

EFFICACY OF COLD THERAPY ON PAIN AMONG POST -OPERATIVE PATIENTS IN INTENSIVE CARE UNIT**R.P. Joseph¹ and M.K. Garasiya²**¹Department of Pediatric Nursing, Sumandeep Nursing College, Sumandeep Vidyapeeth Deemed to be University, Piparia, Waghodia, Vadodara, Gujarat, India²NPCC student², Sumandeep Nursing College, Sumandeep Vidyapeeth Deemed to be University, Piparia, Waghodia, Vadodara, Gujarat, India**ABSTRACT**

Background of the study: Earlier research has shown that the majority of people who have surgery experience acute postoperative pain, however evidence suggests that only half of those patients obtain adequate pain management. After surgery, there are a variety of interventions and treatment measures available to help reduce and manage pain. Acute discomfort is distinguished from chronic pain. Acute pain lasts for up to seven days following surgery, while chronic pain lasts for more than three months after the injury. Inflammation of the skin, the deep somatic structures, or the visceral organs can cause acute and chronic pain, respectively. Material & Methods: 40 post-operative patients admitted to the Intensive Care Unit participated in a true experimental study with a pre-test, post-test, and control group design. A simple random sampling procedure was used to choose the samples, which were then split into two groups of 20 each: one for the experiment and one for the control. The effectiveness of cold therapy on post-operative pain level was assessed using a numerical rating scale of Pain assessment. Data collection was done through this scale. Analyzing the data required the use of descriptive and inferential statistics. Results: the findings revealed that 37.50 percent of participants were aged 30 to 39 years old, and 25 percent of samples had just completed kindergarten. About 17.5 per cent had hysterectomy surgery; 17.5 per cent had an appendectomy; and still another 17.5 per cent had an inguinal hernia surgery. Of all the samples, 25 (62 per cent) were used. there are 22 examples (55 percent). Analgesic Tramadol was found in over half of the samples (22 of 22). Analgesics should be given for a minimum of six hours following surgery and a maximum of eight hours after surgery, according to research. All demographic variables, including pre-test pain scores, were combined to provide a Chi square value that was lower than the table value. It demonstrated that demographic characteristics and the pre-test pain score of the samples have no significant relationship. As a result, hypothesis H2 has been ruled out. Using the 0.05 level of significance, it was discovered that the obtained t value, 5.848, was more than the table value, 1.70. As a result, cold therapy was found to be helpful in the experimental group in reducing post-operative discomfort. As a result, hypothesis H1 was found to be correct. Conclusion: Any medical or surgical procedure entails some level of discomfort. Providing patients with active and evidence-based nursing care after surgery can lower their post-operative burden by a significant proportion.

Keywords: True experimental study, Efficacy, Cold therapy, Intensive care Unit, Post-operative Pain

Introduction

Cryotherapy, another name for cold therapy, is a more technical term. Basically, it reduces blood flow to a specific area, which helps with inflammation and swelling, both of which are major contributors to pain, especially around joints and tendon. When used correctly, it has the potential to temporarily suppress nerve activity, so relieving pain. From arthritis to swollen joints and muscles to inflammation, we use ice packs or heating pads to treat it all. Hot therapy is a highly successful way to treat a wide range of ailments and injuries, and it's also quite cost-effective. The tough thing is determining when hot is appropriate and when chilly is. It's possible that a single treatment will address both issues. As a general guideline, apply ice to any injury or discomfort that is acute as well as any inflammation or swelling that may be present. If you have any muscle discomfort or stiffness,

apply heat to the area. Pain and discomfort are frequently used as synonyms in medical studies. Pain is typically defined as an unpleasant sensory and emotional experience that occurs as a result of damage that has occurred or could occur. As a result of internal or external situations, discomfort can vary in size. It is characterised as a negative affective and/or physical state. Both definitions emphasise the importance of the physical as well as emotional components.

The control of pain is a top issue in critical care. Adequate pain relief begins with a thorough evaluation of the patient. When it comes to evaluating acute pain, guidelines and suggestions were put forth by what is now the Agency for Healthcare Research and Quality (AHRQ). Because self-reports of pain are the most reliable indicators of discomfort, physicians should collect them as often as feasible. The provision of sedatives, mechanical

breathing, and changes in a patient's level of consciousness can all affect verbal contact with them, which is especially true in critical care.

Using conduction to transfer thermal energy, an ice pack is applied to an injured area to absorb heat from the closed traumatic or oedematous wound. Applying cold causes vasoconstriction, which is followed by vasodilation, as well as a decrease in metabolic and enzymatic activity in the affected area, as well as a reduction in oxygen demand. By reducing muscular spindle fibre activity, cold therapy has been shown to reduce spasticity and muscle guarding. Painkillers like ibuprofen are frequently used to treat minor injuries and reduce muscle soreness. As the chilling period begins, the usage of ice packs significantly reduces blood flow due to vasoconstriction and the resulting early sympathetic activity.

Due to its recognised negative effects on performance, such as decreased mitotic reflex and force generation and a reduction in balance immediately following 20 minutes of ice pack therapy, ice is rarely utilised before to rehabilitation or performance. However, if you use an ice pack for less than ten minutes, you won't have any negative consequences on your performance. This is the time to take off the ice pack if necessary. 6 Heliotherapy combines the principles of rest, ice, compression, and elevation with cold compression therapy to relieve soft tissue damage pain and edoema following orthopaedic surgery. Sufferers of muscle and ligament strains and sprains benefit most from this treatment. 7 One of the most popular orthopaedic therapies is cryotherapy, which involves applying ice or cold to a painful area. As a result of the use of cryotherapy in acute injury care, it allows the damaged tissue to survive by lowering its temperature, which slows its metabolic rate. Cryotherapy has been shown time and time again to reduce metabolic rate.

Need For the Study

Ice application is a low-cost and uncomplicated therapy that has been widely regarded as an effective non-pharmacologic pain management strategy for decades. It lowers the inflammatory response and spasm while raising the threshold for pain. After cardiac catheterization, ice application reduces pain and hematoma size by constricting local blood arteries and lowering tissue temperature. Constriction reduces blood

flow and cell metabolism, limiting bleeding into soft tissue. Within 20 minutes of ice application, blood vessels in the wounded area slowly expand, raising the temperature of the tissue. This phenomenon is referred to as "reactive vasodilation." Local therapeutic ice uses include treating oedema, lowering swelling and discomfort, and stopping bleeding into soft tissues after catheterization. These are the most effective uses of local therapeutic ice

Cold water showers have been shown in a 2007 study to help relieve depressive symptoms and may be more useful than prescription drugs if used on a daily basis as a routine. This is due to the fact that exposure to cold water releases a rush of feel-good neurotransmitters. Immersion in cold water stimulates the body's inherent healing abilities, which can help alleviate the symptoms of a variety of medical problems while also promoting overall health and well-being. The immunological, lymphatic, circulatory, and digestive systems of the body can all benefit from regular cold water immersion, and these improvements can continue for years.

Literature review

Haynes JM., (2015) carried out a Stratified randomized controlled trial to reduce pain associated with arterial puncture. Convenience sample of out-patients with a physician order for an arterial blood gas (ABG) test in which intervention group had a plastic bag of ice applied to their wrists for 3 min before drawing an ABG sample from the radial artery and the control group had an ABG sample drawn from the radial artery without the application of ice. Pain from the arterial puncture was measured with a 100-mm visual analogue scale. Ice application before arterial puncture is well tolerated and reduces procedure-related pain.

Mohammadi N (2018) conducted a randomized controlled trial among 90 patients undergoing heart bypass surgery to assess chest tube removal pain by cold application. Patients were randomly divided into two groups (45 samples per group). In the cold application group, an ice bag was placed at the designated point for 20 minutes before chest tube removal, while only routine interventions were applied for chest tube removal in the control group. Pain severity

was measured in the groups before, during, and 15 minutes after chest tube removal, using the visual analogue scale. Repeated measures ANOVA test was applied for data analysis. Cold application, as a non-pharmacological intervention, may contribute to the alleviation of cryotherapy-related pain. Hsieh L Y (2017) conducted a prospective, randomized, single-blind, sham-controlled study in 2017 on pain during chest tube removal after cold application. In addition to the same routine care, subjects in the experimental group (n=30) received cold application of 600-g ice packs 15 minutes before CTR, whereas subjects in the sham group (n=30) received tap water packs. Numerical rating scale was used to measure pain intensity before, immediately after, and 10 minutes after CTR. The results indicate that cold application is not more effective than sham treatment in decreasing pain during CTR, even among gender. Although statistically non-significant, clinically important differences of decreased pain score were observed with cold application among women.

Kol E, Erdogan A, Karsli B, (2016) performed a randomized and single-blinded study done to evaluate the outcomes of ice application for the control of pain associated with chest tube irritation. The samples consisted of 40 patients (20 in the control and 20 in the study group) who underwent thoracotomy with chest tube placement. Standard postoperative analgesic methods were applied to all patients. And also an ice (in flexible and bendable cold gel packs wrapped in fine cloth sheaths) was applied to the chest tube insertion site at the 24th, 28th, 36th, and 40th postoperative hours for 20 minutes. Verbal Category Scale (VCS) and Behavioural Pain Scale (BPS) methods were used to measure the severity of pain. Average pain severity scores during the mobilization activities, including coughing and walking, were compared and found to be significantly lower in the study group patients who received cold therapy than in the control group patients ($p < .05$). Additionally, analgesic consumption was lower in the study group than in the control group patients ($p < .05$). As a result, the application of ice to the chest tube insertion site reduced pain associated with

irritation along with the need for analgesics. Bharadhwaj Ravindhran , Sendhil Rajan , Gayatri Balachandran , L N Mohan (2019) A Study on the title "Do Ice Packs Reduce Postoperative Midline Incision Pain, NSAID or Narcotic Use?" Sixty-eight patients were included in the study: 33 in the cryotherapy group and 35 in the non-cryotherapy group. Mean postoperative pain scores (VAS) were significantly lower in the cryotherapy group versus the control group (3.97 ± 0.6 vs. 4.9 ± 0.7 on postoperative day (POD) 1; $p < 0.001$, and 3 ± 0.5 vs. 0.9 ± 0.8 on POD2; $p < 0.001$). The median narcotic use in morphine equivalents was lesser in the cryotherapy group from POD 1-3 (66 (IQR-16) vs. 89 (IQR-17); $p = 0.001$). No significant difference was seen in the NSAID use between the groups. The cryotherapy group was also found to have a lesser incidence of surgical site infection ($p = 0.03$) and better lung function based on incentive spirometry ($p = 0.01$) and demonstrated earlier functional recovery based on their ability to perform the sit-to-stand test ($p = 0.001$).

M A Finan , W S Roberts, M S Hoffman, J Fiorica, D Cavanagh, B J Dudney (1993) conducted a study on "The Effects of Cold Therapy on Postoperative Pain in Gynaecologic Patients: A Prospective, Randomized Study" Compared with the control group (0.363 ± 0.118 mg/kg/day), the cold pack group used more morphine sulfate on the first postoperative day (0.529 ± 0.236 mg/kg/day, $p < 0.05$). The mean amount of morphine sulfate used by both groups was similar on postoperative day 2.12

Objectives of the study

The objectives of the study were.

1. Find out the association between pre-test pain scores with demographic and clinical variables in experimental group.
2. Compare the Efficacy of cold therapy between experimental group and control group
3. Evaluate the Efficacy of cold therapy among post-operative patients in experimental group.

Hypothesis

H1- There will be significant differences of post-test pain scores between experimental group and control group.

H2- There will be significant association between pre-test pain scores with demographic and clinical variables in experimental and control group.

Operational Definitions

Efficacy: It refers to the impact of cold application therapy on pain among post operative patients underwent abdominal surgery.

Cold therapy: It refers to the application of cold agent such as ice bag on the surrounding area of operative area. This therapy will be given after 8 hours of post operative.

Pain: Pain is defined as an unpleasant feeling that is conveyed to the brain by sensory neurons. In my study it refers to the unpleasant feeling due to operation expressed by the post operative patients.

Post-operative Patients: It refers to the patients who had undergone abdominal surgery and admitted in ICU.

Intensive Care Unit: Intensive care unit is a designated area of a hospital facility that is dedicated to the care of patients who are seriously ill. In present study it refers to the patients after abdominal surgery shifted to unit of where intensive care given.

Methodology

Research Approach

In order to achieve the anticipated objectives of this study, Quantitative research approach was chosen.

Research Design

True-experimental Pre-test-post-test control group research design

Place of Study

The study was conducted at selected tertiary care Hospital, Vadodara

Source of Data

The data was collected from the post-operative patient's undergone abdominal surgery, admitted in the ICU, of selected tertiary care Hospital, Vadodara

Sample description

Sample size

The sample size was 40 (20 samples to experimental group and 20 samples to control group)

Sampling Technique

Samples were selected by simple random

sampling technique

Selection Criteria

Inclusion Criteria: -

1. Post-operative of 12 hours
2. Post-operative male patients
3. Post-operative patients who underwent abdominal surgeries
4. Post-operative patients who were admitted in intensive care unit.

Exclusion Criteria: -

1. Post-operative patients who were unwilling to participate in the study.
2. Post-operative patients whose age was less than 18 years
3. Post-operative patients who were semiconscious & unconscious.
4. Post-operative patients who had undergone cardiac surgery
5. Post-operative patients who had labour pain

Material & Equipments of the Study

This consists of two sections:

Section 1: Socio-demographic and clinical variables such as Age, qualification, education and occupation, Name of surgery, name of analgesics taken, duration of analgesics since taken (in hours).

Section 2: Assessment of Post- Operative Pain using Universal Numerical pain scale – Scoring interpretation

0 - No Pain, 1 – 3 Mild Pain, 4 – 7 Moderate Pain, > 8 is Severe Pain

Plan for Data Collection

The data for main study will be collected from postoperative patients who are shifted to ICU by simple random sampling technique. Demographic variables and Numerical pain assessment scale will be used to collect information about the postoperative patient and pain scores. The data for main study will be collected tentatively from 01/12/2020 to 30/12/2020. Consent will be taken from the participants.

Plan for the Data Analysis

The obtained data was analysed in respect to objectives of the study by using descriptive and inferential statistics.

Descriptive Statistics: Frequency and percentage distribution were used to describe the demographic variables and associated factors.

Inferential Statistics: 't' test was used to test the effectiveness of Cold therapy and Chi-square test was used to find out the association and P-value of $P < 0.05$ taken as significant.

4.1 Research methods

40 post-operative patients admitted to the Intensive Care Unit participated in a true experimental study with a pre-test, post-test, and control group design. A simple random sampling procedure was used to choose the samples, which were then split into two groups of 20 each: one for the experiment and one for the control. The effectiveness of cold therapy on post-operative pain level was assessed using a numerical rating scale of Pain assessment. Data collection was done through this scale. Analyzing the data required the use of descriptive and inferential statistics.

5. Results

5.1 Result of demographic variables: Frequency and percentage distribution of samples

The results revealed that majority of the participants were aged between 30 – 39 years (37.50%), and 25% samples (10) had primary school education. Among all the samples 25 (62%) were employed and almost 17.5% samples undergone hysterectomy surgery, 17.5% samples undergone Appendectomy and another 17.5% samples had undergone surgery for Inguinal Hernia. 22 samples (55%). Nearly 55% (22) samples were taking analgesic Tramadol. The duration of analgesics since taken after surgery was found 35% (6 hours) & 8 hours respectively.

Results of association between demographic variables and Pre-test pain scores

The obtained Chi square value of all the demographic variables with pre-test pain scores of the participants is less than the table value. It was found that there is no significant association between demographic variables and pre-test pain score of the samples. Hence, the hypothesis H2 is rejected.

Effectiveness of cold therapy among post-operative patients in experimental group

The obtained t value 5.848 with the p value of 0.05 is more than the table value at 0.05 level of significance i.e 1.70. Hence it was proved that the cold therapy was effective in reduction of post operative pain among the patients in

experimental group. So, the hypothesis H1 was accepted.

Discussion

Patients frequently experience moderate to severe pain in the postoperative period. Although the pain management is an integral and important part of the nursing care, studies suggest that, nursing management of postoperative pain remains inadequate. Postoperative pain remains one of the greatest concerns for patients following surgical procedures. Nurses play an essential role in postoperative pain assessment and management, especially within the first few days after surgery.

Similar study conducted by Haynes JM., (2015) in which intervention group had a plastic bag of ice applied to their wrists for 3 min before drawing an ABG sample from the radial artery and the control group had an ABG sample drawn from the radial artery without the application of ice. The study found that Ice application before arterial puncture is well tolerated and reduces procedure-related pain

In a Randomized controlled trial conducted by Mohammadi N (2018) among patients undergoing bypass heart surgery also revealed that the pain severity was measured in the groups before, during, and 15 minutes after chest tube removal, using the visual analogue scale. Repeated measures ANOVA test was applied for data analysis. Cold application, as a non-pharmacological intervention, may contribute to the alleviation of cryotherapy-related pain

Another randomized single blinded study (Kol E, Erdogan A, KarliB, (2016) revealed that the application of ice to the chest tube insertion site reduced pain associated with irritation along with the need for analgesics

Conclusion

Nurses must have the knowledge and abilities to select and implement suitable assessment tools and interventions, as well as the ability to accurately evaluate them and identify any difficulties, in order for POP management to be effective. POP and unidentified CPSP levels will remain unacceptably high unless this occurs.

Conflict of Interests

The author reports no conflict of interests.

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