

Assessment and Evaluation of Effectiveness of Valsalva Maneuver on Pain Reduction during IV Cannulation Among Adults

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ABSTRACT

Objectives: The objectives of the study were to assess the level of pain in patients undergoing IV cannulation after use of valsalva maneuver in experimental group, to compare the level of post procedure pain between groups undergoing IV cannulation with and without the use valsalva maneuver, to seek the association of level of pain and selected variables in patients in terms of: Age, Body mass index and Sex.

Methodology: A true experimental research approach with pretest posttest research design was used. Simple random sampling technique was adopted to select 60 patients (30 experimental and 30 controls) but assignment of subjects to the group was through odd and even method. Data was collected using standardized numerical rating pain scale and semi structured interview schedule for demographic data and clinical profile. The tool was validated and reliability was 0.96 which was established using interrater /interobserver.

Results: The study showed that mean post test pain score of adults in experimental group was lower (1.3) than those in experimental group (5.56). 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.

Conclusion: Valsalva maneuver is effective technique in reducing pain associated with IV cannulation. There was significant association between posttest pain scores and sex which indicates females experience more pain than males.

Key words: Valsalva maneuver, adults

INTRODUCTION

Pain is an uncomfortable phenomenon and associated with actual or potential tissue damage. ^[1] Pain is whatever the person says it is, existing whenever the experiencing person says it does means pain is highly subjective in nature. ^[2] The fear of pain is ranked only second to the fear of death ^[3] and it is called fifth vital sign which emphasize increase awareness among health care professional for pain management. ^[4] It is one of the factors which interfere with the quality of life of the people. Pain is the most

common widely under-treated health problems.

IV cannulation is a significant source of adult pain and distress when describing worse pain experiences in hospitalized adult, IV cannulation pain was found to be the second reason for the subject with underlying disease. ^[5] Pain can be managed by using both pharmacological and non-pharmacological method. ^[6] No pharmacologic interventions, used alone or in conjunction with pharmacologic interventions, have the potential to reduce

the perception of pain associated with procedures.^[7]

Non-pharmacological nursing interventions are especially important because they can be used in any setting are cost effective and Valsalva maneuver is one of these measures. Valsalva maneuver is non invasive, non-pharmacological and effective method to reduce pain associated with peripheral intravenous cannulation. Nurses should practice Valsalva maneuver for patients undergoing venipuncture.^[8] This technique is named after Antonio Maria Valsalva,^[9] the Valsalva maneuver is performed by moderately forceful attempted exhalation against a closed airway. During Valsalva maneuver contraction of thoracic cage compresses lung and causes increase in intrathoracic pressure resulting in compression of vessels within the chest and in turn stimulates vagus nerve and vagus nerve in turn activates the bar receptor . The activation of either the cardio pulmonary bar receptor reflux or sin aortic bar receptor reflux induces antinociception.^[9] Through valsalva bar receptors activates and control activity of sympathetic system and reduce pain.^[10]

Objectives of the Study:

- To assess the level of pain in patients undergoing IV cannulation in experimental and control group.
- To compare the level of post procedure pain between groups undergoing IV cannulation with and without the use Valsalva maneuver.
- To seek the association of level of pain and selected variables in patients in terms of:
 - a. Age
 - b. Body mass index
 - c. Sex

Hypothesis:

H₁: There will be significant difference in the mean post test pain scores of patients during IV cannulation in experimental with valsalva maneuver and control group without the use of valsalva maneuver as measured by numeric rating pain scale at 0.05 level of significance.

H₂ : There will be significant association of mean post test pain scores of patients in experimental group with selected variables as evident from semi structured interview and numeric rating pain scale at 0.05 level of significance.

- a. Age
- b. Body mass index
- c. sex

MATERIALS AND METHODS

Research Approach: Quantitative approach

Research Design: True experimental pretest posttest design

Research Variable: Pain and valsalva maneuver

Setting of the study: The setting for pilot and final study was St. Stephen's Hospital, Tis Hazari, Delhi

Population: Comprises of patients admitted in hospital and posted for elective surgery and having zero pain prior to the procedure.

Sample: The sample size comprised of 60 patients (30 in experimental and 30 in control group) posted for elective surgery and having zero pain prior to the procedure.

Sampling technique: Simple random sampling technique used with assignment of subjects to the groups by odd and even method.

Procedure:

- Ethical permission was taken from institutional ethical committee of R.A.K, New Delhi to conduct research study.
- Permission was obtained to conduct the research study from director of St. Stephen's hospital, Tis Hazari, Delhi
- The technique of data collection was semi structured interview schedule for collecting demographic data and clinical profile of patient and numeric rating pain scale was used for assessing pain of the patient.
- To ensure validity of tool nine experts were selected from various fields, three doctors (from field of medicine, general surgery and

anesthesia), six from department of nursing.

- Reliability of numeric rating pain scale was worked out by calculating coefficient of correlation which was established by inter rater / inter observer technique and it was found to be 0.96.
- Formal administrative approval was obtained from the concerned authority to conduct the final study.
- The patients who met the inclusion criteria were selected using simple random sampling technique.
- The purpose of the study was explained to the participants. After obtaining their willingness to

participate in the study the data were collected from the samples.

Statistical Analysis:

- The data was analysed using descriptive and inferential statistics.
- Frequency and percentage for demographic characteristics and clinical profile.
- t- Test was done to compare the level of post test pain in both experimental and control group.
- Chi square was used to find out the association between post test pain score of experimental group and selected demographic variables like age, sex and body mass index.

RESULTS

Table 1(A): Frequency and percentage distribution of demographic characteristics in experimental and control group by age , sex, marital status, educational status, occupation , type of family and monthly income. N = 60

S.no	Sample characteristics	Experimental group N=30(F)	%	Control Group N=30(F)	%	TOTAL N=60	
						F	%
1	AGE						
	20 – 30 yrs	10	33.33%	5	17%	15	25%
	31 – 40 yrs	10	33.33%	10	33%	20	33%
	41 – 50 yrs	10	33.33%	15	50%	25	42%
2	SEX						
	Male	15	50%	22	73%	37	62%
	Female	15	50%	8	27%	23	38%
3	Marital status						
	Married	21	70%	23	77%	44	73%
	b)Unmarried	9	30%	7	23%	16	27%
	c)Divorced	-	-	-	-	-	-
	d)Widower	-	-	-	-	-	-
	e)Separated	-	-	-	-	-	-
4	Educational status						
	Illiterate	4	13%	2	7%	6	10%
	Primary	2	7%	3	10%	5	8%
	Secondary	3	10%	5	17%	8	13%
	Higher secondary	8	27%	4	13%	12	20%
	Graduate and above	13	43%	16	53%	29	49%
5	Occupation						
	Unemployed	8	27%	12	40%	20	33%
	Govt. service	7	23%	8	27%	15	25%
	Pvt. Service	11	37%	9	30%	20	33%
	Bussiness	3	10%	1	3%	4	7%
	Daily wager	1	3%	-	-	1	2%
6	Type of family						
	Joint	12	40%	9	30%	21	35%
	Nuclear	18	60%	21	70%	39	65%
7	Monthly Income (In Rs.)						
	2500-5000	-	-	-	-	-	-
	5001-10000	2	7%	1	3%	3	5%
	10001 – 20000	20	67%	21	70%	41	68%
	> 20001	8	26%	8	27%	16	27%

Data in the table 1(A) depicts that maximum and equal percentages of samples in both groups were between 41-50 yrs age. As per sex in control group males were more and in

experimental both sexes were equal in percentage. Majority of samples in both groups were married. In both groups maximum samples were graduate. As per

occupation most of subjects in both groups were either unemployed and in private service. Maximum subjects in both groups were in monthly income Rs.10001-20000

TABLE 1(B): Frequency and percentage distribution of clinical profile in two experimental and control group by history of any illness, history of previous surgery and history of hospitalization. N=60

S.no	Sample characteristics	Experimental group N=30	%	Control Group N=30	%	TOTAL N=60	
						F	%
1.	History of any illness						
	Yes	5	17%	7	23%	12	20%
	No	25	83%	23	77%	48	80%
2.	History of previous surgery						
	Yes	3	10%	6	20%	9	15%
	No	27	90%	24	80%	51	85%
3.	History of hospitalization						
	Yes	7	23%	5	17%	12	20%
	No	23	77%	25	83%	48	80%

Table 1(B) showed that maximum subjects in both groups were having no history of any illness. Maximum subjects in both groups were having no previous history of surgery. Majority of subjects in both were having no history of hospitalization.

Table 2: Mean, mean difference and Standard error of mean difference and t-value of post test pain scores of adults in experimental and control group. N=60

Group	Mean	Mean difference	SD _D	SE _{MD}	T Value
Experimental group	1.3	4.26	0.09	0.24	17.75*
Control group	5.56				

t(58) = 2.01, p < 0.05

The data presented in the table 2 shows that the mean post test pain scores of adults in experimental group (1.3) is lower than mean post test pain scores of adults in control group (5.56). The obtained mean difference (4.26) between post test scores of experimental and control group was found to be statistically significant as evident from t-value 17.75 at 0.05 level. Therefore obtained mean difference was true difference and not by chance so the research hypothesis (H2) is accepted. This shows that Valsalva maneuver is effective in reducing IV cannulation pain.

Table 3: CHI SQUARE SHOWING ASSOCIATION BETWEEN POST TEST PAIN SCORES AND SELECTED DEMOGRAPHIC VARIABLES. N=30

s.no	Selected variables	Pain scores		Chi-square value	df
		Above median	Below median		
1.	Age in years			0.534 ^{NS}	2
	20-30 yrs	4	6		
	31-40 yrs	4	6		
	41-50 yrs	3	7		
2.	Sex			3.99	1
	Male	21	16		
	female	8	15		
3.	BMI			0.64 ^{NS}	3
	Underweight	1	1		
	Normal	7	13		
	Overweight	3	5		

The data presented in the table 3 shows that computed chi-square value for pain score and selected demographic variables like age and body mass index are not significant at 0.05 level of significance whereas it is significant for sex at 0.05 level of significance. Table frequency also shows that more females than males had post test scores above median indicating that females experience more pain than males.

DISCUSSION

The findings of the present study showed the calculated t-value was 17.75 which was more than table value hence showed significant difference between post test pain scores of experimental and control group This finding is consistent with the findings of the research study conducted by Ravneet. K et al. [8] in which t-value was 10.69 which also shows the significant

difference in post test pain scores of both the groups. Both studies reported that Valsalva maneuver is effective and cost effective technique in reducing pain associated with IV cannulation among adults.

Also a study by Agnihotri M, et al. [11] shows the similar findings in which calculated t-value was 5.31 which also concluded that when pain was assessed immediately after IV cannulation in group underwent Valsalva maneuver, it was found to be lower than those in control group.

The present study showed in valsalva group majority i.e. 80% had mild pain whereas no one had moderate and severe pain in this group whereas in the control group majority i.e. 87% had moderate pain and 10% had severe pain .A study conducted by Anil Aggarwal et al. [12] had consistent findings with present study which also showed that in valsalva group all 100% had mild pain whereas in control group majority i.e. 56% had moderate pain.

The present study also concludes that there is significant association between sex and pain score and females experience more pain as compared to males as more females were having pain score above median compared to males. This finding is consistent with the findings OT the study conducted by Jagdamba et al. [13] on effect of gender on pain perception and reported that female patients experience more pain as compared to male patients as shown by computed chi square value of 31.84.

Limitations:

The study was confined to a small number of experimental and control group of patients in one private hospital. This limits the generalization of the findings.

Recommendations:

1. A similar study can be undertaken on a larger sample; thereby findings can be generalized for a larger population.
2. A similar study can be done in more than one setting.

3. A comparative study can be done between two or more pain control methods.
4. A similar study can be replicated for various population like pediatrics, geriatrics etc.
5. A study can be done to compare the effectiveness of Valsalva maneuver in males and females.
6. A study can be done to assess the effectiveness of valsalva maneuver in other painful procedures
7. A study can be done to assess the effectiveness of other techniques of Valsalva maneuver in IV cannula pain reduction.

CONCLUSION

- Sample characteristics of both the experimental and control groups were nearly same.
- The mean post test pain scores of experimental group was less than control group.
- Valsalva maneuver was effective technique in reducing pain associated with IV cannulation.
- There was significant association between posttest pain scores and sex .whereas there was no association found between age and pain score and body mass index with pain scores.

Implications of the study:

The study will improve the nurse's knowledge and competence in reducing pain of patients undergoing IV cannulation and it will result in better patient's outcome.

Even though various pain reducing techniques is present in basic nursing curriculum, nurse educators should keep the students update about the newer and cheap methods of pain reduction.

In service nursing personnel should be provided with the knowledge regarding the acute pain management regarding IV cannulation as it is also a distressing for patients who are admitted in hospital.

There is need to sensitize the nurse administrators about the importance of pain

management during minor invasive procedures too including IV cannulation; so that they should feel the need to emphasize this practice in nursing.

To ensure quality care, administrators should utilize and rely upon evidence based nursing practice. The nurse administrators should communicate this knowledge to their clinical staff and ensure this practice in their clinical set up. Nurse administrators should organize in service education programme for their nursing staff to follow right and current practices.

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