Effect of Elastic Abdominal Binder on Post Cesarean Pain, Distress, Mobilization and Women's Satisfaction

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Abstract

Background: Abdominal binder (AB) is one of the most effective non pharmacological method that decreases many adverse events after cesarean deliveries as pain and distress, it can also improve physical function and increase women's satisfaction**.** ***Aim of the study****:* This study aimed to assess the effect of elastic abdominal binder on post cesarean pain, distress, mobilization and women's satisfaction. ***Subjects and methods***: Randomized Control Trial was utilized comparing two groups of intervention (AB) and control group (a routine hospital care). The study was carried out at New General Mansoura hospital specific at inpatient departments, and operative room, Egypt, from September 2019 to March 2020. Data was collected through five tools, A Structured Interview Questionnaire Schedule, the Numerical Rating Scale; Symptom Distress Scale ; 6MWT &women satisfaction likert scale. **Results**: This study found that there was a highly statistically significant difference about pain score in the 1st 8,24,48 hours after delivery and after one week in the binder group than control group, Also, a highly statistically significant difference in the distress symptoms in the 1st 24 hours and in 48 hours as well as after one week from delivery, the present study reported that there were a highly statistically significant different in the binder group versus the non-binder group related to 6MWT in the 1st 8 hours and on postoperative 24hrs, 48hrs&1 week. Also, women in the binder group were satisfied by using it. **Conclusion*:*** this study concluded that using AB after CS had a significantly improvement in the post cesarean pain, lowering distress symptoms & foster mobilization. Also, in early initiation of breast feeding. **Recommendations**: Increase awareness of women health care providers about positive effect of abdominal binder.

Keywords: Abdominal binders, Cesarean delivery, pain, distress, mobilization & women satisfaction.

Introduction:

Cesarean section delivery (CS) is the most frequent surgical operation worldwide **(ACOG, 2017).** The rate of CS delivery remains an upward trend all over the world. In Egypt, CS delivery rate rose dramatically from 27.6 % in 2010 to 52 % in 2014, in Dakhalia, cesarean section rate is 65.5 % in 2014 (**Ministry of Health and Populations ,2015).** Although cesarean section birth is a simple surgical operation, but many adverse events

have been occurred post-cesarean section deliveries specifically pain, bleeding, infection, deep veins thrombosis and others (**Singdaeng et al., 2020).** Pain is the most common symptom that affects women's recovery after delivery (**Ghana, 2017)**. Acute pain after CS delivery prevents timely mother infant contact, decreases successful breast feeding, and mother's walking ability. In addition it can also, provoke anxiety and insomnia (**Tussey, 2019).** Most cesarean section cases usually use pharmacological pain relieve methods to feel comfort after CS delivery, that consider a methods of pain relive play a vital role in postoperative pain control. Most of obstetricians describe them during the first days after cesarean section delivery, but they have potentially serious adverse effects. Many studies were conducted to assess the effect of non-pharmacological methods for pain relieve. These had studies reported that the use of abdominal binder is one of the most effective non pharmacological methods that decreases many adverse events after CS delivery (**Arici, et al., 2016, and Onpan, & Khunkumhaeng, 2020).**

Abdominal binder (AB) is a wide belt that surrounds the abdomen and supports the cesarean section incision. It is a soft elastic band attaches around the abdomen and adjusts to different abdominal circumferences by overlapping and attaching with Velcro (**Gillier, 2016).** It provides different sufficient circumferential compression to alleviate pressure on the wound during transfers and ambulation (**Makarova, 2019).** It was also reported that (AB) provides compression of the abdomen, minimizing the movement of abdominal wall muscles. By compressing the abdomen after CS delivery, (AB) can reduce post-operative pain (**Chankhunaphas and Charoenkwan, 2020)**.

Furthermore, AB compression increases blood flow, decreases inflammation at the incision site and maintains rapid tissue repair. It also facilitates uterine involution through compressing the stomach and bowel and helping the uterus to return to pre-pregnant condition (**Gustafson , 2018).** In addition, (AB) has been indicated to enhance mobilization, protect the women's wound and thereby aid in coughing and promote deep breathing. Postpartum women who wear elastic binders reported feeling of comfort, walking freely, resuming normal activities earlier, and alleviating their abdominal pain (**Karaca,2019) .**

Significance of the study:

Postpartum women who delivered through CS are in a unique situation because they must care for their newborns immediately following surgery (**Singdaeng et al., 2020).** Postoperative pain can affect women's ability to perform their daily activities unlike other women who had delivered a vaginal delivery (**Gillier etal., 2016)**. In addition, post-cesarean pain can affect the quality of sleep in women and cause frequent nocturnal awakenings, impairing their daytime function and mother-newborn interactions. Pain is less likely to breastfeed (**Karlstrom2007)**. Moreover, early ambulation is needed for

postpartum women to reduce the risk of thrombosis, but pain at the incision site can affect their ability to walk effectively and performing their daily activities **(Arici et al., 2016; Chankhunaphas & Charoenkwan, 2020).**

Decreasing the length of hospitalization and minimizing the complications that may happen after cesarean section can be accomplished with the use of high quality, efficient, and evidence-based nursing care. As using AB which is a simple and economic device that can be used easily by every woman. The benefits of abdominal binder are well-established in the literature and include; reducing pain and distress symptoms, facilitating early ambulation after major abdominal surgeries and fostering recovery (**Ghana, 2017).**

One of the Egypt strategy 2030 seeks to achieve the Sustainable Development Goals (SDG) by maintaining women's reproductive health that helps in reducing the worldwide maternal mortality ratio to less than 70 per 100.000 live births (**Goodman etal., 2017)**. So, applying non pharmacological methods for pain management like AB helps in decreasing maternal complications after CS deliveries, maintain women health and improve health care delivery systems in Egypt, and easing her adaptation to a new life .In addition, for cesarean section delivery, there are few studies that were conducted to assess the effect of using abdominal binder on postoperative pain and symptom distress. So, the present study was conducted.

Aim of the study

This study aimed to assess the effect of elastic abdominal binders on post cesarean section pain, distress, mobilization and women's satisfaction.

Study hypothesis

H (1): There will be a significant difference (decrease) in pain among women using abdominal binder after CS delivery.

H (2): There will be a significant difference (decrease) distress score among women using abdominal binder after CS delivery.

H (3): There will be a significant improvement in mobilization among women using abdominal binder after CS delivery.

H (4): There will be an increase in the level of satisfaction among women using abdominal binder after CS delivery.

Operational definitions

Distress: Any discomfort affect physical & psychological status.

Binder: Any material that holds together to form a cohesive whole mechanically, by adhesion or cohesion, which support back and abdomen.

Satisfaction: Feeling of comfort

Subjects and method

Design of the study: Randomized Controlled Trial design.

Study Setting: This study was applied at Mansoura new general hospital at inpatient departments and at the operating room, Dakahlia Governorate, Egypt.

Study Subjects:

Include a sample of 112 female who attending inpatient departments, Mansoura new general hospital and fulfilled the inclusion criteria, divided into comparing two groups by random assignment the control & abdominal binder group were assigned. From the prepared list the odd numbers were recruited as control group and the even number are recruited as intervention group.

Inclusion criteria

- Elective CS delivery at term, singleton viable fetus, aged 18 - 34 years old, parity not more than2, were able to read and read and write.
- CS cases that not combined with hysterectomy or other surgical operations.
- Free from medical disease and chronic pain in the past year
- No bleeding disorders or use of anticoagulants; abnormal placenta (previa or accreta).
- Not use of methadone; pre-operative hemoglobin level not less than 10mg/dL.
- Don't have chorio-amnionitis.
- Don't have general anesthesia.

Sample size

Based on data from literature ***(Karaca et al., 2013),*** concerning level of significance of 5%, and power of study of 80%, the sample size can be calculated using the following formula:

$n = [(Z_{\alpha/2} + Z_{\beta})^2 \times \{2(SD)^2\}]/$ (mean difference between the two groups)^2

Where

SD = Standard Deviation

$Z_{\alpha/2}$: This depends on level of significance, for 5% this is 1.96

Z_{β}: This depends on power, for 80% this is 0.84

Therefore,

$n= [(1.96 + 0.84)^2 \times \{2(3.2)^2\}]/ (1.7)^2=55.6$

Based on the above formula, the sample size required per each group is 56.

Data Collection:

Five tools were used to collect the necessary data:

Tool one: A Structured Interview Schedule, which was developed by the researchers after searching and reviewing the related literatures; it entailed of three parts:

Part 1 enclosed subjects' general characteristics (age, education, occupation, residence, etc.)

Part 2 contained subjects' reproductive history such as parity, age, number of previous CS deliveries, gestational age at CS delivery (weeks), infant birth weight, reason for CS delivery.

Part 3 contained of analgesic medications, first time for initiation of breastfeeding.

Tool two: ***Numerical Rating Scale:*** it allows the women in pain to rate their pain score. In this scale, the

user had the option to verbally rate their scale from 0 to 10 or to place a mark on a line indicating their level of pain. 0 indicates the absence of pain, while 10 represents the most intense pain possible. The score distance between (1 and 3) is a mild pain while between (4 and 6) indicated moderate pain and between (7 and 10 score) indicated sever pain (**Jones, 2007**, **Breivik,, 2008 & Jacques**, **2009)**. The degree of pain was recorded on 8hrs, 24 &48 hours and after one week after discharge.

Tool three: Symptom Distress Scale: it covered distress syndrome and was adopted from **McCorkle R, and Young K. (1978)**. This scale included the following 14 symptoms: nausea; vomiting; fatigue; pain; trouble sleeping; anorexia; coughing; difficulty breathing; lacrimation; restlessness; changes in the ability to concentrate, body temperature, bowel elimination, and physical appearance. Each symptom is rated on a 5-point Likert-type scale (0=no occurrence of distress while 4=greatest occurrence of distress). Each measure is given a score of 0–4 by the woman, with high scores indicates high levels of distress. Thus, the total SDS score ranges from 0 to 56. It was measured 4 times 1st at 8 hours, 2nd at 24 hours and 3rd at 48 hours and 4th after one week after discharge.

Tool four: 6-Minute Walk Test; It was adopted from **Shoemaker et al., (2013) & Gremeaux et al., (2011)** and was used to measure the 6 MWT. This scale was also used to evaluate the physical functions of the patients. The researcher recorded the distance the women walked in 6 min in meters. It was measured 4 times 1st at 8 hours, 2nd at 24 hours and 3rd at 48 hours and 4th after one week after discharge.

Tool five: Woman's Satisfaction Likert scale: it was utilized to assess post CS woman's satisfaction about using the binder; this scale was developed by the researchers. It consists of 5 items that clarified the reason for satisfaction (e.g., the binder provide support to their back, has no side effects, cost effective). Likert scale was utilized three points for assessing level of satisfaction (satisfied scored 3, to some degree scored 2 and not satisfied scored 1), the total score was ranged from 5to 15. The higher score indicates the higher level of satisfaction. It was measured after one week from discharge.

Validity of the Tool: by 3 jury experts and specialized university professors in maternity nursing field tools were reviewed to evaluate the validity of the content. Also, according to their evaluation, recommended modifications were considered.

Reliability of the Tools:

Reliability of the study tools was evaluated for 10 women through pilot study by using Cronbach's α (alpha). It was 0.72 for tool 2, 0.70 for tool 3, 0.73 for tool 4 and 0.76 for tool 5.

Ethical Considerations:

- First an ethical approval was obtained from woman's health and midwifery nursing department and

an official letter the head of obstetrics and gynecology department at Mansoura new general hospital.

- Informed consent was taken from the each participant after explaining the aim.
- The information obtained from the participants should be coded and properly maintained to ensure their confidentiality.
- The participants should be informed about their rights to withdraw at any time of data collection or refuse participation in the study without any reinforcement to them.
- The researcher's explain to the participants that the study procedures couldn't cause any harm to them.

Pilot Study:

A pilot study was performed on 10 cases for the purpose of evaluating the applicability and relevance of the study tools and to determine the clarity of the developed questionnaire as well as to measure the proper time needed by every woman to answer them. After that appropriate modifications were done. As a result of the pilot study, the options of second tool was changed from five to three scoring system to accommodate the women's responses. These mothers were excluded from the study sample.

Field Work:

The present study was carried out in the period from September 2019 to March 2020, for a period of 7 months. The researchers divided the study sample into two groups; binder and control group by using closed envelop. The researchers collected the baseline data. The implementation of the study take into three phases (pre assessment phase, implementation phase, and evaluation (post assessment phase):

Pre-assessment phase

A comfortable, private room was selected for the participants who fulfilled the inclusion criteria of the study. Explanation was done about the aim of the study and informed consent was taken from each mother. Each studied mother was individually interviewed where the pre assessment phase was done. Demographic data were collected at time of admission and the obstetric history was obtained from the medical records of participants. The researcher allowed the women in the binder group to see the binder and explain to them where and how the binder can be applied. The women in the intervention group were instructed that the binder will be applied immediately after CS delivery and as the recover from the anesthesia; they will found the binder fitted to their abdomen. The women were encouraged to apply the binder day and night in the first 7 days postpartum, she can remove only while talking shower.

Implementation phase

- This phase was started immediately after CS at the operating room. The mothers in the binder group were fitted with the device that was placed low on the abdomen across the incision before

leaving the operating room. After the mother was transferred to the inpatient unit, they were instructed to continue wearing the binder for the first 48 hours postoperatively. The AB is made of latex free elastic material with a hook-and-loop adjustable closure system.

- Mothers in the control group were not given any opportunity to wear an abdominal binder and receive only the routine hospital care after delivery. During the postoperative hospital stay mothers in both groups were assessed at different time periods at (8, 24, 48 hours) before hospital discharge.
- Firstly, the researcher measured the level of pain during previously mentioned periods among both group using the Numerical Rating Scale. Then, assessed the symptoms of distress at the same periods of time.
- As well as, the researchers recorded the time of certain activities done by the mothers like first time initiation of breast feeding.

Assess 6MWT at 8 hrs 24hrs, 48hrs and 1 week by giving complete explanation about the test as following:

- **Prior to walking say the following tips to the mother: The** objective of this test is to walk as far as possible for 6 minutes. Mother was asked to walk back and forth for six minutes. She asked do not talk during the test unless she has a problem or a question. Mother can slow down if necessary. If the mother stop, it is very useful to continue walking again as soon as possible. The researcher informed the mothers of the time and encouraged them each minute. When the six minutes was up, the researcher asked the mothers to [STOP] where they were.
- **At the beginning, say to mother: Start now, or whenever you are ready [start stop watch when walking starts].**
- **During the test: Provide the following specific encouragements in even tones. Do not use other words for encouragement or other body language to speed up.**

- At 1 minute: mother is doing well. Mother has 5 minutes to go.
- At 2nd minute: Maintaining the good work. Mother has 4 minutes to go.
- At 3rd minute: mother is performing well. This means halfway done.
- At 4th minute: Keep up the good work. Mother has only 2 minutes left.
- At 5th minute: mother is performing well. This means have only 1 minute to go.
- At 6th minute: Please stop where you are.
- Allow the woman to rest or sit in a chair if they want.

- After ending the test: Record the total distance of walk in both group.

Evaluation (post assessment phase)

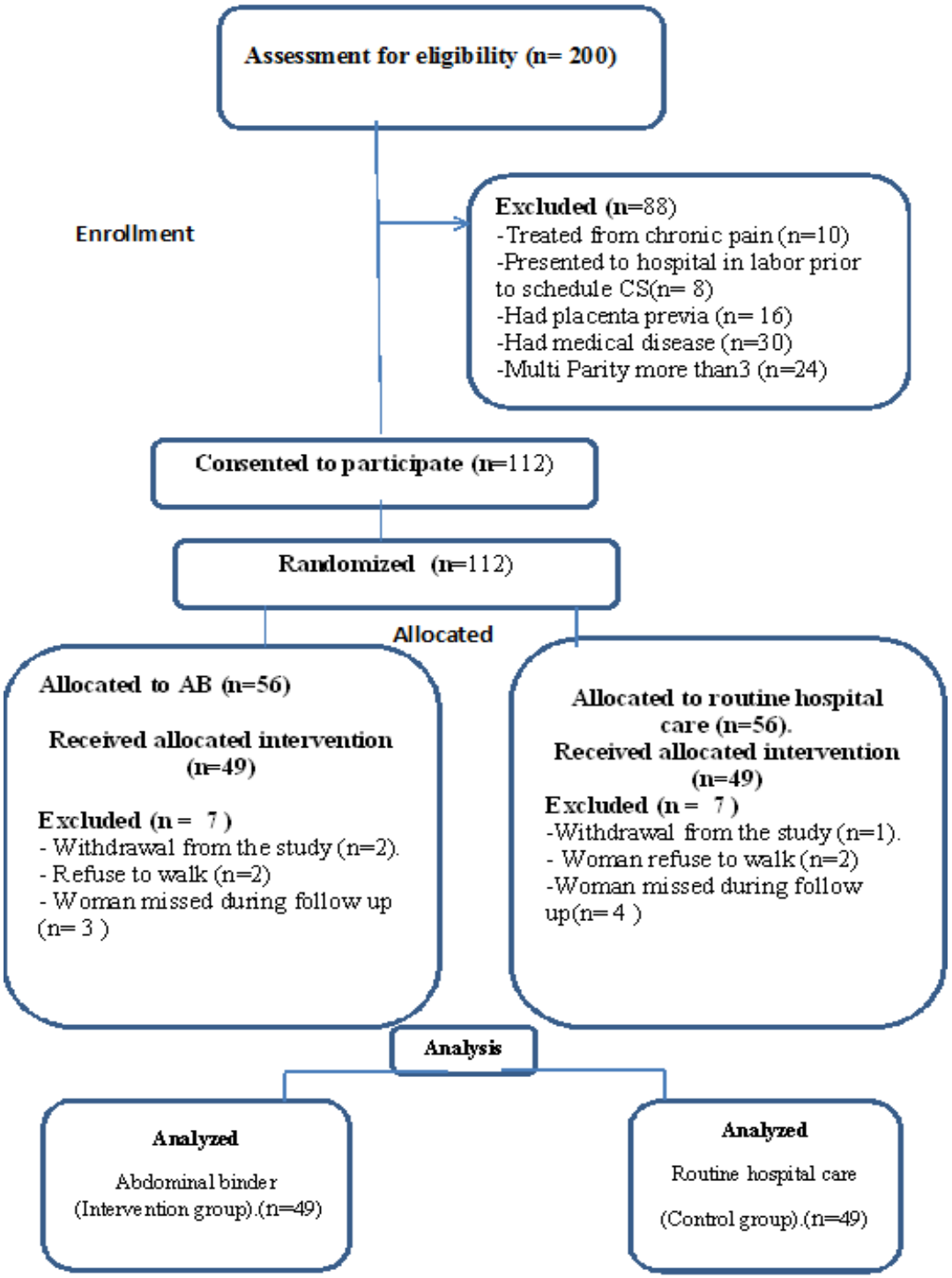
- After one week from discharge, pain level distress symptoms and 6MWT were assessed during follow up visit after one week from discharge among both groups.
- If women did not come during the follow up visit, women was assessed trough telephone calls.

- Finally assess mother satisfaction regarding using AB after CS delivery.

- **Limitation of the study**

Loss of some cases from AB group, and control group as flow chart.

Statistical analysis: using SPSS Inc. version 21. Data were presented as frequency and percentages (qualitative variables) and mean ± SD (quantitative continuous variables). The paired t-test was used for comparison. χ^2, Fisher Exact Test, Monte Carlo correction**..**Cronbach's α (alpha) is used to measure the reliability of the sample test score. Statistical significance was considered at a value $p < 0.05$, a very significant difference obtained at $P < 0.01$ and a non-significant difference obtained at $P > 0.05$.



Flow chart of studied sample

Results

Table (I): Distribution of the studied sample according to their general characteristics

General characteristics	Study Group(AB) (n= 49)		Control Group (n= 49)		F / χ^2 (P) t-test (P)
	No	%	No	%	
Residence:					0.042
- Rural	29	59.2	28	57.1	(0.838)
- Urban	20	40.8	21	42.9	
Age: (Mean & SD)	29.9 ± 3.2		29.2 ± 3.6		1.017 (0.312)
Level of education:					
- Read & write	4	08.2	5	10.2	0.267
- Primary & preparatory	38	77.5	38	77.5	(^{Mc}p=1.000)
- Secondary	7	14.3	6	12.3	
Parity: (Mean & SD)	1.85 ± 0.6		1.8 ± 0.8		0.350 (0.727)
Gestational age at CS (weeks): (Mean & SD)	38.6 ± 0.6		38.5 ± 0.9		0.647 (0.519)
Number of CS deliveries:					0.169
- One	28	57.1	30	61.2	(0.681)
- Two	21	42.9	19	38.8	
Need for analgesic:					
- Need but not met	14	28.6	40	81.7	41.460
- Need and met	1	2.00	5	10.2	(^{Mc}p<0.001)**
- No need	34	69.4	4	08.1	
Baby's weight (kg): (Mean & SD)	2.24 ± 2.5		2.26 ± 3.2		0.035 (0.972)

F (P): Fisher Exact Test & P for FET-Test,

χ^2 (P): Chi-Square Test & P for χ^2 Test

(Mc)Monte Carlo correction

Correction for chi-square when more than 20% of the cells have expected count less than 5

*: Significant at P ≤ 0.05

**: Highly Significant at P ≤ 0.001

Table (1) shows the distribution of the studied sample according to their general characteristics. ***Residence*** illustrated that almost three-fifths (59.2% & 57.1%) of the study and the control groups respectively were rural dwellers, while

nearly two-fifths (40.8% & 42.9%) of both groups respectively were urban dwellers. ***The mean age*** also demonstrated that the study and the control groups were 29.9 ± 3.2 & 29.2 ± 3.6 years old respectively. In addition, ***level of education*** displayed that a sizeable proportion of the former and latter groups (77.5% & 77.5%) respectively had primary & preparatory level.

Moreover, the ***mean parity*** among the study and the control groups was 1.85 ± 0.6 & 1.8 ± 0.8 deliveries respectively, while the ***mean gestational age*** among them was 38.6 ± 0.6 & 38.5 ± 0.9 weeks respectively. Furthermore, number of CS deliveries was one among almost three-fifths & more (57.1% & 61.2%) of the study and the control groups respectively, while about two-fifths & more (38.8% & 42.9%) among the latter and the former groups respectively.

However, ***analgesia*** was needed but not met by the majority of the control group (81.7%), compared to a minority of the study group (28.6%). On the other hand, it was not needed by a sizeable proportion of the latter group (69.4%), compared to only (8.1%) of the former group. finally, the ***mean baby's weight*** was 2.24 ± 2.5 & 2.26 ± 3.2 kg among the study and the control groups respectively.

No statistically significant differences was found between the two groups' general characteristics, except for need for analgesia, which was highly significant (P=0.001)

Table (2): Number and percent distribution of the studied sample according to their first time for initiation of breastfeeding

Hours	First time for initiation of breast feeding			
	Study Group(AB) (n= 49)		Control Group (n= 49)	
	No	%	No	%
2 hours	44	89.8	-----	-----
3 hours	5	10.2	5	10.2
4 hours	---	---	24	48.9
5 hours	---	---	16	32.7
6 hours	---	---	4	08.2
F / χ^2 (P)	88.00 (0.001)**			

F (P): Fisher Exact Test & P for FET-Test
χ^2 (P): Chi-Square Test & P for χ^2 Test
*: Significant at P ≤ 0.05
**: Highly Significant at P ≤ 0.001

Table (2) clarifies the number and percent distribution of the studied sample according to their first time for initiation of breastfeeding. breastfeeding was highly statistically significant (P=0.001) between the study(AB) and the control groups, where they were initiated after 2 hours by 89.8% of the study group(AB), while they were initiated after 4 hours by 48.9% of the latter group.

Table (3): Distribution of the studied sample according to their mean score of symptom distress and pain intensity scales

Scales	Study Group(AB) (n= 49)	Control Group (n= 49)	t-test (P)
	M ± SD	M ± SD	
Symptom Distress:			
8 hours	12.38 ± 1.04	12.63 ± 0.97	1.211 (0.229)
24 hours	10.70 ± 1.15	14.38 ± 1.13	18.988 (<0.0001) **
48 hours	7.02 ± 0.901	12.42 ± 1.08	24.583 (<0.0001) **
Follow up (7 day)	5.53±0.50	11.48±0.58	64.756(<0.0001) **
Pain intensity			
8 hours	7.04 ± 1.4	9.65 ± 0.4	12.32 (<0.0001) **
24 hours	4.65 ± 1.1	7.77 ± 1.2	12.872 (<0.0001) **
48 hours	2.35 ± 0.7	3.83 ± 0.4	12.292 (<0.0001) **
Follow up(7 day)	1.3±0.5	3.2±0.5	18.87(<0.0001) **

*: Significant at P ≤ 0.05

**: Highly Significant at P ≤ 0.001

Table (3) presents the distribution of the studied sample according to their mean score of symptom distress and pain intensity scales. The ***mean symptom distress score*** was highly statistically significant (P=<0.0001) between the study and the control groups after 24 & 48 hours & follow up, where it was 10.70 ± 1.15, compared to 14.38 ± 1.13 after 24 hours and 7.02 ± 0.90, compared to 12.42 ± 1.08 after 48 hours, 5.53±0.05 compared to11.48±0.58 at follow up. The ***mean pain intensity score*** was also highly statistically significant (P=<0.0001) between the study and the control groups after 8, 24 & 48 hours, where it was 7.04 ± 1.4 , compared to 9.65 ± 0.4 after 8 hours, 4.65 ± 1.1, compared to 7.77 ± 1.2 after 24 hours and 2.35 ± 0.7, compared to 3.83 ± 0.4 after 48 hours. In addition 1.3±0.5 compared to3.2±0.5 at follow up.

Table (4): Distribution of the studied sample according to their mean score of 6MWT test

6MWT test	Study Group (n= 49)	Control Group (n= 49)	t-test (P)
	M ± SD	M ± SD	
8 hours	96.65 ± 9.5	75.77 ± 10.24	9.09 (<0.0001) **
24 hours	110.61 ± 12.65	89.75 ± 7.5	9.30 (<0.0001) **
48 hours	140.82 ± 16.53	102.18 ± 7.60	14.75 (<0.0001) **
Follow-up(7 day)	152.24±19.31	112.35±9.79	12.21(<0.0001) **

*: Significant at P ≤ 0.05

**: Highly Significant at P ≤ 0.001

Table (40 manifests the distribution of the studied sample according to their mean score of 6MWT test. The mean score was highly statistically significant (P=<0.0001) between the study and the control groups after 8, 24 & 48 hours, where it was 96.65 ± 9.5, compared to 75.77 ± 10.24after 8 hours, 110.61 ± 12.65, compared to 89.75 ± 7.5 after 24 hours and 140.82 ± 16.53, compared to 102.18 ± 7.60 after 48 hours, 152.24±19.31, compared to 112.35±9.79 at follow up.

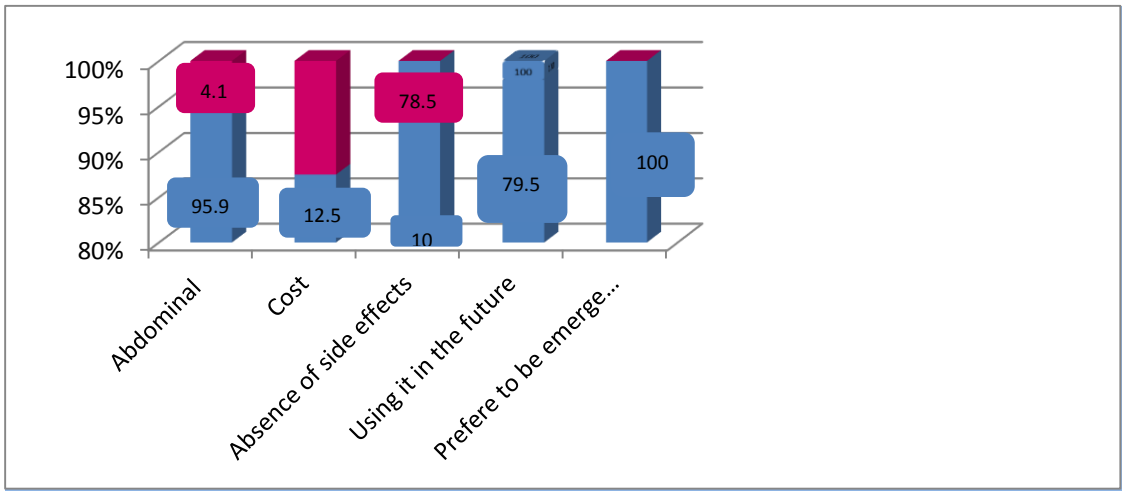


Fig (2): Percent distribution of the study group according to their satisfaction with using binder

Fig (2) demonstrates the percent distribution of the study group according to their satisfaction with using binder. It was revealed that all (100%) of the study group were satisfied because of absence of side effects and reported that they will prefer to emerge the binder as a routine care. Almost all of them (97.9%) were also satisfied and reported that they will use the binder in the future. In addition, most and the vast majority of the study group (95.9% & 87.5%) were satisfied with abdominal and back support as well as cost respectively.

Discussion

The aim of the present study was to assess the effect of elastic abdominal binders for post-cesarean section pain, distress, mobilization and women's satisfaction was achieved. Also, the study hypothesis was achieved within the frame work of the present study. The study findings handled the answer of **H (1) and H(2):** There will be significant differences (decrease) in pain intensity and distress scores among women using AB after CS delivery.

Regarding pain score the current study showed that there was a highly statistically significant difference in pain score in the first 8, 24, 48 hours and during follow up after delivery in the binder group than control group, as well as the majority women in the control group ordered analgesic for pain relieve more than the binder group but according to hospital policy, their orders cannot be met. This finding was supported by **Singdaeng, etal., (2020),** who reported that the use of an AB reduced pain in the 6, 24, and 48 hours post CS. Also, **Ghana, et al., (2017)** who, study about "Randomized controlled clinical trial of abdominal binders for postoperative pain, distress, and blood loss after CS delivery",found that post- CS delivery pain scores were decreased when wearing a binder than the non-binder group. As well as, **Larson et al.,(2009)** found that using abdominal binder after CS delivery had a great effect on decreasing post-operative pain and increased women's feeling of comfort during binder use. In addition, **Rothman et al., (2014)** showed that using AB after CS delivery had a great effect in lowering pain score among the intervention AB group than the control one. This finding may be due to effect of AB which provides direct support the abdominal muscles and minimizes the direct pressure on the CS incision, leading to decreased pain.

Concerning symptoms distress scale, the current study revealed that there was no statistically significant difference related to distress in the first 8 hours after delivery, while there was a highly statistically significant difference in the distress symptoms in the first 24 hours and in 48 hours also, during follow up after delivery. The finding was in agreement with **Karaca et al., (2019)**, who reported that AB usage reduces distress at all time periods after delivery. More over **Ghana et al., (2017)** who reported that women who had AB experienced significant decreases in SDS scores after CS delivery compared to control group.

Also, the present finding is in agreement with **Cheifetz et al., (2010),** who measured SDS scores for 5 days after surgery and found significant decrease in the distress symptoms among the binder group than non- binder group. On the contrary, it is in disagreement with the study of **Gillier et al., (2016**), who study about "A randomized controlled trial of AB for the management of postoperative pain and distress after CS delivery". They reported that distress symptoms slightly decreased among binder group than non- binder group. This contrast may be due to difference in the study

population as the Egyptian females can cope earlier with distress symptoms than others as well as receive social support from family, friends and neighbors.

Concerning to the answer of **H (3) and H (4):** There will be a significant improvement in mobilization and increase in the level of satisfaction among women using AB after CS delivery.

The current study found that 6MWT in the first 8 hours and on postoperative day l and 2 and during follow up, that there were a highly statistically significant different in the binder group versus the non-binder group and the walking distance of the intervention AB group at 6MWT was significantly longer than that of the control group. This finding was in agreement with **Cheifetz et al., (2010)** who used an abdominal binder to reduce abdominal circumference after cesearean delivery and compared the 6 MWT distance between postoperative day 1, 3, and 5 and found that 6MWT on day 5 in the binder group was better than the control group. This finding may relate to level of pain, parity status, and using of AB.

As well as **Arici et al., (2016),** " who study about the effect of using an AB on post-operative gastro-intestinal function, mobilization, pulmonary function, and pain in patients undergoing major abdominal surgery: a randomized controlled trial" sated that similarly used an abdominal binder after cesarean delivery to assess mobilization. They compared 6 MWT distance at postoperative day 1, 4, and 7 and found that an abdominal binder increased women mobility at day 4 and 7 after surgery This is due to abdominal binder reduced postoperative pain, help the women to feel safe and secure so encourage ambulation and early movement. This findings was in contrast with' **Singhdaeng et al., (2020)** who reported that 6MWT on postoperative day l and 2 were not different in the binder versus the non-binder group. This contrast may be due to the healing process after cesarean delivery is faster than other operation and the effect of binder can be observer in the first hours than after the first and second day after operation.

The present study revealed that most of the binder group were satisfied with using binder, the women reported that using binder provide support to abdomen and back, had no side effects, had low cost that help them to buy it, and the majority of them had the desire to use the binder in future delivery and recommended to use as a routine hospital care. These finding was supported by **Ghana et al., (2017),** who reported that women were satisfied by wearing abdominal binders because it had no side effects and easy to use. Also' **Gillier et al., (2016)** reported that women in the binder group were satisfied by using it because it provide more support to cerearean incision as well as it had no adverse effects

The current study found that most of the binder group had their first time for initiation of breast feeding at the first two hours while the majority of the women in the control group had

their first time for initiation of breast feeding after four hours. These finding were supported **Gillier et al., (2016)** who reported that using abdominal binder helped the women for early initiation of breast feeding , perform and improve their physical condition. Also these findings were in agreement with **Cheifetz et al**., **(2010)** who found that women in the women in the binder group were able to handle their babies and started earl initiation of breast feeding than control group. This finding may be due support from binder which decrease level of pain so mothers can start her mother role early from initiation of breast feeding, carry & providing care to her baby.

Finally, it was evident from the present study that using abdominal binders after cesarean delivery had a positive effect in alleviating post cesarean pain and improves mobilization through increase distance of walking than control group. Also, using abdominal binder improve distress symptoms' and increase physical ability of women which facilitate early initiation of breast .Moreover, increase level of satisfaction as reported by the women. Because, using (AB) after cesarean delivery is a cost- effective, non-pharmacologic intervention, simple, comfortable device and could be prescribed to the women after cesarean delivery as a helpful intervention. So, that the present study aim was achieved.

Conclusion

From the current study finding the using of abdominal binders after CS an delivery had a significantly improvement in the post CS pain, lowering distress symptoms' and foster mobilization in the intervention AB group than control group. Also, it was concluded that binder group initiation of breast feeding earlier than non-binder group. In addition women in the binder group were more satisfied by wearing the binder and were comfortable with it.

Recommendation

The current study recommended that :

- Increase awareness of women & health care providers about positive effect of abdominal binder
- Designing& distributing a broushour about importance of applying abdominal binder to all women who indicated to deliver by cesarean delivery before operation
- Trials for applying abdominal binder as a one of routine hospital care after cesarean deliveries.

Further Researches should be performed to:

- Further studies should be encouraged to evaluate the effect of using abdominal binder after major gynecological operation as hysterectomy.
- Further studies should be performed to evaluate the long-term effects of binder use.

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Conflict of Interest Disclosure

Researchers declared that there is no conflict of interest in the research.

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