



Effectiveness of abdominal support on walk performance, pain and pulmonary function among patients with post abdominal surgery

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Abstract:

Abdominal binders are compression belts that encircle abdomen, commonly used to augment the recovery process after abdominal surgery. Speed recovery not only promotes wound healing but also safeguards against deep vein thrombosis, hypostatic pneumonia, and muscle atrophy according to the latest enhanced recovery after surgery concept. Abdominal binder helps to reduce postoperative pain, distress, and improve functional capacity after surgery. The present study aims to assess the effectiveness of abdominal support on walk performance, pain and pulmonary function among patients with post abdominal surgery at SGRD Hospital, Sri Amritsar, Punjab. Quasi experimental study design was adopted for this study. 60 patients with Post Abdominal Surgery were included in this study (30 in Experimental group and 30 in control group). The sample was selected by using purposive sampling technique. Abdominal binder was given to the patients in experimental group and without binder for patients in control group. Post-assessment of pain, walk performance and pulmonary function was done on 1st, 3rd and 5th post-op day. The findings of study reveals that abdominal binders was effective in reducing the pain and improving the walk performance and pulmonary function among patients with post abdominal surgery in experimental group as compared to control group and was found to be statistically significant at $p<0.05$. The study concluded that abdominal binder increases patient mobility soon after surgery. The study suggests that abdominal binder, as a non-pharmacologic method can be advised for the patients' after abdominal surgery to enhance early mobilization.

Keywords: Walk performance, Pain, Pulmonary function, Post abdominal surgery.

INTRODUCTION:

Major abdominal surgeries primarily include surgeries involving gut manipulation in the form of resection, anastomosis or stoma formation. It is fairly common to see various complications following these surgeries that may require invasive treatment in the form of re-exploration or intensive care management. These complications can be avoided altogether by enforcing rigorous peri- and postoperative care measures. The use of abdominal binders postoperatively is one such measure that can greatly enhance the recovery process.¹

After surgery often the patient's freedom of movement is restricted due to intravenous infusion, various tubes or drains that must accompany the patient during ambulation. Modified early ambulation provides patient to develop self-confidence, reduce anxiety and ensure a sense of participation in care, thus protecting the patient from injury, harm and complications.²

Many perioperative events can affect postoperative respiratory complications. General anesthesia and surgery prolonged more than three hours are associated with a higher risk of pulmonary complications. Notably, transverse and upper abdominal incisions are also related to greater rate of postoperative respiratory complications than longitudinal midline and lower abdominal incisions. Therefore, it is recommended for nurses to assess patent airway appropriately. The suitable method is observing the client and assessing the breathing pattern at rest. Pulmonary complications are a leading cause of morbidity and mortality following abdominal surgery.³

Mobilization in postoperative patients may be defined as low intensity exercise that aims to elicit cardiopulmonary responses which enhance oxygen transport and assist in the reduction of postoperative pulmonary complications. Postoperative symptoms delay recovery, prolong the length of stay, require more home care after discharge, and diminish patient's quality of life that leads to the increase in cost of health care systems.⁴

Early ambulation is an important component of post-operative care after abdominal surgery. Early ambulation involves an upright position appears to be of great benefits in the early post-operative period with the evidence of improvement in pulmonary function. Upright ambulation assists in prevention of functional decline and may have a positive effect on depression and anxiety. Modified early ambulation following abdominal surgery has been measured as the time taken to achieve mobility goals such as out of bed, ambulating with assistance or ambulating independently.⁵

Basically, an abdominal binder is a broad compression belt that will encircle the abdomen region. Apart from the above-mentioned uses, some abdominal binders will offer secondary lumbar support as well. Some others will have straps to hold the surgical drainage tubes in position. In general, the abdominal binders are used to speed up the healing process after undergoing an abdominal surgery. The abdominal binders serve several important functions. This is especially true in the early post-surgery stages of abdominal surgeries. Firstly, these abdominal binders will offer both compression, as well as support to the upper and lower abdominal regions. Secondly, they will help enhance blood circulation and oxygen levels at the site of operation, thereby; they decrease the risk of swelling and increase the chances of healing.⁶

An abdominal elastic binder (girdles, trusses, abdominal belts, longuette, etc.) is a wide belt that surrounds the abdomen and supports the incision. Abdominal binder is routinely used after open surgery and Cesarean section, because it has been reported, according to a recent systematic review, to facilitate enhanced recovery after surgery (ERAS) such as pain relief, reduced risk of seroma formation, improved respiratory function, and assisted physical function using additional support to the lower abdominal musculature.⁷

Abdominal binder helps to reduce postoperative pain, distress, and hemorrhage after cesarean section. These are also used in patients with spinal cord injury to support the abdomen, to maintain intraabdominal pressure, improve respiratory function and improve overall mobility. They decrease postoperative pain, psychological stress, promote postoperative recovery and prevent abdominal wall dehiscence in open abdominal surgeries. Abdominal binders are safe after midline laparotomy as these minimally affect respiratory mechanics, intraabdominal pressure and wound healing.⁸

Hence the elasticized abdominal binder on surgical site will reduce the post-operative complications, reduce the hospital stay, improve pulmonary function and promote the surgical site wound healing among post abdominal surgery patients.

Problem Statement

A Quasi Experimental Study to Assess the Effectiveness of Abdominal Support on Walk Performance, Pain and Pulmonary Function among patients with Post Abdominal Surgery at SGRD Hospital, Sri Amritsar, Punjab.

Aim of the study

The aim of the study was to assess the Effectiveness of Abdominal Support on Walk Performance, Pain and Pulmonary Function among patients with Post Abdominal Surgery.

Objectives of study

1. To assess the walk performance, pain and pulmonary function among post abdominal surgery patients in experimental and control group.
2. To assess the effectiveness of abdominal support on walk performance, pain and pulmonary function among post abdominal surgery patients in experimental group and control group.
3. To find out association of walk performance, pain and pulmonary function among post abdominal patients with their demographic variables in experimental group and control group.

Operational Definitions

Abdominal Surgery Patient: Abdominal surgery patient refers to patients who have undergone abdominal surgery with 1st postoperative day to 5th postoperative day.

Abdominal Support: Abdominal support refers to use of elasticized abdominal binder to support the surgical incision site of post-abdominal surgery patients. (with use of Tynor abdominal binder)

Walk Performance: Walk performance refers to the post abdominal surgery patient's ability to walk for a distance in meters which is assessed by 6- minute walk test.

Pain: Pain refers to unpleasant physical discomfort experienced by post abdominal surgery patients which is assessed by Numerical Pain Rating Scale.

Pulmonary Function: Pulmonary Function refers to Force Expiratory Volume of post abdominal surgery patients with use of incentive spirometry (3 air chamber).

Hypothesis

H0 - There will be no significant difference in use of abdominal support in experimental group and without use of abdominal support in control group on level of pain, walk performance and pulmonary function among post abdominal surgery patients.

H1 -There will be significant difference in use of abdominal support in experimental group and without use of abdominal support in control group on level of pain, walk performance and pulmonary function among post abdominal surgery patients.

METHODOLOGY:

Research Approach

For the present study quantitative research approach was adopted to assess the effectiveness of abdominal support on walk performance, pain and pulmonary function among patients with post abdominal surgery at SGRD Hospital, Sri Amritsar, Punjab.

Research Design

To accomplish the objectives of the study and to evaluate the effect of independent and dependent variable the quasi experimental research design is used in this study.

Research Setting

The present study was conducted at surgical wards of Sri Guru Ram Das Hospital, Vallah, Sri Amritsar, Punjab.

Variables under study

Independent variables: Application of abdominal binder

Dependent variables: Pain, walk performance and pulmonary function among post abdominal surgery patients.

Population

The population of the present study was patients admitted in surgery wards at Sri Guru Ram Das Hospital, Vallah, Sri Amritsar.

Target Population:

The target population of the present study was post abdominal surgery patients admitted to surgical wards at Sri Guru Ram Das Hospital, Vallah, Sri Amritsar.

Sample size:

The study was conducted on 60 post abdominal surgery patients (30 in control group and 30 in experimental group)

Sampling technique:

Purposive sampling technique was used to draw sample from target population, after considering inclusion and exclusion criteria.

Inclusion Criteria: Patients who are:

- conscious and co-operative
- 20 to 60 years of age.
- patient's who are able to speak and read Punjabi, Hindi or English.
- patient's who have undergone abdominal surgery
- available at the time of data collection

Exclusion Criteria: Patients who are:

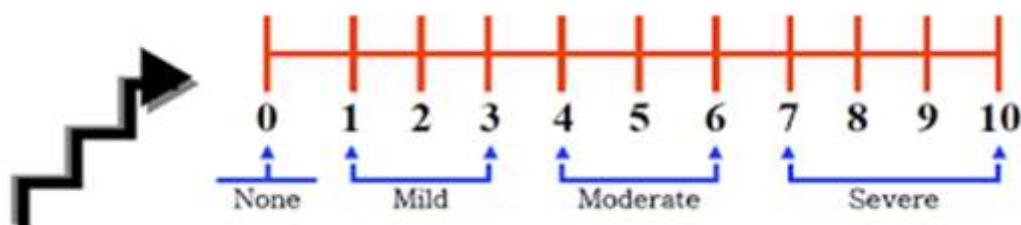
- not willing to participate in study
- critically ill post operative patient
- physically and mentally challenged patient
- patients with orthopedic and neurological disease conditions

Description of tool:

Part- A: Socio demographic data and clinical profile of patient

- Socio demographic data includes age, sex, area of residence, educational status, occupational status, marital status, family income per month, cigarette smoking per day and consumption of alcohol.
- Clinical profile of patient includes present abdominal surgery, previous abdominal surgery, incision type, previous history of DVT, co-morbid diseases, previous experience with abdominal binder application and previous experience with incentive spirometry.

Part- B: Numerical pain rating scale.



PART C: 6 Minute walk test (6MWT) for walk performance

Steps:

For every 100 m up to 600 m marking was done to observe the patient during walking and to measure and interpret the walking distance.

Patient was asked to walk with/without out application of abdominal binder.

Score interpretation of 6 MWT:

Walking Distance in 6 mins	Category	Score
>400 m	Good	3
200-400 m	Average	2
<200 m	Poor	1

PART D: Pulmonary function test with incentive spirometry (3 Air Chamber)

Zones of incentive spirometry	Readings	Category	Score
GREEN ZONE	80-100%	GOOD	3
YELLOW ZONE	50- 79%	FAIR	2
RED ZONE	< 50%	POOR	1

Reliability of the Tool

The reliability of Numeric Pain Rating Scale was determined by using inter-rater reliability was calculated by Pearson Correlation and was found 1.00.

The reliability for the Six Minute walk test tool was measured by using test-retest method using cronbach's formula (0.715)

The reliability for the incentive spirometry tool was measured by using test-retest method using cronbach's formula (0.734)

Description of the Intervention

Six Minute walk test (6MWT):

This test measures the distance an individual is able to walk with use/without use of abdominal binder over a total of six minutes on a hard flat surface.

Patient preparation:

- Patient will be explained about the procedure
- Patient is asked to wear comfortable clothing.
- Patient is permitted to walk for 6 minute.

Incentive spirometry test:

It is the device that measures how deeply an individual can inhale (breath in) through using incentive spirometer with use/without use of abdominal binder.

Patient Preparation:

- Patient will be given clear instructions about the use of the device
- Patient should be in relaxed position suitable for breathing (sitting upright in a chair)
- Patient creates tight seal around the mouth piece and inhales deeply and slowly.

RESULTS AND DISCUSSION:

Table 1: Frequency and percentage distribution of demographic variables

N=60

S.No	Demographic variables	Experimental		Control		Chi-square df p value
		f	%	f	%	
1	Age in years					
	a. 20-29	4	13.3	8	26.6	2.476
	b. 30-39	12	40	12	40	3
	c. 40-49	9	30	5	16.7	0.479 NS
2	Sex					0.268
	a. Male	15	50	17	56.7	1
	b. Female	15	50	13	43.3	0.604 NS
3	Area of residence					0.601
	a. Rural	13	43.3	16	53.3	1
	b. Urban	17	56.7	14	46.7	0.438 NS
4	Educational status					2.887
	a. Primary education	4	13.3	1	3.3	3
	b. Secondary education	12	40	11	36.7	0.409 NS
	c. Higher secondary	11	36.7	12	40	
5	Marital status					0.741
	a. Unmarried	2	6.7	4	13.3	1
	b. Married	28	93.3	26	86.7	0.389 NS
6	Occupational status					6.025
	a. Unemployed	4	13.3	3	10	3
	b. Self employed	13	43.4	21	70	0.110 NS
	c. Government employee	3	10	0	0	
7	Income per month (Rs).					42.228
	a. Less than 10000	3	10	28	93.3	3
	b. 10001-20000	13	43.3	2	6.7	0.00*
	c. 20001-30000	12	40	0	0	
8	Income per month (Rs.)					2.069
	a. Never	30	100	28	93.3	1
	b. 1-2	0	0	2	6.7	0.150 NS

*p<0.05 level of significance

NS-Non significant

Table 1 reveals the homogeneity of demographic variables of samples between experimental and control group was tested by chi-square test. There was a significant association found between Income per month in experimental and control group, hence they are Non homogenous and there is no significant association found between the other demographic variables in both the groups and hence they are homogenous.

Table 2: Frequency and percentage distribution of clinical variables

S.No	Clinical variables	Experimental		Control		Chi-square df p value
		f	%	f	%	
1	Present abdominal surgery					
	a. Cholecystectomy	9	30	9	30	0.720
	b. Laparotomy	7	23.3	7	23.3	4
	c. Appendectomy	6	20	7	23.3	0.948 NS
	d. Gastrojejunostomy	5	16.7	4	13.4	
2	e. Gastroduodenostomy	3	10	3	10	
	Previous abdominal surgery					
	a. Yes	7	23.3	7	23.3	---
	b. No	23	76.7	23	76.7	
	Incision type					
3	a. Vertical	3	42.8	2	28.5	0.311
	b. Horizontal	4	57.2	5	71.5	1
4	Co-morbid diseases					0.577 NS
	a. Diabetes mellitus	20	66.7	10	33.3	1.488
	b. Cardiac diseases	7	23.3	16	53.4	2
	c. No diseases	3	10	4	13.3	0.220 NS

*p<0.05 level of significance

NS-Non significant

Table 2 depicts the homogeneity of clinical variables of samples between experimental and control group was tested by chi-square test. The result showed that there is no significant association between the both the groups and hence they are homogenous.

Table 3: Comparison between level of pain among patients with post abdominal surgery in experimental group and control group

Comparison		Mean	SD	t value	df	p value
Day 1	Experimental	8.30	0.651	2.944	58	0.005*
	Control	8.80	0.664			
Day 5	Experimental	2.63	0.490	6.298	58	0.001*
	Control	3.63	0.718			

*p<0.05 level of significance

Table 4: Comparison between level of walk performance among patients with post abdominal surgery in experimental group and control group

N=60

Comparison		Mean	SD	t value	df	p value
Day 1	Experimental	2.73	0.450	7.071	58	0.001*
	Control	2.07	0.254			
Day 5	Experimental	1.30	0.466	3.525	58	0.001*
	Control	1.00	0.0			

*p<0.05 level of significance

Table 5: Comparison between level of pulmonary function among patients with post abdominal surgery in experimental group and control group

N=60

Comparison		Mean	SD	t value	df	p value
Day 1	Experimental	2.73	0.450	3.019	58	0.004*
	Control	2.37	0.490			
Day 5	Experimental	1.27	0.450	3.247	58	0.002*
	Control	1.00	0.0			

*p<0.05 level of significance

The present study findings showed that in response to pain on day one mean was experimental group (8.30 ± 0.651) and control group (8.80 ± 0.664) with ($t=2.944$, $p=0.005$) indicates highly significant. On day five mean was experimental group (2.63 ± 0.490) and control group 3.63 ± 0.718 with ($t=6.298$, $p=0.001$) indicates highly significant. **Aliya Ahmed, naveed Latif, Robyna Khan (2013)** conducted to assess the effect of abdominal binder on postoperative pain management among patients with abdominal surgery at tertiary care hospital, Karachi. Intervention group were given abdominal binder and control group without binder. The result showed that intervention group had significant reduction in pain as compared to control group and significant effect of abdominal binder was seen in patients with pain relief.

In response to walk performance mean in experimental group was 2.73 ± 0.450 and control group 2.07 ± 0.254 with ($t=7.071$, $p=0.001$) indicates highly significant. On day five mean was experimental group (1.30 ± 0.466) and control group (1.00 ± 0.0) with ($t=3.525$, $p=0.001$) indicates highly significant. **Oren Cheifetz, S. Deborah Lucy, Tom J. Overend and Jean Crowe (2010)** conducted a randomized control trial study to assess the effect of abdominal support on functional outcomes in patient's following Major Abdominal Surgery. findings showed that surgery was associated with marked postoperative reductions ($p<0.001$) in walk distance (approximately 75-78% day 3) and forced vital capacity (35% all days) for both groups. Improved 6MWT distance by day 5 as greater ($p<0.05\%$) for patients wearing a binder (80%) than

for the control group (48%). Pain and symptoms associated distress remained unchanged following surgery with binder usage, increasing significantly($p<0.05$).

In response to pulmonary function on day one mean was in experimental group (2.73 ± 0.450) and control group (2.37 ± 0.490) with ($t=3.019$, $p=0.004$) indicates highly significant. On day five mean in experimental group was 1.27 ± 0.450 and in control group (1.00 ± 0.0) with ($t=3.247$, $p=0.002$) indicates highly significant. The findings revealed that abdominal binders was effective in reducing the pain and improving the walk performance and pulmonary function among patients with post abdominal surgery in experimental group as compared to control group. **Galagher W, Boyd D, Chew C (2016)** conducted a similar study to assess the effect of using an abdominal binder on postoperative gastrointestinal function, mobilization, pulmonary function, and pain in patients undergoing major abdominal surgery. The findings showed that use of abdominal binder had shown effect on reducing pain, improving walk performance and pulmonary function among post-operative patients and significant at $p=<0.05$.

NURSING IMPLICATIONS

The findings of the study have implication in the field of nursing profession in the areas of nursing practice, education administration and research. Nurse acts as an educator, leader, counselor and motivator. The present study emphasized on measures to improve the walk performance, reduce pain and improve pulmonary function in post abdominal surgery patients.

Nursing Practice

- Nurses play a vital role in caring the patients after undergoing abdominal surgery.
- The nurse needs to motivate the patients for early mobilization to improve circulation and to prevent surgery related complications.
- The nurse should enhance the patients undergoing abdominal surgery to use abdominal binder during mobilization.

Nursing Education

- Education is a key component in improving the knowledge and practice of the nurses in care of patients in post operative period.
- The present study emphasized on educating the patients about use of abdominal binders and its support during early mobilization.
- Educate the patients about importance of wearing abdominal binders and its use after undergoing abdominal surgery.
- Educate the patients on breathing exercises after surgery with use of binders.

Nursing Administration

- Nursing administrators should take initiative and be involved in organizing various sessions to update the knowledge and skill among nurses to deal with patients undergoing abdominal surgery
- Nursing administrators should ensure to provide continuous education to the patients undergoing abdominal surgery on use of abdominal binders and its effects on reducing pain and improving pulmonary function.

- Nursing administrators should organize for continuous training sessions for patients undergoing abdominal surgery to follow the physical activities carried out after use of abdominal binders.

Nursing Research

- Research findings can be used as an evidence in the clinical practice for use of abdominal binders for patients undergoing abdominal surgery.
- Follow up nursing research can be conducted among patients on use of binders and its effects on pain, mobility and breathing pattern.

CONCLUSION:

The findings of the present study concluded that abdominal binder was effective in reducing the pain among post abdominal surgery patients and also in improving the walk performance and improving pulmonary function. An abdominal binder increases patient mobility soon after surgery. There was also a measurable effect on pain as reported by patients who used an abdominal binder after undergoing major abdominal surgery. The study suggests that abdominal binder, as a non-pharmacologic method can be advised for the patients' after abdominal surgery to enhance early mobilization.

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