

A Study to Assess the Effectiveness of the Prone Position in Increasing Oxygen Saturation among Acute Respiratory Distress Syndrome Patients at NMCH, Nellore

**A. Latha¹, A. S. Pushpalatha^{2*}, Nasina Subhashini³, B.Vijaya Tulasi⁴,
V. Rupa Saritha Reddy⁵**

¹ Professor, Department of Medical & Surgical Nursing, Narayana College of Nursing, Nellore, Andhra Pradesh, India. Email: manavalanlatha@gmail.com

² Department of Medical Surgical Nursing, M. Sc Nursing, Narayana College of Nursing, Nellore, Andhra Pradesh, India. Email: purnima.latha1994@gmail.com

³ Department of Medical Surgical Nursing, Narayana College of Nursing, Nellore, Andhra Pradesh, India. Email: nsubhashini220@gmail.com

⁴ Associate Professor, Department of Medical Surgical Nursing, Sree Narayana Nursing college, Nellore, Andhra Pradesh, India. Email: bvijayatulasi@gmail.com

⁵ Professor, Department of Medical Surgical Nursing, Sree Narayana Nursing College, Nellore, Andhra Pradesh, India. Email: sarithalahari143@gmail.com

Abstract

This study has aim to understand the effectiveness of prone positioning among ARDS patients in increasing oxygen saturation. 60 patients from Narayana Medical College and Hospital, Nellore have been selected for this study and a quantitative approach has been applied. A non-equivalent control group consisting of experimental and control group have been adopted as the research design where pre-test and post-test have been conducted. In the pre-test it has shown that oxygen saturation 63.3%(19) and 36.7%(11) as moderate and poor saturation levels respectively. In the post-test, it has found that 76.7% (23), and 32.3%(7) has shown normal and moderate oxygen levels in the experimental group. In the control group pre-test 60%(18), and 40%(12) with moderate and poor saturation levels of oxygen. In the post-test 53.4%(16) and 33.3%(10) found moderate poor levels of oxygen saturation, and 13.3%(4) has shown normal oxygen saturation levels. This study will be beneficial for patients with breathing problems.

Keywords: ARDS, Prone Positioning, NMCH, Oxygen Saturation, Experimental Group, Control Group.

1. Introduction

The prone position of breathing refers to an effective method that involves the body positioning in such a way that assists the improvement of oxygenation in the lungs. The respiration process is divided into two phases namely inspiration and expiration whereas inspiration belongs to the active process that brings air inside the lungs and expiration excludes air out of the lungs. *ARDS or, acute respiratory distress syndrome* occurs due to the building of fluid in the alveoli and tiny muscles of the lungs. Pathophysiology of ARDS is marked by disruptions in the capillary alveoli and edema formation, and prone positioning can be helpful for patients with such conditions. This article will focus on the effectiveness of prone positioning among ARDS patients in increasing oxygen saturation.

2. Literature Review

Increasing oxygen saturation among ARDS patients

ARDS or, acute respiratory distress syndrome refers to a fatal condition syndrome of the lung that is a serious condition for patients with poor oxygen supply in the lung. In order to increase oxygen saturation in the lungs of ARDS patients it is important for the health care professionals to give supportive care such as ventilator support, prone positioning, and medications alongside sedation. A ventilator machine is used to open the air sac that is shut down and also helps in breathing (Pleil *et al.* 2021). The ventilator is connected to the patient through a face mask and a tube inserted into the windpipe. Another way to improve oxygen saturation is to bring the prone positioning that increases the blood flow in the alveoli and also helps to reduce the blockages in the tissues of the lungs.

Effectiveness of prone positioning in ARDS patients to improve oxygen saturation

Prone positioning is generally used for patients with breathing problems and this position is utilized for the alternative to the ventilator. This position is often used for neck and back surgeries, collateral surgeries, tendon repairs, and vascular surgeries, and also for patients with oxygen saturation problems. The respiratory system generally is not modified during the prone positioning and after returning to the supine position respiratory mechanics got improved (Protti *et al.* 2022). It increases the blood flow in the alveoli and through the bloodstream, an extra amount of oxygen goes lungs. It improves the oxygenation in the lungs by redistributing the flow of blood in the lungs and that reduces lung pressure.

3. Methodology

Here in this study quantitative data analysis had been done and quantitative data refers to the first-hand data that had been gathered by the researchers themselves. A quantitative structure was made up of tools such as surveys and polls, and a sample size or quantity and quantitative research in the social sciences had been used for the collection of quantitative data.

4. Research Design

The *non-equivalent control group* had been adopted as the research design where pre-test and post-test had been conducted.

Tools Used

Observational checklist was the tool used here to access levels of oxygen saturation.

5. Data collection

There were a total of 60 participants chosen with the application of the *Convenience sampling technique in NMCH or, Narayana Medical College and Hospital, Nellore*. The data had been found in this study represented in a table and graphical form by the application of the primary data collection method and also applied the descriptive method of research

design and *Inferential statistics*. The study conducted the pre-test in addition to both experimental and control groups.

6. Data Analysis

Table 1: Frequency and distribution of percentage on the basis of age

(Source: SPSS)

Age in Years	Experimental Group (N=30)		Control Group (N=30)	
	f	%	f	%
a. 20-30 yrs	2	6.7	3	10
b. 31-40yrs	4	13.3	5	16.7
c. 41-50yrs	8	26.7	7	23.3
d. Above 50yrs	16	53.3	15	50
TOTAL	30	100	30	100

The above table stated the different ages of ARDS patients and they belong to both of the groups of experimental and control. There were approximately 6.7% belonged to 20 to 30 years, 13.3% belong to 31-40 years, 26.7% belong to 41 to 50 years and 53.3% were above 50 years in the 100 experimental group. Besides, approximately 10% belong to 20 to 30 years, 16.7% belong to 31 to 40 years, 23.3% belong to 41 to 50 years and 50% were above 50 years in the 100 control groups of ARDS patients. Therefore, it had been understood that individuals above 50 years, were experienced with this matter and give proper implementations for ARDS syndrome.

Table 2: Distribution of oxygen saturation for post and pre-test among ARDS patients in control and experimental group

Level of oxygen saturation	Experimental Group (N=30)				Control Group (N=30)			
	Pre-test		Post-test		Pre-test		Post-test	
	f	%	f	%	f	%	f	%
Normal OXYGEN SATURATION Level (95-100%)	-	-	23	76.7	-	-	4	13.3
Moderate OXYGEN SATURATION LEVEL (92-95%)	19	63.3	7	23.3	18	60	16	53.4
Poor OXYGEN SATURATION LEVEL (<92%)	11	36.7	-	-	12	40	10	33.3
TOTAL	30	100	30	100	30	100	30	100

In the experimental group, the pre-test showed 63.3%(19) of oxygen saturation in moderate, and 36.7%(11) as poor saturation level. In the post-test 76.7% (23) has shown normal oxygen saturation levels, and 32.3%(7) had shown moderate oxygen levels. On the other hand, in the

control group pre-test 60%(18) had shown moderate saturation level of oxygen,40%(12) with poor saturation level. In the post-test 53.4%(16) had shown moderate oxygen level and 33.3%(10) had shown a poor level of saturation, and 13.3%(4) had shown normal oxygen saturation level.

Table 3: Effectiveness of prone position for post and pre-test among ARDS patients in control and experimental group

Group	Criteria	Mean	Standard deviation (SD)	Paired t-test
Experimental	Pre-test	43.67	1.028	C=117.139 t=2.04 P <0.05 S ***
	Post test	15.17	.913	
Control	Pre-test	42.63	4.098	C=0.044 t=2.04 P <0.05 NS
	Post test	42.6	3.400	

S** Significant NS=Non-Significant P<0.05 df_(n-1) =29

From the above table, it was found from the experimental group that the mean of the pre-test was 43.67 and the SD was 1.028. The post-test SD was 0.913 and the mean was 15.17. The calculated paired t-test was 117.139 and the tabulated value was 2.04. On the other hand, it was found from the control group that the mean of the pre-test was 42.63 and the SD was 4.098. The post-test SD was 3.400 and the mean was 42.60. The calculated paired t-test was 2.04 and the tabulated value was 2.04.

7. Findings and Discussion

60 persons participated in the study conducted in *NMCH*, there were approximately 53.3% belonging to greater than 50 years and 6.7% belonging to 20 to 30 years. The pre-test showed 63.3%(19) of oxygen saturation in moderate, and 36.7%(11) as poor saturation level. In the post-test 76.7% (23) has shown normal oxygen saturation levels, and 32.3%(7) had shown moderate oxygen levels in the experimental group. in the control group pre-test 60%(18) had shown moderate saturation levels of oxygen,40%(12) with poor saturation level. In the post-test 53.4%(16) had shown moderate oxygen level and 33.3%(10) had shown a poor level of saturation, and 13.3%(4) had shown normal oxygen saturation level. The effectiveness of prone positioning in ARDS patients to improve oxygen saturation had been discussed and the effectiveness of prone position for post and pre-test among ARDS patients in the control and experimental group had shown in the table.

8. Conclusion

This paper has drawn a significant picture of the effectiveness of prone positioning among ARDS patients in increasing oxygen saturation levels. Therefore prone positioning effectively helps patients suffering from ARDS and help in increasing the level of oxygen saturation.

References

- [1] Pleil, J.D., Wallace, M.A.G., Davis, M.D. and Matty, C.M., 2021. The physics of human breathing: Flow, timing, volume, and pressure parameters for normal, on-demand, and ventilator respiration. *Journal of breath research*, 15(4), p.042002.
- [2] Protti, A., Santini, A., Pennati, F., Chiurazzi, C., Ferrari, M., Iapichino, G.E., Carenzo, L., Dalla Corte, F., Lanza, E., Martinetti, N. and Aliverti, A., 2022. Lung response to prone positioning in mechanically-ventilated patients with COVID-19. *Critical Care*, 26(1), pp.1-9.