

Effectiveness of Foot Massage on Postoperative Pain in Abdominal Surgery Patients.

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ABSTRACT

Background: Postoperative pain is a common problem among patients undergoing abdominal surgery and may delay recovery, restrict mobility, and increase the risk of complications. Along with pharmacological management, non-pharmacological interventions such as foot massage may help reduce pain, promote relaxation, and improve patient comfort.

Objectives: The objectives of the study were to assess the level of pain among postoperative abdominal surgery patients, evaluate the effectiveness of foot massage in reducing postoperative pain, and determine the association between pain levels and selected demographic and clinical variables.

Methodology: A non-randomized pretest-posttest control group design was adopted for the study. A total of 104 postoperative abdominal surgery patients were selected using purposive sampling from a selected tertiary care hospital in Belagavi. The participants were divided equally into experimental (n=52) and control (n=52) groups. Pain levels were assessed using the Numerical Rating Scale (NRS). The experimental group received foot massage intervention along with routine care, whereas the control group received routine care alone. Pre-test and post-test pain scores were recorded and analyzed using Mann–Whitney U test, Wilcoxon signed-rank test, and Chi-square test.

Results: The findings revealed that most participants in both groups experienced severe pain during the pre-test assessment. Following the intervention, the experimental group demonstrated a significant reduction in pain compared to the control group. The median post-test pain score in the experimental group was lower (1.00) than the control group (6.00), showing a statistically significant difference ($p < 0.05$). No significant association was found between pre-test pain levels and selected demographic or clinical variables.

Conclusion: The study concluded that foot massage is an effective, safe, and non-pharmacological nursing intervention for reducing postoperative pain among abdominal surgery patients. It can be incorporated into routine postoperative care to enhance patient comfort and recovery.

Keywords: Foot massage, postoperative pain, abdominal surgery, nursing intervention, pain management.

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INTRODUCTION

Postoperative pain is one of the most common and distressing problems experienced by patients following abdominal surgery. Pain after surgery can interfere with breathing, mobility, sleep, and daily activities, thereby delaying recovery and increasing the risk of complications such as respiratory infections, thromboembolism, and prolonged hospitalization. Effective postoperative pain management is therefore an essential component of quality patient care and plays a major role in improving recovery outcomes and patient satisfaction.¹

Pain is generally classified as acute or chronic depending on its duration and physiological

response. Acute postoperative pain usually occurs immediately after surgery and may persist for 24–48 hours or longer. When pain is inadequately managed, it can activate stress responses in the body, leading to increased heart rate, blood pressure, anxiety, and metabolic disturbances.² Poor pain control may also negatively affect wound healing and delay the patient's return to normal activities.³ Pharmacological methods such as analgesics and opioids are commonly used for postoperative pain relief; however, these medications may produce adverse effects including nausea, vomiting, respiratory depression, and dependency. Therefore, healthcare professionals are increasingly focusing on complementary and non-pharmacological

interventions to enhance pain management and reduce reliance on medications.⁴

Massage therapy is considered a simple, safe, cost-effective, and non-invasive complementary therapy that promotes relaxation, improves blood circulation, decreases muscle tension, and reduces pain perception. Foot massage, in particular, stimulates nerve endings and promotes the release of endorphins and serotonin, which help block pain signals and provide a calming effect. It may also reduce anxiety and improve comfort among postoperative patients.⁵

Several studies have reported the beneficial effects of massage therapy in reducing postoperative pain and improving psychological well-being. As nurses play a vital role in postoperative care, incorporating evidence-based complementary therapies such as foot massage may contribute to holistic patient care and faster recovery. Hence, the present study was undertaken to evaluate the effectiveness of foot massage in reducing pain among postoperative abdominal surgery patients.

MATERIALS AND METHODS

The present study adopted an evaluative research approach with a quasi-experimental pretest–posttest control group design to assess the effectiveness of foot massage in reducing pain among postoperative abdominal surgery patients. The study was conducted in the surgical wards of KLE's Dr. Prabhakar Kore Hospital. The study population comprised postoperative abdominal surgery patients admitted to the surgical wards. A total of 104 participants who fulfilled the inclusion and exclusion criteria were selected using purposive sampling technique and divided equally into experimental and control groups.

The independent variable of the study was foot massage, while the dependent variable was the level of postoperative pain. Demographic variables included age, gender, education, income, religion, dietary pattern, marital status, and type of surgery. Patients who were conscious, oriented, able to communicate pain levels, and willing to participate were included in the study, whereas unconscious, critically ill, and mentally ill patients were excluded. Ethical clearance and institutional permission were obtained prior to data collection, and informed written consent was secured from all participants.

DATA COLLECTION METHODS :

SECTION A : Socio -Demographic and Clinical data(Such as patient's Age, Gender, Educational status, Marital status, Type of family, Type of surgery).

SECTION B : Numerical rating scale

Data were collected using a structured socio-demographic questionnaire and a 10-point Numerical Rating Scale (NRS) for pain assessment. Pre-test pain scores were assessed before the

intervention. The experimental group received foot massage intervention, while the control group received routine care. Post-test assessment was conducted after the intervention using the same pain scale. The developed tool was validated by six experts from the Department of Medical Surgical Nursing, and necessary modifications were made based on their suggestions to ensure content validity and reliability.

TECHNIQUE OF FOOT MASSAGE :

1. STROKING : Use light pressure strokes from wrist to the finger tips in both back and palm , Begin a long, slow, and firm , stroking motion from the bottom to the tip of the toes.

2. EFFLEURAGE : Effleurage is the sliding manipulation of the superficial tissues. Make large -half -circle stretching strokes from centre to the side using moderate pressure. Make small circles strokes (like an 'o') over the entire back of the foot.

3.THUMB KNEADING : Thumb kneading in a foot massage involves using the thumbs to apply firm circular pressure or 'walk' along the sole, arch and heel to alleviate pain, tension and improve circulation.

4.FINGER KNEADING : Finger kneading in a foot massage using fingers to apply Deep circular pressure to the sole , arch and heel to alleviate pain, tension and improve circulation.

5.WRINGING : Wringing is a petrissage massage technique that involves Lifting, Squeezing, and twisting muscles in opposite directions.

Procedure :

❖ The age group to the patients ranged from 30 to 70 years, after 12 hours of surgery the pretest was done by using numerical pain scale, for Experimental group and control group both.

❖ Foot massage was given to the experimental group with the help of Talcum powder for 5 min in each foot ,total duration of 20 min, twice a day for first 3 days (after 2 hours of pain medication). Post test was done after 3th day by using the same scale for experimental group and control group.

After care : Wash hands, Evaluate the clients tolerance and response ,Record the intensity of pain.

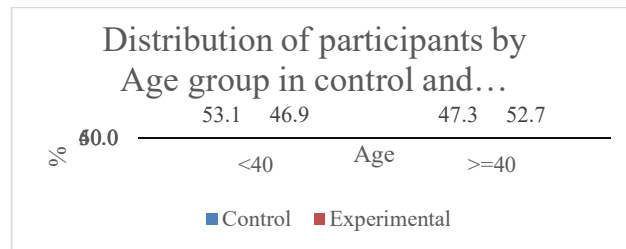
RESULTS

A total of 104 postoperative abdominal surgery patients participated in the study, with 52 patients each in the control and experimental groups. The majority of participants in both groups were below 40 years of age, married, and had secondary-level education. Common surgical procedures included appendectomy, hernia repair, cholecystectomy, and other abdominal surgeries. Baseline demographic and clinical characteristics were comparable between the two groups.

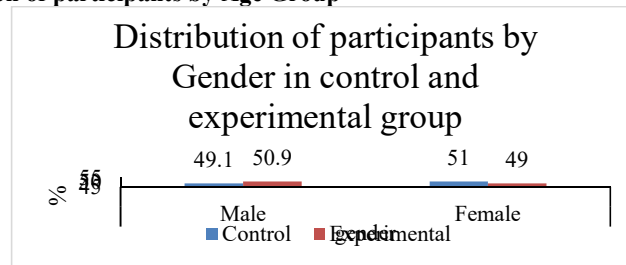
Distribution of participants by selected demographic and clinical variables in and experimental group.

N=104

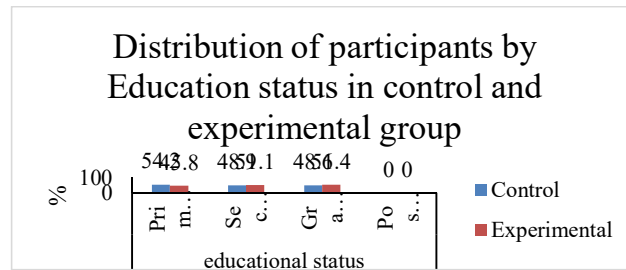
		Control		Experimental	
		f	%	F	%
Age group	<40	26	53.1	23	46.9
	>=40	26	47.3	29	52.7
Gender	Male	26	49.1	27	50.9
	Female	26	51.0	25	49.0
Educational status	Primary	13	54.2	11	45.8
	Secondary	22	48.9	23	51.1
	Graduate	17	48.6	18	51.4
	Post Graduate	0	0.0	0	0.0
Marital status	Single	0	0.0	0	0.0
	Married	42	52.5	38	47.5
	Unmarried	10	41.7	14	58.3
Type of family	Nuclear family	19	48.7	20	51.3
	Joint family	26	54.2	22	45.8
	Extended family	7	41.2	10	58.8
Type of surgery	Appendectomy	9	36.0	16	64.0
	Hernia repair	9	29.0	22	71.0
	Cholecystectomy	12	60.0	8	40.0
	Other abdominal Surgery	22	78.6	6	21.4
Duration of the hospital stay	2 days	0	0.0	0	0.0
	2-3 days	2	100.0	0	0.0
	3-4 days	31	62.0	19	38.0
	5-7 days	19	36.5	33	63.5
Experience of previous surgery	Yes	16	57.1	12	42.9
	No	36	47.4	40	52.6



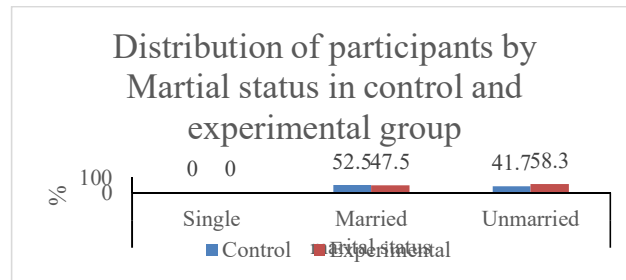
Graph =01 Distribution of participants by Age Group



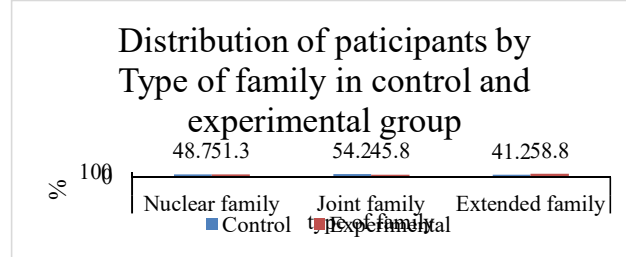
Graph = 02 Distribution of participants by Gender Group



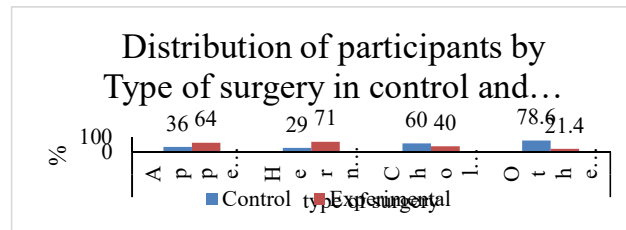
Graph = 03 Distribution of participants by Education status in control and experimental group



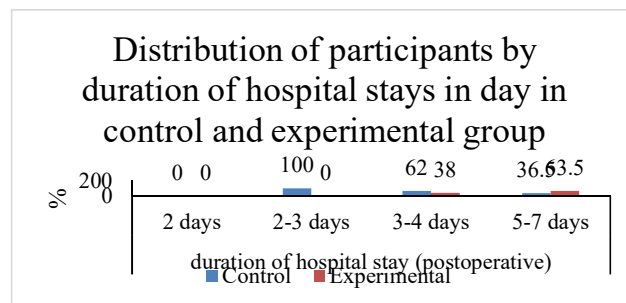
Graph = 04 Distribution of participants by Marital status in control and experimental group



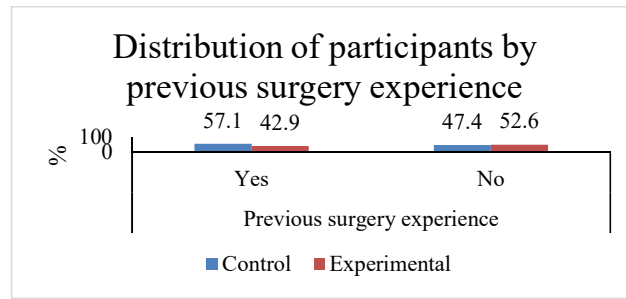
Graph = 05 Distribution of participants by Type of family in control and experimental group.



Graph =06 Distribution of participants by Type of surgery in control and experimental group



Graph = 07 Distribution of participants by duration of hospital stays in day in control and experimental group



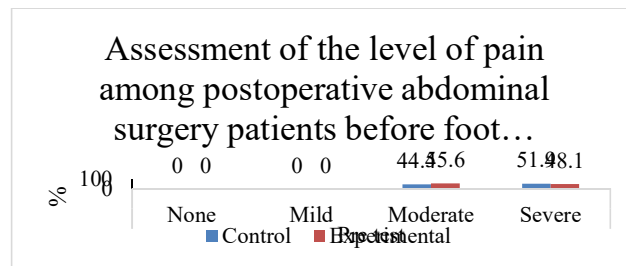
Graph = 08 Distribution of participants by previous surgery experience

Assessment of the level of pain among postoperative abdominal surgery patients before foot massage.

Pre-test assessment showed that most participants in both the control and experimental groups experienced moderate to severe pain before the intervention. In the control group, 44.4% had moderate pain and 51.9% had severe pain, whereas

in the experimental group, 55.6% reported moderate pain and 48.1% reported severe pain. The pre-test median pain scores were 8.00 (IQR 3.00) in the control group and 8.50 (IQR 3.00) in the experimental group, with no statistically significant difference between the groups ($U = 1273$, $p = 0.598$), indicating baseline comparability.

		Control		Experimental	
		F	%	f	%
Pre test	None	0	0.0	0	0.0
	Mild	0	0.0	0	0.0
	Moderate	12	44.4	15	55.6
	Severe	40	51.9	37	48.1

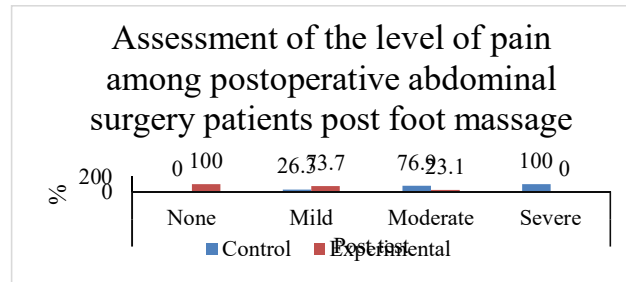


Assessment of the level of pain among postoperative abdominal surgery patients post foot massage.

Post-test findings demonstrated a significant reduction in pain among patients who received foot massage. In the experimental group, 18 patients reported no pain and 28 reported mild pain, while none experienced severe pain after the intervention. In contrast, patients in the control group continued

to report moderate to severe pain. The median post-test pain score in the experimental group was significantly lower [1.00 (IQR 2.00)] compared to the control group [6.00 (IQR 4.00)] ($U = 136$, $p < 0.05$). Wilcoxon signed-rank test also revealed a significant reduction in pain scores within both groups, with greater improvement observed in the experimental group ($Z = -6.166$, $p < 0.05$).

		Control		Experimental	
		F	%	f	%
Post test	None	0	0.0	18	100.0
	Mild	10	26.3	28	73.7
	Moderate	20	76.9	6	23.1
	Severe	22	100.0	0	0.0



Association between socio demographic characteristics and foot massage pre operative abdominal surgery patients.

analysis using Fisher's Exact test showed no statistically significant relationship between pre-operative pain levels and selected socio-demographic or clinical variables such as age,

gender, educational status, marital status, type of family, type of surgery, duration of hospital stay, and previous surgery experience ($p > 0.05$). These findings indicate that foot massage was effective in reducing postoperative pain among abdominal surgery patients irrespective of demographic or clinical characteristics

		Control				Experimental				Chi-square (Sig.)
		None n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	None n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	
Age Group	<40	0 (0.00)	0 (0.00)	5 (19.23)	21 (80.77)	0 (0.00)	0 (0.00)	10 (43.5)	13 (56.5)	4.302 (0.063)
	>=40	0 (0.00)	0 (0.00)	7 (26.92)	19 (73.08)	0 (0.00)	0 (0.00)	5 (17.2)	24 (82.8)	
Gender	Male	0 (0.00)	0 (0.00)	4 (15.38)	22 (84.62)	0 (0.00)	0 (0.00)	7 (25.93)	20 (74.07)	1.524 (0.266)
	Female	0 (0.00)	0 (0.00)	8 (30.77)	18 (69.23)	0 (0.00)	0 (0.00)	8 (32.00)	17 (68.00)	
Educational status	Primary	0 (0.00)	0 (0.00)	4 (30.77)	9 (69.23)	0 (0.00)	0 (0.00)	2 (18.18)	9 (81.82)	0.069 (1.000)
	Secondary	0 (0.00)	0 (0.00)	6 (27.27)	16 (72.73)	0 (0.00)	0 (0.00)	6 (26.09)	17 (73.91)	
	Graduate	0 (0.00)	0 (0.00)	2 (11.76)	15 (88.24)	0 (0.00)	0 (0.00)	7 (38.89)	11 (61.11)	
	Post Graduate	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
Marital status	Single	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0.882 (.427)
	Married	0 (0.00)	0 (0.00)	9 (21.43)	33 (78.57)	0 (0.00)	0 (0.00)	10 (26.32)	28 (73.68)	
	Unmarried	0 (0.00)	0 (0.00)	3 (30.00)	7 (70.00)	0 (0.00)	0 (0.00)	5 (35.71)	9 (64.29)	
Type of family	Nuclear family	0 (0.00)	0 (0.00)	4 (21.05)	15 (78.95)	0 (0.00)	0 (0.00)	7 (35.00)	13 (65.00)	0.676 (.758)

	Joint family	0 (0.00)	0 (0.00)	6 (23.08)	20 (76.92)	0 (0.00)	0 (0.00)	7 (31.82)	15 (68.18)	
	Extended family	0 (0.00)	0 (0.00)	2 (28.57)	5 (71.43)	0 (0.00)	0 (0.00)	1 (10.00)	9 (90.00)	
Type of surgery	Appendectomy	0 (0.00)	0 (0.00)	2 (22.22)	7 (77.78)	0 (0.00)	0 (0.00)	8 (50.00)	8 (50.00)	5.98 1 (.110)
	Hernia repair	0 (0.00)	0 (0.00)	2 (22.22)	7 (77.78)	0 (0.00)	0 (0.00)	4 (18.18)	18 (81.82)	
	Cholecystectomy	0 (0.00)	0 (0.00)	5 (41.67)	7 (58.33)	0 (0.00)	0 (0.00)	2 (25.00)	6 (75.00)	
	Other abdominal Surgery	0 (0.00)	0 (0.00)	3 (13.64)	19 (86.36)	0 (0.00)	0 (0.00)	1 (16.67)	5 (83.33)	
Duration of the hospital stay	2 days	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0.67 6 (0.81 2)
	2-3 days	0 (0.00)	0 (0.00)	0 (0.00)	2 (100.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	
	3-4 days	0 (0.00)	0 (0.00)	8 (25.81)	23 (74.19)	0 (0.00)	0 (0.00)	4 (21.05)	15 (78.95)	
	5-7 days	0 (0.00)	0 (0.00)	4 (21.05)	15 (78.95)	0 (0.00)	0 (0.00)	11 (33.33)	22 (66.67)	
Experience of previous surgery	Yes	0 (0.00)	0 (0.00)	5 (31.25)	11 (68.75)	0 (0.00)	0 (0.00)	2 (16.67)	10 (83.33)	0.01 8 (1.00 0)
	No	0 (0.00)	0 (0.00)	7 (19.44)	29 (80.56)	0 (0.00)	0 (0.00)	13 (32.50)	27 (67.50)	

* $p < 0.05$ significance is obtained by fisher exact test.

DISCUSSION .

1. Baseline Characteristics and Pre-Intervention Findings

The baseline characteristics of participants in the control and experimental groups showed a relatively similar distribution of socio-demographic and clinical variables. Variables such as age group, gender, and other selected characteristics were comparable between the two groups, indicating that both groups were homogeneous before the intervention. Pre-intervention pain levels were also similar in both groups, suggesting that the participants experienced comparable levels of postoperative discomfort prior to the implementation of the foot massage technique. This similarity in baseline findings ensured that any difference observed in the post-test pain scores could be attributed mainly to the intervention rather than to pre-existing differences between groups.

2. Effect of Foot Massage Technique

The present study demonstrated that foot massage was effective in reducing postoperative pain among abdominal surgery patients. The findings revealed

that the post-test pain score in the experimental group was significantly lower than that of the control group (mean $\pm$ SD: 3.2 ± 0.8 vs. 5.6 ± 1.1 , $p < 0.05$). This indicates that patients who received foot massage experienced better pain relief compared to those who received routine care alone. Therefore, the intervention proved to be an effective complementary nursing strategy for postoperative pain management.

3. Interpretation and Mechanism of Findings

The reduction in pain observed in the experimental group may be explained through several physiological mechanisms. Foot massage promotes relaxation, improves blood circulation, and reduces muscle tension. Stimulation of pressure points in the feet may activate neural pathways that influence the perception of pain through the gate control theory. In addition, massage therapy may stimulate the release of endorphins and other neurotransmitters that contribute to pain relief and a sense of well-being. These physiological responses collectively help reduce the intensity of postoperative pain.

4. Comparison with Previous Studies

The findings of the present study are consistent with the study conducted by **Koraş and Karabulut (2018)**, which reported that patients who underwent laparoscopic cholecystectomy and received foot massage experienced significantly lower pain scores at 30, 60, 90, and 120 minutes after surgery compared with those in the control group ($p < 0.05$). The study also noted a reduction in analgesic consumption among patients who received the massage intervention. These results support the effectiveness of foot massage as a complementary method for postoperative pain relief.

5. Findings Contradicting Previous Studies

However, the results differ from certain studies such as **Smith et al. (2015)**, which did not report a significant reduction in postoperative pain following foot massage therapy. The variation in findings may be due to differences in study design, sample size, duration and frequency of massage sessions, types of surgical procedures, or the pain assessment tools used. Such methodological differences could influence the effectiveness of the intervention.

6. Clinical Implications

The results of this study highlight the clinical importance of incorporating non-pharmacological interventions such as foot massage into routine postoperative nursing care. Foot massage is a simple, cost-effective, safe, and non-invasive technique that can be easily performed by trained nurses. It may enhance patient comfort, reduce thereby minimizing the risk of medication-related in clinical and community environments are all affected by the study.

NURSING SERVICE

Caregivers may implement foot massage as a supplemental therapies in addition to standard postoperative care to help patients recovering from abdominal procedure feel less pain. Evidence-based nursing practice aids medical practitioners in delivering quality care. The results of the current research will raise the standard of caring for patients by assisting nurses in appreciating the value of alternative pain treatment strategies.

NURSING EDUCATION

The current investigation emphasizes how crucial it is to instruct nursing trainees in non-surgical pain treatment methods like ankle rubbing. Other treatments should be given more weight in the nursing school curriculum by nursing educators. In order to facilitate patient comfort and healing, students should be taught how to evaluate pain and use suitable therapies, such as foot-based reflexology.

NURSING ADMINISTRATION

In order to treat discomfort, physicians should be encouraged by nurses in charge to use evidence-based techniques like heel acupuncture. To increase nurses' understanding of and proficiency with pain

side effects. postoperative pain, and potentially decrease the need for analgesic medications.

7. Recommendations for Future Research

Future studies may be conducted with larger sample sizes and in different clinical settings to strengthen the generalizability of the findings. Researchers may also examine the long-term effects of foot massage on pain, recovery time, and patient satisfaction. Comparative studies evaluating different massage techniques, durations, and frequencies may provide further insight into the most effective protocol for postoperative pain management.

CONCLUSION

As a particular Referral hospital in Belagavi, a standard experiment was carried out to evaluate the efficacy of Specific therapeutic technique in lowering painful sensations compared to residents recovering from intra-abdominal surgery. The outcomes of the research showed that leg stimulation helped individuals recovering from Procedures on the abdomen feel less discomfort. Victims were got foot massages had significantly reduced afterwards pain index relative to those who got specialized standard therapy. Therefore, foot massage can be regarded as a straightforward, secure, and unconventional nursing technique to enhance client satisfaction and lessen the aftermath of surgery.

NURSING IMPLICATION

Healthcare management, research on nursing, standardized nursing care, and education in nursing relief without drugs methods in clinical situations, administrations might host seminars, training classes, and ongoing learning sessions.

NURSING RESEARCH

It serves as a foundation for future investigations into alternative pain relief strategies. The efficacy of various additional treatments in lowering discomfort following surgery may be investigated in subsequent studies. Additionally, it motivates nurses to take part in studies to advance the field of nursing.

RECOMMENDATIONS

1. To improve the result' generalizability, comparable research could be carried out with greater sample size.
2. A longer training period might be used for the same study.
3. To assess the efficacy of various non-pharmacological pain treatment strategies, comparative research can be carried out.
4. Comparable research can be conducted in various healthcare environments.

LIMITATION

The outcomes may have limited external validity A examination those confined to following gastrointestinal operation patients admitted to a particular higher-education facility in Belagavi.

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