



## Effect of Valsalva Maneuver on Pain Perception During Blood Sample Collection Among Patients

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 06 Nov 2023	<p><b>Background:</b> Blood sample collection is the most frequent intrusive practise that hurts patients in hospital settings. A non-pharmacological and economical way to lessen pain during blood sample collection is the Valsalva Maneuver. <b>Objectives;</b> The aim of this study was to evaluate the effect of Valsalva Maneuver during blood sample collection. <b>Methods:</b> A quasi-experimental design (post-test only control group design). Self-structured questionnaire on Socio demographic information, clinical parameter and Wong baker face pain scale was used to observe the pain score of participants. The research population includes all the adult patients between the ages of 18 and 50 admitted in IPD. The sample size for the study comprises of 500 Participants who met the inclusion criteria. Purposive sampling technique was used to identify adult patients between the ages of 18 and 50 who were having blood sample collection admitted in IPD in IMS &amp; SUM hospital, Bhubaneswar, Odisha. <b>Results:</b> The results revealed that there is significant reduction in pain during blood sample collection in experimental group with (<math>p=0.000</math>). No association was found between level pain and socio-demographic and clinical parameters. <b>Discussion:</b> The Valsalva manoeuvre is a non-invasive, non-pharmacological, and efficient way to lessen pain related to drawing blood samples. During the collection of blood samples, nurses should demonstrate the Valsalva manoeuvre to patients. In-service education programmes for nurses and students should be included by hospital administration in order to promote the non-pharmacological technique of pain alleviation during blood sample collection.</p>
CC License CC-BY-NC-SA 4.0	<b>Keywords:</b> Effect, Valsalva Manoeuvre, Pain, Blood sample collection

### 1. Introduction

In the healthcare setting, procedural pain is a significant source of suffering pain perception for patients. The routine procedure that nurses regularly do that causes pain to the patient was blood sample collection for routine check-up. Due work burden and professional carelessness nursing personals fail to treat pain. According to Donabue (1989), the patients may feel moderate to severe pain during vein puncture. Nurses offer care for patients in a variety of places and circumstances, often involving actions that enhance comfort. To meet client needs, nursing care is provided with a variety of nursing comforts. The topic of comfort serves as a general heading for information about pain and pain management solutions. The concept of comfort is essential to the practise of nursing. Nurses provide people courage, comfort, hope, support, encouragement, and help through comforting actions.<sup>1</sup> When people are sceptical of needs or have had bad experiences, taking blood samples might be difficult. Pain during blood sample collection anticipation is typically underestimated and underappreciated. It is odd that practises like blood sample collection don't typically follow evidence-based practise. Vijay VR, (2013) reviewed that the Valsalva maneuver is one of the non-pharmacological pain-relieving techniques. Antonio Maria Valsalva, a 17th century physician and anatomist, was the inspiration for this procedure.

A fairly vigorous attempted exhalation against a closed airway is used in the Valsalva technique. During an intravenous operation, the Valsalva technique can help minimize discomfort.<sup>2</sup>

Kauffman RE. (2008) concluded that the majority of clients are apprehensive about the pain of vein puncture. The degree to which a customer is afraid of an intravenous operation is determined by their personality, gender, culture, and other factors. Past intravenous procedure experience may lead to avoidance or postponement of necessary medical care.<sup>3</sup> This research is conducted to assess the effect of Valsalva maneuver on pain perception during blood sample collection. The researcher observed that many patients are facing needle phobia. Therefore, the investigator felt that, the present study may help to reduce pain perception during vein puncture and other health care problem will not be faced during treatment.

## **2. Materials And Methods**

This is a quantitative experimental research approach was used for this study. Quasi experimental design was used for the study. 500 number of adult patients undergoing blood sample collection in IMS & SUM Hospital, Bhubaneswar, Odisha. The study was conducted in the male medicine ward patients of IMS & SUM Hospital, Bhubaneswar, Odisha. The sample size for the study comprises of 500 participants. The inclusion criteria for participants were as follows: Adult patients who have been admitted to the wards, members who are willing to take part in the research. The exclusion criteria were as follows: Adults admitted in ICU, adults' patients with cerebrovascular accident, adult patients with bleeding problem, adult patients with mechanically ventilated, adult patient with neurological disorder, and adult patient admitted in male and female surgery ward.

Sample size calculated by SLOVIN'S Formula: - (n = sample size, N = population size (1300) , e = margin of error (5%). Purposive sampling technique was used to select the IPD patients. They were divided into two groups: experimental and control. The researcher after extensive understanding plans prepares the module and apply in the IPD (In patient department) adult patients undergoing blood sample collection to evaluate effect of valsalva maneuver on pain perception.

The three-part instrument was used for data collection. The first part included self-structured questionnaire demographic variables (age, gender, education, needle size, site of prick, previous experience of blood draw, Is there double prick, previous experience of hospitalisation), the second part included self-structured questionnaires for clinical parameters which include blood pressure and heart rate), the third part Wong-baker faces pain rating scale. Wong-baker faces pain scale observed by facial expression with 10 points, in this scale '0' indicates no hurts, '2' indicates hurts little bit, '4' indicates hurts little more, '6' indicates hurts even more, '8' indicates hurts whole lot, '10' indicates hurts worst. The investigator categorized Wong-baker faces rating scale after testing the S-CVI and I-CVI scoring. Categories of the pain scale are: No pain (0), Mild pain (1-3) , Moderate pain (4-6), Severe pain (7-10).

## **Statistical analyses**

Statistical analyses were performed using SPSS software version 20. Finding frequency (f) & percentage (%) distribution of socio demographic and clinical parameters variables. The two groups were compared by using Mann- Whitney U test. Finding association of pain perception with socio demographic variables and clinical parameters by Chi –square test.

## **Ethical Consideration**

Furthermore, the study protocol was approved by IEC, IEC registration number – ECR/627/Inst/OR/2014/RR-20, Sum Nursing College, SOA Deemed University, approved by Research Committee of Sum Nursing College, SOA Deemed University, Written permission approved by Medical Superintendent of IMS & SUM Hospital, Bhubaneswar, Odisha.

## **3. Results and Discussion**

Distribution of control and experimental group socio – demographic characteristics of the adult undergoing blood sample collection in control group, maximum 29 – 38 years age groups undergone for blood draw i.e., 36.4% and in experimental group, maximum 18 – 28 years age groups undergone for blood draw i.e. 30.4%. In control group, 62.8% female undergone for blood draw and in experimental group, 63.6% male undergone for blood draw. In control group, 32.8% completed their secondary education and in experimental group 33.6% completed their secondary education. In control group 56% was pricked with 23-gauge needles and in experimental group 52.8% was pricked was pricked with 23-gauge needles. distribution of control and experimental group socio – Demographic characteristics of the adult undergoing blood sample collection. 42.4% was having twice history of previous experience of blood draw among control group and 33.6% was having twice and thrice history of previous experience of blood draw. 58.4% maximum was pricked in arm among control group and

58% maximum was pricked in arm among experimental group. 90% was having single prick during blood sample among control group and 96% was having single prick during blood sample among experimental group. 70.8% patient having previous experience of hospitalization among control group and 74.4% patient having previous experience of hospitalization among experimental group. clinical parameter undergoing blood sample collection among control and experimental group shows that in control group, 42.8% was having blood pressure >120/80, 35.2% was having blood pressure 120 – 129/>80, 20.4% was having blood pressure 130 – 139/80 – 89 and 4% was having blood pressure <140/<90 and in experimental group, 47.2% was having blood pressure >120/80, 26% was having blood pressure 120-129/>80, 12.8% was having blood pressure 130-139/80-89 and 14% was having blood pressure <140/<90. Heart rate among the control group 30.4% was having >70 heart rate, 48.4% was having 71-80 heart rate, 14.4% was having 81-100 heart rate and 6.8% was having <100 heart rate. Heart rate among the experimental group, 28.8% was having >70 heart rate, 48.8% was having 71-80 heart rate, 13.6% was having 81-100 heart rate and 8.8% was having <100 heart rate. Frequency (f) and percentage (%) distribution of participants on level of pain among control and experimental group. Comparison of Mean Score of Pain perception during blood sample collection between Experimental Group and Control Group. Means score of control group was 4.75 and mean score of experimental groups was 1.50. Hence, it is interpreted that there is a difference between mean pain score in experimental and control group. Comparison of pain score among control and experimental group by using Mann – Whitney U test comparison between control and experimental group and level of pain is reduced. In the table 4.4 shows calculated p value was less than the tabulated p value. The Mean rank 365.4 and 135.5 for control and experimental group, sum of rank for control and experimental group were 91352.50 and 33897.50, median score was 8 and 2 for both the group and U test value is 2522.05. P value is 0.00 which is less than 0.05. The control group pain score is more than experimental group pain score. Hence, it is interpreted that there is a difference between experimental and control group. From the above analyses it is concluded that research hypothesis is accepted and null hypothesis is rejected. Association of pain perception during blood sample collection of experimental groups with socio demographic variables and clinical parameters shows that, there was a statically non-significant association between level of pain and age in years ( $\chi^2=9.79$ ,  $p=.368$ ), gender ( $\chi^2=2.51$ ,  $p=.473$ ) education ( $\chi^2=10.31$ ,  $p=.588$ ), needle size. ( $\chi^2=4.57$ ,  $p=.870$ ), previous experience of blood draw ( $\chi^2=11.14$ ,  $p=.266$ ), site of prick ( $\chi^2=1.90$ ,  $p=.593$ ), is there double prick ( $\chi^2=5.79$ ,  $p=.122$ ), previous experience of hospitalization ( $\chi^2=.379$ ,  $p=.945$ ), clinical parameter i.e., blood pressure ( $\chi^2=15.90$ ,  $p=.069$ ), and heart rate ( $\chi^2=4.2$ ,  $p=.898$ ).

**Table 1:** Comparison of Mean Score of Pain perception during blood sample collection between Experimental Group and Control Group. N=n<sub>1</sub> (250) +n<sub>2</sub> (250)

Mean Pain score by Wong bakers face rating pain scale	Mean score	Mean score percentage	Remark
Control group	4.75	76%	Increased in pain
Experimental group	1.50	24%	Decreased in pain

**Table 2:** Comparison of pain score among control and experimental group by using Mann – Whitney U test N=n<sub>1</sub> (250) +n<sub>2</sub> (250)

Pain score by Wong bakers face rating pain scale	Mean rank	Sum of Rank	Median	U value	P value	Remarks
Control group	365.4	91352.50	8			
Experimental group	135.5	33897.50	2	2522.50	.000*	Significant

P ≤ .05\* = Significant

**Table 3:** Association of pain perception during blood sample collection of experimental groups with socio demographic variables and clinical parameters N=n<sub>1</sub> (250) +n<sub>2</sub>(250)

Demographic variable	Level of pain perception			X2	Df	p value
	No pain	Mild pain	Moderate pain			
<b>Age in year</b>						
18 – 28	19	30	27	9.79	9	.368
29 – 38	16	26	27			
39 – 48	20	30	20			
49 years and above	10	16	9			
<b>Gender</b>						

Male	37	63	59	2.51	3	.473
Female	28	37	20			
<b>Education</b>						
Illiterate	14	12	11	10.31	12	.588
Primary	10	25	23			
Secondary	23	32	29			
Higher secondary	4	13	9			
Graduates	14	18	13			
<b>Needle size</b>						
20 gauge needle	7	10	9	4.57	9	.870
21 gauge needle	22	31	22			
23 gauge needle	32	53	47			
24 gauge needle	4	6	7			
<b>Previous experience of blood draw</b>						
Once	10	8	6	11.14	9	.266
Twice	17	35	25			
Thrice	23	32	24			
More than thrice	15	25	10			
<b>Site of prick</b>						
Arm	38	54	53	1.90	3	.593
Hand	27	46	32			
Feet	0	0	0			
<b>Is there double prick</b>						
Yes	27	31	28	5.79	3	.345
No	38	69	57			
<b>Previous experience of hospitalization</b>						
Yes	47	74	65	0.38	3	.945
No	18	26	20			
<b>Blood Pressure</b>						
>120/80	37	45	36	15.9	9	.069
120-129/>80	9	27	29			
130-139/80-89	6	16	10			
<140/<90	13	12	10			
<b>Heart rate</b>						
>70	16	32	24	4.2	9	.898
71 – 80	36	44	42			
81 – 100	8	14	12			
<100	5	10	7			

Note: df = degree of freedom,  $P \leq .05^*$  = Significant

According to the present study, as compared to the control group there was a reduction of pain in the experimental group. The results show that the mean score of the experimental group is 1.50 whereas the control group mean score is 4.75,  $U = 2522.5$ ,  $P < 0.00$ . Research findings were supported by Anil Agarwal et al (2005). The results of the study showed that there was a significant reduction both in the incidence and severity of pain in the Valsalva group compared to the other two groups. In the Valsalva group, 18 out of 25 patients (72%) experienced a reduction in pain while all 25 patients in the other two groups reported pain. This difference was statistically significant ( $p < 0.001$ ), indicating that the Valsalva group had a significantly lower incidence of pain. Furthermore, the severity of pain was also significantly reduced in the Valsalva group compared to the other two groups. The study did not provide specific details about the severity reduction but it states that the reduction was statistically significant ( $p < 0.001$ ). This suggests that Valsalva tech. was effective in reducing the severity of pain experienced by the patients.<sup>33</sup>

According to the present study, blood pressure 0.069 which was not statically significant and heart rate 0.898 which was not statically significant as the calculated chi square value which was more than 0.05 level of significance.

Research findings were conducted by Devendra Gupta et al (2006) aimed to assess pain levels in patients using the visual analog score (VAS) and measure physiological parameters such as mean arterial pressure (MAP), heart rate (HR) and oxygen saturation (SPO2) during venous cannulation. The results showed that the VAS for group V was  $2.15 \pm 1.95$ , indicating a moderate level of pain. In group E, the VAS was  $1.00 \pm 0.79$ , which suggests a lower level of pain.

compared to group V. Group C had a VAS of  $2.55 \pm 2.74$ , indicating a higher level of pain compared to both Group V and E.<sup>34</sup>

#### **4. Conclusion**

The Valsalva maneuver has been identified as an effective nursing intervention for reducing pain in adult patients during blood sample collection. This intervention has been found to be comparable to pharmacological treatments in terms of pain reduction, but without any side effects. The study also found that patients were highly cooperative and satisfied with this intervention. These findings highlight the potential of the Valsalva maneuver as a cost-effective nursing intervention for reducing pain blood sample collection.

#### **Conflict of Interests:**

The authors hereby declare that there is no conflict of interest in this study.

#### **Acknowledgments**

This study was supported by the Sum Nursing College, SOA Deemed University, Bhubaneswar for supporting and for successful completion of this project. Researchers would like to thank all patients for their participation.

#### **Funding**

This research was conducted with personal funds, with no external sponsorship or financial support.

#### **Author contributions**

Suman Prabha Singh Deo, Sasmita Das conceived the study. Susan Konda developed the methods for evaluate. Puspanjali Senapati, P.Rashmipriya Rath involved in data collection and analysis. All authors were involved in developing the manuscript for submission.

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