



# Effect of Abdominal Support on Reducing Incisional Pain and Early Mobilization among Post-Operative Cesarean Section Women

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## Abstract

**Background:** Pain intensity after cesarean section is the most common complaint that can cause the women to avoid mobilization, and increase the risk of thromboembolism rate. Abdominal support by binder is considered one of the most important modalities of non-pharmacological pain relief with the less adverse effects. **Aim:** to evaluate the effect of abdominal support by binder on reducing incisional pain and early mobilization among postoperative cesarean section. **Design:** Quasi-experimental nonequivalent control group (pretest- posttest design) was used in the current study. **Sample:** A purposive sample of 60 post cesarean section women was equally divided into two groups (30 for each). **Setting:** The study was carried out at postpartum ward (21) in Obstetrics and Gynecology hospital, Kasr Al-Aini, Egypt. **Tools:** Three tools were utilized for data collection **1)** Structured interviewing questionnaire; **2)** Numerical rating scale (NRS) and **3)** Six Minute Walking Time (6MWT). **Results:** Means pain score were reduced after application of abdominal support by binder with highly statistical significance differences between abdominal support by binder group compared to control group at 4,5,6 &7hrs ( $p < 0.05$ ) ( $8.5 \pm 0.93$  vs  $9 \pm 0.71$ ) ( $3.3 \pm 0.57$  vs  $7.7 \pm 2.4$ ) respectively. Also, the means of mobilization length time and distance were found highly statistical significance differences between abdominal support by binder and control groups ( $p < 0.05$ ). **Conclusion:** Application of abdominal support by elastic binder over cesarean section incision was effective in reducing pain intensity and increased mobilization length time and distance. **Recommendations:** Integration of elastic abdominal binder as part of routine hospital care will be considered.

**Keywords:** Abdominal support, Incisional pain, Mobilization, walking, Cesarean section.

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## Introduction

Cesarean section (CS) represents the most commonly performed inpatient surgical procedure which increased during the past few decades worldwide. In Egypt its rate reached to be 52 % (Abdel-Tawab, Hassanein, oraby& ElNakib's, 2018). Pain is the most common complains that in turn can cause the women to avoid mobilization, thereby increasing the risk of thromboembolism and disrupting the maternal bonding with newborn. Therefore, effective postoperative pain control is a crucial concern for women who seek cesarean surgery (Roofthoof, Joshi, Rawal, & Velde, 2021).

Administration of analgesia in the form of pharmacological methods which includes prescription of medications as pain killers are often a primary method of pain relief used postoperatively according to American college of Obstetricians and Gynecologists (ACOG, 2018) guidelines. However, use of some of pain medication can lead to undesirable side effects such as nausea, vomiting, constipation, urinary retention, itching and sedation. A potential non-pharmacologic way to reduce postoperative pain and improve mobilization is the use of an abdominal support by binder during postoperative recovery. The binder is a soft elastic band, which attaches around the abdomen and adjusts to different abdominal circumferences by overlapping and attaching with Velcro (Mascio et al.,2021).The binder is hypothesized to control pain as it provides sufficient circumferential compression to reduce stress on the wound during transfers and ambulation. Another theory is that the binder provides sensory input when in

contact with the skin and that the sensory signals override the neural pathways carrying pain signals to the brain (Makarova, 2019).

The benefits of abdominal support by using binder for reducing pain and improving mobility after major abdominal surgeries including CS are well-established in the literature by karaca et al., (2019) ; Saeed et al., (2019) that conducted trials to compare the effect of abdominal binder versus no binder after major abdominal surgery including cesarean sections on various parameters related to post-operative recovery . The findings revealed that study participants in the abdominal binder group reported significantly less postoperative pain on first day (p value < 0.001) compared to the non-binder group. Based on review of literatures, most of studies conducted focused on certain abdominal surgeries and limited studies combined the effect of abdominal binder on pain reduction and the early mobilization times among postoperative CS .In addition, lack of agreement between literatures regarding the timing of wearing abdominal binder as previous study reported it was applied at operating room or can be wearing two hours after operation or during first mobilization. Therefore, this study will evaluate the effect of abdominal support by binder on incisional pain and mobilization postoperative cesarean section.

## Significance of the study

Adequate pain relief after CS by using a safe and effective analgesic agent is a universal concern since pain relief is one of the basic human rights (Ismail,



Shahzad, &Shafiq,2016) .Furthermore, early mobilization in postoperative period is the key to achieving rapid and maximum muscle function and restoring maternal health. Moreover, mobilization helps to reduce most of the complications by ensuring good blood circulation, promoting gastric motility, reducing the risk of thrombophlebitis (El-Sayed, Elmashad& Kandeel,2020). Hopefully results of this study will increase the knowledge base about the benefits of non-invasive modality regarding application of abdominal binder to alleviate post-operative pain among mothers undergoing cesarean section as well as, findings from this study will be a clinical implication for improving the quality of care.

#### **Aim of the study**

The current study aimed to evaluate the effect of abdominal support by binder on reducing incisional pain and early mobilization among postoperative cesarean section.

#### **Research Hypothesis**

H 1: Post cesarean section women who will use abdominal support by elastic binder reports less incisional pain intensity, increase mobilization length time and distance than those who don't.

#### **Operational Definitions**

**Abdominal support:** Means using elastic abdominal binder to surround the abdomen circumferentially to support abdomen and incisional site over the anterior abdominal wall after cesarean section.

**Early mobilization:** Means ability of post CS woman to mobilize out of bed at four hours after delivery as measured by using six minute walking time tool and stopwatch.

#### **Subject and methods**

##### **Research Design**

Quasi-experimental nonequivalent control group research design (pretest- posttest design) was used in the current study.

##### **Setting**

The study was conducted at the postpartum ward (section 21) in Obstetrics and Gynecological hospital at Kasr Al-Aini which affiliated to Cairo university hospitals, Egypt. This ward provides care to women who had delivered cesarean section .

##### **Sample**

A purposive sample of 60 postoperative cesarean section women were selected. The study samples were recruited based on the inclusion criteria: elective CS delivery at term, singleton viable fetus, aged from  $20 \geq 35$  years old, parity not more than two, were able to read and write, free from medical diseases and chronic pain in the late year and receiving epidural anesthesia. Women who were un-willing to participate in the study, cases combined with hysterectomy or connected with drains, multiple gestation, and bleeding disorders were excluded from the study.

##### **Sample size**

The sample size was calculated using a G-power version 3.1.1 for power analysis. A Power of .95 ( $\beta = 1-.95 = .05$ ) at alpha .05 (one-sided) was used as the significance level, and effect size= (80%) was utilized. Based on sample size calculation, from the total sample, two groups were constituted, group (A) (n = 30) who used abdominal support by elastic binder; and group (B) (n= 30) who received the routine hospital care based on hospital policy.



### **Tools of data collection**

Three tools were used for data collection. They were designed and filled by the researcher after extensive review of recent literatures. 1) Structured interviewing questionnaire, 2) Numerical Rating Scale and 3) Six Minute Walking Time (6MWT).

#### **1-Structured Interviewing**

**Questionnaire:** This tool was developed by the researcher and it included 2 sub-sections: sub-section (1) included data related to demographic characteristics as (age, educational level, occupation, residence; sub-section(2) included data related to obstetrical profile such as gravidity, parity, and gestational age , types of cesarean section delivery either emergency or planned .

**2- Numerical Rating Scale (NRS):** This tool was adopted from Jensen, Karoly& Braver (1986). This scale is uni-dimensional standardized tool ( $r=0.92$ ) to assess the perceived pain intensity by numbers. **Scoring system:** numerical scale ranged from 0 to 10. With (zero score) denotes no pain; score from (1- 3) indicated mild pain; score from ( 4- 6 ) demonstrate moderate pain; and score from ( 7-10) revealed severe pain.

#### **3-Six Minute Walking Time (6MWT) :**

This tool was developed by the researcher after reviewing the literatures and includes two parts related to mobilization as time and distance. It was measured 4 consecutive times at 4hrs, 5hrs, 6hrs & 7hrs from recovery.

### **Validity and Reliability of the Tools**

Content validity was ascertained by a group of experts of maternity nursing,

modifications were carried out according to the expert's judgment on clarity of sentences and the appropriateness of contents. Reliability of all items of the tools was done. The reliability test was established by using the Cronbach alpha to assess internal consistency of the tool. It was ( $r=0.92$ ) for tool ( 2 ); ( $r = 0.87$ ) for tool (3) which denoted the good reliability of these tools.

### **Ethical consideration**

The ethical approval was obtained from the Research and Ethics Committee at faculty of Nursing, Cairo University (2021-28). Moreover, an official permission to conduct the proposed study was obtained from the hospital administrators in the selected setting for data collection. At the initial interview, each potential participant was informed about the purpose, the procedure, the benefits of the study, and the cover letter explaining the research study was read to them. Each participant woman was assured that participation in this study is voluntary and they had the right to withdraw from the study at any time without affecting on the health care services that she was received.

### **Procedure of data collection**

The researcher proceeded with the data collection in the following sequence as interviewing and initial assessment, implementation and evaluation phases.

#### **1. Interviewing & initial assessment phase:**

All women who met the inclusion criteria were interviewed by the researcher at postpartum unit after introduced herself and explained the nature, aim of the study, importance & benefits to ensure the study posed no risks or hazards on their health and obtained their written consent to be recruited in the current study. During this phase, initial assessment was conducted as a baseline data for both groups (study and



control) related to pain intensity levels at three hours using Numerical Rating Scale (NRS).

## 2. Implantation phase

Regarding group of abdominal support by binder which consisted of 30 postnatal CS; an elastic binder which made of breathable elastic bands. It has two ends; one of them had adhesive tape (Velcro) to be tightly attached to another end. Its width was 25cm 128cm with different sizes. Firstly, the researcher measured the waist circumference of the study participant to choose the appropriate size of elastic abdominal binder and then assist the woman to wear abdominal binder while she was lying in bed on her back. After that, the study participant was encouraged to sit for ten minutes in bed in order to prevent hypotension and then she was encouraged to mobilize with assistance from the researcher at first. Then the researcher recorded the mobilization length time and distance using 6 minute walking time tool. For mobilization length time was calculated through stopwatch of mobile phone to calculate duration and document time consumed. While, mobilization length distance was calculated through counting number of tiles by meters that the mother had walked and multiply them by size of one tile (40cm) to document the accurate distance. This assessment was assessed at 4th, 5th, 6th & 7th hours at every mobilization time.

## Results

Table ( 1 ) Distribution of the study sample according to their demographic data

Variables	Study group (n=30)		Control group (n=30)		P value
	N	%	n	%	
Age					>0.05*
20 -	6	20	12	40	
25 -	8	26.7	8	26.7	
30-	7	23.3	7	23.3	
≥35	9	30	3	10	
Mean ±SD	29.9±4.9		27.0±5.13		
Residence					>0.05*
Urban	22	73.3	14	46.7	
Rural	8	26.7	16	53.3	

While control group comprised of 30 postnatal CS women who were received routine hospital care according to the hospital protocol, as they did not receive any intervention from the researcher.

**3.Evaluation phase:** In this phase, all study participants in both groups recruited in the current study were evaluated at four consecutive times 4hrs, 5hrs, 6hrs &7hrs (Post-test) respectively from time of recovery. Level of pain intensity, mobilization length time and distance were documented using the previous tools as mentioned for abdominal binder group.

## Statistical Analysis

Upon the completion of data collection, data was tabulated and analyzed by using Statistical Package for the Social Science (SPSS) version (20).Data management was done by coding and entering responses in to computer. Descriptive statistics were carried out such as mean, standard deviation and frequency distribution and percentages. Inferential statistics such as parametric and nonparametric analysis, t-test were used to examine the differences and similarities between the study groups, level of significant will be P value (<0.05)



Educational level					>0.05*
Can read & write	5	16.7	4	13.3	
Primary	4	13.3	1	3.3	
Preparatory	6	20.0	8	26.7	
Secondary	10	33.3	11	36.7	
University	5	16.6	6	20	
Occupation					>0.05*
Housewife	29	96.7	24	80.0	
Working	1	3.3	6	20.0	

\* Insignificant > 0.05

Table (1) shows that; the age range of the study sample ranged from 20 to  $\geq 35$  years old with a mean of  $29.9 \pm 4.9$  among abdominal binder group compared to the mean age of control group  $27.0 \pm 5.13$ . About seventy three point three percent of the in the abdominal binder group lived in urban areas compared to 53.3% of the study sample in control group lived in rural areas. In addition, thirty three point percent of the study sample in the abdominal binder group had

completed their secondary education compared to 20% in control group had university education. Furthermore, ninety six point seven percent in abdominal binder group were housewives compared to 20% of control group were working. The results revealed that there were no statistical significant differences were found among both group regarding their demographic data and thus denotes homogeneity between both groups ( $p > 0.05$ ).

Table (2) Distribution of the study samples according to their obstetrical profile

Variables	Study group (n=30)		Control group (n=30)		P value
	n	%	n	%	
Gravidity					>0.05*
Primigravida	2	6.7	7	23.3	
Multigravida	28	93.3	23	76.7	
Parity					>0.05*
Primipara	3	10	4	13.3	
Para two	27	90	26	86.7	
Gestational age (weeks): (Mean $\pm$ SD)	38.8 $\pm$ 1.1		38.05 $\pm$ 1.07		>0.05*
Types of Cesarean section					>0.05*
Emergency	5	16.7	13	43.3	
Planned	25	83.3	17	56.7	
Indications of Cesarean section					>0.05*
Previous Cesarean section	22	73.3	20	66.7	
Fetal malposition	3	10.0	3	10.0	
Oligohydraminos	2	13.3	3	10.0	
Failed to progress labor	3	10.0	4	13.3	

\* Insignificant > 0.05

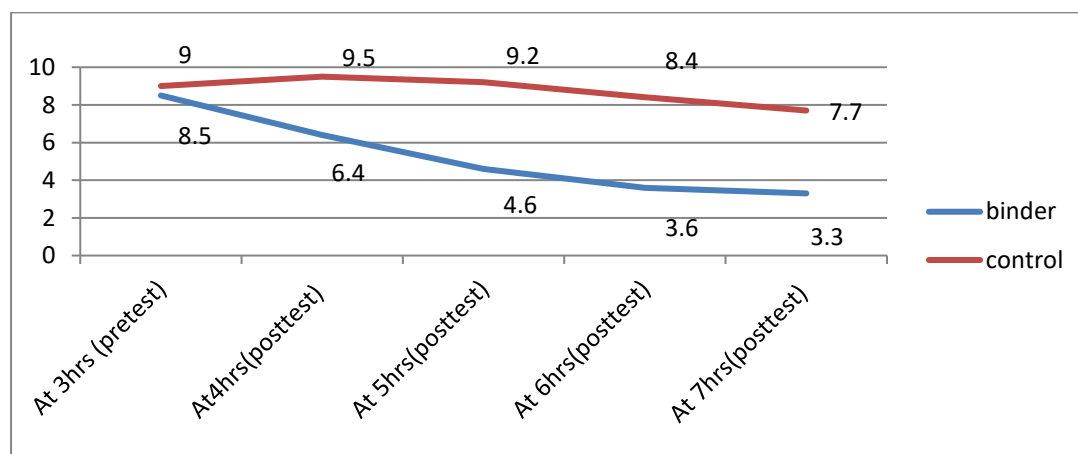




Table (2) shows that; 93.3% in abdominal binder group were multigravida compared to 76.7% in control group. Regarding parity, the majority of both groups were para two(90% & 86.7%, respectively). The mean of gestational age for abdominal binder group was 38.8±1.1 compared to 38.05±1.07 for control group. Moreover, regarding types of cesarean section; the majority of study sample

83.3% in abdominal binder group had planned cesarean section compared to 43.3% of control group had emergency CS .Further more, regarding the causes of CS ; previous cesarean section was the main cause and represent (73.3% & 66.7%, respectively) between both groups. The results reveal no statistically significant differences between two groups regarding their obstetrical profile (p >0.05).

Figure (1) Means of pain intensity levels pre and post intervention between abdominal binder and control groups.



As shown in figure (1), the mean reduction of pain intensity level for abdominal binder (pretest at 3hrs) were found (8.5±0.93&9.5±0.56, respectively) with no statistical significant differences among both groups (p> 0.05). By repeated

measures using paired t test showed that the mean level of pain intensity scores post intervention between time points at 4hr, 5hr , 6hr &7hrs with statistical significance differences (p<0.05).

Table (3) Means of mobilization length time /minutes post intervention between abdominal support by binder and control group

Time per minutes / Hrs	Study group (n=30) M ±SD	Control group (n=30) M ±SD	t	P value
At 4hrs	2.40±1.4	0.69±0.62	6.862	0.01*
At 5 hrs	3.5±1.1	1.92±0.57	7.741	0.01*
At 6hrs	5.24±1.2	3.32±0.65	7.806	0.01*
At 7hrs	6±0.0	4.53±0.78	10.182	0.01*

\* Highly significant <0.05



Table (3) revealed that; abdominal binder group has higher means of mobilization length time per minutes at 4hrs, 5hrs, 6hr&7hrs (2.40±1.4, 3.5±1.1, 5.24±1.2 & 6±0.0, respectively) compared to control group with means of (0.69±0.62,

1.92±0.57, 3.32±0.65 & 4.53±0.78, respectively) with highly statistical significance differences (t=6.862, t=7.741, t=7.806 &t=10.182, p=<0.01) between both groups.

Table (4) Means of mobilization length distances/ meters post intervention between binder and control groups

Distance in meters Hrs	Study group (n=30) M ±SD	Control group (n=30) M ±SD	t	P value
At 4hrs	6.99±2.2	1.18±1.3	12.231	0.01*
At 5 hrs	10.62±2.7	3.98±1.83	10.770	0.01*
At 6hrs	14.29±2.6	6.28±2.1	12.502	0.01*
At 7hrs	16.95±2.5	8.90±2.30	13.462	0.01*

\* Highly significant <0.05

Table (4) illustrates that; abdominal binder group achieved longer distance of mobilization at 4,5,6&7hrs after wearing abdominal binder with a mean of (6.99±2.2 , 10.62±2.7, 14.29±2.6& 16.95±2.5, respectively )compared to control with means (1.18±1.3, 3.98±1.83, 6.28±2.1 & 8.90±2.30,respectively) with highly statistical significance differences(p=0.01) between both group.

### Discussion

The present research aimed to evaluate the effect of abdominal support by elastic binder on reducing incisional pain and early mobilization postoperative cesarean section. Findings of the current study

support research hypothesis which stated that Post cesarean section women who will use abdominal support by elastic binder reports less incisional pain intensity, increases mobilization length time and distance than those who don't.

The current study finding showed that there are highly statistical significant differences of pain intensity levels between abdominal binder and control groups at 4 ,5,6&7hrs postoperative CS (p<0.05) .This findings are consistent with study conducted by Hassan, El-Feshawy& Ahmed (2021) and Ghana et al., (2017) who stated that effectiveness of abdominal binder on reducing pain after cesarean delivery compared to non-binder group (p <0.01 ).

Moreover,Singhdaeng,Sangkomkamhang&Sangkomkamhang(2020)conducted randomized controlled trial which was





in harmony with current study in relation to the effect of using abdominal binder after cesarean delivery on postoperative wound, pain and analgesic use at Thailand among fifty women and the study results found that postoperative pain score using visual analogue scale at 6 hours was significantly lower in the binder group mean  $\pm$  SD at 6, 24hrs (  $4.77 \pm 1.97$ ,  $2.51 \pm 1.63$  vs. standard care  $6.85 \pm 2.26$ , and  $4.66 \pm 2.21$ ;  $p < 0.05$ ).

On the contrary, Chankhunaphas & Charoenkwan(2020) and Mascio et al.,(2021) were contradicted with the current study finding that there was no statistically significant difference between the abdominal binder versus control group for pain score . Moreover, study conducted by Gillier, Sparks, Kriner& Anast,(2016) in United States on one hundred fifty five patients who underwent cesarean section delivery and this study included two groups (abdominal binder group versus control group). The result found that pain scores at both groups didn't differ in pain intensity at postoperative day one ( $P = 0.33$ ). This disagreement might be due to different sample size, different tools of pain assessment as well as, different time of measuring pain intensity levels among the study populations.

Concerning effect of abdominal binder on mobilization length time, the current study found that distance at 4,5,6& 7hrs from recovery were highly statistical significant differences( $p<0.05$ ) in the binder group versus the control group .This results were in agreement with Hassan, et al.,(2021) who reported that there were a highly statistically significant differences in the binder group versus the non-binder group in relation to mobilization length time in the 1st 8 hours.

Moreover, Arici et al.,(2016) who investigated abdominal binder usage on pain level and mobility after major abdominal surgery in Turkey on eighty four patients divided into binder group (42) which wear binder at all times when out of bed and (42)for control group and reported that binder group walked longer distance compared to control group ( $p < 0.001$ ).

Furthermore, Chantawong&Charoenkwan (2021) conducted a study that women wearing binder gynecological patients group were instructed to wear the binder all times during hospitalization and this findings reported that the intervention group achieved longer distance of walking postoperative compared to control.

On the contrary, the current study is in disagreement with Singhdaeng, ,Sangkomkamhang& Sangkomkamhang (2020) they reported that there was no statistical significant differences in relation to walking distance using 6MWT tool between the abdominal binder and control group . Moreover , Saeed et al., (2019) conducted randomized controlled trial to compare the effect of abdominal binder after major abdominal surgery including cesarean section on early mobility and reported that there was no statistically significant difference in the 6MWT distance at day one postoperative ( $p = 0.076$ ).This disagreement might be due to type of anesthesia the women received, type of surgical operation as well as ,differences in gravidity and parity as well as duration of wearing of abdominal binder among the study samples.

## Conclusion

The current study concluded that using elastic abdominal support by elastic binder was effective in reducing incisional



pain following CS and increasing mobilization length time and distance.

**Recommendations:** on the basis of the current findings presented in this study, the following recommendations were suggested:

- Increase awareness of postoperative CS women about positive effect of abdominal binder on pain intensity and early mobilization.
- Integration of abdominal binder as part of routine hospital care after postoperative cesarean section.
- Replicate the study on large sample size and in different settings.
- Conduct further live experience research to explore women perception regarding effectiveness of abdominal binder on pain perception.

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**Conflict of Interest:** there are no conflicts of interest.

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