A Study to Evaluate the Combined Efficacy of Abdominal Binders and Nutritional Care on Ambulatory Pain among Postoperative Patients in a Government Hospital, Coimbatore

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ABSTRACT

Abdominal binders and appropriate nutritional care are commonly employed to enhance postoperative recovery by reducing pain and promoting early ambulation. This study aimed to evaluate the combined efficacy of abdominal binders and nutritional care on ambulatory pain among postoperative patients who underwent abdominal surgery in a government hospital in Coimbatore. A quasi-experimental post-test only control group design was adopted. Sixty patients were selected using random sampling, with 30 assigned to the experimental group and 30 to the control group based on inclusion and exclusion criteria.

Demographic and clinical data were collected from all participants. The experimental group received both abdominal binder support and structured nutritional care, while the control group received routine postoperative care. Ambulatory pain was assessed using a numerical pain rating scale twice daily for the first three postoperative days.

On postoperative day one, the mean ambulatory pain scores in the experimental and control groups were 8.35 and 9.07 respectively, with a mean difference of 0.72, which was not statistically significant at the 0.05 level. On day two, the mean pain scores were 5.93 in the experimental group and 7.28 in the control group, with a mean difference of 1.35, showing a statistically significant reduction in pain at the 0.001 level.

The findings indicate that the combined use of abdominal binders and nutritional care is more effective in reducing ambulatory pain compared to routine care alone, thereby facilitating improved postoperative recovery and early mobility.

Keywords: Abdominal binder, nutritional care, postoperative patients, ambulatory pain, abdominal surgery, early ambulation

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Surgical procedures often induce tissue injury, leading to hyperalgesia, which, if inadequately managed, may progress to chronic postoperative pain (Sundeep, 2018). Effective pain relief is a critical component in the management of surgical patients, as it provides significant physiological and psychological benefits. Consequently, monitoring and managing postoperative pain has become an essential indicator of quality care. The primary goal of postoperative pain management is to alleviate pain and discomfort while minimizing adverse effects (Veerabhadram Garimella, 2013).

Postoperative pain is an expected outcome following surgery, yet inadequate management can delay recovery. Effective pain control is associated with improved patient satisfaction, early mobilization, reduced hospital stay,

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and decreased healthcare costs. Therefore, the prevention and control of pain remain central objectives in postoperative care (Saramma, 2020). Globally, approximately 310 million major surgeries are performed annually, with 1–4% mortality, up to 15% experiencing severe postoperative complications, and 5–15% requiring readmission within 30 days (Dobson GP, 2020). These statistics highlight the need for effective interventions that enhance recovery and minimize complications.

Following abdominal surgery, patients are typically advised to support the incision site during movement to reduce pain and prevent strain. However, continuous manual support is not feasible, making abdominal binders a practical alternative. Abdominal binders provide external support to the surgical site, restrict excessive movement, enhance circulation, reduce inflammation, and promote tissue healing. They have also been associated with reduced risk of complications such as hernia, seroma, and hematoma (Boonploeng et al., 2021).

In addition to mechanical support, adequate nutritional care plays a vital role in postoperative recovery. Proper nutrition contributes to wound healing, strengthens immune function, reduces inflammation, and supports overall physical recovery, which may indirectly reduce pain perception and improve ambulation. The combined use of abdominal binders and nutritional care may therefore provide a more comprehensive approach to managing ambulatory pain in postoperative patients.

These considerations prompted the researcher to undertake a study to evaluate the combined efficacy of abdominal binders and nutritional care on ambulatory pain among postoperative patients in a government hospital, Coimbatore.

Statement Of the Problem:

A quasi-experimental study to evaluate the combined efficacy of abdominal binders and nutritional care on ambulatory pain among postoperative patients in a selected government hospital in Coimbatore.

Objectives Of the Study:

- To assess the baseline level of ambulatory pain among postoperative patients.
- To compare pain levels between intervention and control groups.
- To evaluate the impact of nutritional care on postoperative recovery indicators.
- To determine the association between selected demographic variables and ambulatory pain.

Operational Definition:

Efficacy

Efficacy refers to the extent of reduction in ambulatory pain levels among postoperative patients following the combined use of abdominal binders and structured nutritional care. It is measured using the Numerical Pain Rating Scale (NPRS) twice daily during the first three postoperative days.

Abdominal Binder

An abdominal binder is a non-elastic supportive belt applied around the abdomen to provide external support to the surgical incision. It helps in stabilizing the abdominal muscles, reducing strain during movement, and promoting comfort during the postoperative period.

Nutritional Care

Nutritional care refers to the planned dietary management provided to postoperative patients, including adequate calorie intake, high-protein diet, micronutrient supplementation, and hydration to promote wound healing, enhance recovery, and reduce complications.

Ambulatory Pain

Ambulatory pain refers to the pain experienced by patients during movement or walking following abdominal surgery. It is assessed using the Numerical Pain Rating Scale (NPRS).

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Postoperative Patients

Postoperative patients refer to individuals who have undergone abdominal surgery and are in the recovery phase following the surgical procedure.

Hypothesis:

Null hypothesis(H_0):

There is no significant difference in ambulatory pain levels between postoperative patients receiving abdominal binders with nutritional care and those receiving standard care.

Research Hypothesis: (H_1):

There is a significant reduction in ambulatory pain among postoperative patients receiving abdominal binders combined with structured nutritional care compared to those receiving standard care.

METHODOLOGY:

RESEARCH APPROACH: Quantitative Approach

RESEARCH DESIGN: Quasi- experimental design (non- randomized control group).

RESEARCH SETTING: The study was conducted in, surgical and post-operative , wards at GH , Coimbatore

TARGET POPULATION: Patients who underwent abdominal surgery in Coimbatore

ACCESSIBLE POPULATION: Postoperative patients who underwent abdominal surgery at GH, Coimbatore

SAMPLING TECHNIQUE: Purposive sampling (n=60)

SAMPLING SIZE: 60 samples who underwent abdominal surgery.

Criteria For Sample Selection:

The purposive sampling method is employed to pick 60 patients. Patients were chosen for the study based on inclusion and exclusion criteria.

Inclusion criteria:

1. Patient age 18-65 years
2. Patients undergoing abdominal surgery.
3. Patients able to ambulate postoperatively.
4. Patients willing to participate.

Exclusion criteria:

Critically ill patients

- Patients with complications affecting mobility
- Patients with dietary restrictions and contraindicatory study diet
- Patients undergoing laparoscopic surgery

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Intervention Protocol:
Experimental group:

Application of abdominal binder

Structured nutritional care including:

- High protein diet (1.2 – 1.5 g/kg/day)
- Adequate calorie intake
- Micronutrient support (Vitamin C, zinc, Iron)
- Hydration guidance
- Brief dietary counselling

Control group:

Routine hospital care without structured intervention

Data Collection Tools:

Tool – I: Demographic and Clinical data

Tool – II: Numerical Pain Rating Scale

Data Collection Procedure:

A non-randomised quasi-experimental design with a control group was adopted for the study. A total of 60 postoperative patients were selected using random sampling based on predefined inclusion and exclusion criteria. The participants were alternately assigned to the experimental group (n=30) and the control group (n=30).

The intervention consisted of the application of abdominal binders along with structured nutritional care. In the experimental group, abdominal binders were applied from the first postoperative day and continued throughout the study period, along with appropriate nutritional support as per the planned regimen. The control group received routine postoperative care without the additional interventions.

Ambulatory pain was assessed in both groups using the Numeric Pain Rating Scale (NPRS) twice daily during the first three postoperative days. The collected data were used to evaluate the combined effect of abdominal binders and nutritional care on ambulatory pain among postoperative patients.

Data Analysis and Interpretation

Section I

Demographic details of post-operative patients with abdominal surgery

(n =60)

S. No		**No. of Patients**			
		Experimental group (n =30)		**Control group (n= 30)**	
		Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
Age	*(in years)*				
1	18 - 30	4	13.3	3	10.0
2	31 – 40	5	16.7	6	20.0
3	41 – 50	11	36.7	6	20.0
4	51 – 60	7	23.3	7	23.3
5	Above 60	3	10.0	8	26.7

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Gender					
1	Male	8	26.7	8	26.7
2	Female	22	73.3	22	73.3
Religious Status					
1	Hindu	25	83.3	21	70.0
2	Muslim	4	13.3	5	16.7
3	Christian	1	3.3	4	13.3
Dietary Pattern					
1	Vegetarian	8	26.7	6	20.0
2	Non-Vegetarian	22	73.3	24	80.0
Educational Status					
1	Illiterate	4	13.3	6	20.0
2	Primary	9	30.0	2	6.7
3	Secondary	11	36.7	11	36.7
4	Graduate and above	6	20.0	11	36.7
Occupation					
1	Government	3	10.0	1	3.3
2	Private	8	26.7	6	20.0
3	Business	3	10.0	2	6.7
4	Daily Wages	1	3.3	1	3.3
5	Unemployed	15	50.0	20	66.7
Marital Status					
1	Single	3	10.0	2	6.7
2	Married	21	70.0	21	70.0
3	Widow	6	20.0	4	13.3
4	Separated	-	-	3	10.0
Type of Family					
1	Joint	14	47.0	18	60.0
2	Nuclear	16	53.0	12	40.0
Family Monthly Income					
1	Less than 10000	1	3.3	-	-
2	10,001 to 20,000	3	10.0	2	6.7
3	20,001 to 30,000	5	16.7	4	13.3
4	30,000 above	21	70.0	24	80.0

Section – II: Clinical Variables

S.No	Characteristics	Experimental Group (n=30) Frequency	Experimental Group (n=30) Percentage (%)	Control Group (n=30) Frequency	Control Group (n=30) Percentage (%)
Diagnosis					
1	Abdominal blunt injury	1	3.3	1	3.3
2	Abdominal Pelvic Mass	1	3.3	-	-
3	Abnormal Uterine Bleeding	5	16.6	4	13.3
4	Appendicitis	2	6.6	1	3.3
5	Hernia	8	26.6	10	33.3
6	Fibroid uterus	3	10.0	4	13.3
7	Cancer in uterus	3	10.0	5	16.6
8	Pancreatitis	2	6.6	1	3.3

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9	Cancer in abdomen	4	13.3	2	6.6
10	Jejunal perforation	-	-	1	3.3
11	Recurrent pyogenic cholangitis	-	-	1	3.3
12	Sigmoid diverticulitis	1	3.3	-	-
Surgical Procedure					
1	Emergency laparotomy	3	10.0	3	10.0
2	Elective laparotomy	9	30.0	10	33.33
3	Abdominal Hysterectomy	10	33.33	10	33.33
4	Hernia repair	8	26.67	7	23.34
Body Temperature	*(°F)*				
1	Hypothermia (<95)	-	-	-	-
2	Normothermia (96 - 98.9)	23	76.7	21	70.0
3	Hyperthermia (99 - 100)	7	23.3	9	30.0
Pulse Rate	(beats per minute)				
1	70 - 80	16	53.33	12	40.0
2	80 - 90	12	40.0	16	53.33
3	90 - 100	2	6.67	2	6.67
Respiratory Rate	(breaths per minute)				
1	18 - 22	25	83.3	21	70.0
2	22 - 30	5	16.7	9	30.0
Systolic Blood Pressure	*(mm Hg)*				
1	100 - 110	13	43.3	7	23.33
2	111 - 120	3	10.0	10	33.33
3	121 - 130	10	33.3	11	36.67
4	131 - 140	2	6.6	1	3.33
5	> 141	2	6.6	1	3.33
Diastolic Blood Pressure	*(mm Hg)*				
1	60 - 70	11	36.6	10	33.33
2	71 - 80	13	43.0	17	56.67
3	81 - 90	6	20.0	3	10.0
Body Mass Index					
1	Underweight (< 18.5)	5	16.7	4	13.3
2	Normal (18.5 - 24.9)	15	50.0	13	43.3
3	Overweight (25.0 - 29.9)	3	10.0	6	20.0
4	Obesity (Above 30)	7	23.3	7	23.3
Co-morbid Illness					
1	Yes	15	50.0	17	56.67
2	No	15	50.0	13	43.33
Previous Surgery					
1	Yes	22	73.3	22	73.3

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2	No	8	26.7	8	26.7
Duration of Surgery					
1	Less than 3 Hrs	16	53.3	20	66.7
2	More than 3 Hrs	14	46.7	10	33.0
Anaesthesia					
1	General	17	56.7	11	36.7
2	Spinal	8	26.7	6	20.0
3	Both	5	16.7	13	43.3
Recovery from Anesthesia					
1	≤ 3 Hours	12	40.0	18	60.0
2	> 3 Hours	18	60.0	12	40.0
Abdominal Girth					
1	≤ 85 cm	17	56.7	15	50.0
2	> 85 cm	13	43.3	15	50.0
Length of Surgical Incision					
1	Less than 15 cm	16	53.3	17	56.7
2	More than 15 cm	14	46.7	13	43.3
Surgical Dressing					
1	Grip Band Plaster	21	70.0	21	70.0
2	Gauze Pad	9	30.0	9	30.0
Presence of Drain					
1	No drain tube	8	26.7	10	33.3
2	Romovac drain	7	23.3	8	26.7
3	Romovac and pvc drain	15	50.0	12	40.0
Post Operative Diet					
1	Empty Stomach	13	43.3	10	33.3
2	Liquid Diet	15	50.0	8	26.7
3	Bland Diet	2	6.7	12	40.0

Assessment on level of ambulatory pain among post operative patients with abdominal surgery n=60

S.No	Level of Ambulatory Pain	Experimental Group (n=30) POD 1 (Frequency)	Experimental Group (n=30) POD 2 (Frequency)	Experimental Group (n=30) POD 3 (Frequency)	Control Group(n=30) POD 1 (Frequency)	Control Group(n=30) POD 2 (Frequency)	Control Group(n=30) POD 3 (Frequency)
1	Mild (1-3)	-	-	16	-	-	-
2	Moderate (4-6)	-	19	14	-	-	26
3	Severe (7-10)	30	11	-	30	30	4

Table 4.3.1. above shows the assessment of outpatient pain levels in postoperative patients undergoing abdominal surgery. The results show that 30 (100) patients in the experimental and control groups had severe pain on the first postoperative day. On the second day, 19 (63.33%) patients in the experimental group had moderate pain and 11 (36.67%) patients had severe pain. In contrast, 30 (100%) patients in the control group had severe pain.

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On the third day, 16 (53.3%) patients in the experimental group had mild pain and 14 (46.67%) patients in the control group had moderate pain. In contrast, 26 patients in the control group had moderate pain and 4 (13.33%) patients had severe pain. The above table 4.3.1.depicts the assessment on level of ambulatory pain among Post-Operative Patients with Abdominal surgery. The results showed that in the experimental and control group 30 (100%) patients had severe pain on the first postoperative day. On the second day, 19 (63.33%) patients had moderate pain and 11 (36.67%) patients had severe pain in the experimental group. On the other hand, 30 (100%) patients had severe pain in the control group.

On the third day, 16(53.3%) patients had mild pain, and 14 (46.67%) patients had moderate pain in the experimental group. On the other hand, 26 patients had moderate pain, and 4 (13.33%) patients had severe pain in the control group.

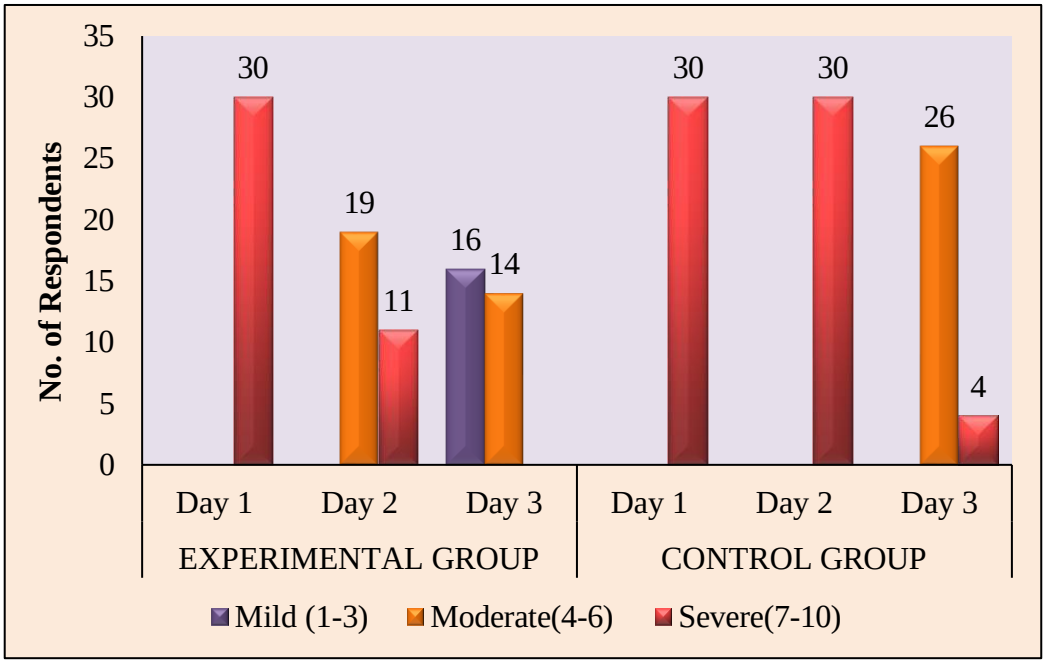

Chart- Assessment on level of ambulatory pain among post operative patients with abdominal surgery

Effect of abdominal binder on ambulatory pain among post operative patients with abdominal surgery in the experimental and control group

n=60

POD*	Group	Mean	SD	Mean difference	'z' Value	Table value
I	Experimental group	8.35	0.787	0.72	0.286	1.96
	Control group	9.07	0.435			
II	Experimental group	5.93	0.81	1.35	6.037	3.29***
	Control group	7.28	0.692			
III	Experimental group	3.28	0.663	1.90	3.653	3.29***
	Control group	5.18	0.748			

*-POD-Post Operative Day

***significant at 0.001 level

RESULTS AND DISCUSSION

The analysis of ambulatory pain scores among postoperative patients indicates the effect of the combined intervention of abdominal binders and nutritional care. On the first postoperative day, the mean ambulatory pain score in the experimental group was 8.35, while in the control group it was 9.07, with a mean difference of 0.72.

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The calculated 'z' value (0.286) was less than the table value (1.96) at the 0.05 level of significance. This indicates that there was no statistically significant difference in ambulatory pain between the experimental and control groups on the first postoperative day.

On the second postoperative day, the mean ambulatory pain score in the experimental group decreased to 5.93, whereas in the control group it remained higher at 7.28, with a mean difference of 1.35. The calculated 'z' value (6.037) exceeded the table value (2.58) at the 0.001 level of significance, indicating a highly significant difference between the groups. These findings demonstrate that the combined use of abdominal binders and nutritional care has a significant effect in reducing ambulatory pain from the second postoperative day onwards when compared to routine postoperative care alone.

CONCLUSION

Postoperative ambulatory pain is a common outcome following abdominal surgery and can hinder early mobilization and recovery. The findings of the study indicate that structured postoperative care plays a crucial role in reducing pain and promoting early ambulation.

The combined application of abdominal binders and nutritional care was found to be effective in significantly reducing ambulatory pain among postoperative patients. Abdominal binders provide mechanical support to the incision site, reduce strain during movement, and contribute to hemodynamic stability, while appropriate nutritional care enhances wound healing and overall recovery. The study concludes that the integration of abdominal binders with nutritional care is a simple, non-invasive, and cost-effective approach for reducing ambulatory pain and improving postoperative outcomes in patients undergoing abdominal surgery.

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