Original Article

# Early Versus Delayed Oral Feeding after Uncomplicated Cesarean Section under Spinal Anesthesia: A Randomized Controlled Trial

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ABSTRACT

**Objective:** The objective of this study is to compare the safety of early versus delayed oral feeding after uncomplicated cesarean section (CS) under spinal anesthesia. **Methods:** This was a randomized, controlled trial that enrolled 152 women who had uncomplicated CS under spinal anesthesia between January 2014 and June 2014. Women in the early feeding group had sips of oral fluid 6 h postoperatively while those in the delayed feeding group were on nil per oral for the first 24 h after surgery before commencement on liquid diet. Primary outcome measure was development of symptoms of paralytic ileus while secondary outcome measures included time interval to return of bowel sound, duration of hospital stay, and patients satisfaction which was determined using a visual analog score. **Results:** The incidence of mild ileus symptoms was similar in both groups. Early-fed group had significantly shorter mean postoperative time intervals to return of bowel sound, (7.3 h vs. 11.5 h [$P = 0.005$]), passage of flatus, (30.7 h vs. 37.5 h [$P = 0.009$]). Hospital stay was also significantly shorter in the early feeding group, (4.2 days vs. 4.9 days [$P < 0.001$]). Early-fed women had higher levels of satisfaction. **Conclusion:** Early initiation of oral feeding after uncomplicated CS under subarachnoid block is not associated with increased incidence of gastrointestinal symptoms or paralytic ileus.

**Keywords:** *Cesarean section, early feeding, safety, subarachnoid block*

## Introduction

Conventionally, oral intake is usually withheld for the first 24 h postcesarean section (CS) because of fear of postoperative paralytic ileus.[1] This practice continues to be perpetuated in clinical settings despite overwhelming evidence of the beneficial effects and safety of early initiation of oral feeding after CS.[1,2]

A recent meta-analysis of studies comparing early oral feeding with delayed oral feeding after CS found out that "early oral feeding after CS enhances return to bowel function and does not increase the risk of postoperative complications."[3] To the best of the authors knowledge, only one study in Nigeria has hitherto compared the safety of early oral feeding with delayed oral feeding after CS.[4] The aforementioned study, however, did not exclude patients with complicated CSs, emergency CS, and patients who had general anesthesia all of which may affect return of bowel sound after surgery.

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The reluctance of clinicians changing their practice of traditional withholding of oral feeds till 24 h in low-resource settings like Nigeria may be due to the lack of local studies investigating this phenomenon.

This study was undertaken with the objective of evaluating the safety of early feeding with that of delayed (traditional) feeding after uncomplicated CS under spinal anesthesia.

## Methods

This was a randomized controlled trial (RCT) to compare early and delayed (traditional) oral feeding

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after uncomplicated CS under spinal anesthesia at University of Abuja Teaching Hospital, Abuja. The hospital has an average of 3000 deliveries annually and provides specialist health-care services mostly to inhabitants of Nigeria's Federal Capital Territory and serves as a referral centre for neighboring states in Nigeria. The study was conducted between January 2014 and June 2014. Ethical clearance was obtained from the University of Abuja Teaching Hospital Research and Ethics committee for the conduct of the study. Written informed consent was also obtained from each participant.

Consenting women with term singleton pregnancies and planned for elective or emergency CSs under spinal anesthesia were recruited for the study.

Primary outcome measure was development of paralytic ileus symptoms while secondary outcome measures included time interval to return of bowel sound, duration of hospital stay, and patients' satisfaction.

Exclusion criteria were CSs performed under general anesthesia, history of bowel surgery, maternal diseases (preeclampsia, diabetes mellitus), intraoperative or immediate postoperative complications, use of magnesium sulfate in the perioperative period and contraindications to spinal anesthesia.

The sample size of 152 (76 women for each arm of the study) was calculated using the formula for calculation of sample size for RCT with categorical primary outcome variable[5] on the following assumptions:

- Sample size adjustment for dropout of 10%
- Proportion of participants in the nonintervention population (delayed feeding group) that developed ileus symptoms. This was 13% from a previous study in Nigeria[4]
- Study designed to detect at least a 20% increase in the proportion of participants in the early feeding that will develop ileus symptoms
- Significance level of 5% for the hypothesis test and a power of 80% (or 0.8).

Patients allocation into one of the two study groups, "early feeding" or "delayed feeding" group was accomplished by a computer-generated list of random numbers. The group name was placed inside consecutively numbered opaque envelopes. The sealed envelopes were secured in a box and placed in the maternity ward from where they were drawn serially until completion of the study. Both the surgeon and the primary investigator were blinded of the study assignment into group. The managing team of obstetricians attended to the patients according to what was contained in the picked envelopes.

The early feeding group took oral sips of water 6 h after CS, and this was graduated to liquid diet of 100 ml of tea taken under supervision by any member of the research team after 12 h postoperatively and thereafter every 6 h. This was followed by soft diet on the patient's demand after 24 h. Thereafter, regular diet was introduced.

The delayed feeding group was restricted from oral fluid intake for the first 24 h. Oral sips of water were administered after 24 h postoperatively. This was based on the presence of or absence of bowel sounds. Liquid diet (100 ml) was taken by the patient under supervision of any member of the research team 4 h after oral sips of water and thereafter every 6 h. This was followed by a soft diet on the patient's demand after 48 h. Thereafter, regular diet was introduced.

Terms used in this study are defined in Table 1.

Patients were also asked to note the time they passed the first flatus after the surgery.

The demographic characteristics, indication for CS, operative and outcome characteristics of the CS were recorded. The participants were interviewed regarding their hospital progress and satisfaction with study protocol, using visual analog scale (VAS 0–100). A VAS for satisfaction is a horizontal line of 100-mm long. At the beginning and at the end, there are two descriptors representing extremes of satisfaction (i.e., no satisfaction and extreme satisfaction). The patient rated her satisfaction by making a vertical mark on the 100-mm line. The measurement in millimeters was converted to the same number of points ranging from 0 to 100 points. The exact question was "Are you satisfied with the duration of time it took for you to commence oral feeding following your surgery?" A standard explanation of how to fill in the VAS form was mentioned beneath the VAS horizontal line.[6]

The data were analyzed using Statistical Package for Social Science (SPSS) version 16 (SPSS in Chicago, IL, USA).

Categorical data were analyzed by Chi-square test while continuous data were analyzed by *Z*-test, at significant level of 0.05 and confidence level of 95% to determine level of significance.

## Results

A total of 152 women were randomized into the study with 79 participants in the early feeding group and 73 in the delayed (traditional) feeding group. Two women dropped out of the study from the intervention group due to use of general anesthesia in the first and unwillingness to continue the study by the second

while only one participant did not complete the study in the control group because she commenced oral intake before 24 h. Thus, 149 participants completed the study and were included in the final data analysis [Figure 1].

**Table 1: Definition of terms used in the study**

| Terms used in the study | Definitions |
|---|---|
| Early oral feeding | Commencement of oral sips of water at about 6 h after surgery |
| Delayed (traditional) feeding | Commencement of oral sips after 24 h |
| 0 h | Time of onset of surgery |
| Operative time | The time from the onset of surgery (0 h) to the completion of skin closure |
| Day 0 of surgery | The first 24 h |
| First postoperative day | >24-48 h |
| Second postoperative day | >48-72 h |
| Duration of intravenous fluid administration | The time from the onset of surgery to last dose of intravenous fluid. |
| Time interval to bowel movement | The time from the onset of surgery until the first detection of active bowel sound |
| Length of hospital stay | Was the time interval from the onset of surgery (0 h) to hospital discharge |
| Mild ileus symptoms | Includes symptoms of anorexia, abdominal cramping or nonpersistent nausea and/or vomiting |
| Severe ileus | Abdominal distension, >3 episodes of emesis in a 24 h period and inability to tolerate oral liquid. It also included patients who required nasogastric tube or abdominal radiographs |
| Febrile morbidity | Temperatures equal to or exceeding 38°C on two or more occasions, at least 6 h apart, occurring >24 h after surgery |

There was no statistically significant difference in the demographic, obstetrics, and operative characteristics of the trial participants in the two groups. The mean age of participants was 30.23 ± 4.7 versus 30.81 ± 4.7, $P = 0.458$ while the mean parity was 2.01 ± 1.1 versus 2.39 ± 1.3, $P = 0.061$ for the early and delayed feeding group, respectively [Table 2].

The indications for CS were also quite similar in both groups except for cephalopelvic disproportion which was the indication in 30 (39.0%) in early feeding group compared to 16 (22.2%) in delayed feeding group [Table 3].

There was no statistically significant difference between the groups with regard to patients that had symptoms of paralytic ileus. Mild paralytic ileus occurred only in 3 (3.9%) early-fed patients and 2 (2.8%) delayed-fed women ($P = 0.075$). All patients who developed mild ileus were managed conservatively by continuing intravenous fluid administration and restriction of oral intake. There was spontaneous resolution within 1–2 days. There was no case of severe ileus in either of the groups.

When compared with women on delayed feeding, women in early feeding group had significantly shorter time to development of bowel sounds; 7.3 h versus 11.5 h ($P = 0.005$). The mean duration of passage of first flatus was shorter in early feeding than late feeding group; 30.7 h versus 37.5 h ($P = 0.009$). There was shorter mean interval in return of bowel movement as evidenced by passage of feces in the early feeding group than in the late feeding group and this was statistically significant, 62.6 h versus 69.9 h ($P = 0.035$). Patients in the early feeding group had a shorter duration of intravenous fluid administration, 18.9 h versus 25.0 h ($P < 0.001$). Duration of urethral catheterization following surgery was significantly less in the early than in the delayed feeding group; 18.3 h versus 20.9 h ($P < 0.001$). There was a significantly shorter postoperative hospital stay

**Table 2: Demographic, obstetrics, and operative characteristics of participants**

| Characteristics | Early feeding group ($n$=77) | Traditional (delayed) feeding group ($n$=72) | $\chi^2$ | $P$ |
|---|---|---|---|---|
| Age (years) | 30.23±4.7 | 30.81±4.7 | 0.744* | 0.458 |
| Parity | 2.01±1.1 | 2.39±1.3 | 0.873* | 0.061 |
| Gestational age | 39.1±1.5 | 38.9±1.4 | 1.081 | 0.280 |
| Prior cesarean delivery | 26 (33.8) | 25 (34.7) | 0.015 | 0.902 |
| Prior abdominal surgery | 7 (9.1) | 8 (11.1) | 0.168 | 0.682 |
| Elective cesarean section | 26 (33.8) | 27 (37.5) | 0.226 | 0.634 |
| Presence of adhesions | 30 (39.0) | 29 (40.3) | 0.027 | 0.870 |
| Severe adhesions | 9 (11.7) | 4 (5.6) | 1.757 | 0.183 |
| Estimated blood loss (ml) | 513.6±146.6 | 535.4±161.5 | 0.860* | 0.389 |
| Duration of surgery | 59.5±16.8 | 61.75±14.6 | 0.882* | 0.378 |

*Z-value

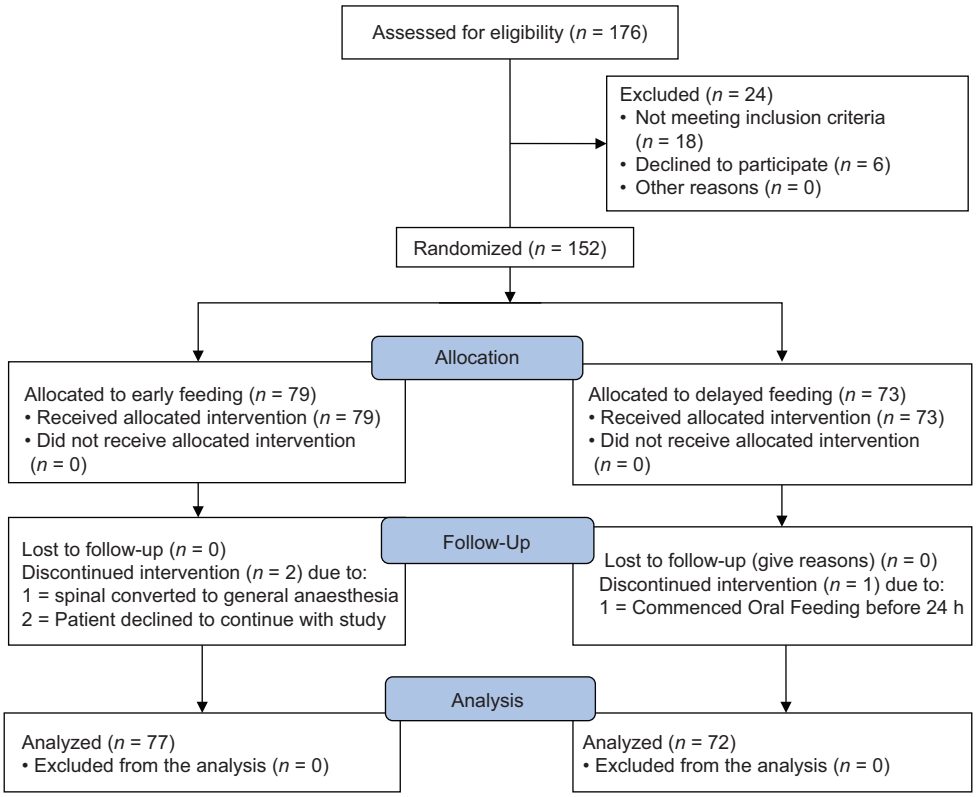


**Figure 1:** Consort flow diagram

**Table 3: Indications for caesarean delivery**

| Characteristics | Early feeding group (*n*=77) | Traditional (delayed) feeding group (*n*=72) |
|---|---|---|
| Cephalo-pelvic disproportion | 30 (39.0) | 16 (22.2) |
| Previous uterine surgery | 16 (20.8) | 23 (31.9) |
| Fetal distress | 5 (6.5) | 6 (8.3) |
| Malpresentation | 7 (9.1) | 6 (8.3) |
| Abnormal lie | 6 (7.8) | 8 (11.1) |
| Others* | 13 (16.9) | 13 (18.1) |

*Bad obstetric history, secondary infertility, postdate pregnancy, failed induction of labor

**Table 4: Outcome characteristics**

| Characteristics | Early feeding group (*n*=77) | Traditional (delayed) feeding group (*n*=72) | $\chi^2$ | *P* |
|---|---|---|---|---|
| Mild ileus | 3 (3.9) | 2 (2.8) | 0.143 | 0.705 |
| Severe ileus | 0 | 0 | | |
| Hospital stay (days) | 4.2±0.7 | 4.9±1.2 | 4.189* | <0.001 |
| Postoperative time to early bowel sounds (h) | 7.3±2.8 | 11.5±12.6 | 2.794* | 0.005 |
| Patient report of first flatus (h) | 30.7±15.3 | 37.5±16.5 | 2.602* | 0.009 |
| Postoperative time to bowel movement (h) | 62.6±22.9 | 69.9±19.3 | 2.106* | 0.009 |
| Postoperative fever | 2 (2.6) | 2 (2.8) | 0.005 | 0.946 |
| Hospital readmission | 0 | 1 (1.4) | 1.077 | 0.299 |
| Duration of IV fluid administration (h) | 18.9±1.7 | 25.0±2.4 | 17.650* | <0.001 |
| Duration of Foley's catheter (h) | 18.3±2.1 | 20.9±1.9 | 7.908* | <0.001 |
| Abdominal circumference | 3.0±1.4 | 3.0±1.7 | 0.007* | 0.994 |
| Patient's satisfaction | 96.4±4.9 | 90.7±1.6 | 3.856* | <0.001 |

*Z-test. IV: Intravenous

in early feeding group than in the late feeding group; 4.2 days versus 4.9 days ($P < 0.001$) [Table 4].

There was, however, no significant difference in the postoperative complications between the study groups.

Postoperative fever occurred in four patients, two in each group. One case of readmission was recorded in delayed feeding group. It was a case of wound sepsis with dehiscence 1 week after discharge and was managed appropriately within 2 weeks with daily dressing, antibiotics and secondary suturing.

The mean satisfaction of the mothers measured on VAS of 0–100 was more in the early feeding group than in the control group, 96.4 versus 90.7 ($P < 0.001$). The difference was however statistically significant.

## Discussion

This study demonstrated that there was no significant difference in the incidence of paralytic ileus symptoms in patients who had early oral feeding and those that had delayed feeding following uncomplicated CS under subarachnoid block. This is similar to findings from the previous studies where the safety of early oral feeding following uncomplicated CS under spinal anesthesia were documented.[7-9] Safety of early feeding has also been demonstrated in African obstetric populations that had CSs majorly using general anesthesia.[4,10] Meta-analysis of RCTs investigating the safety and benefits of early oral feeding compared to delayed feeding for patients after CS concluded that early oral feeding seemed to be well tolerated by patients, did not increase incidence of postoperative complications and could be beneficial for the patients.[2,3]

Shorter time to development of bowel sounds, time of passage of flatus postsurgery as well as bowel movement (feces) observed in the early feeding group is in keeping with findings from the previous studies.[4,7-10] Early feeding is said to have a positive effect on the gastrointestinal tract by stimulating bowel peristalsis and earlier return to bowel function.[3]

The length of hospital stay was found to be significantly shorter in the early feeding group as the patients had more rapid return of bowel function, early ability to ambulate, and received regular diet sooner than the traditional group. These women who were fed early made more rapid recovery and expressed their interest in early discharge. Other authors had observed similar findings.[3,4,6-9,11-13] However, a study in Uganda[10] reported that there was no significant difference in length of hospital stay between early feeding group and traditional feeding group. This variation could be explained from the point of view that 99% of patients in the above mentioned study received general anaesthesia with return to bowel movement of 67.8 ± 22.8 and 75.8 ± 22.9 h in the early feeding and delayed feeding groups, respectively, compared to 100% of patients having spinal anaesthesia and 62.6 ± 22.9 versus 69.9 ± 19.3 h of return to bowel movement in our study.

Although the economic impact of early feeding was not measured in this study, it can be easily argued that the decreased intravenous fluids and parenteral medications occasioned by early oral intake as well as early discharge from hospital may have benefited the patients economically.

Important also is the fact that most cultures in Nigeria and other African settings observe the naming ceremony of a newborn on the 8 days. This implies that most women would be happy to be discharged home earlier to enable them prepare for this important cultural activity.

This study showed a significantly shorter duration of need for retaining a Foley's catheter in the early feeding group. Again, this facilitates early ambulation for the patient and may also reduce the risk of urinary tract infection which is a feared complication of urethral catheterization.[14]

The postoperative complications, including postoperative fever in the two study groups, were comparable and not statistically significant. Other studies reported similar findings.[1,4,6,12,13] This is quite reassuring as most clinicians who delay oral feeding after CS do so due to the fear of the patients developing postoperative complications.

Maternal satisfaction was higher in the early-fed than in the traditional group. This was similar to findings from other studies.[4,15,16] The higher satisfaction reported by the early-fed group could be explained by the positive gains of this practice which included early ambulation, shorter hospital stay, psychological benefit of early recovery, and economic benefits.

It is worthy to mention that another study[6] that compared early introduction of regular diets 8 h postsurgery rather than fluids as was used in this study showed no difference in the levels of satisfaction between the two groups. This difference in findings could be attributed to the introduction of regular diets rather than fluids which is much more acceptable after CS by most women as noted by a previous researcher. Another reason for the nonstatistically significant difference in the levels of satisfaction could be the fact that the quoted study did not also detect any difference in hospital stay, time to passage of first flatus, and time to bowel movements between the two groups unlike in this study were significant differences existed between the groups regarding these variables which have likelihood of influencing patients satisfaction.

Limitations to the findings from this study include the complexity of interpreting satisfaction which may be

related to other aspects of care received in the hospital rather than just the early introduction of oral feeds.

## Conclusion

Findings from this study suggests that early initiation of oral feeding after uncomplicated CS under spinal anesthesia is safe and well tolerated as there was no increased incidence of gastrointestinal symptoms or paralytic ileus. It was rather associated with early return of normal bowel function, shorter duration of intravenous fluid administration, early removal of the urethral catheter, faster patient mobilization, reduced duration of hospital stay, and cost of hospital bill as well as higher levels of satisfaction by the patients.

Thus, there are no obvious advantages in withholding fluid and food after uncomplicated CS under spinal anesthesia. Obstetric units should, therefore, embrace the practice of early feeding after CS.

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### Conflicts of interest

There are no conflicts of interest.

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