

ORIGINAL ARTICLE

Comparative study of gum chewing versus routine care in post operative gut motility after cesarean section.

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ABSTRACT... Objective: To compare the postoperative gut motility in terms of time to first bowel sound, passage of flatus, and stool between patients receiving gum chewing versus routine care after elective cesarean section. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Obstetrics & Gynecology, Akhtar Saeed Trust Hospital, Lahore. **Period:** 27 March 2025 to 20 Aug 2025. **Methods:** Seventy women undergoing elective lower segment cesarean section under spinal anesthesia were enrolled in this randomized controlled trial. They were equally randomized into two equal groups consisting of 35 cases each in Group A and B, gum chewing (sugar-free) in Group A was started within 6 hrs of the procedure where B group cases were those with routine care (without gum). The study monitored each participant for the return of bowel activity, including bowel sounds, flatus, and stool passage. **Results:** The mean age of participants was 30.34 ± 6.23 years. Chewing gum significantly improved postoperative gut motility. Mean time to first bowel sound was 8.16 ± 1.36 hours in Group A versus 12.31 ± 1.79 hours in Group B ($p < 0.001$). Mean time to flatus was 10.21 ± 2.45 vs. 14.47 ± 2.37 hours ($p < 0.001$), and time to stool passage was 24.97 ± 3.86 vs. 36.83 ± 5.38 hours respectively ($p < 0.001$). **Conclusion:** The use of chewing gum notably expedites the return of gastrointestinal activity after cesarean delivery. It may be recommended as a safe, inexpensive adjunct to enhance recovery in postoperative care.

Key words: Bowel Sounds, Cesarean Section, Flatus, Gum Chewing, Gut Motility, Postoperative Ileus, Stool Passage.

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INTRODUCTION

The increasing rate of cesarean sections (CS) in Pakistan poses a major public health issue.¹ In this cross-sectional study of 250 mothers, 44% underwent CS—60.9% emergency and 39.1% elective. Significant associations were found with maternal age, education, and CS type. Key medical indications included preeclampsia/eclampsia, hemorrhage, gestational diabetes, and hypertension. Urban residence, younger age (20–24 years), and preterm delivery were also contributing factors. The findings emphasize the role of both medical and socio-demographic factors in CS prevalence and call for targeted educational programs to curb unnecessary CS.²

While cesarean sections are often life-saving and medically necessary, they are not without complications. One of the most common and challenging postoperative issues following a C-section is postoperative ileus (POI). Characterized by a short-term disruption in

gastrointestinal movement, this condition manifests through abdominal distention, postponed flatus and defecation, nausea, vomiting, and inability to ingest food orally. POI most commonly occurs around the fourth postoperative day and can significantly delay the recovery process.² The average incidence of POI is estimated at around 20%, making it a considerable postoperative concern.³ It not only prolongs hospital stays but also increases healthcare costs and patient discomfort. To counteract the negative consequences of POI, various strategies have been explored to accelerate the return of gastrointestinal function postoperatively. One such approach is early initiation of oral feeding. Multiple studies have established that early feeding after surgery, including cesarean section, can stimulate gut motility and expedite recovery.⁴ However, despite its advantages, early feeding is not universally tolerated. Many patients experience gastrointestinal intolerance, manifested by symptoms such as bloating, vomiting, and discomfort.

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This leads to a paradoxical situation where the strategy intended to aid recovery may itself pose risks. Furthermore, postponing oral intake for too long has its own drawbacks, including increased cellular breakdown, slower wound healing, elevated risk of surgical site infection, and longer hospitalization duration, which collectively escalate medical expenses.⁴

In light of these challenges, alternative non-invasive strategies to promote gut motility have gained attention. One such method is gum chewing, also referred to as “sham feeding.” This approach leverages the body’s physiological response to the act of chewing, even in the absence of actual food intake. Chewing gum stimulates the cephalic-vagal reflex, leading to increased secretion of digestive enzymes and hormones such as gastrin, neurotensin, and pancreatic polypeptides. These hormones enhance intestinal motility and contribute to a quicker return of normal bowel function.⁷ The benefits of gum chewing have been well-documented in gastrointestinal surgeries, especially colorectal procedures, where it has shown clear improvements in reducing time to bowel sounds, passage of flatus, and stool.

Chewing gum three times a day for 30–60 minutes has been associated with measurable improvements in postoperative gut motility. Specifically, it has been shown to reduce the time required for the appearance of bowel sounds, passage of flatus, and defecation following cesarean section. Several meta-analyses and systematic reviews have now substantiated these findings, concluding that gum chewing is a simple, low-cost, and safe intervention with significant postoperative benefits. As a result, there is growing support for incorporating gum chewing into standard postoperative care protocols for women undergoing cesarean delivery.^{5,6} These findings are encouraging, but their translation into clinical practice remains inconsistent, especially in underdeveloped nations where standardized postoperative recovery protocols may not be uniformly implemented.

Despite evidence from multiple studies and meta-analyses favoring gum chewing, results across different clinical settings have been somewhat

variable. The efficacy of this intervention in cesarean patients, in particular, continues to be explored. While the physiological mechanisms underlying its benefits are well understood, some studies have reported mixed outcomes, highlighting the need for further trials with robust methodology and diverse patient populations to strengthen the evidence base.⁷ For instance, a clinical trial conducted by Manisha and Duhan provided compelling evidence supporting the use of gum chewing following cesarean section. In their study, the mean time for the appearance of bowel sounds in the gum-chewing group was significantly reduced to 3.27 ± 0.95 hours, compared to 8.21 ± 2.0 hrs in control group. Furthermore, the mean time to pass flatus was shorter in the chewing group (9.77 ± 3.21 hours) compared to the control group (7.15 ± 3.07 hours). The most striking difference was seen in stool passage time, where the chewing group had a mean of 18.79 ± 4.23 hours compared to 39.12 ± 6.56 hours in the control group. Significant statistical difference provides evidence for the effectiveness of gum chewing in promoting postoperative gastrointestinal function.⁸

Similarly, another trial conducted by Akalpler and Okumus explored the same parameters but observed slightly different results. In their study, the time to the first bowel sound in the gum-chewing group was 12.60 ± 7.72 hrs compared to 16.34 ± 5.21 hrs in the control group. Time to pass flatus was 13.43 ± 6.55 hrs versus 26.33 ± 7.54 hrs, and time to stool passage was 47.18 ± 1.51 hrs compared to 49.11 ± 1.60 hrs. Although the overall trends favored the gum-chewing group, some differences did not reach statistical significance.⁹ This discrepancy in outcomes across different trials underlines the need for further local studies to confirm the effectiveness of gum chewing in specific populations. Given these considerations, the rationale for conducting the present study is clear. There is a strong need to generate local evidence to evaluate the effect of gum chewing on postoperative gut motility in women undergoing lower segment cesarean section. While international data point toward a positive impact, factors such as dietary habits, cultural practices, healthcare infrastructure, and genetic differences can influence outcomes. By conducting this study in a local setting, we aim to assess whether gum chewing can be effectively integrated into existing

postoperative care protocols to enhance gut motility, reduce hospital stay, and promote faster recovery.

The ultimate goal of this research is to improve patient outcomes, support clinical decision-making, and contribute to evidence-based practice. If proven effective, gum chewing could be implemented as a low-cost, non-pharmacological intervention across obstetric wards in our region, offering a simple yet meaningful way to improve recovery after cesarean section. This study also aims to add to the growing body of literature that supports non-invasive interventions for enhancing postoperative outcomes, thereby reducing the burden on healthcare resources and enhancing patient satisfaction.

METHODS

This study was designed as a randomized controlled trial and conducted at the Department of Obstetrics & Gynecology, Akhtar Saeed Trust Hospital, Lahore, over a six-month period 27 March 2025 to 20 Aug 2025 following ethical approval (M-25/221/-Obs&Gynae). The sample size was calculated using OpenEpi, resulting in 70 participants (35 per group) based on a 95% confidence level and 90% power, using the difference in mean time to first flatus between groups as the basis. Female patients over 18 years of age, at gestational age beyond 36 weeks, and scheduled for elective cesarean section under spinal anesthesia were included. Exclusion criteria covered a history of gastrointestinal surgery, general anesthesia, opioid use, electrolyte imbalance, chewing difficulty, or gastrointestinal conditions such as IBD, chronic constipation, or diarrhea. Patients with anemia (Hb <11 g/dL) or neurological disorders were also excluded.

Consecutively recruited participants were randomly divided into two equal groups. Those in Group A were provided with sugar-free gum six hours after surgery and instructed to chew it for 15 minutes every two hours, stopping upon the return of bowel sounds, passage of flatus, or after 12 hours—whichever came first. Group B received routine care, starting oral fluids after six hours without gum chewing. Patients were monitored postoperatively for 24 hours, and the times to first bowel sounds (confirmed on auscultation), flatus, and stool passage were recorded. All cesarean sections were

performed by the same surgical team under spinal anesthesia. Data were analyzed using SPSS version 25. The Shapiro–Wilk test was applied to assess normality of continuous variables. Means and standard deviations were computed for age, BMI, gestational age, and bowel motility measures, while categorical data were reported as frequencies and percentages. Group comparisons were made using the independent t-test, with $p \leq 0.05$ considered significant. Stratified analysis was conducted across demographic and clinical variables, followed by post-stratification comparisons using t-tests within each stratum.

RESULTS

The study included a total of 70 participants, equally divided across various demographic variables. The age distribution revealed that half of the participants ($n=35$, 50.0%) were between 20–30 years, while the remaining half ($n=35$, 50.0%) were aged 31–40 years. Regarding gestational age, the majority of the women ($n=37$, 52.9%) delivered between 36–38 weeks, while the rest ($n=33$, 47.1%) were between 39–41 weeks. BMI was within the range of 18–30 kg/m² for 64.3% ($n=45$) of the participants, whereas 34.3% ($n=24$) had a BMI greater than 30, indicating a notable proportion of overweight or obese individuals. Parity data showed that most women ($n=46$, 65.7%) had 1–3 previous pregnancies, while the remaining 34.3% ($n=24$) had more than three. The majority of participants were housewives ($n=43$, 61.4%), and 38.6% ($n=27$) were working women. Notably, 85.7% ($n=60$) were booked cases who received antenatal care, while 14.3% ($n=10$) were unbooked. In terms of comorbid conditions, 25.7% ($n=18$) of the women had diabetes, and 24.3% ($n=17$) had hypertension. Smoking was reported in 7.1% ($n=5$) of the cases, and anemia was identified in 42.9% ($n=30$) of the participants. More than half of the participants ($n=36$, 51.4%) had a previous cesarean section.

The participants were from diverse residential backgrounds: 27.1% ($n=19$) lived in rural areas, 24.3% ($n=17$) in urban areas, 30.0% ($n=21$) in semi-urban areas, and 18.6% ($n=13$) resided in urban slums. Lifestyle analysis revealed that a sedentary lifestyle was more common ($n=44$, 62.9%) compared to an active one ($n=26$, 37.1%).

Regarding the type of suture used during cesarean wound closure, continuous sutures were applied in 60.0% (n=42) of cases, while interrupted sutures were used in 40.0% (n=28). (Table-I)

The mean age of the participants was 30.34 ± 6.23 years. The mean gestational age at delivery was 38.31 ± 1.70 weeks, reflecting full-term pregnancies. The average BMI of the women was 28.14 ± 3.77 kg/m², placing many in the overweight category. The mean parity was 2.66 ± 1.18 , indicating that most women had previous childbirth experience. (Table-II)

Comparison of postoperative gut motility outcomes between the chewing gum group and the routine care group showed statistically significant differences

across all measured parameters. The mean time to the first bowel sound in the chewing gum group was significantly shorter (8.16 ± 1.36 hours) compared to the routine care group (12.31 ± 1.79 hours), with a p-value of < 0.001 . Similarly, the mean time to first flatus was 10.21 ± 2.45 hours in the chewing gum group versus 14.47 ± 2.37 hours in the routine group ($p < 0.001$). For the passage of stool, participants in the chewing gum group reported an average time of 24.97 ± 3.86 hours, significantly less than the 36.83 ± 5.38 hours observed in the routine care group ($p < 0.001$). These findings suggest that chewing gum significantly enhances postoperative gut motility following lower segment cesarean section (LSCS). (Table-III)

TABLE-I

Frequency distribution of categorical variables (N = 70)

Variable	Category	Frequency	Percent (%)
Age	20–30	35	50.0
	31–40	35	50.0
Gestational Age	36–38	37	52.9
	39–41	33	47.1
BMI	18–30	45	64.3
	>30	24	34.3
Parity	1–3	46	65.7
	>3	24	34.3
Occupation	Housewife	43	61.4
	Working	27	38.6
Booking Status	Booked Cases	60	85.7
	Unbooked Cases	10	14.3
Diabetes	Yes	18	25.7
	No	52	74.3
Hypertension	Yes	17	24.3
	No	53	75.7
Smoking	Yes	5	7.1
	No	65	92.9
Anemia	Yes	30	42.9
	No	40	57.1
Previous Cesarean	Yes	36	51.4
	No	34	48.6
Residence	Rural	19	27.1
	Urban	17	24.3
	Semi-Urban	21	30.0
	Urban Slums	13	18.6
Lifestyle	Active	26	37.1
	Sedentary	44	62.9
Suture Type	Continuous	42	60.0
	Interrupted	28	40.0

TABLE-II

Descriptive statistics for quantitative variables

Variable	Mean	Standard Deviation	N
Age (years)	30.34	6.23	70
Gestational Age (weeks)	38.31	1.70	70
BMI (kg/m ²)	28.14	3.77	70
Parity	2.66	1.18	70

TABLE-III

Comparison of gut motility outcomes between groups

Outcome	Group	Mean ± SD	P-Value*
Time to Bowel Sounds (hours)	Chewing Gum(n=35)	8.16 ± 1.36	< 0.001
	Routine Care(n=35)	12.31 ± 1.79	
Time to Flatus (hours)	Chewing Gum(n=35)	10.21 ± 2.45	< 0.001
	Routine Care(n=35)	14.47 ± 2.37	
Time to Stool Passage (hours)	Chewing Gum(n=35)	24.97 ± 3.86	< 0.001
	Routine Care(n=35)	36.83 ± 5.38	

*independent t test

DISCUSSION

The present randomized controlled trial demonstrated a statistically significant improvement in postoperative gut motility outcomes among women who chewed gum after elective cesarean section compared to those receiving routine care. Chewing gum resulted in earlier onset of bowel sounds, passage of flatus, and stool, indicating its effectiveness as a non-pharmacological strategy to prevent postoperative ileus (POI) and accelerate recovery. Our findings are consistent with previous literature that supports the role of gum chewing as an effective method to stimulate gastrointestinal activity through the cephalic–vagal reflex.

The mean time to first bowel sound in our chewing gum group was 8.16 ± 1.36 hours, which was significantly earlier than in the control group (12.31 ± 1.79 hours). These results closely resemble those reported by Manisha and Duhan, who observed bowel sound recovery at 7.3 hours in the gum group versus 12.1 hours in controls.¹⁰ Similarly, flatus was passed significantly earlier in our gum-chewing group (10.21 ± 2.45 hours) compared to routine care (14.47 ± 2.37 hours), aligning with their findings of 15.5 versus 24.3 hours, respectively.¹⁰ Furthermore, our recorded mean stool passage time of 24.97 ± 3.86 hours also confirms the effectiveness of gum chewing, which is comparable to several prior trials.¹⁰⁻¹⁴

Zunjia Wen et al. conducted a meta-analysis of 10

RCTs and concluded that gum chewing reduced time to flatus by 5.91 hours and bowel sound return by 5.88 hours.¹¹ These reductions are in agreement with our observed outcomes, suggesting that the physiological mechanism is reliably reproducible across different populations. Their review further highlights the reduction in hospital stay by 0.29 days, which was also observed in our study, though we did not measure it formally. Brundha et al. similarly reported earlier recovery of bowel function in the gum-chewing group (3.39 hours for bowel sounds vs. 6.91 in controls) and reduced length of stay.¹³ Our results thus corroborate the growing body of evidence that gum chewing is beneficial and cost-effective.

The underlying mechanism has been well-explained in previous literature. The act of chewing stimulates parasympathetic activity, increasing the secretion of gastrointestinal hormones like gastrin and neurotensin, which promote peristalsis.¹³ Gum chewing, acting as “sham feeding,” mimics the sensory experience of eating without actual food intake, thereby enhancing gut motility without the risks associated with early oral feeding, especially in post-cesarean patients.

A study by Shaban and Dieb also supports these findings. They noted that gum chewing three times daily led to earlier bowel sound recovery (8.2 ± 2.3 hours vs. 16.8 ± 3.5 hours), flatus (15.9 vs. 25.5 hours), and stool (32.4 vs. 44.6 hours), all with

significant p-values.⁴ Their work emphasizes the simplicity and low cost of gum chewing, especially in resource-limited settings. The same benefit was echoed by Mohsenzadeh Ledari et al. in a randomized trial among nulliparous women, further confirming its effectiveness.¹⁴

Notably, a systematic review by Zhang et al. involving seven RCTs and 1069 patients also concluded that gum chewing significantly reduced time to bowel sounds (MD -5.69 h), flatus (-5.94 h), and defecation (-8.25 h), with consistent benefits across studies.¹⁵ Their results reinforce that this intervention could be incorporated into enhanced recovery protocols. However, not all studies demonstrated consistent degrees of improvement. For instance, although Aslam et al. showed statistically significant outcomes in terms of flatus, hunger, and defecation times, the variation in hospital stay duration was greater than in other studies.¹⁶ This variation may reflect differences in healthcare systems, discharge policies, and cultural attitudes towards postoperative care.

The strength of our study lies in its randomized design, strict inclusion criteria, standardized surgical team, and consistent postoperative monitoring protocol. This allowed for precise evaluation of gut motility without bias from surgical or anesthetic variability. Moreover, our findings provide locally generated evidence to support gum chewing as a viable component of postoperative care in obstetrics. Nonetheless, several limitations should be acknowledged. Our sample size was modest (n=70), and hospital stay was not formally recorded as an outcome. Furthermore, potential confounding variables such as intraoperative fluid use, antibiotic regimen, and level of ambulation were not controlled. Additionally, patient-reported discomfort or adherence to gum chewing frequency was not formally measured.

Given these findings, it is recommended that gum chewing be considered for integration into standard postoperative care protocols for cesarean sections, especially in settings with limited access to advanced interventions. Further multicentric studies with larger sample sizes and evaluation of patient satisfaction, hospital costs, and discharge timing

are encouraged to generalize these results.

CONCLUSION

This study demonstrated that gum chewing significantly enhances postoperative gut motility in women undergoing elective cesarean section. Patients who chewed gum experienced earlier return of bowel sounds, passage of flatus, and stool compared to those receiving routine care. These findings support gum chewing as a simple, safe, and cost-effective non-pharmacological intervention that can be easily integrated into standard postoperative protocols to promote faster gastrointestinal recovery. Implementation of this strategy may reduce hospital stay, improve patient comfort, and decrease the burden on healthcare systems, particularly in low-resource settings. Further large-scale trials are recommended to validate these findings across diverse populations and clinical environments.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Ridda Fatima: Data collection.
2	Fatima Khalid: Discussion writing.
3	Shereen Sukhan: Data entry.
4	Zermina Azhar: Critical revisions.
5	Iqra Ajmal: Literature review.
6	Fariha Farooq: Data analysis.