

Effect of Early Progressive Bed Exercise and Movement on Recovery after Caesarean Section

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Abstract

Background: Early mobilization in postoperative period is the key to get rapid and maximum muscle function and restoration of mother's health. Ambulation helps to decrease most of the complications by ensuring good blood circulation, promoting gastric motility, enhancing respiration, improving the physical strength. **Aim:** This study aimed to investigate the effect of early progressive bed exercise and movement on recovery after caesarean section. **Design:** A quasi – experimental was used. **Sample type:** A purposive sampling was applied. **Setting:** The study was carried out at Post-Natal Unit in Mansoura University Hospital on 100 mothers after cesarean section. **Tools:** A Structured Interviewing Questionnaire, pain assessment scale and structured nursing assessment sheet. **Results:** The average scores of post-operative pain were significantly reduced post-intervention (8.48 ± 1.05 , 7.52 ± 1.54) at ($P=0.001$). Also, there were a significant difference between both groups regard to the duration of catheterization after caesarean section (15.94 ± 3.825 , 13.68 ± 4.088), self-void after removal of catheter (2.16 ± 0.997 , 1.32 ± 0.653), initiation of breast-feeding and holding baby (11.50 ± 3.57 , 6.48 ± 0.735), oral hydration (8.24 ± 2.825 , 6.24 ± 0.657) and first flatus passed after caesarean section (12.28 ± 5.338 , 6.60 ± 7.910) in favor of the intervention group ($P < 0.001$). **Conclusion:** It has been proved that early postoperative bed exercise and movement is considering effective, safe and an inexpensive method that can be used to improve recovery and activities in women undergoing cesarean section delivery. **Recommendation:** Integrating early bed exercise and movement in nursing care protocol for caring women after cesarean section, also, implementing health education sessions for pregnant women regarding the benefits of post-operative early bed exercise and movement.

Keywords: Bed exercise, Cesarean section, Early movement, Recovery.

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I. Introduction

The most commonly performed operation in obstetrics is cesarean section .It had saved uncountable lives of mothers and their babies (Kshirsagar, 2017).According to recommendation of WHO the rate of cesarean section is higher than the acceptable rate of 10-15% (World Health Statistics, 2011 & Zakerihamidi et al., 2015). In Egypt CS rate increased from 4.6% in 1990 to 51.8% in 2014 (Betrán et al., 2016).

Although the lives of thousands of women and fetuses can be saved through CS, there are many complications that women can face, which include urinary tract infection, wound infection, deep vein thrombosis , postural hypotension, and constipation (American College of Obstetricians & Gynecologists, 2014).

Also, a woman who undergoes a CS has greater problems than a woman with a normal vaginal delivery. It includes longer hospital stays, postoperative pain, bladder and bowel problems, breastfeeding problems, more time required to return to normal diet, breast congestion, else , women who recover after CS may limit their activities due to fatigue and pain that interferes with their ability to restore their previous performance level (Margarete, 2014). In addition, the incidence of disease among women with CS occurs mainly due to postoperative difficulties related to immobility (Mascarello et al., 2017).

Otherwise, the inability to move after the CS has an effect on women physically and mentally, physical effects may include deep vein thrombosis, increased pain intensity, urinary tract infection, intestinal obstruction and pressure ulcers. The mental effect manifests in the appearance of different levels of depression. On the other hand, early exercise has different benefits, as reduces pain intensity, decrease irritation of the uterus, capillary drainage, gastrointestinal function, urinary tract and progression and improved wound healing (Kaur et al.,

2015). In addition, early movement helps CS women participate in restoring their health and improving muscle tone so that women can perform daily life activities effectively (Paul et al., 2019).

Through prevention and promotional nursing care, women can be helped to prevent postoperative problems and complications. Early movement can be one of the most important parts of comprehensive postoperative care. The patient can get out of bed as soon as possible depending on the type of surgery and the exercises described. In a Cs, this period may be less than 6-8 hours after surgery (Dube & Kshirsagar, 2014 & Kaur et al., 2015 & Feldheiser et al., 2016 & Chatterley, 2017).

Early movement is a large and practiced part of post-operative care whose benefits were first reported in the 1940s, when it was observed that early movement accelerated recovery and reduced the incidence of postoperative pulmonary complications (Browning et al., 2007). Early movement includes: moving in bed, sitting outside the bed and standing, wandering around, wandering in the hallway, and doing low-intensity exercises (Blackburn et al., 2016, Shields et al., 2017, Rupich et al., 2018 & Kılıç et al., 2019).

Furthermore, early mobilization in postoperative period is the key to achieving rapid and maximum muscle function and restoring maternal health. Ambulation helps reduce most of the complications by ensuring good blood circulation, promoting gastric motility, enhancing respiration, reducing the risk of thrombophlebitis, preventing orthostatic hypotension, improving the physical strength etc. A complete ambulation program done at this time can prevent complications in later life (Nydahl et al., 2016).

The complications that can occur after CS surgery can be minimized with high-quality, effective and evidence-based care. Maternity nurses can play a major role in helping mother for adapting to a new role and a new life. Therefore, it is important to improve outcomes and women's recovery. The decision-making at the mobility level in nursing interventions can promote not only physical activity but also emotional and social well-being (Kalisch et al., 2013, Mary et al., 2018).

Significance of the study:

Early exercise and movement are an important part of the early recovery of patients who undergo abdominal surgery without complications. Early mobilization reduces the postoperative complications such as gastrointestinal problems, pneumonia, atelectasis and circulatory problems. Early mobilization reduces stagnation of the bronchial secretions in the lungs and increases ventilation. Also, reduce postoperative flatulence by increasing the tone of the digestive tract, abdomen and peristalsis. Also, alleviates intensity of pain (Suvarna & Jyoti, 2014).

Postnatal caesarean mothers need to be re-educated about early recovery, pain relief after a cesarean and early mother-child interaction which results from early movement and exercise. Although there are reasons to believe that mobilization and exercise have beneficial effects, there are few studies that are not practiced in many institutions. Hence the role of a nurse is to identify areas where health promotion, disease prevention, rehabilitation or treatments are necessary. The researcher therefore decided to conduct this study.

Aim of the study:

This study aimed to investigate the effect of early progressive bed exercise and movement on recovery after caesarean section.

Study hypothesis:

Post caesarean women who applied early progressive bed exercise and movement will expect to achieve improved postoperative recovery than those who didn't.

Subjects and method:

Design: A quasi-experimental design (study and control) was used.

Setting: The study was conducted at the postpartum ward in Mansoura university hospitals, Egypt.

Sample type: Non probability purposive sampling was used in the study.

Subjects: One hundred mothers undergoing caesarean section who fulfilled the following criteria:

Inclusion criteria:

- Mothers age (18-40 years).
- Gestational age with (37 to 41 weeks).
- Those who underwent an emergency or planned caesarean section of the lower segment under spinal anesthesia.
- With minimum discomfort after operation.

Exclusion criteria: Mothers who had:

- High-risk pregnancy.

- Complications during labour and postpartum.
- Classical CS or Lower Segment Cesarean Section (LSCS) under general anesthesia.
- Newborns with stillborn or admitted in NICU.

Sample Size:

Calculating sample size using the Dss.research.com web site with decreasing pain score from 6.00 ± 1.31 to 5.30 ± 1.34 among women using early ambulation in post-operative (Kaur et al., 2015) and at confidence 95.0% and power of study 80.0%; the calculated sample size is 50 subjects in each group.

Groups' Allocation:

One hundred mothers undergoing a cesarean section were randomly assigned to two equal groups of fifty using a sealed envelope containing the early progressive bed exercises and movement (EPBEM group) and control group cards. With regard to the (EPBEM group) of fifty mothers, perform early progressive bed exercises and movement 5 hours after CS. The control group consisted of fifty mothers receiving routine postpartum care.

Data Collection Tools:

Tool I: A Structured Interviewing Schedule: Designed by the researchers after reviewing the relevant literature, it consisted of two parts: **Part One:** Covered data related to the general characteristics of mothers (age, education, profession, and residence). **Part two:** Covered the obstetric data as (para, gestational age, indications of CS, number and type of CS).

Tool II: Pain assessment scale (Using the numerical pain rating scale): It was adopted from McCaffery and Beebe (1993). To assess level of pain, mother was given a score to the level of pain, she felt from 0 to 10. The pain was measured two times, at baseline before early bed exercise and movement and immediately after movement.

Tool III: Structured Nursing Assessment Sheet: To evaluate postoperative recovery such as use of analgesia after movement, passage of first flatus, initiation of oral intake, duration of catheterization, self-void after removal of catheter, breast-feeding and holding the baby independently.

Content validity of the Tools:

The content was reviewed by five experts in woman's health and midwifery nursing field to test its validity; Based on his comments, modifications were considered.

Tools Reliability:

It was tested for 10 women during the pilot study using α Cronbach (alpha). Pain Rating Scale = (0.90), Reliability of the Nursing Assessment Paper = (0.94).

Ethical Considerations:

The approval of the Women's Health and Midwifery Department was obtained, after obtaining the approval of the Ethical Research Committee (ERC) of the Faculty of Nursing at Mansoura University, in addition to obtaining informed consent from each mother before the intervention. They are informed of the right to withdraw at any time. The search process does not harm mothers. After statistical analysis the tools of collect data were burning to ensure the confidentiality of the research, as well as the data collection tools did not deal with ethical and religious or cultural issues and maternal dignity

Pilot Study:

A pilot study was conducted on 10 women to assess the clarity of the designed questionnaire and the applicability of the study tools, as well as to estimate the required time to collect them and then made the necessary adjustments, as change some words to be understood, these mothers were excluded from the study sample.

Method:

- This study was carried out in the above mentioned setting from July 2019 to October 2019 in three phases.
- **Preparatory phase:** The researchers reviewed the literature relevant to the study, and then developed and designed tools for collecting data. Official permission was obtained from the director of Mansoura University Hospitals. Head of the Women and Midwifery Nursing Department and the Ethical Committee of the College of Nursing to conduct the study. The final pilot study was conducted among 10 mothers.
- **Implementation phase:** The researchers visited the previously mentioned study setting 3 days/week from 9:00 am to 9:00 pm., the researchers started by introducing themselves to each woman in the study, greeting the woman, making her feel comfortable, then explaining the purpose of the study and obtaining written

consent. The researchers started the intervention phase with the women of the (EPEBM group) first and then the women of the control group to avoid bias.

- **In the intervention group:** The women done the early progressive exercise and movement. This technique started shortly after 5 hours of surgery. Before starting this technique, a preliminary evaluation was performed to assess the general condition of the mother. The researcher put the woman in a semi-recumbent position and helping her to do breathing and coughing exercises, then gradually moving and moving her legs first in the bed, then sitting next to the bed on a chair and then standing, then walking in the room with the support of the researcher or his relatives from a distance of 40 meters. This technique is repeated three times a day from 3 to 4 hours for a period of two days. The pain score was evaluated twice, the first evaluation was made before the movement, and the second evaluation was performed immediately after the movement.
- **The control group:** The routine post caesarean medical and nursing care in which the ambulation including moving out of bed was initiated on second day after cs.
- **Evaluation phase:** During this phase, In both group researcher assess the women' recovery as intensity of post-operative pain, use of analgesics after movement, passage of first flatus, initiation of oral intake , breastfeeding, duration of catheterization, self-void after removal of catheter, holding baby and duration of hospital stay.

II. Results

Table 1. Distribution of the studied sample according to their general characteristics

Variables	Control group (n=50)	Early bed exercise and movement group (n=50)	Significance test
Age			
18-23	13(26.0)	17(34.0)	X ² =4.21 P=0.122
24-29	28(56.0)	18(36.0)	
30-40	9(18.0)	15(30.0)	
Education			
Basic education	6(12.0)	4(8.0)	X ² =1.61 P=0.447
Secondary education	30(60.0)	36(72.0)	
University education	14(28.0)	10(20.0)	
Occupation			
Working	16(32.0)	10(20.0)	X ² =1.87 P=0.171
Not working	34(68.0)	40(80.0)	
Residence			
Rural	26(52.0)	31(62.0)	X ² =1.02 P=0.313
Urban	24(48.0)	19(38.0)	

Table (1) shows the general characteristics of the studied sample. The womens' age ranged from 18-40 years old. Also, the higher percentages of control and EPBEM group had secondary educational level, not working and from rural area (60%, 68%, 52% &72%, 80%, 62% respectively) with no significant difference. Both groups were matched as regard age, education, occupation and residence.

Table 2. Distribution of the studied sample according to their obstetric data

Variables	Control group (n=50)	Early bed exercise and movement group (n=50)	Significance test
Parity			
Primiparous	20 (40.0)	13 (26.0)	X ² =2.22 P=0.137
Multiparous	30 (60.0)	37 (74.0)	
Gestational age (weeks)			
36-37	7 (14.0)	2 (4.0)	X ² =3.05 P=0.081
>37	43 (86.0)	48 (96.0)	
Type of caesarean Section			
- Planned	16 (32.0)	13 (26.0)	X ² =0.44 P=0.509
- Emergency	34 (68.0)	37 (74.0)	

Table (2) shows that there was no statistical significant difference between both group regarding their obstetrics characteristics. The gestational age of the EPBEM and control groups nearly the same > 37 weeks

(96% & 86% respectively). Concerning parity, it was obvious that 74% & 60% respectively of the EPBEM group and the control group were multi para. Also, it was obvious that the type of cesarean section among 74% & 68% respectively of the EPBEM group and the control group was emergency.

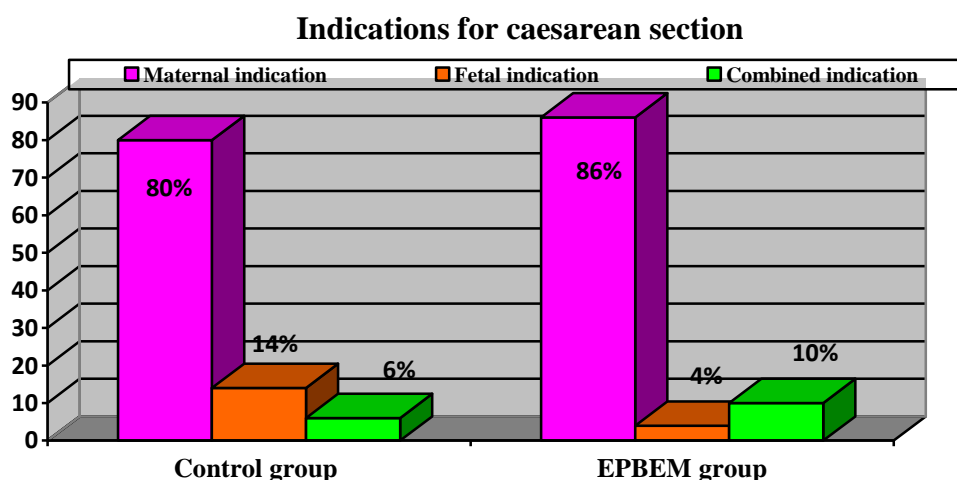


Figure (1): Frequency distribution of the study sample regarding to indications of cesarean section
 This figure shows that most of the EPBEM and control group had cesarean section related to maternal indications (86% & 80% respectively).

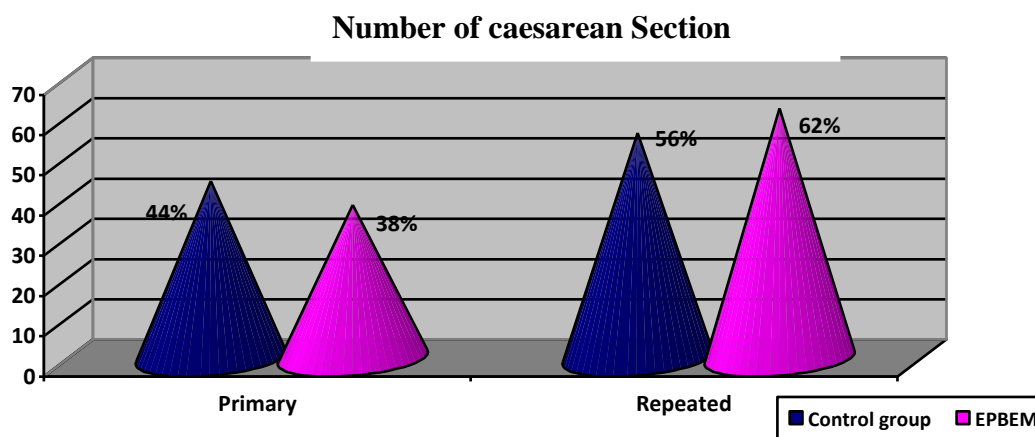


Figure (2): Frequency distribution of the study sample regarding to number of cesarean section

Figure 2 shows that more than half of the EPBEM group and control groups had repeated cesarean sections (62% and 56%, respectively).

Table 3: Mean score of post-operative pain before and after movement among the studied sample

Variables	Control group Mean± SD (Range)	Early bed exercise and movement group Mean ± SD (Range)	Significance test
Before movement	8.48 ± 1.05	8.66 ± 1.35	t=0.743& p=0.459
After movement	7.52 ± 1.54	6.86 ± 1.54	t=2.142& p=0.035
Paired t test	t=4.201	t=5.78	
p value	p <0.001	p <0.001	

It was clear from this table that the average scores of post-operative pain were significantly reduced post-intervention (P= 0.001). Also, there was a significant difference between control and EPBEM group after movement with the reduction of pain among EPBEM group was more than the control group (p=0.035).

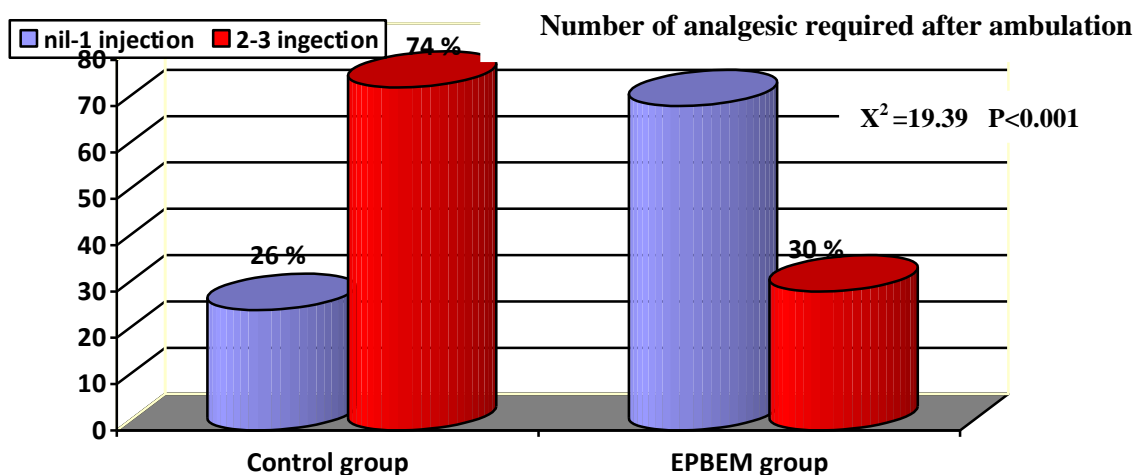


Figure 3 : Distribution of the study sample regarding to number of analgesic required after ambulation.

Figure 3 showed that there was a significant difference between the two groups with regard to the number of analgesics required after ambulation, in favor of the EPBEM group (P <0.001).

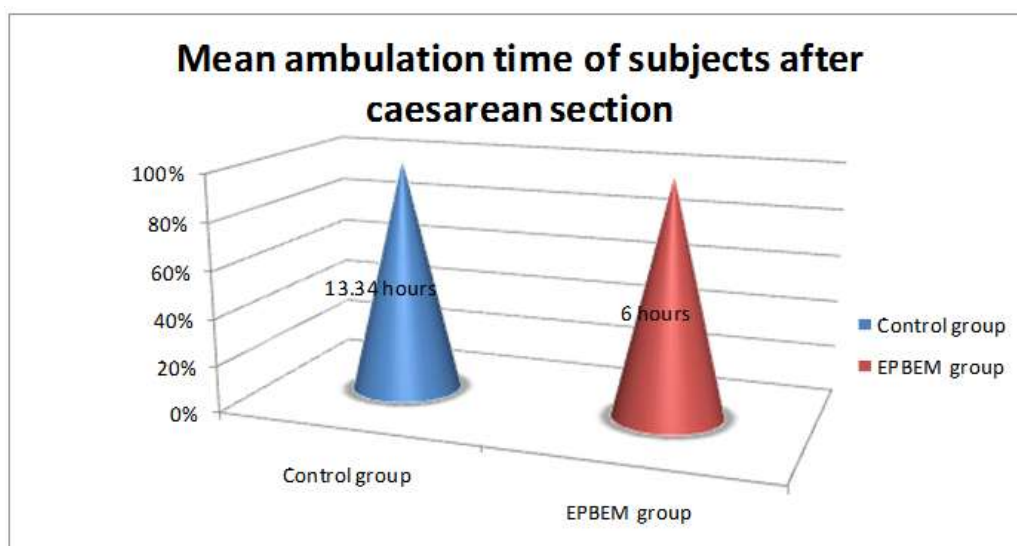


Figure (4): Frequency distribution of the studied sample regarding mean time of ambulation after caesarean section

Figure 4 shows that the mean ambulation time was 13.34 hours and 6 hours respectively between the EPBEM and control group.

Table 4: Comparison between control and early bed exercise and movement group related to post-caesarean section recovery

Variables	Control group (n=50)	Early bed exercise and movement group (n=50)	Significance test
Duration of catheterization after caesarean section	15.94 ± 3.825	13.68 ± 4.088	t=2.855& p=0.005
Self-void after removal of catheter	2.16 ± 0.997	1.32 ± 0.653	t=4.984& p<0.001
Start of oral intake after caesarean section	8.24 ± 2.825	6.24 ± 0.657	t=4.876& p<0.001
Breast feeding and holding baby independently after caesarean	11.50 ± 3.57	6.48 ± 0.735	t=9.739& p<0.001

First flatus passed after caesarean section	12.28 ± 5.338	6.60 ± 7.910	t=4.209& p <0.001
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The table illustrates that there were a significance difference between control and EPBEM group related to all items of post-caesarean recovery. As average score in all items reduced in a fovor of the EPBEM group at p value < 0.001 (table 4).

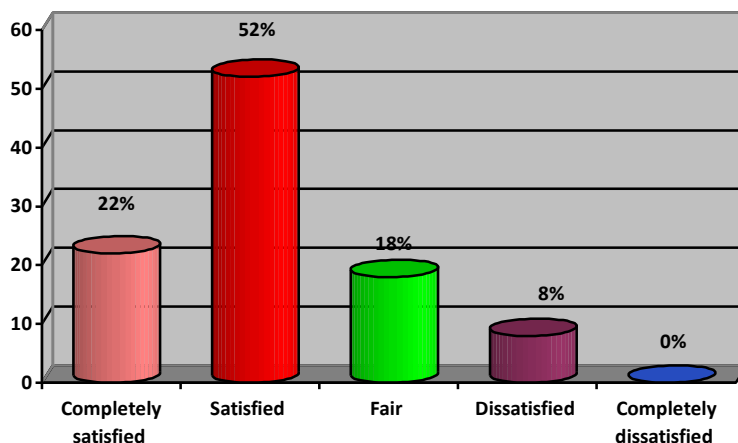


Figure (5): Frequency distribution of women’s satisfaction regarding effectiveness of early bed exercise and movement on postoperative cesarean section recovery

Figure 5 shows that 22% and 52% of the EPBEM group were completely satisfied or satisfied with the perceived intervention.

Table 5: Relationship between womens’ satisfaction and mean score of post-operative pain after intervention among early bed exercise and movement group

Variables	N0	Early bed exercise and movement group Mean ± SD	Significance test
Completely satisfied	11	5.273 ± 1.272	F=16.230 P=0.000
Satisfied	24	6.792 ± 1.179	
Fair	9	7.556 ± 0.882	
Dissatisfied	6	9.000 ± 0.632	

This table illustrates that there was a significant difference relationship between the level of satisfaction and mean score of post-operative pain after intervention among EPBEM group.

III. Discussion

This study aimed to study the effect of early progressive bed exercise (EPBEM group) and movement on recovery after caesarean section. The study findings revealed that there was a statistically significant difference between control and EPBEM groups whereas first flatus passage after caesarean section, urination after urinary catheter removal, duration of catheterization after caesarean section, start of oral intake after caesarean section, carry baby without help and breast feeding after caesarean and level of post cesarean pain were improved in favor of the EPBEM group than the control group. The results of this study support the research hypothesis that post-caesarean women who applied early progressive bed exercise and movement expected to achieve improved postoperative recovery compared to those who did not.

The recent study showed that women in the early bed exercise and movement group had a more faster return of bowel function including bowel sounds and flatulence time compared to the control group and this may be due to this intervention can stimulate a reflex causing a coordinated propulsive activity and expanding the discharge of gastrointestinal hormones. In agreement with Hassan et al., (2019) study about “outcome of intestinal motility and the satisfaction of the woman post-caesarean after implementation of three different nursing interventions” who found the same results among early mobilization group. In same line, the current

results were in agreement with **Çevik & Başer (2016)** who studied "effect of gum-chewing and bed exercises on intestinal sounds, flatulence and early discharge in the early time after cesarean section". Who reported that in the exercise group, the starting of bowel movements, passing intestinal gas and defecation were earlier compared to control group after caesarean operation.

Regarding the catheter duration in both groups, this study showed that there was a significant difference between the two groups since the bed exercise and movement group removed the catheter before the control group. This conclusion was in agreement with **Youness & Ibrahim, (2017)**. In same line, **Paul et al., (2019)** stated that majority of the women removed catheter in 2nd post operative day in experimental group where as in control group the majority of the women were not removed catheter till 3rd post operative day. However, unlike with **Kaur et al., (2015)** who observed that the duration of catheterization was not affected by early ambulation and no difference between both groups. This difference was due to the hospital's policy of removing catheters among most women after CS at the same time each morning for women who performed CS in the afternoon in the middle of the night without taking into account the walking ability of women and obtain a self-void.

Regarding urination after urinary catheter removal and passing of first flatus after early mobility and exercises, the current study revealed that there were significant differences between the two groups. Majority of women in EPBEM group micturate within 1-2 hour after removal of catheter compared to more than half of control group urinated within more than 2 hour. This may be due to walking promotes the flow of oxygen throughout the body and strengthens muscle tone. These results were agreed upon with **Kaur et al., (2015)**, who showed that early ambulation had a clear effect to improve urination after catheter removal and first flatus passage. Likewise, **Dube and Kshirsagar (2014)** reported that early ambulation significantly improved all health parameters after surgery, including bowel function.

In relation to the mean time of ambulation, in present study the post cesarean section women in EPBEM group were ambulated at six hours post-caesarean section while women in control group ambulated at thirteen to fourteen hours after caesarean section. In agreement with **Kaur et al., (2015)** who found the same findings.

With regard to oral hydration, this study presented that there was a significant difference between the two groups. This was in agreement with **Al-Ghareeb et al., (2013)** and **Youness & Ibrahim (2017)** who found that early ambulation encouraged women to hydrate early. Similarly, **Barai & Vahitha (2019)** while comparing between control and experimental groups in terms of structured observational schedules among post cesarean mothers, stated that there was significant association found related to initiation of oral intake after ambulation which was supported the current study.

Results of the present study revealed that there was a significant difference in reducing pain before and after the intervention with reduction of pain among EPBEM group was more than the control group and need for analgesic was less among EPBEM group than control group. This result was supported by a study by **Yunus and Ibrahim (2017)**. Also, in a study of 50 women after cesarean delivery, the experimental group received physiotherapy with early mobilization, a significant difference was noted in the amount of analgesia required and the experimental group needed less analgesia for pain control (**Karakaya et al., 2012**). In same line **Barai & Vahitha (2019)** reported that there was a significant difference between the mean postoperative pain score after ambulation among experimental and control group in study about "effectiveness of early ambulation on post-operative recovery among primiparous post cesarean mothers" and the higher percentage of subjects in control group required more number of analgesics injection than experiment group.

In a concordant study by **Kaur et al., (2015)**, in which they compared early movement group with control group, found that early movement had an essential role in improving recovery after CS. Moreover, **Dube et al., (2013)** studied the impact of intended early movement on certain postnatal activities and showed that there was a significant impact of early movement on improving post CS activities.

Regarding to initiation of breast-feeding and ability to holding the baby, the finding of present study showed that there were a significant difference between both groups in favor of the EPBEM group. The majority of the EPBEM group initiate breast feeding before six hours. In agreed with **Andrade & Mathias (2017)** study about "assess the impact of early and late ambulation on maternal outcome of mothers with caesarean birth in a selected hospital in Mangalore" who found that seventy two percent of the mothers in early ambulation group had initiated breast feeding between 2-6 hours of the surgery and more than one third of the mothers in late ambulation group had initiated breast feeding between 6-12 hours of the surgery.

Regarding to satisfaction of mothers after the intervention, more than two third of women in EPBEM group were either very satisfied or satisfied regarding effectiveness of early bed exercise and movement on postoperative cesarean section recovery and this may be due to improvement of ability to perform the daily activities of the women and minimal pain score among them after intervention. In same line **Hassan et al., (2019)** study reported that more than half of early mobilization group were completely satisfied and satisfied with the perceived intervention.

The present study revealed that there was a significant difference relationship between the level of satisfaction and mean score of post-operative pain after intervention among intervention group. This is may be due to the sense of pain is the first concern that irritate and bring fear among post cesarean section women. So relieve pain lead to more satisfaction among them.

Hence it interpreted that the EPBEM group post operative recovery was much higher and earlier than the control group which showed that intervention was effective to improve the post operative recovery.

IV. Conclusions

The results of the present study highlighted that early postoperative bed exercise and movement was an effective, safe and economical method that can be applied to improve recovery and activities in women who undergo cesarean section.

V. Recommendations

- Integrate bed exercise and movement early in nursing protocol for women after cesarean section.
- Implementing of health education sessions for pregnant women about the benefits of post-operative early bed exercise and movement.
- Further study to explore the effect of bed exercise and movement on a diverse types of lower abdominal gynecological operation using a larger sample.

Acknowledgment

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Conflict of Interest Disclosure

Researchers declare that there is no conflict of interest in research.

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