compared to epidural anesthesia, where 83% of those with CPSP had received spinal anesthesia and only 27% had received epidural ( $p < 0.0001$ ). This result aligns with findings from Moriyama *et al.*, [10], who observed that during spinal anesthesia, CPSP incidence reduced by 50%, suggesting that the choice of anesthesia and adjunct analgesics can play a protective role. Additionally, prolonged surgery duration ( $\geq 1$  hour) was associated with higher chronic pain risk in this study ( $p = 0.041$ ), a finding also noted in Jin *et al.*, [5], where longer surgery times correlated with higher pain reports due to extended tissue trauma and inflammation. These findings emphasize the importance of optimizing intraoperative practices and anesthesia choice to minimize long-term pain outcomes. The study identified postoperative wound infection and excessive physical activity as significant contributors to chronic pain, with 23% of participants reporting wound infections and 33% citing excessive physical activity during puerperium, all associated with increased chronic pain incidence ( $p < 0.0001$  for each). This aligns with the findings of Krieger *et al.*, [19], who identified wound complications as critical postoperative risks that significantly increase pain duration and intensity. Daly *et al.*, [14] found that patients with intraoperative complications or additional interventions faced significantly higher pain persistence rates. Complications often exacerbate physical recovery needs, and the subsequent increase in postoperative

inflammation may drive heightened pain sensitivity [17]. Furthermore, Borges *et al.*, [7] noted that adequate postpartum care, including infection management and rest, is essential for minimizing chronic pain risks. The progression of pain intensity in our study, as measured using the Visual Analogue Scale (VAS), demonstrated a statistically significant decline over time, from an average of 6.8 ( $\pm 2.0$ ) immediately postoperative to 2.0 ( $\pm 1.2$ ) at three months. This reduction mirrors trends observed by Eisenach *et al.*, [20], who found that acute pain intensity within 24–48 hours was a critical predictor of chronic pain. As immediate pain levels decrease, so does the likelihood of long-term pain. This suggests that targeted pain management in the acute phase could influence long-term recovery outcomes, consistent with findings from Myles *et al.*, [21] that stress the significance of minimizing immediate postoperative pain to reduce chronic pain risk. These findings suggest that improving postoperative care protocols to encourage rest, monitor infection risks, and educate patients on activity limitations could significantly reduce CPSP. The findings of this study and the comparative literature highlight the necessity of a holistic approach to cesarean care that addresses not only the physical aspects but also the psychological and social factors that contribute to pain persistence.

#### Limitations of the study

In our study, there was small sample size and absence of control for comparison. Study population was selected from one center in Dhaka city, so may not represent wider population. The study was conducted at a short period of time.

#### VII CONCLUSION AND RECOMMENDATIONS

This study highlights a significant incidence of chronic pain after cesarean delivery, with socioeconomic status, psychological factors, anemia, malnutrition, intraoperative complications, postoperative wound infection and excessive physical activity as strong predictors. Spinal anesthesia and prolonged surgery duration also influenced chronic pain risk. These findings underscore the need for comprehensive perioperative care that addresses both physical and psychological factors to enhance recovery. Targeted interventions could improve long-term outcomes, particularly for at-risk groups identified by socioeconomic and clinical factors.

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