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Returning of Bowel Function in Early Versus Delayed Oral Feeding after Cesarean Delivery

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ABSTRACT

Objectives: To study the recovery time of the normal bowel function in early oral feeding patients after the cesarean delivery.

Materials and Methods: This randomized controlled trial included 140 term pregnant women who had uncomplicated cesarean delivery under spinal anesthesia at Chonburi Hospital during December 26, 2018 - June 30, 2019. The patients were categorized into two groups: 1) the patients who experienced early oral feeding after 6 hours following the cesarean delivery and 2) the patients who received delayed oral feeding after 12 hours following the cesarean delivery. The sample size of each group was 70 (n = 70), collected via blocked randomization. The main purpose of this categorization was that to compare the time to first passage of flatus and defecation between these two groups. In addition, the postoperative gastrointestinal complications and the patient's satisfaction level (by Short Assessment of Patient Satisfaction score), which were regarded as the supporting outcomes, were collected.

Results: The study found that the mean time to first passage of flatus in early oral feeding group, which was 1,485.29 ± 538.15 minutes (24.7 ± 8.9 hours), was significantly shorter than the delayed feeding group, which was 2,411.29 ± 451.51 minutes (40.1 ± 7.5 hours), at 95 percent confidence level. Besides, the early oral feeding group produced the mean first defecation time of 2,106.71 ± 582.98 minutes (35.1 ± 9.7 hours) after the cesarean delivery, which was significantly shorter than the mean first defecation time of 3,295 ± 553.89 minutes (54.9 ± 9.2 hours) yielded by the delayed feeding group at 95 percent confidence level. Additionally, the patient's satisfaction level in the early oral feeding group was higher than the other group; however, the more signs of nausea and vomiting symptoms were shown in the early feeding group.

Conclusion: The returning of the normal bowel function after the cesarean section in term pregnant women under spinal anesthesia can be improved by starting the oral feeding after 6 hours following the cesarean section. However, the chance for undergoing the nausea and vomiting symptoms tends to be higher in patients who received the early feeding practice.

Keywords: cesarean delivery, early oral feeding, gastrointestinal complication.

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การกลับมาทำงานของลำไส้เป็นปกติในสตรีตั้งครรภ์ที่เริ่มรับประทานอาหารก่อนเวลาเทียบกับการเริ่มรับประทานอาหารภายหลังการผ่าตัดคลอดทางหน้าท้อง

วลัยพรรณ สุพัฒนารังษี , ธีรภัทร์ จุลละพราหมณ์

บทคัดย่อ

วัตถุประสงค์: *เพื่อศึกษาหาระยะเวลาที่ลำไส้กลับมาทำงานเป็นปกติหลังเริ่มรับประทานอาหารรับประทานอาหารก่อนเวลาปกติหลังผ่าตัดคลอดทางหน้าท้อง*

วัสดุและวิธีการ: *การศึกษานี้เป็นวิจัยทางคลินิกแบบสุ่ม ศึกษาในหญิงตั้งครรภ์ที่มีอายุครรภ์ตั้งแต่ 37 สัปดาห์ขึ้นไปที่คลอดบุตรโดยวิธีการผ่าตัดคลอดด้วยการใช้ยาระงับความรู้สึกทางไขสันหลังโดยมีข้อบ่งชี้ทางสูติกรรมที่โรงพยาบาลชลบุรี ในช่วงวันที่ 26 ธันวาคม 2561 ถึง 30 มิถุนายน 2562 จำนวน 140 ราย ผู้เข้าร่วมการศึกษาจะถูกแบ่งเป็นสองกลุ่ม 1) ให้ผู้ป่วยเริ่มรับประทานอาหาร 6 ชั่วโมงหลังผ่าตัดคลอด 2) ให้ผู้ป่วยเริ่มรับประทานอาหาร 12 ชั่วโมงหลังผ่าตัดคลอด แต่ละกลุ่มมีจำนวน 70 ราย โดยใช้วิธีการสุ่มแบบบล็อก วัตถุประสงค์หลักของวิจัยนี้คือเพื่อเปรียบเทียบระยะเวลาที่เริ่มผายลมและขับถ่ายครั้งแรกของทั้งสองกลุ่ม ในขณะเดียวกันได้เก็บข้อมูลภาวะแทรกซ้อนทางระบบทางเดินอาหารหลังผ่าตัดและระดับความพึงพอใจของผู้เข้าร่วมวิจัย*

ผลการศึกษา: *ผลการศึกษาพบว่าระยะเวลาที่เริ่มผายลมครั้งแรกในกลุ่มที่เริ่มรับประทานอาหารที่ 6 ชั่วโมงหลัง คิดเป็น 1485.29 ± 538.15 นาที (24.7 ± 8.9 ชั่วโมง) เร็วกว่าในกลุ่มที่รับประทานอาหารที่ 12 ชั่วโมง คิดเป็น 2411.29 ± 451.51 นาที (40.1 ± 7.5 ชั่วโมง) อย่างมีนัยสำคัญทางสถิติ นอกจากนี้กลุ่มที่เริ่มรับประทานอาหารที่ 6 ชั่วโมง มีระยะเวลาการเริ่มขับถ่ายครั้งแรกคิดเป็น 2106.71 ± 582.98 นาที (35.1 ± 9.7 ชั่วโมง) เร็วกว่ากลุ่มที่เริ่มรับประทานอาหารที่ 12 ชั่วโมง คิดเป็น 3295 ± 553.89 นาที (54.9 ± 9.2 ชั่วโมง) อย่างมีนัยสำคัญทางสถิติ นอกจากนี้พบว่าผู้เข้าร่วมวิจัยในกลุ่มที่เริ่มรับประทานอาหารเร็วมีความพึงพอใจมากกว่ากลุ่มที่เริ่มรับประทานอาหารภายหลัง แต่ในทางกลับกันกลับพบภาวะคลื่นไส้อาเจียนได้มากกว่าเช่นกัน*

สรุป: *การเริ่มรับประทานอาหารที่ 6 ชั่วโมงหลังผ่าตัดคลอด สามารถช่วยให้การทำงานของลำไส้กลับมาเป็นปกติได้เร็วขึ้นในหญิงตั้งครรภ์ครบกำหนดที่ได้รับการผ่าตัดคลอดด้วยการใช้ยาระงับความรู้สึกทางไขสันหลัง แต่อย่างไรก็ตามอาการคลื่นไส้อาเจียนนั้นจะพบได้มากกว่าเช่นเดียวกัน*

คำสำคัญ: *การคลอดโดยวิธีผ่าตัดคลอดหน้าท้อง, การรับประทานอาหารทางปากก่อนเวลาปกติ , การทำงานของลำไส้หลังการผ่าตัด*

Introduction

Nowadays, the number of cesarean deliveries tends to rapidly increase since it is the most common surgical practice available. Also, it is the most typical method that patients in the public health can access. The incidences of cesarean delivery in Thailand[1] had surged by 24.6% during the last few decades, rising from 14.8% in 1990 to 39.4% in 2014. This uptrend indicates that the greater number of cesarean delivery cases is speculated to continue in the future. Therefore, the postoperative problems should be concerned after surgery; especially the gastrointestinal complications such as bowel ileus, abdominal distention, and nausea vomiting.

The traditional postoperative feeding practice is that to begin feeding after the occurrences of the bowel sounds and movements in order to prevent the bowel ileus and vomiting; which cause serious complications in patients, such as aspiration pneumonia, wound dehiscence, and sepsis[2]. Nevertheless, this belief has been modified by the recent studies showing that the early oral feeding is the safer method[3].

Recently, Thai medical institutions have established a program called "Enhanced Recovery After Surgery or ERAS"[4] for preventing and reducing these problems in patients. This program recommends the early oral intake following the cesarean section within 4-6 hours instead of the traditional oral feeding, which allows the oral intake within the 24-hour period after the surgery.

According to a study conducted by Saad et al[5], the early oral feeding within the 6-hour period provided the greater tolerance and induced the earlier return of the bowel function in term pregnant women who received the elective cesarean section under spinal anesthesia than starting the oral feeding after 12 hours following the surgery (late feeding). A study performed by Adeli[6] also showed that the early feeding decreased post cesarean gastrointestinal complications and showed no reports for nausea, vomiting, or ileus symptoms in patients when being assessed via bowel sounds, gas passing, and defecation at the 4-, 12-, 24-, 36- and 48-hour periods after the surgery. Furthermore, a number of meta-analysis of studies which compared the early and delayed feeding practices; in terms of the return of bowel function, patient's satisfaction level, breastfeeding and length of hospital stay, at the duration of 12 hours after the surgery showed no advantages for holding the oral-fluid intake[7]. Also, the early feeding provides several benefits for postpartum women. For example, it reduces the postpartum fever and intravenous fluid intake in patients. However, the results were found to vary among individual practitioners and institutions in the ERAS program.

Hence, the aim of this study was to assess the recovery of the gastrointestinal tract function and the postoperative complications by evaluating the time to first passage of flatus and defection when applying the early intake approach within the 6-hour period after the cesarean delivery under the spinal anesthesia.

Materials and Methods

The Ethics Committee for Human Research of Chonburi Hospital approved this study on December 26, 2018. This blocked randomized controlled trial for the enrolled 140 term pregnant women who were treated using the uncomplicated cesarean delivery under spinal anesthesia at Chonburi Hospital during December 26, 2018 and June 30, 2019. These patients were equally classified into two groups: the early and delayed oral feeding groups, each contains 70 patients. The outcomes were available for all patients and no patients were dropped out. Women with preeclampsia with severe feature, abruptio placenta, morbid obesity, placenta previa, and underlying disease of gastrointestinal, heart, lung or kidney were excluded from this study. Moreover, patients who possessed the emergency conditions for delivery and the prior bowel surgery were also excluded from this study. The baseline characteristic data; including maternal age, parity, body mass index (BMI), gestational age, previous surgeries, adhesion, intraoperative time, anesthetic time, intraoperative blood loss, indication for cesarean section, were recorded in this study. The data were collected by adopting a questionnaire checklist after the surgery.

Generally, the returning of the normal bowel function can be evaluated using various methods such as belching, farting and excretion. However, this study specifically opts to measure the returning of the normal bowel function based on fart and excretion. The reason for pulling out belching from the evaluation is that it could be caused by gastroesophageal reflux disease, according to the normal physiology of women in pregnancy. As a result, burping may be increased and it can remain till the first postpartum period. Therefore, measuring the outcome by assess the belching could be inaccurate.

A sample size of at least 134 was processed based on the mean times and standard deviations of 715 ± 1,200 and 1,300 ± 1,200 in the early feeding and delayed feeding groups, respectively (the type I error probability and the power of the study were selected as 0.05 and 0.80, respectively). These values were adopted from the study conducted by Saad et al[5].

The sample size (N) was calculated using the following formula:

$$n_1 = \frac{(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2 \left[\sigma_1^2 + \frac{\sigma_2^2}{r}\right]}{\Delta^2}$$

$$r = \frac{n_2}{n_1}, \Delta = \mu_1 - \mu_2$$

μ1 = Mean of outcome in group1
μ2 = Mean of outcome in group 2
σ1 = A standard deviation in group1
σ2 = A standard deviation in group 2
α = type I error probability
β = type II error probability

After the patients were enrolled by consent, the computer-generated randomization number in the blocks of 4 was applied. Next, the randomized numbers in each group (group A or B) were concealed by sealed envelope and blinded from surgeons and operating-room nurses. During the operation, the surgeon evaluated and recorded the severity of adhesion (mild, moderate, severe), based on type of adhesion (filmy or dense) and the difficulty for dissecting the adhesions[8]. When the operation was finished, the surgeon picked the number for assignment each group, using the standard order for the postoperation order. Group A (early oral feeding) was the patients who received the oral regular diet after 6 hours following the surgery, while group B (delayed oral feeding) was the patients who received the restricted diet during the first 12 hours after the surgery. All participants in the study were the elected cases who had been pre-scheduled for each day, in which no more than two cases per day were chosen. The first case began at 9 a.m., whereas the last case was finished at noon, so as to provide the last diet intake within midnight of that date. The diets in this study were prepared by the postpartum nurse and patient's cousin. In case the hospital cannot prepare the diets in time, the researcher asked for the cooperation from relatives of patients to take care of the patients for intake diets as assigned. Next, the patients received the bowel function evaluation by assessing the time to first passage of flatus and defecation.

Then, the questionnaire in the survey was recorded. The bowel sounds of every patient was assessed after 12 hours following the surgery for early detection of the first sign of bowel ileus or gut obstruction that cause serious complications. Other outcomes, including gastrointestinal complications (nausea, vomiting, flatulence) and the satisfaction level, were also documented.

In this study, the postoperative analgesia was given to the patients based on the ERAS protocols that recommends a combination of drugs with different mechanisms of action for providing adequate pain control[9]. In all cases, the patients were given the opioid in spinal anesthesia, where the effect of the neuraxial morphine in spinal anesthesia lasted for 4-6 hours. After 6 hours following the surgery, we promptly gave the oral acetaminophen drug to relieve pain in all patients. However, the patients were allowed to request more pain reliever by themselves if needed. Therefore, it was sufficient for promoting the early ambulation in both groups. In postpartum, the patients received medicines, analgesics, ferrous,

domperidone, and antiretroviral drug for underlying diseases caused by human immunodeficiency virus infection. There were no side effects occur to bowel function, except domperidone. Domperidone was used for increasing milk production in the women who insufficiently produced milk after the failure of the encouragement by baby sucking and breast stimulation. In case this problem still existed, we would give domperidone on the third day to stimulate lactation, which has no impacts on evaluating the outcomes.

The satisfaction level of our participants was evaluated by the Short Assessment of Patient Satisfaction (SAPS) scores. The SAPS scores consist of several items assessing the core domains of patient satisfaction. The SAP scores consist of treatment satisfaction, explanation of treatment results, clinician care, respect by the clinician, time with the clinician, and satisfaction with hospital/clinic care[10]. This evaluation consists of 5-point scales can be interpreted as score between 0 and 28, categorized into four groups, ranging from the extremely dissatisfying to extremely satisfying levels.

Statistical analysis was performed using SPSS for Windows Version 22. The baseline characteristics of this study were described in the form of means ± standard deviation or n (%), as appropriate. Using independent t-test and chi-square test to determine the continuous and categorical variables, respectively. The p value set as below 0.05 was regarded as statistically significant.

Results

The total of 145 term pregnant women participated in the study between December 2018 and June 2019 at the Obstetrics and gynecologic department of Chonburi hospital. Five patients were primarily excluded from the study due to the postpartum hemorrhage. Next, the participants were equally categorized into two groups of 70 patients: the early feeding and the delayed feeding groups. No patients were lost to the follow-up (Fig. 1).

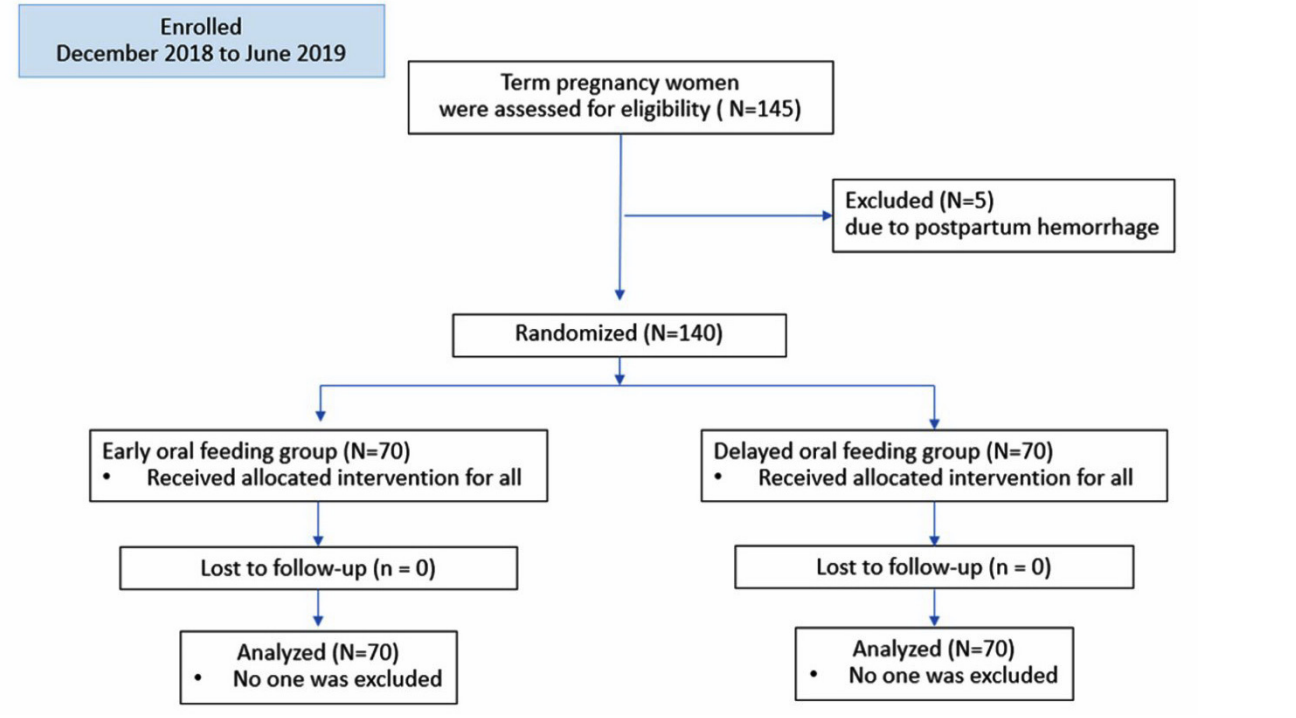

Fig. 1. The study flow chart.

With regard to the baseline demographic data (maternal age, parity, BMI, gestational age, previous surgery, adhesion, intraoperative time, anesthetic time, intraoperative blood loss), the indication for cesarean section were not significantly different between the two oral feeding groups (Table 1).

Table 1. Patient characteristics and demographics.

	Early oral feeding (n=70)	Delayed oral feeding (n=70)	p value
Age[a]	29.24 ± 5.25	29.77 ± 5.79	0.573
Parity[a]	2.64 ± 0.83	2.51 ± 0.97	0.403
Gestational Age[a]	38.56 ± 0.66	38.53 ± 0.89	0.799
BMI (kg/m^2)[b]			
> 30 (%)	22 (31.4%)	24 (34.3%)	0.719
≤ 30 (%)	48 (68.6%)	46 (65.7%)	0.719
Previous surgery[b]			
No (%)	15 (21.4%)	23 (32.9%)	0.128
Yes (%)	55 (78.6%)	47 (67.1%)	0.128
Operation time[a]	51.03 ± 16.96	53.17 ± 20.03	0.496
Adhesion (%)[b]			
Mild	58 (82.9%)	53 (75.7%)	0.297
Moderate	10 (14.3%)	17 (24.3%)	0.134
Severe	2 (2.9%)	0 (0%)	0.154
Blood loss[a]	419.29 ± 255.84	397.86 ± 172.88	0.562
Indication for cesarean section[b]			
Breech presentation (%)	7 (10%)	12 (17.1%)	0.217
fetal macrosomia (%)	3 (4.3%)	7 (10%)	0.189
Underlying heart disease (%)	1 (1.4%)	0 (0%)	0.316
HIV infection (%)	1 (1.4%)	1 (1.4%)	1
Previous cesarean section (%)	55 (78.6%)	47 (67.1%)	0.128
PIH (%)	0 (0%)	1 (1.4%)	0.316
Twin pregnancy (%)	1 (1.4%)	1 (1.4%)	1
No progression of cervix (%)	2 (2.9%)	1 (1.4%)	0.560

[a] Data were presented as mean ± standard deviation

[b] Data were expressed as number (%)

BMI: Body Mass Index, HIV: Human Immunodeficiency Virus, PIH: Pregnancy-induced Hypertension.

The results showed that the average first flatus of the early oral feeding group occurred at 1,485.29 ± 538.15 minutes (24.7 ± 8.9 hours) after the oral feeding; which was significantly different from the delayed oral feeding group, indicating the average time to first passage of flatus of 2,411.29 ± 451.51 minutes (40.1 ± 7.5 hours), at 95 percent confidence level ($p < 0.001$). In addition, the average first defecation of

the early oral feeding group occurred at 2,106.71 ± 582.98 minutes (35.1 ± 9.7 hours) after the oral feeding; however, the average time to first passage of flatus of 3,295 ± 553.89 minutes (54.9 ± 9.2 hours) was produced by the delayed oral feeding group, which was also significantly different from the former group at 95 percent confidence level ($p < 0.001$).

Furthermore, in terms of the gastrointestinal complications, the early oral feeding group turned to significantly yield the greater number of vomiting patients than the delayed oral feeding group, 15 patients versus 6 patients, at 95 percent degree of confidence ($p = 0.033$). However, there was no significant difference between the two groups in terms of the number of patients who experienced abdominal distention ($p = 0.227$). All patients had been evaluated bowel sounds after 12 hours following the surgery for early detection of bowel ileus to indicate that everyone had normal bowel sounds.

The satisfaction of participants was measured based on SAP score that ranges from the extremely dissatisfying to extremely satisfying (score 0-28). The total score in the early feeding group was found to be significantly greater than the delayed feeding group, 21.46 ± 2.51 versus 19.94 ± 2.04 ($p < 0.001$). The scores of these two groups were eventually interpreted in the form of level of satisfaction. Ultimately, all the patients' satisfactions in the early feeding group were significantly higher than the delayed feeding group (Table 2).

Table 2. Primary and secondary outcomes between the two groups.

	Early oral feeding group (n=70)	Delayed oral feeding group (n=70)	p value
1st time pass of flatus a	1,485.29 ± 538.15	2,411.29 ± 451.51	< 0.001*
1st time for defecation a	2,106.71 ± 582.98	3,295 ± 553.89	< 0.001*
Bowel sound at 12 hours (%)[b]	70 (100%)	70 (100%)	1
Gastrointestinal complications[b]			
Vomiting (%)	15 (21.4%)	6 (8.6%)	0.033*
Abdominal distention (%)	4 (5.7%)	8 (11.4%)	0.227
Satisfaction score[a]	21.46 ± 2.51	19.94 ± 2.04	< 0.001*

[a] Data were presented as mean ± standard deviation

[b] Data were expressed as number (%)

Discussion

Traditionally, after surgery the patients were restricted to oral diet for more than 12 hours to prevent the gastrointestinal complications, such as bowel ileus and gut obstruction. So far, the appropriate starting time for feeding after cesarean section has not been definite yet; therefore, the patients must be tolerated to poor nutrition after surgery. Nowadays, a handful of evidences have shown that the early oral feeding promotes the early return of bowel function; which can reduce risk of thrombotic events from the impaired of ambulation, improve postoperative pain, decrease the risk of sepsis, and restore the mothers' ability to breastfeed their newborns earlier[11].

ERAS programs were developed to help the patients to get into the normal physiology as soon as possible after surgery[12]. This finding is consistent with the results found in this study. The results showed that the early start of the regular diet after 6 hours following the cesarean section enhanced the recovery after the surgery by improving returning of bowel function. Moreover, the patients in the early feeding group were found to be more satisfied with their treatments than the patients in the delayed feeding group were.

Nevertheless, the early feeding method tended to have more chance of being involved with the vomiting symptom than the other method due to some adverse effects caused by the spinal anesthesia.

The strength of this research was that it was a prospective study with well-defined outcomes. The main aspect that differentiated this study from other recent studies was that the oral regular diet (solid diet) was applied at the beginning of feeding in the study instead of the stepping diet (liquid to solid diet), which was widely adopted by the other research. We also realize that the bowel function of the patients is not affected from the surgery; therefore, it is not necessary to hold time for diet. However, this research also had some limitations as follows:

The limitation in this study was that the data were collected based on each patients' recall on the time to first passage of flatus and defecation have impacts on the outcomes. In other words, the time to first passage of flatus and defecation might not have been precisely recorded as an exact value due to the self-estimation performed by each patient. However, patients were repeatedly reminded to record the time to first passage of flatus and defecation prior to participating in this study, in order to resolve this potential flaw.

However, the length of hospital stay in two groups were not significantly different since all the newborns were checked up after the birth on the third day. As a result, the mothers cannot be discharged earlier. In the future studies, this factor may be controlled for finding the relationship between the early feeding approach and length of the hospital stay.

Conclusion

In conclusion, the returning of the normal bowel function after the cesarean section in term pregnant women under spinal anesthesia could be improved by starting the oral feeding after 6 hours following the surgery. However, the nausea and vomiting symptoms were found to be increased in the early feeding group. As a result, we suggest that the results in this study can be applied for enhancing the post-cesarean care in the future.

Potential conflicts of interest

The authors declare no conflict of interest.

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