

Effectiveness of Cryotherapy on Pain after the Intravenous Administration of Chemotherapeutic Agents among Patients with Cancer

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Abstract: **Background:** Pain caused by IV chemotherapy could be one of the reason for cancer patients to either change the route or drop the treatment. Chemotherapy treats many types of cancer effectively. But like the other treatments it can cause side effects. It is therefore important to be aware of possible side effects from chemotherapy so one knows what to watch for and talk with the health care team about preventing and relieving them. The side effects and their level are different for each person. They depend on the type of cancer, location, drugs and dose, and one's general health. **Objectives:** To assess the effectiveness of cryotherapy among the cancer patients in experimental group. **Materials and Method:** quasi-experimental design was adopted to accomplish the objectives. Non-Probability purposive sampling technique was used. The sample consists of 60 patients from oncology department, Shri Mahent Indires Hospital, Dehradun Uttarakhand. Out of 60 samples, 30 were included in Experimental Group and another 30 in Control group. The pretest and post-test assessment of practice of the Patients was carried out using the VAS (Visual Analogue Score). The obtained data were analyzed and interpreted using descriptive and inferential statistics. **Result:** The mean post-test pain score of experimental group i.e. 3.7 was less than the pretest mean practice score i.e. 5.63 by a mean difference of 1.93 indicating the effectiveness of a Cryotherapy on level of pain among patients receiving iv chemotherapeutic agents in Shri Mahent Indires Hospital at Dehradun ($P < 0.05$). **Conclusion:** The study findings concluded that the Cryotherapy has reduced the level of pain at iv site receiving chemotherapeutic agents.

Keywords: Effectiveness, chemotherapy, cryotherapy, VAS Score

1. Introduction

Cancer is the second leading cause of death in our country. The term "cancer" is used to refer to malignant neoplasms. The tumour is a cell disease, where normal mechanisms for controlling growth and proliferation are changed. Cancer's not just one disease, a series of related illnesses that can occur almost anywhere in the body. Cancer is, to put it bluntly, a disease of the genes in our cells. For our clients and families, the experience of chemotherapy is changing. [1] According to NCI, In 2020, an estimated 1,806,590 new cases will be diagnosed in the United states and 606,520 people will die from the disease. As of January 2019, there was an estimated 16.9 million cancer survivors in the United states. The number of cancer survivors is projected to increase to 22.2 million by 2030. [2] In cancer, chemotherapy is a common treatment. It's involving powerful medicines that stop cancer cells from growing and spreading. The goals of chemotherapy (cure, control, palliation) chemotherapeutic agents may be administered in the hospital, clinic, or home settings by topical, oral, intravenous, intramuscular, subcutaneous, arterial, intracavitary, and intrathecal routes. [3] The route of administration depends on the type, site and extent of tumour to be treated. During the administration of chemotherapeutic agents, particular care should be taken. Due to the frequency and duration of intravenous therapy, access to the intravenous route is particularly important in patients undergoing chemotherapy. Pain is occasionally a side effect of treatment, even though it isn't uncomfortable. [4] The word intravenous means within the vein, according to the National Institutes of Health's Medline Plus. Bleeding may occur in the surrounding tissue if veins are

thin and rupture or cannula is not properly inserted, this circumstance is known as a "tissuing" or blowing vein," particularly chemotherapy drugs. Depending on the medicine, it may result in extravasation of the drug causing edema, pain and tissues to be damaged including necrosis. [5] According to ISAP (International association for the study of pain), pain is defined as "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage". [6] ISAP ranking says, PAIN ranked 5th the anesthesiology category in 2021, and attained the impact factor of 7.926- the highest in the journal's history! Phlebitis, defined as an inflammation of the vein, is the most common complications of IV therapy. Studies estimate that anywhere from 20-80% of patients receiving IV therapy develops phlebitis. Although the central access does not eliminate the risk of phlebitis, the issue is mainly of concern in peripheral cannula. [7] According to Dr John Diamond (2009) Up to 80% cancer patients are reported to have died from complications, treatment and side effects or related symptoms. The injection site reactions are local skin reactions. Mainly extravasation. One of the most important nurses responsibility to assess the pain and give supportive complimentary therapy. There are many ways to relieve pain. Treatments vary from individual to individuals depending upon the type and severity of pain. [8] The ultimate responsibility of the nurse is to provide comfort and relieve distress. One of the method that can be used to relieve pain is cryotherapy. Cryotherapy also known as cold therapy, the local or general use of low temperatures in medical therapy. Cryotherapy may be used to treat a variety of tissue lesions. The most prominent use of the term refers to the surgical treatment, specifically known as cryosurgery

Volume 12 Issue 12, December 2023

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or cryoablation. [9] Cryosurgery is the application of extremely low temperatures to destroy abnormal or diseased tissue and is used most commonly to treat skin conditions. The mechanism of destruction in cryotherapy is necrosis, which results from the freezing and thawing of cells. Treated areas reepithelialize. Mechanism of action in cryotherapy can be divided into 3 phases: heat transfer, inflammation and cell injury. [10]

2. Material and Methods

In this current study “quasi experimental design” was selected which was a Non randomized control group design to measure effectiveness of cryotherapy on level of pain among cancer patients receiving IV chemotherapy. Non-Probability purposive sampling technique was used. The sample consists of 60 patients from oncology department, Shri Mahent Indires Hospital, Dehradun, Uttarakhand. Out of 60 samples, 30 were included in Experimental Group and another 30 in Control group. There were two groups, one experimental group to which intervention was given and another control group to which intervention was not given. Cryotherapy was given after 20 minutes of chemotherapy. Pretest and post test score was measured of both the groups. Post test was taken after 15 minutes of Cryotherapy. The pretest and post-test assessment of practice of the Patients was carried out using the VAS (Visual Analogue Score).

The obtained data were analyzed and interpreted using descriptive and inferential statistics.

3. Instrument/Tool

Tool consists of Section A and Section B. Section A consists of Demographic performa such as Age in years, gender, Marital status, Educational status, Occupational status, Family income per month, Type of family, Family history of cancer, Type of Diet, Do you have any of the following Habits?, How long are you receiving chemotherapy? and size of needle used for receiving chemotherapy. Section B consists of Visual Analogue Scale, is a pain scale that was used to check the level of pain of cancer patients while receiving chemotherapy. Score interpretation for scale will be 0 for no pain, 1-2 for mild pain, 3-4 for moderate pain, 5-6 for severe pain, 6-7 for very severe pain, 7-8 for worst possible pain.

4. Statistical Analysis

Frequency and percentage distribution was used to analyse the demographic variables and level of pain, Mean and Standard Deviation Calculated. With the Paired and Unpaired T test the difference in the mean scores of Experimental and Control Group pre test and post test score was taken and compared.

Table 1: Comparison between pre test of pain scores between experimental and control group, N=60

Pre test	Mean	Std. Deviation	Mean difference	“t” test/ Table Value	Df	Inference Value/ P value
Experimental group	5.63	1.44	2.26	5.49/	58	Significant P<0.05 /0.000
Control group	3.36	1.73		2.00		

t test shows difference in pre test mean and post test and is significant (P<0.05).

Table 2: Comparison between post test pain scores between experimental and control group.

Post test	Mean	Std. Deviation	Mean difference	“t” test/ Table Value	Df	Inference Value/ P value
Experimental group	3.70	1.31	0.03	0.08/	58	Not Significant P>0.05/ 0.93
Control group	3.66	1.78		2.00		

t test shows very less difference in post test mean and post test mean is not significant (p>0.05).

5. Discussion

In this study, experimental group pretest mean and standard deviation of the pain score were 5.63 and 1.44, respectively, and the post test mean and standard deviation were 3.7 and 1.31 respectively. In control group, the pretest mean and standard deviation of the pain score were 3.36 and 1.73 respectively, and the post test mean and standard deviation were 3.66 and 1.78 respectively. The study’s findings revealed that the cryotherapy was effective on reducing the level of pain at iv site of patients receiving chemotherapeutic agents had a mean post test pain score 3.7 that is less than the pre test pain score 5.63 with a mean difference 1.93, indicating that cryotherapy was effective. At the 0.05 level of significance, the calculated t value (14.31) was higher than table t value 2.05 at df 29, indicating that null hypothesis (H0) was rejected and data was statistically significant.

Ethical Consideration:

The proposed study was conducted after the approval of the Authorities of Shri Mahent Indires Hospital, Dehradun. Informed written consent from patients who are willing to

take part in the study. Privacy and confidentiality of the subjects will be maintained. Data collected will be used strictly for the research purpose only.

Conflict of Interest:

None declared.

Financial Support:

Nil

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