

Comparison of Early versus Conventional Oral Fluid Intake on Bowel Function Recovery after Cesarean Section

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Abstract: Delayed bowel function recovery is a common postoperative concern following cesarean section, contributing to gastrointestinal discomfort and prolonged hospitalization. Early oral fluid intake may promote faster gastrointestinal recovery and reduce postoperative complications. However, its effectiveness compared with conventional oral fluid intake requires further evaluation. Aim to compare between early oral fluid intake (within two postoperative hours) and conventional delayed oral fluid intake (after 6 postoperative hours) on bowel function recovery, gastrointestinal complications, women satisfaction and length of hospital stay in women who underwent cesarean section. This study was prospective comparative study and included 100 women who had cesarean section surgery, with no indication for the operation, in Al-Basra Maternity and Children Hospital from January to August 2026. The participants were split into two groups of equal numbers: early (within 2 hours) and conventional (after 6 hours) oral fluid intake. Appropriate statistical tests were used to compare the postoperative outcomes. Early oral intake significantly reduced the time to first bowel sounds (4.94 vs. 6.66 hours), flatus (8.30 vs. 10.53 hours), and bowel motion (10.18 vs. 12.20 hours; all $p=0.001$). It was noted that the time spent in the hospital was shorter (19.42 hours vs 21.66 hours; $p=0.001$), urinary catheter was removed earlier ($p=0.001$), and ambulation was recorded earlier ($p=0.004$). The number of antiemetic requirements were less (4% versus 16% $p=0.046$) and maternal satisfaction was greater ($p=0.001$). No significant differences were observed with regard to gastrointestinal complications. Post-CS early oral fluid intake is associated with quicker bowel recovery, shorter hospital stays, and better maternal satisfaction without causing gastrointestinal complications.

Keywords: Cesarean Section, Early Oral Hydration, Bowel Recovery, Postoperative Outcomes, Maternal Satisfaction

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Introduction

One of the most widely used obstetric interventions globally is cesarean section (CS) which is expected to reach near 30% of all births by 2030 [1,2]. While CS is important to minimize maternal and neonatal

complications, post-operative complications can include delayed gastrointestinal motility, abdominal discomfort, nausea and postoperative ileus [3]. These complications may result in a longer stay, delay mobilisation of the mother and affect early breastfeeding and maternal wellbeing [4].

Gastrointestinal dysfunction after surgery is caused by surgical stress, anesthesia, inflammatory reactions and opioid analgesics, all of these contribute to decreased intestinal peristalsis and delayed bowel recovery [5]. The traditional method of fluid replacement after CS was to withhold oral fluids until bowel sounds returned or flatus was passed, to reduce nausea, vomiting and aspiration [5]. But, extended fast can lead to discomfort, hospitalization time, and dependence on intravenous fluid for mother [6].

Early oral fluid intake (within 2-4 hours) after surgery has been shown to be safe and effective in promoting gastrointestinal recovery [7]. Research has shown earlier bowel sounds, earlier flatus passage, higher maternal satisfaction and shorter hospital stays, but no significant increase in postoperative gastrointestinal complications [8]. Early hydration may also help mobilisation, initiation of breastfeeding and bonding between mother and infant [9]. As a result, early oral hydration is considered a key part of evidence-based care after cesarean section (ERAC) [10].

However, providing delayed oral feeding is still prevalent in some Iraqi healthcare institutions and local evidence on the clinical benefits is still limited. Thus, the aim of the present study is to compare between early oral fluid intake (within two postoperative hours) and conventional delayed oral fluid intake (after 6 postoperative hours) on bowel function recovery, gastrointestinal complications, women satisfaction and length of hospital stay in women who underwent cesarean section at Al-Basra Maternity and Children Hospital, Basra, Iraq. Results could help optimize peri-operative care and enhance care for mothers after birth.

Methodology

A prospective comparative study was conducted at Al-Basra Maternity and Children Hospital, a tertiary care hospital that specializes in obstetric and gynecological services in Basra Governorate, southern Iraq, from January to August 2026. The purpose of the study was to assess the impact of early oral fluid versus conventional oral fluid intake on bowel function recovery after cesarean section and on gastrointestinal symptoms and stay in the hospital. Only elective cesarean section cases were included and emergency cesarean section cases were excluded so as to have a uniform application of the feeding protocols and a correct evaluation of the postoperative status. The participants were randomized in to early and conventional feeding group and baseline demographic, obstetric and intraoperative parameters were compared to determine group comparability. The feeding protocols were agreed upon based on recommendations from the Enhanced Recovery After Surgery (ERAS) Society for cesarean care post surgery [11].

The inclusion criteria were women between 18 and 40 years of age with singleton pregnancies at 37 weeks of gestation or more, who had elective cesarean section performed with regional anesthesia and who remained hemodynamically stable after cesarean section. Excluded were women with chronic gastrointestinal diseases such as chronic constipation, peptic ulcer disease, esophagitis, hiatus hernia or irritable bowel syndrome, or a history of bowel surgery. Other exclusion criteria were severe obstetric complications including placenta accreta, severe intra or postoperative bleeding, admission to intensive care unit, conversion from regional to general anesthesia, uncontrolled systemic diseases (such as hypertension, diabetes mellitus, or hepatic disease), or bowel or bladder injury during surgery, and any postoperative complication that precluded oral feeding.

Using the formula for comparing two independent means, the sample size $n = 2(Z\alpha/2 + Z\beta)^2\sigma^2/d^2$, where

$Z\alpha/2 = 1.96$ for a two-sided significance level of 0.05, $Z\beta = 0.84$ for a statistical power of 80%, σ represented the pooled standard deviation, and d represented the expected difference between the two groups. But the primary outcome for sample size calculation was time to first flatus. The minimum sample size was calculated based on a previous comparable study that reported a mean time to first flatus of 23.9 ± 6.2 hours in early-feeding group and 34.1 ± 8.8 hours in conventional-feeding group [12] to be approximately nine participants per group. However, a larger sample size of 100 women, with equal numbers of participants in each group, was targeted to enhance statistical power for the secondary outcomes, including gastrointestinal complications, and length of hospital stay, with an allowance for approximately 10% of missing or incomplete data.

The two postoperative oral fluid regimens that were assigned to the participants. Within two hours after surgery, the women in the early oral fluid group were provided with oral fluids, while the women in the conventional group received oral fluids six hours after the surgery. Oral intake started in both groups with small sips of water and gradually progressed to tea or juice depending on personal tolerance. Using a structured case report form, the timing and amount of the first oral intake were noted. Oral fluid tolerance was considered to be no vomiting, no worsening of nausea more than mild and no new onset of abdominal distention 2 hours after initial fluid. If this was not met, this was deemed as oral intake intolerance and feeding was temporarily stopped and re-introduced after clinical evaluation [23]. Bowel sounds were evaluated at 2-hour intervals until they returned.

Prospective data were gathered on a structured case report form which included demographic and obstetric data, intraoperative findings, oral fluid administration, postoperative outcomes, gastrointestinal symptoms, recovery and discharge data, and final clinical outcomes. Operative data documented were type and duration of surgery, method of anesthesia, complications during surgery, use of opioids, any other bowel manipulation and the length of postoperative hospitalization. The postoperative complications were also evaluated based on readmission to the hospital within 10 days after surgery.

The main outcome measures were time to return of bowel sounds, time to first flatus passage, and time to first bowel movement after the completion of surgery. Secondary measures were length of stay, gastrointestinal complications (nausea, vomiting, abdominal distention, postoperative ileus), and satisfaction of the mother with postoperative care.

The data obtained was analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were tested for normality using Kolmogorov–Smirnov test. For normally distributed quantitative variables, mean $\pm$ standard deviation was used and independent-samples t-test was used to compare groups. Categorical data were presented as numbers and percentages and compared by using chi-square test. A p-value of ≤ 0.05 was considered statistically significant.

Before starting data collection ethical approval was obtained from Department Council of Obstetrics and Gynecology, Scientific Committee and Professional Conduct Committee College of Medicine University of Basrah. All participants were given an explanation of the study objectives and procedures and verbal informed consent was obtained.

Results

Table 1. Obstetric and operative data in the studied groups

Characteristic	Early fluid intake (N= 50)	Late fluid intake (N= 50)	P value
Age (Mean $\pm$ SD)	27.8 ± 6.2	28.6 ± 6.6	0.553 [NS]

Gravidity:			
Primigravida	10 (20%)	6 (12%)	0.502 [NS]
Multigravida	29 (58%)	30 (60%)	
Grand-multigravida	11 (22%)	14 (28%)	
Parity: Primiparous	10 (20%)	6 (12%)	0.739 [NS]
Multiparous	40 (80%)	44 (88%)	
Gestational age:			
37th week	12 (24%)	13 (26%)	0.828 [NS]
38th week	27 (54%)	23 (46%)	
39th week	7 (14%)	10 (20%)	
40th week	4 (8%)	4 (8%)	
BMI: Normal weight	10 (20%)	11 (22%)	0.715 [NS]
Overweight	26 (52%)	22 (44%)	
Obese	14 (28%)	17 (34%)	
Previous CS: Yes	28 (56%)	28 (56%)	1.000 [NS]
No	22 (44%)	22 (44%)	
Indication: Previous CS	18 (36%)	21 (42%)	0.786 [NS]
Fetal causes	11 (22%)	8 (16%)	
Maternal causes	2 (4%)	1 (2%)	
Patient wish	19 (38%)	20 (40%)	
Associated medical diseases: Yes	6 (12%)	6 (12%)	1.000 [NS]
No	44 (88%)	44 (88%)	
Need for systemic opioid use: Yes	5 (10%)	0 (0%)	0.023 [S]
No	45 (90%)	50 (100%)	

Table 1 showed that both the early and late fluid intake groups (n=50 each) were closely matched across baseline variables. Mean age was 27.8 ± 6.2 versus 28.6 ± 6.6 years, with similar distributions of gravidity, parity, and gestational age. BMI categories were comparable, with overweight being the largest subgroup. Previous cesarean section was identical at 56% in both groups, and indications for CS were similarly distributed. Associated medical diseases were present in 12% of each group. Systemic opioid use was uncommon overall, 5 patients (10%) in the early-intake group received systemic opioids compared with none in the conventional delayed-intake group.

Table 2. Postoperative oral fluid intervention in the studied groups

Characteristic	Early fluid intake (N= 50)	Late fluid intake (N= 50)	P value
Volume of first intake (ml) (Mean $\pm$ SD)	257.4 ± 101.3	238.8 ± 85.6	0.406 [NS]
Tolerated first intake: Yes	48 (96%)	45 (90%)	0.240 [NS]

No	2 (4%)	5 (10%)	1.000 [NS]
Immediate vomiting:			
Yes	2 (4%)	2 (4%)	
No	48 (96%)	48 (96%)	

Table 2 showed no significant differences between the two groups as regards volume of first intake, tolerating first intake or incidence of immediate vomiting.

Table 3. Postoperative outcomes in the studied groups

Characteristic	Early fluid intake (N=50)	Late fluid intake (N=50)	P value
Time to first bowel sounds (hrs.) (Mean $\pm$ SD)	4.94 $\pm$ 1.6	6.66 $\pm$ 2.1	0.001 [HS]
Time to first flatus (hrs.) (Mean $\pm$ SD)	8.3 $\pm$ 2.1	10.53 $\pm$ 2.9	0.001 [HS]
Time to first bowel motion (hrs.) (Mean $\pm$ SD)	10.18 $\pm$ 2.6	12.2 $\pm$ 2.9	0.001 [HS]
Time to first ambulation (hrs.) (Mean $\pm$ SD)	5.9 $\pm$ 1.1	6.72 $\pm$ 1.6	0.004 [HS]
Time for urinary catheter removed (hrs.) (Mean $\pm$ SD)	7.35 $\pm$ 2.8	10.39 $\pm$ 5.3	0.001 [HS]

As regards postoperative outcomes, table 3 showed that patients in the early fluid intake group reported significantly shorter time to first bowel sounds, time to first flatus, time to first bowel motion, time to first ambulation and time for urinary catheter removed.

Table 4. Gastrointestinal symptoms in the studied groups

Characteristic	Early fluid intake (N=50)	Late fluid intake (N=50)	P value
Nausea: None	40 (80%)	36 (71.4%)	0.205 [NS]
Mild	8 (16%)	7 (14.3%)	
Moderate	2 (4%)	7 (14.3%)	
Vomiting: Yes	3 (6%)	3 (6%)	1.000 [NS]
No	47 (94%)	47 (94%)	
Abdominal distention: None	6 (12%)	5 (10%)	0.075 [NS]
Mild	30 (60%)	20 (40%)	
Moderate	14 (28%)	25 (50%)	
Need for antiemetic:	2 (4%)	8 (16%)	0.046 [S]

Yes		
No	48 (96%)	42 (84%)

In table 4, patients in the early fluid intake group reported significantly lower need for antiemetics compared to patients in the late fluid intake group ($p=0.046$). There was no statistically significant difference between the two groups as regards incidence of nausea, vomiting or abdominal distension. No patients complained of ileus in both groups.

Table 5. Recovery, discharge and satisfaction in the studied groups

Characteristic	Early fluid intake (N=50)	Late fluid intake (N=50)	P value
Length of hospital stay (hours) (Mean ± SD)	19.42 ± 3.9	21.66 ± 2.8	0.001 [S]
Satisfaction: Poor	1 (2%)	1 (2%)	0.001 [S]
Fair	4 (8%)	30 (60%)	
Good	36 (72%)	19 (38%)	
Excellent	9 (18%)	0 (0%)	1.000 [NS]
Readmission: Yes	0 (0%)	0 (0%)	
No	50 (100%)	50 (100%)	0.461 [NS]
Use of laxatives: Yes	45 (90%)	47 (94%)	
No	5 (10%)	3 (6%)	
Postoperative complications: Yes	0 (0%)	0 (0%)	1.000 [NS]
No	50 (100%)	50 (100%)	

In table 5, patients in the early fluid intake group reported significantly shorter duration of hospital stay and significantly higher satisfaction. There was no statistically significant difference between the two groups as regards readmission, use of laxatives or postoperative complications.

Discussion

The present study compared between early (within two hours postoperatively) and late (after six hours) oral fluid intake in terms of bowel function recovery, GI complications, maternal satisfaction and length of stay among women underwent cesarean section at Al-Basra Maternity and Children Hospital, Basra city. 100 women were selected for the study who had C-section and all were operated with spinal anesthesia. Patients were equally allocated into two groups, early postoperative oral fluid intake group (50 patients) and late postoperative fluid intake group (50 patients). Except for use of systemic opioids, there were no statistically significant differences between the two groups in terms of obstetric and operative data. Patients who had early fluid intake were significantly administered opioids compared to patients in the later fluid intake group. The overall low need for opioids could be attributed to the TAP block administered in patients in both groups. Several similar studies were conducted and a non-significant difference in obstetric data between the two groups was obtained to exclude any effect of obstetric data on final outcome [13].

There was no significant difference between the two groups with respect to the volume of first intake, tolerating first intake or incidence of immediate vomiting in the current study. Several studies reported agreeing findings as early fluid intake postoperatively was well tolerated and didn't induce vomiting compared to late fluid intake [14, 15]. However, postoperative outcomes showed that patients in the early fluid intake group had significantly shorter time to first bowel sounds, time to first flatus, time to first bowel motion, time to first ambulation and time for urinary catheter removed. Jalilian and Ghadami [13] also reported similar findings in Iran based on their study on 140 women comparing early versus late oral feeding regime after cesarean section (CS) on its postoperative outcome. The early feeding group had significantly shorter time to return of bowel movement and time to mobilization. In the same context, Mohamed et al. [15] in Egypt, found the effect of early oral hydration on post cesarean outcome and maternal satisfaction in 160 women. The early oral fluid intake group had significantly shorter time of first bowel sounds and first passage of flatus and early removal of the catheter. Anwer et al. [16] evaluated the impact of early postoperative feeding on patients' satisfaction and gastrointestinal function in 200 Egyptian women undergoing cesarean delivery, reporting that early feeding group had earlier return of bowel sound and bowel motility. Moreover, in Egypt, Hosny Abd Elhady et al. [17] investigated the effects of early versus late oral fluid feeding on gastrointestinal function and early maternal nutrition in 100 cesarean delivery women and found that there was a significant difference between early oral fluid feeding group and late group with regard to time of first bowel sounds, and time of first flatus passage. Kavya and colleagues [18] and Saravanan and colleagues [26] conducted a study in India which compared the efficacy and side effects of early postoperative oral fluid intake with delayed or conventional oral fluid intake in caesarean section patients and found that the early fluid group had significant reduction in the mean postoperative time interval to return of bowel sound, passage of flatus and stools. The present study also demonstrated that the need for antiemetic was significantly less among patients in the early fluid intake group than among patients in the late fluid intake group. While some previous studies found no differences in early versus late fluid intake for nausea and vomiting [19], our study indicates that there may be a clinical benefit for antiemetic sparing. In addition, the early fluid intake group showed significantly less hospital stay and significantly higher satisfaction scores. This is in agreement with Mohamed and colleagues [14] and Hosny Abd Elhady and colleagues [17] in Egypt and Ahmed and colleagues [19].

Conclusion

The current study found that fluid intake by mouth in the early postoperative period was much better tolerated than fluid intake late in the early postoperative recovery period. This was reflected by a highly significantly reduced time to first bowel sounds, time to first flatus, time to first bowel motion, time to first ambulation and time for urinary catheter removal. In addition, there was a significant reduction in the requirement for antiemetics, hospital stay and significant increase in satisfaction in the early fluid intake group.

References

- [1] C. M. Angolile, B. L. Max, J. Mushemba, and H. L. Mashauri, "Global increased cesarean section rates and public health implications: A call to action," *Health Science Reports*, vol. 6, no. 5, Art. no. e1274, 2023.
- [2] S. Thomaidi, A. Sarantaki, M. T. Chatzopoulou, E. Orovou, V. Jotautis, and D. Papoutsis, "The rising global cesarean section rates and their impact on maternal and child health: A scoping review," *Journal of Clinical Medicine*, vol. 14, no. 22, Art. no. 8102, 2025.

- [3] E. Pavlidou et al., “Association of maternal risk factors with the prevalence of caesarean section deliveries: A cross-sectional study,” *Medical Sciences*, vol. 11, no. 4, Art. no. 66, 2023.
- [4] Z. Q. Liu, W. J. Du, and S. L. Yao, “Enhanced recovery after cesarean delivery: A challenge for anesthesiologists,” *Chinese Medical Journal*, vol. 133, no. 5, pp. 590–596, 2020.
- [5] K. Patel and M. Zakowski, “Enhanced recovery after cesarean: Current and emerging trends,” *Current Anesthesiology Reports*, vol. 11, no. 2, pp. 136–144, 2021.
- [6] H. P. Sviggum and E. E. Sharpe, “Enhanced recovery after cesarean delivery: Improving patient outcomes,” *Current Anesthesiology Reports*, vol. 14, no. 1, pp. 121–130, 2024.
- [7] S. J. Chapman, G. Thorpe, A. E. Vallance, D. P. Harji, M. J. Lee, and N. S. Fearnhead, “Systematic review of definitions and outcome measures for return of bowel function after gastrointestinal surgery,” *BJS Open*, vol. 3, no. 1, pp. 1–10, 2019.
- [8] H. Kehlet and K. Holte, “Review of postoperative ileus,” *The American Journal of Surgery*, vol. 182, no. 5, pp. 3–10, 2001.
- [9] M. Al-Beltagi et al., “Gastrointestinal consequences of cesarean section birth: A systematic review of short- and long-term effects in infancy and beyond,” *World Journal of Clinical Pediatrics*, vol. 15, no. 1, Art. no. 111501, 2026.
- [10] H. Kim, Y. Jeon, S. Yoon, and G. Lee, “Effects of early oral feeding versus delayed oral feeding on bowel function, gastrointestinal complications and surgical recovery after cesarean section under regional anesthesia: Systematic review and meta-analysis.”
- [11] G. A. Macones et al., “Guidelines for postoperative care in cesarean delivery: Enhanced Recovery After Surgery (ERAS) Society recommendations (part 3),” *American Journal of Obstetrics and Gynecology*, vol. 221, no. 3, Art. no. 247.e1, 2019.
- [12] S. Saran, M. Singh, and N. Nikita, “Comparative analysis of early versus traditional feeding protocols in elective lower segment cesarean sections,” *Cureus*, vol. 16, no. 9, 2024.
- [13] N. Jalilian and M. R. Ghadami, “Randomized clinical trial comparing postoperative outcomes of early versus late oral feeding after cesarean section,” *Journal of Obstetrics and Gynaecology Research*, vol. 40, no. 6, pp. 1649–1652, 2014.
- [14] A. H. Mohamed and A. D. K. Gudia, “The effect of early versus delayed oral hydration on post cesarean maternal outcome and satisfaction,” *The Malaysian Journal of Nursing*, vol. 9, no. 4, pp. 3–10, 2018.
- [15] D. Saravanan, S. Chandrasekaran, and P. Raj, “Effect of early vs delayed oral feeding following cesarean delivery: A randomized controlled trial,” *Journal of South Asian Federation of Obstetrics and Gynaecology*, vol. 16, suppl. 3, pp. S158–S162, 2025.
- [16] M. M. Anwer, F. A. Elomda, and M. M. Labib, “Effect of early postoperative feeding on gastrointestinal tract motility after cesarean section,” *Al-Azhar International Medical Journal*, no. 10, pp. 55–59, 2022.
- [17] E. Hosny Abd Elhady, F. Mustafa, and O. A. Hasan, “Study of early versus delayed oral fluid and food after cesarean section,” *International Journal of Medical Arts*, vol. 6, no. 6, pp. 4553–4558, 2024.
- [18] C. Kavya, S. Kunamneni, N. Uma, and K. Chava, “A comparative study of early versus conventional initiation of oral fluid intake after the caesarean section,” *Cureus*, vol. 17, no. 2, 2025.
- [19] H. A. Ahmed, A. A. El-Shahawy, and H. M. Sammour, “Effect of immediate versus early oral hydration on caesarean section postoperative outcomes: A randomized controlled trial,” *The Egyptian Journal of Hospital Medicine*, vol. 72, no. 8, pp. 5072–5078, 2018.