International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Effect of Valsalva Maneuver on Level of Pain among Cancer Patients Undergoing Peripheral Venous Cannulation

Nitasha Sharma[1], Rose Mary George[2]

[1]M.Sc Nursing (Medical Surgical Nursing), Akal College of Nursing, Eternal University, Baru Sahib, Dist. Sirmour, Himachal Pradesh-173101, India, August, 2018

[2]Associate Professor, Medical surgical Nursing Department, Akal College of Nursing, Eternal University, Baru Sahib, Dist. Sirmour, Himachal Pradesh-173101, India, August, 2018

Abstract: ***Background: Cancer is the name given to collection of related diseases. In all types of cancer, some of the body cells begin to divide without stopping and spread into surrounding tissues. Adequate vascular access is of paramount importance in oncology patients, it is important in treatment of cancer for chemotherapy. Patients often claim that pain resulting from procedures is often worse than the condition which needs procedure. Valsalva maneuver is one of the non pharmacological methods that can be used to reduce pain of cannulation. Methods: The study adopted true experimental post test only control group design and was conducted at day care centre of Regional Cancer Hospital Shimla, H.P. (Feb 2018). A total of 100 female patients were selected by simple random sampling technique. Inclusion criteria: Adult female patients above 20 years of age who are prescribed with intravenous cannulation, getting cannulated at arm and who are willing to participate in the study. Exclusion criteria: Patients diagnosed with- respiratory problems, neurological problems, cardio- vascular problems, glaucoma, skin problems on the cannulation site and lung cancer. A structured interview schedule of socio demographic and clinical data was used to get background information and Numerical pain Rating Scale was used to assess the level of pain during cannulation. Results: Data analysis was done by descriptive and inferential statistics. In experimental group 26% were under the category of none and 68% were categorised as mild pain. In control group 60% had moderate and 38% of the samples experienced severe pain and mean pain score and standard deviation of experimental group as 1.52±1.249 and of control group as 6.14±1.565.The calculated t value as 16.313 at significance level of <0.001 and df (98) hence the calculated t value is greater than the tabulated 't' value which indicates the research hypothesis is accepted. The above findings shows that the Valsalva maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain in adult patients. Conclusion: Conclusion drawn from the findings of the study is that Valsalva Maneuver can be used as an effective nursing intervention in reducing pain among adult patients during peripheral intravenous cannulation.***

Keywords: Valsalva maneuver, Pain, Cancer, Intravenous cannulation, Chemotherapy

1. Introduction

Cancer is a collection of diseases which lead to uncontrolled growth of cells. In cancer, some cells of the body begin to multiply uncontrollably and spread into other tissues surrounding them. Its treatment include Chemotherapy which uses one or more anti-cancer drugs as part of a consistent course. There are various other types of cancer treatments which include radiation therapy, surgery, and systemic therapies (e.g., hormonal therapy, chemotherapy, immune therapy, and targeted-therapy and gene therapy).

These treatments may be used alone or in combination on the type and stage of cancer; tumor characteristics and the patient's age, health, and preferences.[1] Adequate vascular access is very important in oncology patients. It is important in the primary phase of surgical cancer treatment or chemotherapy.[2] Peripheral venous cannulation (PVC) is the insertion of a Vascular Access Devices into a peripheral vein. [3] Pain is an unpleasant feeling or sensory experience by actual or potential tissue damage, and it is the most common cause for people to visit health care centers.[4] As intravenous cannulation is one of the most widespread invasive method used for the treatment of diseases and which is painful as well as stressful for the patients. Fear of injection by needles affected at least 10 per cent of the population and in chronic cases may lead to avoidance of medical care.[5]

One of the studies indicated that pain is directly associated with decrease in quality of life indicators including increased depression, disease, and decreased life satisfaction.[6] There are many non-pharmacological interventions which includes nursing activities that can relieve pain. Such interventions are successful, straightforward, and safe and do not require definite time and costly apparatus. In addition, the side effects caused by using pharmacological interventions are reduced in non pharmacological process.[7]

Valsalva Maneuver (VM) is one of the non-pharmacological methods that can be used to decrease pain of intravenous cannulation. VM increases the intra-thoracic pressure most important to activation of sinoarotic baroreceptors and thus stimulation of vagus nerve. Vagal stimulation leads to antinociception. VM does not require any costly equipment. Its learning is easy for the patients undergoing cannulation and it reduces the intensity of pain during peripheral intra venous cannulations which will ultimately increase the success rate of venous cannulation. VM also reduces the pain drastically which is caused by skin puncturing in spinal injection. This maneuver causes a distraction; therefore, it is effective to be used for relieving the pain of veni-puncture.[8] [9]

2. Review of Literature

Literature search encompassed pertinent facts, figures, findings and discussions arranged in the following sub headings

Section-I: Literature related to incidence and prevalence of cancer

Section-II: Literature related to pain of intravenous cannulation

Section III: Literature related to Effect of Valsalva Maneuver on cannulation pain

Section IV: Literature related to other effects of valsalva maneuver

Section-I: Literature related to incidence and prevalence of cancer:

According to national cancer control and registration program report of year 2014 Cancer has emerged as a major public health concern in India. Every year 12.5 lakh new cases are diagnosed and at any given point of time around 28 lakh cases of cancers are prevalent. About 6.8 lakh patients are dying because of this per year. According to the World Health Organization (WHO), death from cancer cases in India is projected to rise to 13.1 million by the year 2030. The burden of cancer is expected to increase further due to increase in the life expectancy. As per latest data of India from GLOBOCAN 2012, top cancers in female are breast, cervix, uterus and colo-rectum and in males are oral cavity, lung and stomach.[10]

As per an article published in Times of India in year 2012, Himachal Pradesh there is rise in number of cancer patients with 23,241 cancer patients during last year alone, afterwards 2,471 new cases have been registered. According to the authorities, state had 16,405 cancer patients in 2009 that increased to 19,705 patients in 2010, while the number increased to 23,241 by 2011-12. in next statements, the authorities also stated that among the new cases, registered during financial year 2011-12, included oral cancer -179 cases, Ca digestive tract -478 , 623 cases of respiratory and intra-thoracic organ cancer, bone 302 cases, 519 cases of genitourinary organ and 370 of other types of cancer.[11]

As per the analysis of Cancer statistics of India, every 8 minutes one woman dies of cervical cancer in India. One woman dies of every 2 women who are newly diagnosed with breast cancer. Estimated number of people living with Cancer is around 2.5 million In India and every year over 7 lakh new cancer patients registered in various national cancer treatment facilities. Cancer-related deaths in India is around 5,56,400 people annually in which most of the patients are from 30-69 years of age group. Cancers of oral cavity and lungs in males and in females cancer of cervix and breast accounts for 50% of all the cancer deaths in India.[12]

Section II: Literature related to pain of intravenous cannulation

A prospective randomised study was conducted to verify the effect of site selection on pain of venous cannulation among Fifty-five adults, who were scheduled to undergo elective surgery were randomly allocated in the study to get IV cannulation 28 patients on Antecubital fossa and 27 patients on dorsum of hand. Pain scores on cannulation related to both sites were compared. Non-parametric data and frequency data analysis was done using the Wilcoxon signed rank test or the Chi-square test as appropriate, results showed that Antecubital fossa site was significantly less painful in comparison to the DOH for intravenous cannulation ($P < 0.05$). The study recommendations were- in the absence of any contraindications, ACF should be the site of choice for cannulation.[13]

A randomized Controlled Study was conducted for checking the Efficacy of Local Anesthetics during intravenous cannulation on 450 patients revealed that pain during venipuncture depended to a large extent on the caliber of the chosen venous cannula. vapocoolant spray and lidocaine lessened the discomfort compared to control treatment (5.0 ± 1.5) on numerical pain rating scale with mean and standard deviation of (2.6 ± 1.3) and (3.5 ± 2.2) When a smaller 20G cannula was used, vapocoolant spray improved discomfort by only 0.8 NRS points, The rate of unsuccessful puncture was higher after lidocaine pretreatment (12.7%) than after either vapocoolant spray (4.7%; $p = 0.0066$) or no intervention (4.0%; $p = 0.0014$).[14]

A study was conducted on gender variation in pain perception after intravenous cannulation in adults. 100 subjects, informed written consent was taken. The subjective pain was assessed by using Visual Analogue pain scale (VAS) on 0 (No pain) – 10 (Max pain) immediately after the intravenous cannulation done by using 20 gauge intravenous cannula. Results of the study were analyzed by using Pearson Chi Square test and the pain perception was moderate to severe (5-10) in 64% of females as compared to 12% in males. There was significant increase in the pain perception of females compared to males ($\chi^2 = 31.84$, $p<.001$).[15]

An observational study was conducted on 120 male and female patients, 60 -60 in each group and the objective of this prospective, observational study was to determine the effect of gender on pain perception The mean pain scores were significantly higher in female patients and they concluded that female patients exhibited greater intensity of pain and required higher doses of analgesics compared to males.[16]

A randomized prospective study was conducted in Brazil to evaluate pain during intravenous cannulation. Samples of 300 patients undergoing intravenous cannulation were selected. Out of 300 samples, 150 samples were administered local analgesics prior to cannulation. Again each of the 150 group was further allocated to one of the five cannula size group 20, 18, 17, 16, 14. The samples were asked to quantify the pain using a four point scale. The result showed that the incidence of pain for 14G, 16G were 77.4% and 45.1% as compared to 10% and 12.9% with local anesthetics. The rest of the 18G, 20G, and 17G without analgesics had more pain as compared with those who applied local anesthetic agent.[17]

An observational and self-report survey analysis on clinical implication of un-managed needle insertion pain was

conducted among children and adolescents undergoing routine venipuncture. Samples of 171 children's ranging from 3 to 17 yrs were included in the study. Visual analogue scale was used to assess the pain. 36% of children at the age of 3 to 6 years and 13% of children 7 to 17 years of age reported moderate to severe pain.[18]

Section III: Literature related to Effect of Valsalva maneuver on Cannulation pain

A randomised controlled study was conducted to evaluate the role of 3 different non pharmacological measures such as Valsalva maneuver, flash of light, and distraction method in attenuation of pain during venous cannulation. Two hundred patients of either sex, aged between 18 and 65 years, posted for elective surgery were enrolled in this study. Patients were randomly allocated into four groups, Group C-control, Group V (valsalva) - blew into sphygmomanometer raising the mercury column up to 30 mm of Hg, Group D (distraction) - pressed a rubber ball and Group L (light) - photographed with a flash of light before venous cannulation. During the process of cannulation, patients were observed and questioned, and pain was graded using a 4- point scale. After the cannulation, pain during the procedure was also assessed using visual analog scale (VAS) score A significant reduction in the incidence of pain was noted in distraction group 36% as compared to 44% in Group L, 46% in Group V, and 100% in the control group. The severity of pain as assessed by 4-point score was significantly lowest in Group D (0.26 ± 0.53) as compared to other three groups (Group V and L = 0.54 ± 0.16, Group C = 1.64 ± 0.6, P < 0.001). Mean VAS score was significantly low in Group D (0.6 ± 1.11) and Group L (0.54 ± 1.06) as compared to Group V (1.26 ± 1.76) and Group C (5.0 ± 1.21, P < 0.001).[36]

A study was conducted to assess the effectiveness of valsalva maneuver prior to IV cannulation on pain perception. 60 samples were taken at HAHC hospital in Delhi The objective was to compare the level of pain during IV cannulation between experimental and control group and to find out the association between them with selected variables. The findings revealed that there was a significant decrease in the level of pain after performing valsalva maneuver ($p<0.05$), and there was no significant association of post-test pain score with any of the selected associated variables in the experimental and control group. It was concluded that valsalva maneuver was effective in reducing the pain in patients undergoing intravenous cannulation.[37]

A study was done to assess the effectiveness of Valsalva Maneuver on pain during venipuncture among patients admitted in the medicine wards of Guru Gobind Singh Medical Hospital, Faridkot, Punjab. Design of the study was Quasi-experimental and was done on 60 samples, through convenient sampling with random assignment, The results revealed that there is significant reduction in pain during venipuncture after intervention in experimental group with ($p=0.000$). No association was found between pain level and socio-demographic and clinical variables.[38]

A study was conducted for checking the efficacy of the Valsalva maneuver on pain of venous cannulation. 75 adults were taken as samples and they include- American Society of Anaesthesiologists (ASA) physical status I and II, both sex, patients undergoing elective surgery, were included. They were randomized into 3 groups and they were-control group, group blowing into sphygmomanometer tubing and raised the mercury column up to30 mmHg for period of 20 seconds(valsalva maneuver) and group pressed rubber ball. Venous cannulation pain was graded using a 4-point scale and visual analog scale of 0–10. There was significant reduction observed in the Valsalva group: 18 patients among 25 patients (72%), whereas 25 of 25 patients (100%) experienced pain in the other two interventional groups ($P<0.001$).[39]

A comparative study was conducted on 70 patients undergoing hemodialysis. By using convenient sampling they were taken from two centres Amin Medical Center and Hazrat-e Zahra-e Marziye Hospital in Isfahan. Then were placed in two groups one receiving valsalva maneuver and other ice massage. Data was collected using an interview questionnaire Abbey pain scale and numerical pain rating was used. Test results showed that there was no significant difference in objective pain rating between two groups after giving intervention ($P=0.73$). This study also revealed that, pain rating by subjects in Valsalva maneuver group were less than ice massage group at ($p=0.04$). Valsalva maneuver method reduces more objective pain as compared to ice massage method [23]

A quasi experimental study was done with the objective to evaluate the effectiveness of valsalva maneuver prior to peripheral intravenous cannulation on intensity of pain and it was conducted on 100 subjects. Randomisation was done for allocation of subjects into control (50) and interventional group (50) by using lottery method. In control group (cannulation without performing valsalva maneuver) was applied, where as in interventional group,(performing valsalva maneuver before cannulation) was applied. Socio-demographic data of subjects was taken from subjects by using interview schedule. Pain during cannulation was assessed by using numerical pain scale(NRS). Mean NRS pain score was significantly less in interventional group than control group at ($t=5.31, p<0.001$). In control group 64% of subjects experienced moderate pain whereas in interventional group 66% had mild pain .Ten percent of subjects from control group had severe pain whereas only 2% had severe pain in interventional group (chi square=16.69,$p<0.01$).There was no significant difference between the sites of cannulation and number of pervious cannulations.[24]

A comparative study was conducted on 195 patients for comparing the analgesic efficacy of eutectic mixture of local anesthetic (EMLA) with valsalva maneuver in adult patient during intravenous cannulation. Subjects were randomly divided in three groups. In the EMLA group- the dorsum of the non-dominant hand was covered with a thick paste of 2.5 g of EMLA cream (group E) and left for of 30 min before venipuncture. In the control group (group C), the same procedure was applied except instead of the EMLA, Vaseline was used. The Valsalva group (group V) were cannulated during a Valsalva maneuver while placed in the supine position during venipuncture. The patients then reported the amount of pain during cannulation by using an

11-point numerical rating scale. The valsalva maneuver was more effective in reducing pain then other interventions in groups E and C (p<0.001). Then when the median pain scores were assessed by the NRS after venipuncture then they were as follows- in C group it was 3 (ranging from 0-9), whereas the median pain values in E and V groups were 2 (ranging from 0-7) and 2 (ranging from 1-8). The Valsalva maneuver gives similar results to the EMLA in terms of pain reduction during venipuncture. Concluded that Valsalva maneuver is an effective method to reduce pain during intravenous cannulation.[25]

A randomized clinical trial was conducted for assessing the effect of valsalva maneuver on intravenous cannulation pain which leads to baroreceptor activation and nociception .90 adult patients with ASA physical status I and II who were undergoing elective surgeries were included. Random allocation of patients into three equal groups was done. Control group as- Group I; Group II taken for pressing a rubber ball which is attention-diverting method; Group III for valsalva maneuver; by blowing into sphygmomanometer tubing and holding the mercury column up to 30 mm Hg for a period of 20s. Pain was rated by using numeric rating scale: 1-10, where 1-3 was rated as mild, 4-6 as moderate, and more than 6 as severe. Significant reduction in pain was observed in the valsalva group compared with the control group and the ball groups (p=0.001).[26]

A quasi experimental study was done for evaluating the effect of Valsalva maneuver on pain intensity during insertion of needle to the arteriovenous fistula among patients who are undergoing hemodialysis and 35 samples were taken for conduction of study. The results of study showed that 14.3%, 71.4%, and 14.3% of the studied units had mild, moderate, and severe pain, respectively, in terms of subjective pain due to needle insertion before intervention. After intervention, 42.9%, 45.7%, and 11.4% had mild, moderate, and severe pain, respectively. Wilcoxon test results showed that the subjective pain intensity due to needle insertion was decreased significantly, after intervention.[27]

A true experimental study was conducted for assessment and evaluation of effectiveness of Valsalva Maneuver on pain reduction during IV cannulation in Delhi among adults on 60 samples and the results showed that mean post test pain score of adults in experimental group was lower (1.3) than those in control group (5.56). No significant association was found between age and body mass index with post test pain scores whereas significant association was found between post test pain scores and sex which indicates females experience more pain than males and it showed that Valsalva maneuver is effective technique in reducing pain associated with IV cannulation.[28]

A prospective randomized clinical trial was conducted on 110 patients scheduled for elective surgery, they were randomly divided into two groups. Half of the patients received venepuncture during a Valsalva maneuver (group A patients) and patients of other group (group B) underwent venepuncture without Valsalva maneuver. Pain assessment was done using a 0–10 point numerical rating scale. Results showed numerical rating scale score as 1.5 ± 1.2 for Group A and 3.1 ± 1.9 for Group B, the difference being statistically significant (P <0.0001). On the basis of data from this study, the Valsalva maneuver may be of the value before venous cannulation as a simple and practical method to reduce pain from venous cannulation.[29]

Section IV: Literature related to other effects of Valsalva maneuver

Randomized controlled trials has been performed to understand effectiveness of valsalva maneuver for reversion of the Supra-Ventricular Tachycardia (SVT). Total 316 participants have participated in the study. This research compared the effectiveness of Valsalva Maneuver (VM) in reverting the Supra-Ventricular Tachycardia(SVT) with that of other vagal maneuvers in a cross-over design. Two other studies induced the Supra-Ventricular Tachycardia (SVT) within a controlled environment inside a well- equipped laboratory. The Participants of this respective research had ceased all medications before engaging in the studies. The third study reported on patients presenting to a hospital's emergency department with an incident of the Supra-Ventricular Tachycardia (SVT). The patients, who were undergone trial, were not controlled for prescribed medications or other factors before the intervention. The two other lab studies presented the reversion rates of 45.9 percent and 54.3 percent, at the same time the clinical study demonstrated reversion success of 19.4 per cent. This discrepancy may be due to method based differentiations in between the studies which were; the consequence of induced the Supra-Ventricular Tachycardia (SVT) against spontaneous episodic SVT, and participant factors such as medications and co-morbidities. The outcome shows that there were no enough verifications to maintain or refute the effectiveness of the Valsalva maneuver for Supra-Ventricular Tachycardia (SVT). [30]

A potential trial for the impact of the modified Valsalva maneuver was performed on patients presenting with Supra - Ventricular Tachycardia (SVT) to the emergency unit of hospital. After fulfilling the study criteria and giving consent in written, the participants were instructed to perform modified Valsalva maneuver in which they forcefully expire into a section of suction tubing and pressure gauge for at least 15 seconds and at a pressure of at least 40 mmHg , while lying supine on their bed in a trendelenberg position. Result showed that in all 19 patients, admitted for trial, 6 reverted with the modified Valsalva Maneuver. The Valsalva Maneuver has an effect to revert Supra-Ventricular Tachycardia(SVT).[31]

Another randomized controlled clinical trial has been conducted in 10 emergency departments of UK to evaluate the effectiveness of modified Valsalva Maneuver in treatment of Reentrant tachycardia's (REVERT). In this study the comparison between a standard Valsalva Maneuver with a modified Valsalva Maneuver has been done. The modified valsalva maneuver includes leg elevation with a supine posture after giving a strain in stable patients presenting to the emergency departments with SVT. The prime conclusion measure is return to sinus rhythm on a 12 LEAD-ECG. Secondary outcome measures consist of the need for treatment with adenosine long with other premier antiarrhythmic treatments and the time which the patients

spend in the emergency departments. In 372 patients, with 80% power to demonstrate an absolute improvement in cardio version rate of 12%.An improvement of this magnitude through the use of a modified VM would be of significant benefit to patients and healthcare providers, and justify a change to standard practice.[32]

A Study was conducted for evaluating the effect of valsalva maneuver on intra-abdominal pressure and issues of safety during resistance exercise. During resistance exercise, while lifting heavy loads or when lifting lighter loads is to failure. Study showed that valsalva maneuver while doing resistance exercise is helpful for increasing the stability of the spine by putting intra-abdominal pressure. However, the resistance trainers are often advised to avoid valsalva maneuver when performing resistance exercise because it can lead to adverse vascular events. The aim of this study was to establish the effect of the Valsalva maneuver (VM) on intra abdominal pressure and to evaluate if the VM during resistance exercise is a safe practice or not. Various researches were reviewed for checking the effect of the VM on: intra abdominal pressure and various hemodynamic changes which take place during resistance exercise. The data showed that VM alone will increase IAP and the VM augment IAP during various resistance exercises. It was also reported that as the lifting intensity and effort increases there will be an incremental rise in IAP, and IAP tends to be lower compared with peak IAP from the VM alone. Valsalva maneuver is associated with an increase BP during resistance exercise, but when doing VM alone it was associated with greater hemodynamical changes. It concludes that VM effectively increases Intra abdominal pressure and also assist for spine stability and rigidity of trunk while doing resistance exercise. And the risk associated with valsalva maneuver during resistance exercise remained unconfirmed. [33]

3. Methodology

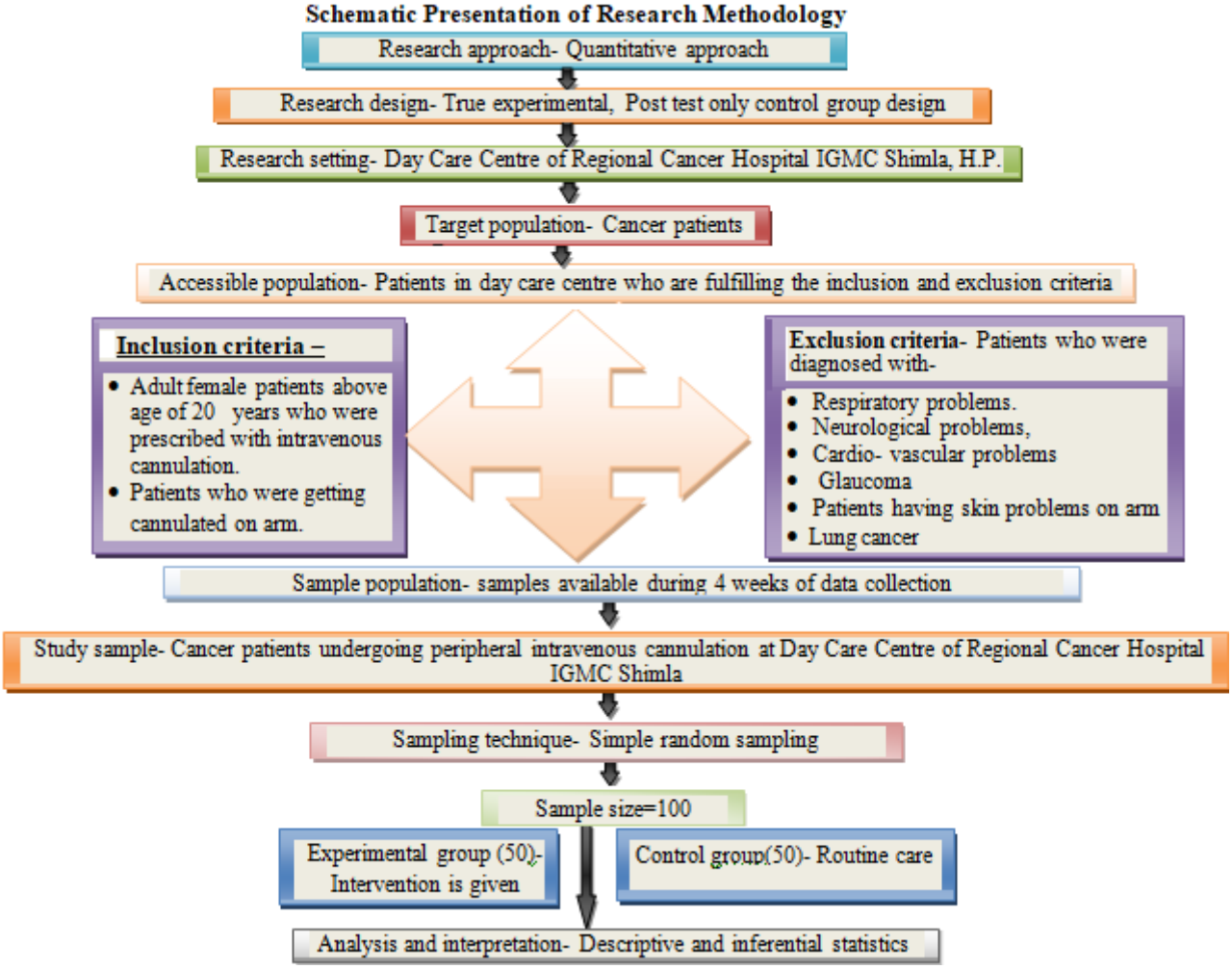
Research approach

The purpose of this study was to assess the effect of Valsalva Maneuver on level of pain among cancer patients. So, Quantitative research approach was used to test the hypothesis & to measure relationship between two variables i.e. valsalva maneuver and level of pain

Research design

In this study, randomized post test only control group research design was used. First, after doing randomization the researcher had taken two groups i.e. control group and experimental group. After that informed consent was taken from the patients of both the groups and then experimental group after giving Valsalva maneuver and control group without giving any intervention (Valsalva Maneuver) were cannulated and the post test pain scores were measured in both the groups by using Numerical pain rating scale

Research Methodology



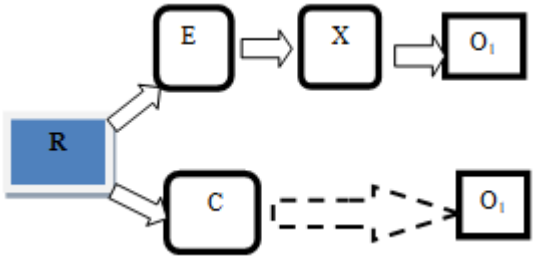


Figure 2: Schematic Diagram of Research Methodology

R: Randomisation
E: Experimental group
C: Control group
X: Valsalva Maneuver
O_1: Post test

Variables
1) Independent variable: Valsalva maneuver
2) Dependent variable: Level of pain

Research setting- Day Care Centre of Regional Cancer Hospital IGMC Shimla, H.P.

Population
1) **Target population:** Cancer Patients
2) **Accessible population:** Cancer patients undergoing peripheral intravenous cannulation at Day Care Centre of Regional Cancer Hospital IGMC Shimla, H.P.

Sampling
1) Sample
All female Cancer patients above 20 years of age undergoing peripheral intravenous cannulation at Day Care Centre of Regional Cancer Hospital IGMC Shimla , H.P. who fulfilled the inclusion criteria

2)Sample size

$$N= \frac{2\,(SD)^2 x(Z\alpha/2+Z\beta)^2}{d^2}$$

Where,

$$\left\{\begin{array}{l} Z \text{ at } 0.05/2 = 1.96 \\ Z \text{ at } 0.02 = 0.842 \\ d=\mu_1 - \mu_2/SD \end{array}\right\}$$

α =constant value
β= constant value
μ= Mean [$\mu_1 - \mu_{2=5.3}$]

$$SD= \sqrt{\frac{(SD_1)^2+(SD_2)^2}{d^2}}$$

SD=2.63
SD_1 = 0.699
SD_2 = 3.590

Calculated Sample size: 8
Estimated sample size: 16

Sample size estimation was done on the basis of pilot study on sample of 20 patients and it was found to be 16 [8 in each group], but for the purpose of generalization sample taken was 100. In the control group (50) and experimental group (50)

3)Sampling Technique
In this research study, Simple random sampling technique was used.

Criteria for sample selection
a) Inclusion criteria
- Female patients above age of 20 years who are prescribed with intravenous cannulation.
- Patients who were getting cannulated on arm .
- Patients who were willing to participate in the study.

b) Exclusion criteria
Patients who were diagnosed with-
- Respiratory problems
- Neurological problems
- Cardio- vascular problems
- Glaucoma
- Patients having skin problems on arm
- Lung cancer

4)Development and description of tool
The tool has been developed after extensive review and discussion with the experts and with the investigator's personal and professional experiences. The questions were directed towards getting Socio demographic and Clinical data from subjects.
a) List of tool
Tool 1 - Structured interview schedule to collect background information
Section A: Socio demographic data
Section B: Clinical data
Tool 2 – Numerical pain rating scale
b) Description of the tools

Tool 1- it consisted of two sections A and B

Section A
It consisted of socio-demographic data of subjects which includes age, educational status, occupation, Family monthly income, marital status, place of residence and religion.

Section B
It consists of Clinical data of subjects which includes size of cannula, site of cannulation, previous exposure to cannulation, diagnoses of patient, use of analgesics and any alternative therapy
Tool 2: It consists of Numerical Pain Rating Scale (0-10) mild, moderate and severe pain.

Content validity
The content validity of the tool was established after the consultation with experts in nursing and medical fields.
Nursing experts 8
Medical experts 3

5)Description of the independent variable
Valsalva maneuver- it refers to forcefully blowing into the rubber tubing connected to an aneroid BP apparatus and raising the needle of dial up to 40 points and holding the breath for of 20 seconds.

Ethical Consideration

1) The researcher had explained the purpose of the study to the participants
2) A written informed consent was obtained from each participant.
3) Participants were informed that they can withdraw from the study at any point.
4) The anonymity and confidentiality of the participants was protected throughout the study.
5) Professional norms were maintained.
6) Three principles which need to be followed in any research which is beneficence, respect of human dignity and justice were duly considered in the study and practiced during the actual conduction of the study.

Pilot Study

Pilot study was conducted prior to the data collection to check the feasibility of the tool. It was conducted during the last week of January, 2018 in Regional Cancer Hospital district Shimla (H.P.). Total 20 participants were selected for the pilot study (10 in experimental group and 10 in control group) by using simple random sampling technique. The samples which were included during the pilot study were not taken during main study data collection. No specific concerns arised during pilot study and the study was found to be feasible. Some additions were done in the tool for main study data collection like- use of analgesics, alternative therapy use

Procedure of data collection

The data collection for the main study was collected in the month of February 2018.

Subjects were divided by random selection in to control and experimental group by using randomization.

After selecting the subjects for both the groups by using structured interview schedule demographic and clinical data was obtained from the subjects of control group. Supine position was given to control group and after applying tourniquet, cannula was inserted and immediately after cannulation with the help of numerical pain scale the client was asked to notify the level of pain form score 1-10 on pain score sheet

In experimental group, demographic data and clinical data of subjects was taken similarly by structured interview schedule , then the intervention was given to subjects by asking them to blow in to the rubber tubing of aneroid BP apparatus for a period of 20 second so that the needle of dial reached up to 40 points, then immediately after doing this intravenous cannula was applied, after cannulation with the help of numerical pain scale the client was asked to notify the level of pain form score 1-10 on pain score sheet.

Plan for data analysis

The data was analyzed in two parts.

1) Descriptive statistics

Frequencies and percentages distribution was used to analyze the socio demographic data and clinical data of subjects. Mean and standard deviation was used to analyze the level of pain.

2) Inferential statistics

Independent “t” test was used to find the effectiveness of valsalva maneuver on pain level of intravenous cannulation. Chi- square test was used to find out association of level of pain with selected socio-demographic variables.

4. Results and Discussion

This chapter deals with the results and interpretation of data collected from 100 female adult patients undergoing intravenous cannulation in Regional cancer Hospital Shimla, Himachal Pradesh. The present study was done to assess the effect of Valsalva maneuver prior to intravenous cannulation on level of pain among cancer patients undergoing peripheral venous cannulation. In this chapter a detailed description of the results obtained from the analysis of findings has been presented. The data was acquired by using structured interview schedule and analyzed by using both descriptive and inferential statistics. The gathered data were first coded and summarized in a master sheet and then analyzed by using statistical package for social sciences (SPSS version 16). The variables were described as simple percentages, means and standard deviation as appropriate depending on the nature of the variables.

Organization of Data Analysis

The analysis of data was organized and presented under the following sections:

- **Section A:** Socio-Demographic Data
- **Section B :** Clinical Data
- **Section C:** Comparison of the level of pain during intravenous cannulation between the experimental and control group.

Additional finding

- **Section D:** Association of the level of pain during intravenous cannulation between experimental and control group with selected demographic variables.

Section A: Socio-Demographic Data

1. Frequency and percentage distribution of socio demographic data of patients, N=100

Variables	Experimental group, n=50		Control group, n=50		p value
	F	%	F	%	
Age (in years)					
20-30	0	0	2	4	.864 NS
31-40	4	8	4	8	
41-50	23	46	12	24	
51-60	10	20	13	26	
>60 years	13	26	19	38	
Educational Status					
Graduate or above	6	12	4	8	.696 NS
Higher Secondary	8	16	11	22	
Secondary Education	5	10	3	6	
Primary education	4	8	5	10	
No formal education	27	24	30	60	
Occupation					
Government employee	5	10	3	6	.998 NS
Private employee	1	2	1	2	
Self Employed	1	2	0	0	
Labourer/ Daily wager	5	10	3	6	

Unemployed	38	76	43	86	
Family monthly					
<5000	24	48	20	40	.268 NS
5001-10000	10	20	10	20	
10001-15000	3	6	8	16	
15001-20000	3	6	4	8	
>20000	10	20	8	16	
Marital status					
Married	37	74	41	82	0.008
Unmarried	1	2	1	2	
Widow	12	24	7	14	
Divorced	0	0	1	2	
Place of residence					
Urban	4	8	8	16	.082 NS
Rural	46	92	42	82	
Religion					
Hindu	49	98	50	100	
Muslim	1	2	0	0	
Sikh	0	0	0	0	
Christians	0	0	0	0	
Others	0	0	0	0	

Table 1 depicts that maximum of the adults in experimental group (46%) falls in the category of 41-50 years and in control group (38%) were more than 60 years of age. 54% of adults in experimental and (60%) in control group were not having any formal education. Maximum of the adults (76%) in experimental and (86%) in control group were unemployed.48% of adults in experimental and (40%) in control group were having less than 5000 rupees monthly family income. Majority of adults in experimental group (74%) and in control group (82%) were married and maximum adults (92%) in experimental and (82%) in the control group belongs to rural area. Majority (98%) in experimental and all (100%) in control group were Hindus. The study results have shown that both the groups were similar in terms of socio-demographic variables.

Section B: Clinical Data

2. Frequency and percentage distribution of Clinical data of patients, N=100

Variables	Experimental group, n=50		Control group n=50		p value
	F	**%**	**F**	**%**	
Size of cannula					
20G	16	32	14	28	.441 NS
22G	**32**	**64**	**36**	**72**	
24G	2	4	0	0	
Site of cannulation					
Dorsum of hand	**37**	**74**	**42**	**84**	.254 NS
Inner aspect of forearm	8	16	4	8	
Outer aspect of forearm	5	10	3	6	
Yoga/ meditation	0	0	1	2	
Previous exposure to cannulation					
Yes	**48**	**96**	**48**	**96**	.768 NS
No	2	4	2	4	
If yes, number of previous cannulation					
Once	10	20	5	10	.320 NS
Twice	11	22	8	16	
More than two times	**29**	**58**	**37**	**74**	
Analgesics use					
Yes	17	34	17	34	.162 NS
No	**33**	**66**	**33**	**66**	
Use of Alternative Therapy					
Yes	3	6	2	4	.715 NS
No	**47**	**94**	**48**	**96**	
If yes then Specify					
Yoga and meditation	**3**	**6**	**2**	**4**	.715 NS

Table 2 depicts that (64%) of the adults from experimental group and (72%) from control group were cannulated with 22G cannula. Maximum (74%) in experimental and (84%) in control were cannulated on dorsum of hand. Most of the adults (96%) in both the groups were previously exposed to cannulation. Maximum adults(58%) from experimental and (74%) from control group were having previous exposure to cannulation more than two times; maximum adults (66%) from both the groups were not on analgesics and majority of them (94%) from experimental and (96%) from control were not on any alternative therapies, and 6% from experimentral mand 4% from control were using any other alternative therapy like yoga etc. The study results had shown that subjects in both the groups were similar in terms of clinical variables.

Section C: Comparison of the level of pain during intravenous cannulation between the experimental and control group.

3. Frequency and percentage distribution of samples based upon level of pain in Experimental and Control group, N=100

Level of pain	Experimental group n=50		Control group n=50	
	F	%	F	%
0	13	26	-	-
1	14	28	1	2
2	10	20	-	-
3	10	20	-	-
4	3	6	4	8
5	-	-	12	24
6	-	-	14	28
7	-	-	10	20
8	-	-	6	12
9	-	-	2	4
10	-	-	1	2

Table 3 depicts the scoring of pain in numerical pain rating scale in experimental group, it varies from 0 to 4 and maximum adults (26%) were having 0 pain scoring and 28% had pain score of 1 ; 20% were having 2 and next 20% were having pain score of 3 and (6%) had pain score of 4 and control group pain score varies from 1 to 10 and maximum adults (24%, 28%, and 20%) in pain score of 5,6 and 7.

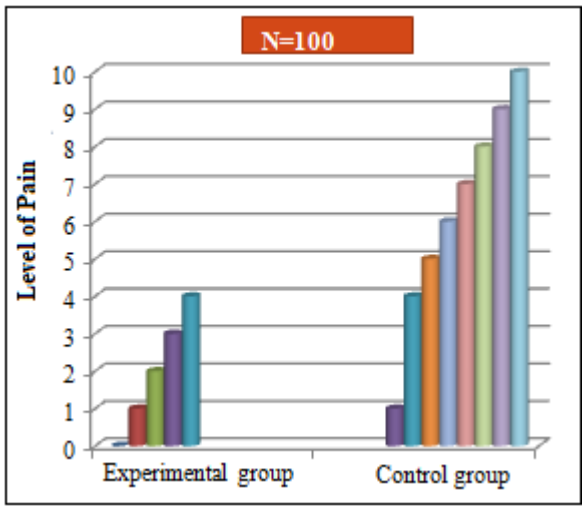


Figure 3: Frequency distribution of samples based upon level of pain in experimental and control group

4. Frequency and percentage distribution of sample based upon Category of pain, N=100

Category of pain	Experimental group N=50		Control Group N=50	
	f	%	F	%
None	13	26	0	0
Mild	34	68	1	2
Moderate	3	6	30	60
Severe	0	0	19	38

Table 4 shows the frequency and percentage distribution of samples according to pain categories. In experimental group 26% were under the category of none and 68% were categorised as mild pain. In control group 60% had moderate and 38% of the samples experienced severe pain.

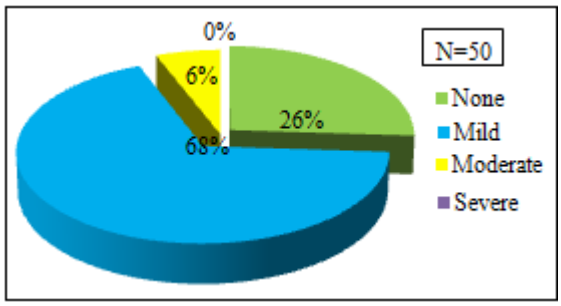


Figure 4: Percentage distribution of samples based on category of pain in experimental group

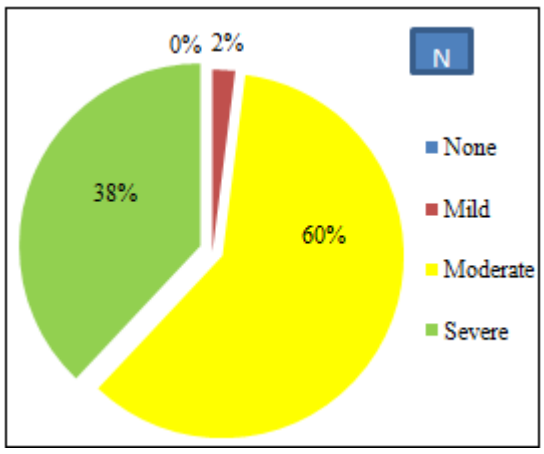


Figure 5: Percentage distribution of samples based on category of pain in control group

5. Range, Mode, Median, Mean and Standard deviation of Pain Score-

N=100	Maximum Pain score	Mean	SD	Range		Mode	Median
				Minimum	Maximum		
Experimental Group	10	1.52	1.249	0	4	1	1
Control group	10	6.14	1.565	1	10	6	6

Table 5 shows the range of pain score in both experimental and control group. The range in experimental group varies from 0 to 4 and in control group from 1 to 10. It also shows the mean pain score and standard deviation of experimental group as 1.52±1.249 and of control group as 6.14±1.565 and mode, median of experimental group is 1 and of control group is 6.

6. Comparison of Mean, standard deviation, standard error, mean difference and t value between experimental and control group, N=100

Group , N(100)	Mean	SD	SE	MD	t value	p value
Experimental group (50)	1.52	1.249	.28	4.620	-16.313	<0.001
Control group (50)	6.14	1.565	.28			

Table 6 shows the mean difference between experimental and control group is 4.620 and calculated t value as 16.313 at significance level of <0.001 and df 98 Hence the calculated t value is greater than the tabulated 't' value which indicates the research hypothesis is accepted. The above findings shows that valsalva maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain in cancer patients

Section D: Association of the level of pain with selected demographic variables

7. Association between level of pain and Selected Variables in Control group

Table 7: Depicts that, there is a significant association at p<0.001 between site of cannulation and level of pain

Variables	Calculated ($\chi 2$)	df	p value
Age (in years)	25.012	28	0.627
20-30			
31-40			
41-50			
51-60			
>60 years			
Educational Status	21.092	28	0.821
Graduate or above			
Higher Secondary			
Secondary Education			
Primary education			
No formal education			
Occupation	17.571	21	0.676

Government employee			
Private employee			
Self Employed			
Labourer/ Daily wager			
Unemployed			
Family monthly	33.714	28	0.21
<5000			
5001-10000			
10001-15000			
15001-20000			
>20000			
Marital status	28.957	21	0.115
Married			
Unmarried			
Widow			
Divorced			
Place of residence	6.882	7	0.441
Urban			
Rural			
Religion	29.68	22	0.122
Hindu			
Muslim			
Sikh			
Christians			
Others			
Size of cannula	4.625	7	0.706
20G			
22G			
24G			
Site of cannulation	59.758	21	0.000*
Dorsum of hand			
Inner aspect of forearm			
Outer aspect of forearm			
Yoga/ meditation			
Previous exposure to cannulation	15.524	21	0.796
Yes			
No			
Analgesics use	14.222	7	0.047
Yes			
No			
Alternative Therapy	6.287	7	0.507
Yes			
No			

8. Category of pain on the basis of site of cannulation-

Categories	*Mild/ Moderate*	*Severe*	*Total*
Dorsum of hand	28	14	42
Inner aspect of forearm	2	2	4
Outer aspect of forearm / any other	1	3	4
Total	**31 62%**	**19 38%**	**50 100%**

Table 8 depicts that, 28 patients who were cannulated on dorsum of hand had mild to moderate pain and 14 had severe pain. 4 patients were cannulated on inner aspect of forearm and among them 2 had mild and moderate pain and 2 had severe pain. One patient was cannulated on outer aspect of forearm having mild and moderate pain and 3 were having severe pain.

9. Association between level of pain and Selected Variables in Experimental group

Variable	*Calculated (χ2)*	*df*	*P value*
Age (in years)	5.408	12	0.943
20-30			
31-40			
41-50			
51-60			
>60 years			
Educational Status	26.12	16	0.052
Graduate or above			
Higher Secondary			
Secondary Education			
Primary education			
No formal education			
Occupation	9.222	16	0.904
Government employee			
Private employee			
Self Employed			
Labourer/ Daily wager			
Unemployed			
Family monthly	16.694	16	0.406
<5000			
5001-10000			
10001-15000			
15001-20000			
>20000			
Marital status	4.306	8	0.829
Married			
Unmarried			
Widow			
Divorced			
Place of residence	6.522	4	0.163
Urban			
Rural			
Religion	4.082	4	0.394
Hindu			
Muslim			
Sikh			
Christians			
Others			
Size of cannula	10.546	8	0.229
20G			
22G			
24G			
Site of cannulation	5.294	8	0.726
Dorsum of hand			
Inner aspect of forearm			
Outer aspect of forearm			
Yoga/ meditation			
Previous exposure to cannulation	14.743	12	0.256
Yes			
No			
Analgesics use	5.193	4	0.268
Yes			
No			
Alternative Therapy	1.212	4	0.876
Yes			
No			

Table 9 depicts that there is no significant association between any of the study variable and level of pain

5. Discussion

The findings of the study have been discussed in accordance with the objectives of the study and previously reviewed literature.

Frequency and percentage distribution of socio demographic data of patients

In the current study maximum of the adults in experimental group (46%) falls in the category of 41-50 years and in control group (38%) were more than 60 years of age. 54% of adults in experimental and (60%) in control group were not having any formal education. Maximum of the adults (76%) in experimental and (86%) in control group were unemployed.48% of adults in experimental and (40%) in control group were having less than 5000 rupees monthly family income. Majority of adults in experimental group (74%) and in control group (82%) were married and maximum adults (92%) in experimental and (82%) in the control group belonged to rural area. Majority (98%) in experimental and all (100%) in control group were Hindus. The study results have shown that both the groups were similar in terms of socio-demographic variables.

Frequency and percentage distribution of Clinical data of patients

In this study (64%) of the adults from experimental group and (72%) from control group were cannulated with 22G cannula. Maximum (74%) in experimental and 84% in control were cannulated on dorsum of hand. Most of the adults (96%) in both the groups were previously exposed to cannulation. Maximum adults(58%) from experimental and (74%) from control group were having previous exposure to cannulation more than two times; maximum adults (66%) from both the groups were not on analgesics and majority of them (94%) from experimental and (96%) from control were not on any alternative therapies, and 6% from experimentral mand 4% from control were using any other alternative therapy like yoga. The study results had shown that subjects in both the groups were similar in terms of clinical variables.

To assess the level of pain during intravenous cannulation among the experimental group

In current study scoring of pain in numerical pain rating scale in experimental group , it varies from 0 to 4 and maximum adults (26%) were having 0 pain scoring and (28%) had pain score of 1 ; (20%) were having 2 and next (20%) were having pain score of 3 and (6%) had pain score of 4

To assess the level of pain during intravenous cannulation among the control group

In control group pain score varies from 1 to 10 and maximum adults (24%, 28%, and 20%) in pain score of 5,6 and 7.

To compare the level of pain during intravenous cannulation between experimental and control group

Current study findings show the range of pain score in both experimental and control group. The range in experimental group varies from 0 to 4 and in control group from 1 to 10 and the mean pain score of experimental group as 1.52 and of control group as 6.14. The mean difference between experimental and control group is 4.620, standard deviation of experimental group is 1.249 and control group is 1.565. The calculated t value as 16.313 at significance level of <0.001 and df (98) hence the calculated t value is greater than the tabulated 't' value which indicates the research hypothesis is accepted. The above findings shows that valsalva maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain in adult patients

The study finding is congruent with various other studies which have found its effectiveness. One study conducted by Kadyan R showed that mean post test pain score of adults in experimental group was lower (1.3) than those in experimental group (5.56) and there was no significant association between age and body mass index with post test pain scores whereas there was significant association present between post test pain scores and sex. This study concluded that Valsalva maneuver is effective technique in reducing pain associated with IV cannulation and females experience more pain than males.[46]

Kaur J et al in their study revealed that there is significantly less pain in children with cartoon distractions at initiation, at five minutes, and at termination of administration of intravenous injection.[57]

Also, it is supported by the study conducted by Vijay VR et al who reported that valsalva maneuver decreases the intensity of pain associated with intravenous cannulation.[39]

Sundaran J et al came forward with the similar findings which revealed that there was a significant decrease in the level of pain after performing valsalva maneuver ($p<0.05$), thus indicating that valsalva maneuver is an effective measure in decreasing the level of pain in patients undergoing intravenous cannulation.[58]

Also, it was supported by study conducted by Agarwal et al. He reported that incidence of pain during venipuncture in Valsalva group was 72% as compared with 100% in the control and ball group hence this study proved that Valsalva Maneuver performed during venous cannulation decreased the incidence and severity of pain associated with venipuncture.[59]

Another study, by Mohammadi SS et al concluded that Valsalva Maneuver can decrease the skin puncture pain associated with spinal needle projection while observing hemodynamic changes.[44]

To find out the association of the level of pain during intravenous cannulation between experimental and control group with selected demographic variables

The present study revealed that there is no association of pain with socio-demographic and clinical variables except between site of cannulation and level of pain. But in some studies it is found that there is association of various socio-demographic and clinical variables Lautenbacher S et al conducted a study to see the effect of age on perception of pain in younger and older adults. He reports that elderly people experience more pain than younger people. It

concludes that there is age related difference in pain perception.[60]

Another study conducted by Aziza Hussain et al on effect of gender on pain perception and reported that female patients experience more pain as compared to male patients. [61]

Another study conducted by GG Basavana et al concludes that when venipuncture is done on the antecubital fossa causes less pain than on any other site. So, it concludes that pain during venipuncture depends on the site of cannulation. [62]

6. Summary, Major Findings, Implications, Recommendations & Conclusion

6.1 Summary

The research study adopted a true experimental research design and was conducted at, Regional Cancer Hospital Shimla, Himachal Pradesh. The aim of the study was to assess the effect of valsalva maneuver prior to intravenous cannulation on level of pain among cancer patients undergoing peripheral intravenous cannulation.. A total of 100 female adult patients above 20 years of age were selected by random sampling technique. A structured interview technique was used to assess the level of pain. Data analysis was done by descriptive and inferential statistics. The mean ± SD in experimental group was 1.52 ±1.249 whereas for control group the mean ± SD 6.14 ± 1.565. The independent 't' test had shown that calculated t value as 16.313 at significance level of <0.001 and df (98) hence the calculated t value is greater than the tabulated 't' value which indicates the research hypothesis is accepted. The above findings shows that valsalva maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain in adult patients.

6.2 Findings of the Study

On the basis of objectives

To assess the level of pain during intravenous cannulation among the experimental group.
In current study scoring of pain in numerical pain rating scale in experimental group , it varies from 0 to 4 and maximum adults (26%) were having 0 pain scoring and (28%) had pain score of 1 ; (20%) were having 2 and next (20%) were having pain score of 3 and (6%) had pain score of 4

To assess the level of pain during intravenous cannulation among the control group.
In control group pain score varies from 1 to 10 and maximum adults (24%, 28%, and 20%) in pain score of 5,6 and 7.

To compare the level of pain during intravenous cannulation between the experimental and control group
Current study findings shows the range of pain score in both experimental and control group. The range in experimental group varies from 0 to 4 and in control group from 1 to 10 and the mean pain score of experimental group as 1.52 and of control group as 6.14. The mean difference between experimental and control group is 4.620, standard deviation of experimental group is 1.249 and control group is 1.565. the calculated t value as 16.313 at significance level of <0.001 and df (98) hence the calculated t value is greater than the tabulated 't' value which indicates the research hypothesis is accepted. The above findings shows that valsalva maneuver had a significant effect in reducing the level of peripheral intravenous cannulation pain in adult patients

To find out the association of the level of pain during intravenous cannulation between experimental and control group with selected demographic variables
The present study revealed that there is no association of pain with socio-demographic and clinical variables except between site of cannulation and level of pain

6.3 Strengths of the study

1) The problem area selected for the study was of major concern among chemotherapy receiving patients in Regional cancer Hospital
2) Intervention (valsalva maneuver) used in the study was an effective non-pharmacological and easy and less time consuming procedure for reducing intravenous cannulation pain.
3) Non- pharmacological method was used in the study with minimal or no risk to patients.
4) The design and methodology used was appropriate for the study.

6.4 Limitations

1) The study was limited to the patients of Day care chemotherapy unit coming during data collection period
2) The data collection period was only one month
3) Extraneous variables could be controlled only up to certain extent.

Nursing implications
Intravenous cannulation is the commonest procedure done in the hospital for drug administration and most of the patients are afraid of intravenous cannulation pain. The anxious patients may avoid or postpone the needed medical care.

Researches indicated that valsalva maneuver is effective to reduce the pain intensity during peripheral intravenous cannulation. The findings of the study have considerable implications on Nursing Administration, Nursing Education, Nursing Practice and Nursing Research

1) Nursing Administration –
- Nurse administrator can take steps to incorporate the technique of valsalva maneuver into routine peripheral intravenous cannulation procedure.
- Nurse administrator can act as a change agent and can take initiative for utilization of present research findings.
- Nurse administrator can conduct in-service education and training programs regarding proper practice of valsalva maneuver prior to intravenous cannulation

2) Nursing education-

- Nurse educator can train and encourage student nurse to implement valsalva maneuver as a pain reducing technique prior to intravenous cannulation
- Present study can motivate student nurse to search various new strategies for effective reduction of pain during peripheral intravenous cannulation
- Research report of this study can be kept in library for reference of nursing professionals and other health care professionals

3) Nursing practice-

- Valsalva Maneuver is a safe and better non pharmacological modality which brings a higher level of satisfaction for patients
- The nurses can take practice of Valsalva Maneuver prior to intravenous cannulation as a research evidence and should practice in their daily nursing care.

4) Nursing research-

- The disseminated findings of this research can be used as an evidence for nurse researchers, student nurses and other faculty working in related areas
- By utilizing results of this research study a comparative study can be done to determine the effectiveness of Valsalva Maneuver with other non pharmacological measures for intravenous cannulation pain reduction

6.5 Recommendations

In the light of the above findings and personal experience of the investigator the following recommendations are offered.

1) Study may be replicated on other population rather than the cancer patients like- geriatric and pediatric population
2) The nurse researcher can conduct studies to find out the knowledge and practice of Valsalva Maneuver prior to intravenous cannulation among staff nurses.
3) Researches can be done on Valsalva Maneuver in response of pain reduction for other procedures
4) Comparative researches can be done among other non-pharmacological methods with Valsalva Maneuver for reduction of intravenous cannulation pain
5) Similar study can also be conducted by using more number of variables like- change in heart rate of patient because of Valsalva Maneuver
6) Similar study can be done in more than one setting
7) Studies can be done to determine other therapeutic effects of Valsalva Maneuver
8) Nurse researcher can do various studies related to effect of Valsalva Maneuver for improving quality of care
9) Study can be done for assessing effect of and standard deviation Valsalva Maneuver on other painful procedures
10) Study can also be done to compare the effect of Valsalva Maneuver on male and female
11) Similar study can be conducted on more number of samples for the purpose of generalization.

6.6 Conclusion

Peripheral intravenous cannulation is one of the most common invasive procedure done in the hospitals for drug administration and because of patients anxiety and fear concerning pain of needles may prevent them from seeking health care, Valsalva Maneuver was found to be an effective nursing intervention in reducing pain among adult patients during peripheral intravenous cannulation it is found to have no side effects when comparing with other pharmacological treatments and Patient satisfaction is very much higher in this intervention. The findings of the study enlighten the fact that Valsalva Maneuver can be used as a cost effective nursing intervention in reducing the pain during peripheral intravenous cannulation

References

[1] Cancer Treatment & Survivorship Facts & Figures 2016-2017
[2] Vascular Access in Oncology Patients, Maurizio Gallieni, MD; Mauro Pittiruti, MD; Roberto Biffi, MD, CA Cancer J Clin 2008;58:323–346, https://pdfs.semanticscholar.org/4f8b/9a9406263fd94ef0ed5f12359ec32d725619.pdf
[3] Peripheral venous cannulation guidelines, nursing practice guidelines, Nottingham University Hospital, file:///D:/Downloads/Cannulation%20(1).pdf.
[4] Smeltz S, Ber B, Hinkle JL, Chyioer KH. Surgical-Internal Nursing, Brunner and Sudart, Shock Pain and Electrolytes, Cancer and Cares of End of Life. Parsa Yekta Z, Tazakorri Z, Salemi S, Abed Saeedi J, Barahimi N, Farahani M, translators. Tehran: Salemi Press; 2007. p. 320. Back to cited text no. 1
[5] Fareed EM, Abd El-Hay AH, El-Shikh AA. Cutaneous stimulation: Its effect on pain relieving among hemodialysis patients. J Educ Pract 2014;5:9-20. Back to cited text no. 3
[6] Nayak-Rao Sh. Achieviny effective Pain relief in Patients with Chronic kidney disease: A review of a Analgesics in renal failure. J Nephrology 2011;24:35-40
[7] Sadeghi T, Neyshabour MA, Bahrami N. Evaluating the effect of blowing ballon on venous opening pain of children. Sci J Qazvin Univ Med Sci 2010;3:68-72.
[8] Kafkia T, Vehvilainen-Julkunen K, Sapountzi-Krepia D. Assessment and management of pain in hemodialysis patients: A pilot study. Prog Health Sci 2014;4:53-60.
[9] Asgari MR, Hoshmand Motlagh N, Soleimani M, Ghorbani R. The effect of transcutaneous electrical nerve stimulation on the pain intensity during insertion of vascular needles in hemodialysis patients. Critical Care Nurses 2012;5:117-24.
[10] Gandhi AK, Rath GK, 2014 (Oct-Dec; 35(4): 288–29, cited on Feb. 2018), National cancer control and registration program in India: Indian Journal of Medical & pediatric oncology, Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4264276/
[11] 2,471 new cancer cases in Himachal, The Times of India, 2012, (Updated: Apr 6, 2012, 07:35 IST), Available from https://timesofindia.indiatimes.com/india/2471-new-cancer-cases-in-Himachal/articleshow/12554306.cms
[12] NICPR, India Against Cancer, http://cancerindia.org.in/statistics/
[13] Goudra BG, Galvin E, Singh PM, Effect of site selection on pain of intravenous cannula insertion: A

prospective randomised study, 2014 (cited on Feb. 2018), Available from: http://www.ijaweb.org/article.asp?issn=00195049;year=2014;volume=58;issue=6;spage=732;epage=735;aulast=Goudra

[14] Rusch D, Med PD, Koch T, Spies M, Pain During Venous Cannulation, A Randomized Controlled Study of the Efficacy of Local Anesthetics; 2017 (cited on: Feb 2018), Available form: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5629277/

[15] Jagadamba A, Kutty K, Shankar V, Annamalai N, Madhusudhana N, Gender Variation in Pain Perception After Intravenous Cannulation In Adults, The International Journal of Anesthesiology Volume 28 Number 1, 2010 (Cited on: Feb 2018); Available from: https://print.ispub.com/api/0/ispub-article/5143

[16] Aziza M. Hussain, Fauzia A. Khan, Aliya Ahmed, Tabish Chawla, Syed I, Effect of gender on pain perception and analgesic consumption in laparoscopic cholecystectomy: An observational study. Journal of Anaesthesiology and Clinical Pharmacology. Jul-Sep; 29(3): 337–341, 2013 (cited on April 2018), Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3788232/

[17] Revista brasileira de anestesiologia, brazilian journal of anesthesiology Official Publication of the Brazilian Society of Anesthesiology, Volume 63, Número 4, Julho – Agosto, 2013 (cited on: Feb 2018); Available from: https://www.sbahq.org/resources/pdf/arquivos/rba/rba0413.pdf

[18] Rickard C, McCann D, Munnings J, McGrail MR, Routine resite of peripheral intravenous devices every 3 days did not reduce complications compared with clinically indicated resite: A randomized controlled trial, 2010 (cited on March 2018), 10.1186/1741-7015-8-53, Available from:https://www.researchgate.net/publication/46218282

[19] 19.. Shivashankar A, Nalini K. B., and Rath P, The Role of Nonpharmacological Methods in Attenuation of Pain Due to Peripheral Venous Cannulation: A Randomized Controlled Study, Anesth Essays, PMCID: PMC5872897, PMID: 29628545, 2018 (cited on Jan 2018), Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5872897/

[20] Jisha S, Khan F, Bansal P. An experimental study to assess the effectiveness of valsalva maneuver prior to intravenous cannulation at HAHC Hospital in Delhi. Journal of Surgery 2016 (cited on Feb March 2018); Available from: https://www.researchgate.net/publication/308122489

[21] Kaur R, SM P, Kaur R. Effectiveness of valsalva maneuver on pain during venipuncture.International journal of health sciences and research 5(8):407-16, 2015 (cited on April 2018), Available from: http://www.ijhsr.org/IJHSR_Vol.5_Issue.8_Aug2015/62.pdf

[22] Suzanne CS, Brenda GB, Hinkle JL, Kerry HC. Brunner and Suddarth's Textbook of Medical Surgical Nursing. New Delhi: Walters Kluwer, 2009 (cited on April 2018), Available from: Library of Eternal University

[23] Yılmaz D, DikmenY.Nonpharmacological Methods Used in the Management of Pain Caused by Peripheral Intravenous Catheters Journal of Nursing Science and Practice; 6(3):61–66p, 2016 (cited on March 2018), available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5735659/

[24] VR VR, Agnihotri M, Kaur S, Bhalla A. Effect of valsalva maneuver prior to peripheral intravenous cannulation on intensity of pain. Nursing and Midwifery Research Journal 9(4):143-4, 2013 (cited on march 2018), available from: http://medind.nic.in/nad/t13/i4/nadt13i4p143.pdf

[25] Suren M1, Kaya Z, Ozkan F, Erkorkmaz U, Arıcı S, Karaman S. J Anesth, Comparison of the use of the Valsalva maneuver and the eutectic mixture of local anesthetics (EMLA®) to relieve venipuncture pain: a randomized controlled trial, 407-11. doi: 10.1007/s00540-012-1540-1, 2013 (cited on march 2018), available from: https://www.ncbi.nlm.nih.gov/pubmed/23242570

[26] Soltani S., Mohammadi, Pajand A G , Shoeibi G., Efficacy of the Valsalva Maneuver on Needle Projection Pain and Hemodynamic Responses During Spinal Puncture, Int J Med Sci. 8(2): 156–160, PMCID: PMC3047080 PMID: 21369370, 2011 (cited on March 2018), Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3047080/

[27] Babaei M , Jalali R , Jalali A , Rezaaei M, The Effect of Valsalva Maneuver on Pain Intensity and Hemodynamic Changes during Intravenous (IV) Cannulation, Iran Journal of Nursing, Volume 30, Issue 108, 30(108): 52-59, 2017 (cited on May 2018), Available from: http://ijn.iums.ac.ir/browse.php?a_id=2517&sid=1&slc_lang=en

[28] Basaranoglu G., Basaranoglu M., Erden V., Delatioglu H., The effects of Valsalva manoeuvres on venepuncture pain, Volume 23, Issue , pp. 591-593, 2016 (cited on may 2018), Available from: https://www.cambridge.org/core/journals/european-journal-of-anaesthesiology/article/div

[29] Smith GD1, Dyson K, Taylor D, Morgans A, Cantwell K, Effectiveness of the Valsalva Manoeuvre for reversion of supraventricular tachycardia; CD009502. doi: 10.1002/14651858.CD009502.pub2., 2013 (cited on April 2018) ; Available from: https://www.ncbi.nlm.nih.gov/pubmed/23543578

[30] Walker S1, Cutting P, Impact of a modified Valsalva manoeuvre in the termination of paroxysmal supraventricular tachycardia, 27(4):287-91. doi: 10.1136/emj.2009.073866, 2010 (cited on march 2018), Available from : https://www.ncbi.nlm.nih.gov/pubmed/20385681

[31] Appelboam A, Reuben A, Mann C, Randomised Evaluation of modified Valsalva Effectiveness in Re-entrant Tachycardias (REVERT) study, BMJ Open Journal,Volume 4, Issue 3, 2013 (cited on may 2018), Available from: http://bmjopen.bmj.com/content/4/3/e004525

[32] Appelboam A, Reuben A, Mann C, Randomised Evaluation of modified Valsalva Effectiveness in Re-entrant Tachycardias (REVERT) study, BMJ Open Journal,Volume 4, Issue 3, 2013 (cited on may 2018), Available from: http://bmjopen.bmj.com/content/4/3/e004525
[33] Hackett, Daniel A. Chow, Chin-Moi; The Valsalva Maneuver: Its Effect on Intra-abdominal Pressure and Safety Issues During Resistance Exercise, The Journal of Strength & Conditioning Research: Volume 27 - Issue 8 - p 2338–2345, 2013 (Cioted on May 2018), Available from: https://journals.lww.com/nsca-jscr/Fulltext/2013/08000/

Author Profile

Nitasha Sharma, M.Sc Nursing (Medical Surgical Nursing), Akal College of Nursing, Eternal University, Baru Sahib, Dist. Sirmour, Himachal Pradesh-173101, India, August, 2018

Rose Mary George, Associate Professor, Medical surgical Nursing Department, Akal College of Nursing, Eternal University, Baru Sahib, Dist. Sirmour, Himachal Pradesh-173101, India, August, 2018