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EFFECT OF VALSALVA MANEUVER ON PAIN REDUCTION IN PATIENTS UNDERGOING PERIPHERAL INTRAVENOUS CANNULATION AT A SELECTED HOSPITAL IN IDUKKI, KERALA

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ABSTRACT

Introduction and Background of the study: Health is defined by WHO as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." American Pain Society introduced the concept of pain as the "fifth vital sign." Pain is an unpleasant sensory and emotional experience perceived by the patient objectively during the hospital stay. For reducing or controlling pain, various measures are explained by the health experts mainly Valsalva Maneuver, which is an effective method to attain this goal. Materials and methods: A quantitative research approach with quasi experimental, post-test only control group research design was used. 224 samples were randomly selected based on inclusion criteria. Experimental group underwent PIVC with VM and control group had PIVC as routine procedure. Pain level was assessed in both groups with Modified FLACC scale. Collected data was analysed using SSPS V26. Results show 27.7% of samples in control & 32,1% in experimental group are between 31-40 years. Of the more pain experienced patients with > 60 years of age (M=6.43, SD=3.956) in experimental group 47.3% are male gender, and in control group 58.6% are females. Level of pain shows more in males (M=3.12, SD= 3.301) than females (M=2.96, SD=3.402). Patients in control group had higher level of pain (M=6.04, SD=2.959) than patients in experimental group (M=3.04, SD=3.335), also showing a positive relation (t=0.24, p>0.05, df=110). According to the independent t-test there exists a positive relation which is significant (t=7.100, p<0.01, df =222) while comparing modified FLACC score of control and experimental group. Study emphasises that non-invasive technique of VM is more effective method in reducing pain during PIVC.

Keywords: *Valsalva maneuver, pain reduction, peripheral intravenous cannulation, venipuncture pain, non-pharmacological interventions, patient comfort, Idukki, nursing practice*

ABOUT AUTHOR:

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INTRODUCTION

Background of the study: Generally, pain and distress arising from invasive procedures are underestimated. Health professionals assume that these painful feelings are not long lasting and provision of sedation or analgesics is time consuming, so they give less concern during invasive procedures. For all health practitioners, primary responsibility is to lend support and attention while performing painful procedures. In hospitalised patients, intravenous cannulation is generally a highly skilled invasive technique. For reducing pain, pharmacological measures such as endotracheal spray, xylocaine cream application as well as nursing measures like cold or warm saline sock, play a vital role. Most of these trials does not need additional effort by the staff nor does it need other expenses. There are some innovative alternative techniques including cough trick, Valsalva manoeuvre, ball pressing, which are less expensive, rarely create complications and are easily applicable to the patients.

For pain reduction in clinical settings, number of methods have been performed to achieve the target. Neglecting circuiting pain can hinder the future treatment and diagnostic procedures of the patient. VM is one of the physiological approaches that can affect somatic and psychological impact of pain perception by the patient. In variety of procedures VM promotes two aspects in pain reduction through sinoaortic baroreceptor reflex arc and distraction. Pain is the major concern of all living beings when going through an illness. As a part of keeping the patient's rights, we are responsible for minimising the suffering of patients. IV cannulation is a widespread and essential medical procedure having both diagnostic and therapeutic value, but is in a need of effective intervention to make it painless. A method named VM has been identified as a good choice in that strategy. The benefits of VM in reducing needle prediction pain had been testified in a number of studies. Cannula insertion is a routine method done by the nurse. To alleviate painful experience on IVC, VM is an easy and profitable method which is performed by nurses. Considering these aspects, the researcher felt the need to conduct this study.

STATEMENT OF THE PROBLEM

"A study to assess the effect of Valsalva manoeuvre on pain reduction in patients undergoing peripheral intravenous cannulation in a selected hospital in Idukki, Kerala."

OBJECTIVES

- To assess the level of pain among control and experimental groups after intervention.
- To find out the significant difference in post-test level of pain among control and experimental groups.
- To determine the association between post-test level of pain and selected variables in the experimental group.

HYPOTHESIS

H_1: There is a significant difference in pain score during PIVC between the control and experimental groups after intervention.

H_2: There is a significant association between post-test level of pain in an experimental group and their selected demographic and clinical variables.

REVIEW OF LITERATURE

R Kaur, (2019) conducted an interventional study at the GGSM hospital in Faridkot, Punjab, to evaluate the efficiency of VM in controlling pain through cannulation in 60 young children. In an experimental group, 18.3% experienced mild pain, 26.7% moderate pain, and 5% had severe pain. The pain score in the control group is 10% for mild, 28.3% for moderate, and 11.7% for severe pain. VM was effective and statistically ($p<0.05$) significant.

Nitasha, (2019) conducted one true experimental research on the outcome of VM in relieving pain during PIVC in cancer hospital in Himachal Pradesh, India, with a sample of 100 female cancer patients. In the intervention group, 68% reported mild pain, while 26% reported no pain. 60% in control had moderate pain, while 38% had severe pain.

Upasana, (2019) conducted another experiment at Indira Gandhi Medical College in Himachal Pradesh to evaluate the outcome of VM on painful IVC. Purposive sampling was used to select 50 samples, and a controlled design was established for post-testing only. In the experimental group, 80% of subjects reported minimal pain, while 72% reported moderate pain in the control group. Findings show that VM was effective and highly ($p < 0.05$, $t = 5.608$) significant.

RESEARCH METHODOLOGY

Research design and Approach: For testing hypotheses, a quantitative approach and a quasi-experimental, post-test only control group research design was used. The study was conducted at Emergency department, medical and surgical wards of St. John's Hospital, Kattappana in Idukki District, Kerala.

Sampling technique: Purposive sampling techniques were used to recruit participants for this investigation.

Samples and sample size estimation: Estimated samples in the present study were 224 subjects, which were positioned in interventional and non-interventional categories, each consisting of 112 participants. Based on the proportion of pain (pilot study) in group (i) (60%) and in group (ii) (40%) and with 80% power and 95% confidence, the minimum sample size comes to 97 in each group and totalling to 194 samples.

Criteria for sample selection

Inclusion criteria: Patients who were —

- admitted and given a 20-gauge intravenous cannulation.
- having a prominent vein on the hand

Exclusion Criteria: Patients who were —

- consuming any sedation, narcotics, or analgesic medications.
- critically ill patients (e.g. cardiovascular accidents, bleeding disorders, hypertension, unconscious patients, mechanically ventilated patients) and unable to follow the instructions.
- the ones where first two attempts at cannulation were unsuccessful. (This entails pricking the patient more than twice in order to insert an intravenous cannula).
- having skin infections, eczema, psoriasis, and scars at the site of venipuncture.

Demographic and Clinical Profile Sheet

Tool 1: A self-structured questionnaire that includes demographic and clinical data.

Section - 1: This section contains the participant's socio-demographic data, which includes nine items such as living area, age, gender, and family type etc.

Section - 2: It contains the participant's medical data which includes height, weight, BMI, diagnosis, site of cannulation, previous cannulation experiences, number of hospital-stays, pulse rate, BP etc.

Tool 2: Pain Assessment Scale (Modified FLACC scale). This MFLACC scale is used to determine objective and subjective pain.

Table - 1: Scoring of Items

Score	%	Level of pain
0	0%	No reported pain
1 - 5	≤ 35%	Mild pain
6 - 10	36 - 70%	Moderate pain
> 10	> 70%	Severe pain

Data collection procedure

- Permission was granted from the concerned authority with IEC. Ref. No: SJ/IE/03/2019
- Consent was obtained from study participants prior to the data collection procedure.
- The investigator collected detailed clinical and demographic information from study participants using a self-structured questionnaire.
- Before the data collection procedure, the study participants were asked to confirm that they had not taken any sedatives, pain relievers, or narcotics.

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Data results: Data was analysed with descriptive and inferential statistics by using SPSS V-24.

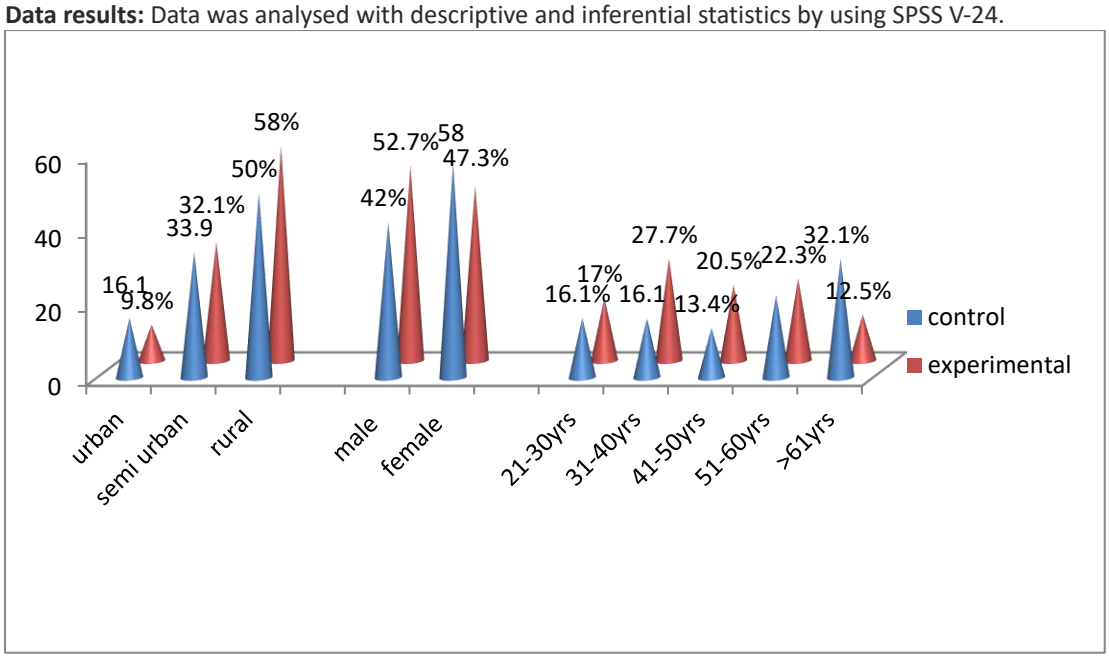

Figure - 1: The percentage distribution of demographic data

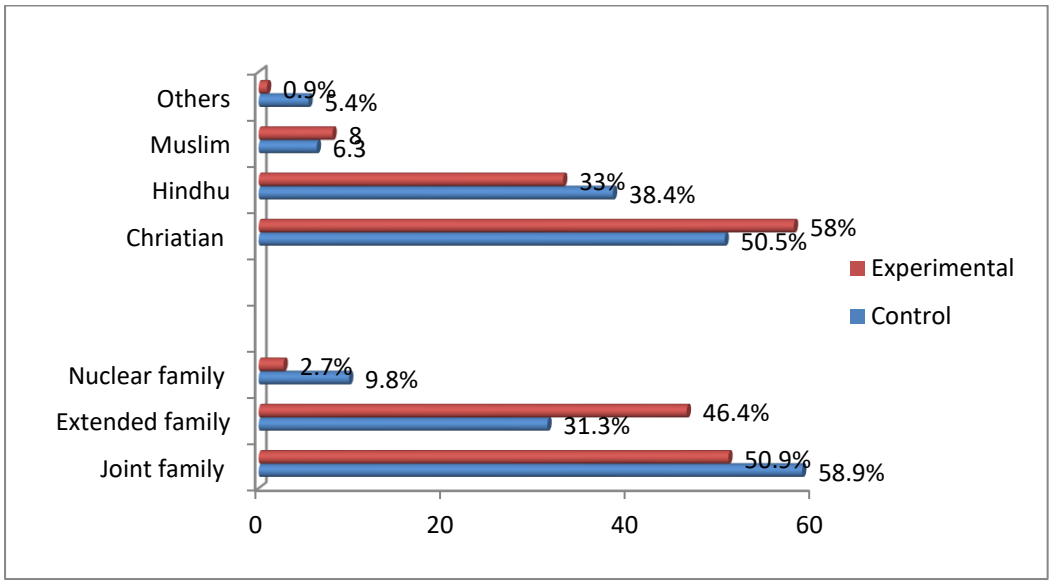

Figure - 2: Percentage distribution of demographic data

- Regarding educational status 31.3% were graduates in control group and 41.1% were having primary education in experimental group.
- In control group 57.1% were unemployed and 35.7% were in experimental group were self-employed.
- 43.8% of them in both groups were having monthly income between Rs 10001-25000.

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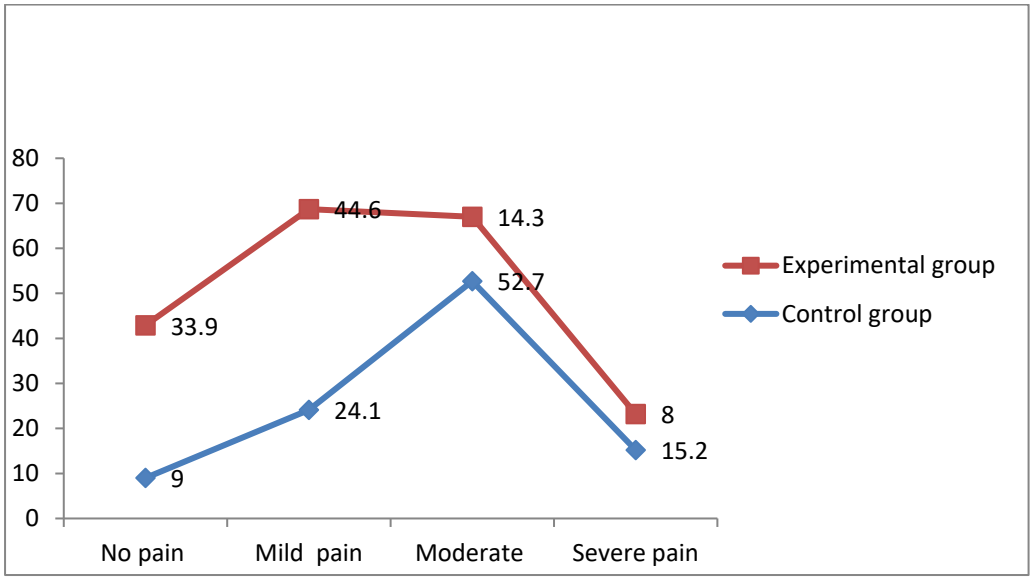

Figure - 3: Level of pain in control group and experimental group.

Table - 2: Comparison of BP of Control and Experimental groups

Variable	Group	Mean	SD	t	df	Sig.(2-tailed)
SBP before procedure	Control	123.64	10.93	0.073	222	0.942
	Experimental	123.54	11.03			
SBP after procedure	Control	132.48	7.81	5.079	222	0.000
	Experimental	126.38	10.04			
SBP after 5 minutes	Control	130.91	7.04	3.874	222	0.000
	Experimental	126.86	8.54			
DBP before procedure	Control	73.91	8.07	7.531	222	0.000
	Experimental	81.59	7.15			
DBP after procedure	Control	81.71	8.11	2.015	222	0.045
	Experimental	83.68	6.37			
DBP after 5 minutes	Control	80.64	7.22	3.300	222	0.001
	Experimental	83.52	5.734			

Table - 3: Comparison of Modified FLACC Score of Control & Experimental groups

Scale	Group	n	Mean	SD	t	df	Sig. (2 tailed)
MFLACC	Control	112	6.04	2.95	7.10	222	0.000
	Experimental	112	3.04	3.33			

*The independent test shows that there is a positive relation and the relation is significant [t (222) =7.100, p<.01].

Table - 4: Comparison of BP of Control & Experimental groups

Scale	Group	n	Mean	SD	t	df	Sig. (2 tailed)
BP	Control	112	0.25	0.455	2.665	222	0.008
	Experimental	112	0.11	0.338			

**The independent test shows that there is a positive relation but the relation is significant [t (222) =2.665, p<.01].

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Table - 5: Relationship of level of pain of Experimental group with other clinical conditions

Scale	Statistical Value	Age	Weight	Height	BMI
MFLACC	Pearson Correlation	0.204*	-0.091	-0.231*	0.040
	Sig. (2-tailed)	0.031	0.341	0.014	0.674
	Samples	112	112	112	112

*Correlation is significant at the 0.05 level, (r=0.204, p<0.05).

Table - 6: Relationship of level of pain of Experimental group with pulse rate

Scale	Statistical Value	Pulse before	Pulse after	Pulse after 5 minutes
MFLACC	Pearson Correlation	-0.179	0.099	0.000
	Sig. (2-tailed)	0.059	0.300	0.997
	n (Samples)	112	112	112

*Correlation is significant at the 0.05 level (2-tailed).

The table - 6 shows negative correlation of Pain with pulse rate (r=-0.179, p>0.05).

Table - 7: Correlation of Weight with SBP & DBP

Scale	Statistical Value	SBP before	SBP after	DBP before	DBP after
Weight	Pearson Correlation	0.089	0.078	0.041	0.106
	Sig. (2-tailed)	0.353	0.413	0.668	0.266
	n (Samples)	112	112	112	112

**Correlation is significant at the 0.01 level, (2-tailed).

The results of Pearson correlation designated that there is positive correlation between weight and SBP before but the relation is not significant (r=0.089, p>0.05).

Table - 8: Relationship of level of pain with other clinical parameters

Scale	Particulars	Face score	Bodily score	Activity score	Vocalization	Console ability score
MFLACC	Pearson Correlation	0.877**	0.778**	0.875**	0.883**	0.769**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000
	n (Samples)	112	112	112	112	112

**Correlation is significant at the 0.01 level, (2-tailed).

The results of Pearson correlation specified that there is positive correlation between MFLACC and face score (r=0.877, p<0.01), bodily movement and the relation is significant (r=0.778, p<0.01) and also with activity score (r=0.875, p<0.01). vocalization (r=0.883, p<.01) and console ability score shows positive relationship and the relation is significant (r=0.769, p<0.01).

DISCUSSION

The level of IV cannulation pain on using VM was analysed and brought the subjects under classes of no pain, mild, moderate and severe pain corresponding to their pain score. In an experimental group, 33.0% had not felt pain. This can be bolstered up by the result of 28% for Ken J Farion (2008), 36.5% for FWO Yi Tee (2015) and 26% by Rose Mary (2018). 44.6% of present study participants have been grouped as mild pain. There we could identify certain studies that are in analogy with our findings, one by Ken J Farion (2008) obtained it as 42% and P Chitra (2014) as 3.3%. Subjects with moderate pain were 14.3% in existing study which ensured the support by Upasana (2019) with 20% and by Anjana S (2015) with 16.6%. Only 8.0% were detected as having severe pain which cannot be detached from those by R. Kaur (2019) as 5%, Anila James (2019), M S Sainu (2014) and P Chitra (2014) who all obtained it as 3.3% in their studies.

RECOMMENDATIONS

- A proportional or comparative study can be performed to evaluate the accuracy of the results.
- Subjective and objective pain assessments can be included in the study for better evaluation.
- Two or three clinical experts can be involved in the cannulation procedure, which increases the precision of the results.
- Newly admitted patients can be chosen as participants for clarity and accuracy of the results.
- To avoid bias, the age group of the samples can be selected based on a standardised classification.

CONCLUSION

In clinical settings, majority of patients undergoing painful, invasive procedures are a common source of concern. Needle phobia is more common in young children and adults with prescribed PIVC. This can stimulate their fear, anxiety, and negligence of further treatment or hospitalisation. To alleviate their bitter experience, various methods have been implemented by experts, like complementary therapies, non-pharmacological approaches, and pharmacological approaches. A non-pharmacological, cost effective and much suitable method called VM will be an appropriate choice for all the medical practitioners who were struggling for patient comfort during IV cannulation. The impact of VM is more effective in reducing cannulation pain. Study findings explored the usage and efficacy of VM during safe cannulation as non-invasive, low-cost, and easy to carry out by the clinical staff. Study suggests that VM can be beneficial to incorporate with general practice for intravenous cannulation in adult patients.

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