

## Original Research Article

# Knowledge and attitude of nursing staff towards nebulization therapy in a tertiary care hospital

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### ABSTRACT

**Background:** Nebulization is an important tool in the treatment of respiratory conditions. Nurses are primary health care providers for using the nebulizers in a hospital setting. The examination of nurse's knowledge and performance regarding the nebulizer therapy is of utmost importance for proper nebulization. Aim of the study was to access the knowledge and attitude of staff nurses towards nebulization therapy.

**Methods:** A cross sectional study was conducted at the RL Jalappa hospital, Kolar, Karnataka, India. 50 nurses working the intensive care units and wards were given a questionnaire regarding the key aspects of nebulization therapy. A workshop was then conducted for the same participants on correct nebulization techniques and the questionnaire was given and the results post workshop was analyzed.

**Results:** In pre-study, most nurses had unsatisfactory knowledge with respect to breathing pattern during nebulization (72.2%), types of masks used (83.3%), changing of filter (62.5%). On comparing satisfactory knowledge level of nurses pre-and post, it was found statistically significant increase in knowledge for breathing pattern during nebulization, knowledge of types of nebulization, nebulization time, nebulization end point, types of drugs used, type of dilution, proportion of dilution, ideal volume of drugs in medication, replacement of tubing, changing of filter, types of disinfections used, types of nebulization and types of mask ( $p < 0.05$ ).

**Conclusions:** The knowledge of the staff nurses regarding the nebulization therapy was unsatisfactory which was reflected by improvement in the knowledge post workshop training. The staff nurses should be provided periodic training on nebulization therapy to give effective and safe care to patients.

**Keywords:** Meter dose inhaler, Nebulization therapy, Nurses knowledge

### INTRODUCTION

Inhaled medications are an essential for the treatment of common respiratory diseases like asthma, COPD. The major advantage of inhaled therapy is that the drugs are delivered directly into the airway producing higher local concentration with significantly less risk of systemic side effects. Inhaled medication can be delivered by meter dose inhaler (MDI), dry powder inhaler (DPI) and nebulizer. Nebulization is used both in adult and pediatric patients for acute and long-term treatment of respiratory

diseases. High rates of inhaler misuse in patients with chronic obstructive pulmonary disease and asthma contribute to hospital readmissions and increased healthcare cost. Poor inhalation techniques are associated with decreased medication delivery and poor disease control.<sup>1</sup>

Aerosolized medication if not performed with appropriate technique, will lead to several consequences and perils such as mucosa irritation, bronchospasm, dyspnoea, airway burns (when heating elements are used),

headaches, coughing, tachycardia, palpitations, nausea and precipitation of bronchoconstriction most common in asthmatic and COPD patients and may result in hypoxemia.<sup>2</sup> To benefit from the prescribed treatment, avoid instability, and achieve control, patients must know how to properly use their inhaler devices.<sup>3</sup> Providing hospital-based education on inhaler technique can decrease risk of misuse at discharge.<sup>4</sup> Educating patients on self-management also leads to fewer hospitalizations and decreased medical costs for patients with chronic lung diseases

The nurses are the primary health care providers educating patients and giving nebulization, making it critical that they convey accurate device technique to the patients and they are the trusted hand of doctors for nebulization.<sup>5-7</sup> The examination of nurse's knowledge and information regarding nebulization therapy has to be studied for proper and correct treatment. Identifying gaps in nursing knowledge regarding proper inhaler technique for patient education is important to design interventions that may positively impact patient outcomes. There are very few studies regarding the knowledge and correct practice of nebulization among nurses and hence his study was taken up to evaluate the same.

## METHODS

The present study was a cross sectional study conducted by the department of pulmonary medicine RL Jalappa hospital, Kolar, Karnataka, India. 50 nursing Staff working at RL Jalappa hospital in MICU, SICU, PICU and wards were included in the study. Nurse's knowledge assessment questionnaire was used to assess the knowledge and attitude of the staff nurses.

Nurse's knowledge assessment questionnaire sheet in English language was constructed after studying the

relevant literature to assess knowledge about nebulization techniques. The questionnaire consisted 15 questions related to key aspects such as hand hygiene, key aspects of nebulization, drugs used in nebulization, drug compatibility, care and maintenance of nebulization and do and don'ts of nebulization.

The total score is 15. Correct response was scored 1 and incorrect response was scored as 0. Satisfactory level of knowledge was consisted if more than or equal to 60% and unsatisfactory level less than 60%. Informed consent was taken from the staff nurses prior to the study and the questionnaire was distributed to the participants. Their knowledge and performance regarding the nebulization were assessed. A workshop was then conducted for the same participants including a power point presentation, video demonstration and hand on experience on correct nebulization techniques over a period of 3 hours. The staff nurses were given the same questionnaire after the workshop and their performance and knowledge gained was assessed and tabulated.

The institute's ethics committee approved the study. Informed written consent was taken from all participants before enrolling them. Data was entered in Microsoft excel spreadsheet and analyzed with SPSS version 17.0. Wherever applicable, proportions and mean (SD) were calculated. ANNOVA was used a test of significance. P value of <0.05 was considered significant.

## RESULTS

A total number of 50 nurses were studied in the present study. Of these 18 were from intensive care units, and 32 from ward. The majority of nurses (66.6%) were between 26-30 years old.

**Table 1: Comparison of nurses' knowledge at two units pre-and post-workshop.**

Knowledge	Pre satisfact. no. (%)	Post satisfact. no. (%)	Increased %	P value
Breathing pattern during nebulization	18 (36.0)	34 (68.0)	32	0.000
Knowledge of types of nebulization	29 (58)	39 (78)	20	0.003
Nebulization time	34 (68)	47 (94)	26	0.000
Nebulization end point	33 (66.0)	46 (92)	26	0.000
Remaining liquid in chamber	36 (72)	42 (84)	12	0.057
Types of drugs used	23 (46)	36 (72)	26	0.000
Type of dilution	26 (52.0)	35 (70)	18	0.005
Proportion of dilution	22 (44)	40 (80)	36	0.000
Ideal volume of drugs in medication	29 (58)	39 (78)	20	0.001
Replacement of tubing	29 (58)	43 (86)	28	0.000
Changing of filter	22 (44)	34 (68.0)	24	0.001
Types of disinfections used	25 (50)	38 (76)	26	0.000
How often nebulization accessories to be cleaned	34 (68)	39 (78)	10	0.096
Types of nebulization	25 (50)	35 (70)	20	0.001
Types of mask	11 (22)	30 (60)	38	0.000

In pre-study, the majority of nurses in I.C.U had unsatisfactory knowledge with respect to breathing pattern during nebulization (72.2%) and types of mask (83.3%). In pre-study, the majority of nurses in ward had unsatisfactory knowledge regarding changing of filter (62.5%) and types of mask (75.0%). Overall the maximum satisfactory knowledge was found with respect to nebulization time and how often nebulization accessories to be cleaned, 68% each, respectively. There was no significant difference in knowledge of ICU and ward nurses in different domains.

In post study, the majority of nurses in I.C.U had satisfactory level of knowledge in various domains except type of dilution (50%). The lowest satisfaction level among ward nurses post study was with types of mask (56.3%). Overall, the highest proportions of nurses have knowledge about nebulization time (94%) and nebulization end point (92%) respectively.

There was significant difference in ICU and ward nurses' knowledge about type of dilution ( $p$ -value=0.028).

On comparing satisfactory knowledge level of nurses pre-and post, it was found statistically significant increase in knowledge for breathing pattern during nebulization, knowledge of types of nebulization, nebulization time, nebulization end point, types of drugs used, type of dilution, proportion of dilution, ideal volume of drugs in medication, replacement of tubing, changing of filter, types of disinfections used, types of nebulization and types of mask ( $p < 0.05$ ) (Table 1).

The mean total pre-knowledge score of nurses was 7.94 (1.57). The mean total post knowledge score of nurses was 11.54 (2.03). There was significant increase in nurses' total pre-and post-knowledge score with  $p < 0.001$ . There was no significant difference in nurses' total pre-and post-knowledge score with age, years of experience and unit (Table 2).

**Table 2: Comparison of total nurses' knowledge pre-and post by different characteristic.**

Variable	Total pre			P value	Total post			P value
	Mean	N	Std. deviation		Mean	N	Std. deviation	
Total	7.94	50	1.570		11.54	50	2.032	
<b>Age in years</b>								
<=25 years	7.63	8	1.506	0.809	11.63	8	2.504	0.811
26-30 years	7.97	33	1.686		11.42	33	2.016	
>30 years	8.11	9	1.269		11.89	9	1.833	
<b>Years of experience</b>								
<5 years	7.90	32	1.634	0.842	11.34	32	2.238	0.368
>5 years	8.00	18	1.495		11.89	18	1.605	
<b>Unit</b>								
ICU	8.06	18	1.862	0.701	11.28	18	2.081	0.499
Ward	7.88	32	1.408		11.69	32	2.023	

## DISCUSSION

Nebulizers are commonly used in the management of acute exacerbation airways disease. The nurses are the primary health care providers for educating the patients and giving proper and correct nebulization therapy. They are the trusted hand of the doctors for the nebulization therapy. The staff knowledge level and capabilities are a major factor in determining the number of staff required to carry out unit goals.<sup>8</sup> This study aimed to know the knowledge of the staff nurses working in the various intensive care units and the general wards of the hospital where nebulization and inhaled medication is of utmost important in the treatment of the respiratory diseases.

Majority of all the nurses were in between the age group of 25-30 years. All nurses had no previous training about nebulization (100%). The findings revealed that total

knowledge was at an unsatisfactory level. Initially in the pre-training assessment, the nurses had unsatisfactory knowledge regarding the breathing pattern during nebulization, type of drugs used, proportion of dilution, changing of filter and type of mask.

However, they had significant knowledge about the total time duration of nebulization, nebulization end point and cleaning of the accessories after nebulization. There was a significant improvement in the knowledge towards nebulization therapy after a brief training and hands on experience about the correct techniques related to nebulization and inhaled medications which was statistically significant.

The study identifies lack of understanding on correct inhaler and nebulization techniques among the nurses. According to the survey, nurses were unaware about the

correct practice regarding the nebulization therapy, which reflects the improvement in the knowledge and understanding after the workshop.

In a study, majority of the nurses acknowledge that providing some amount of education about nebulization therapy to the patients during the hospital stay or at the time of discharge is duty of the staff nurses who act as bridge between the doctors and patients. However, few of them felt that it's the primary responsibility of the doctors or the respiratory therapist to teach the patients about the correct and accurate use of nebulization in order to reduce the complications and adherence to the inhaled medications.<sup>9</sup>

It is of utmost important to recognize the improper techniques of the nebulization practice by nurses and the doctors/respiratory therapist in order to reduce the side effects, improve the compliance for nebulization and reduce the complications related to nebulization therapy. The nursing staff in critical care units are responsible for giving care to the patients connected to nebulizer machine should be trained enough to give effective and safe care to such patients. Providing a brief training about correct practice of nebulization periodically to the staff nurses and the doctors will reduce the burden of the disease.

## CONCLUSION

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