



## Status of the practice of oral care and sputum suction for patients with intubation and mechanical ventilation among nurses at Vinh Phuc general Hospital in 2023

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### ABSTRACT

**Objectives:** Describe the status of the practice of oral care and sputum suction for patients with intubation and mechanical ventilation among nurses at Vinh Phuc General Hospital in 2023 and associated factors. **Methods:** A cross-sectional descriptive study was conducted on nurses' implementation of technical procedures of sputum suction and oral hygiene for patients on mechanical ventilation through endotracheal tube. Research time was from March 2023 to June 2023. Participants were nurses working at the Intensive Care and Poisoning Control Department of Vinh Phuc General Hospital performed oral hygiene and sputum suction for patients. **Results:** Nurses in the age group 18-40 accounted for the highest percentage (88.2%). Working seniority from 5-10 years accounted for the highest proportion of 55.9%; Seniority <5 years accounted for the lowest rate at 11.8%. There were 64.7% of nurses who performed satisfactorily and 35.3% of them performed unsatisfactorily the sputum suction and oral hygiene procedures. **Conclusion:** The implementation of the procedures of sputum suction and oral hygiene for patients with ventilators is not at a high level. Some factors related to the care activities of nurses include age, professional qualifications; working seniority; working time; number of patients to be cared for.

**Keywords:** Care for patients on mechanical ventilation; sputum suction through Endotracheal; oral hygiene for patient.

### INTRODUCTION

Ventilator-related pneumonia is one of the most dangerous and common complications for patients with endotracheal tubes on mechanical ventilation. Intubation often causes damage to the upper respiratory tract; The air breathed in through the ventilator is not humid enough; mechanically ventilated patients use sedatives and muscle relaxants, which increases phlegm stagnation and limit coughing and spitting to expel phlegm <sup>1</sup>. Oral hygiene and sputum suction for patients

with endotracheal tubes and mechanical ventilation are care activities of nurses to prevent patients from pneumonia caused by mechanical ventilation in the intensive care unit <sup>2</sup>. Effective suctioning of phlegm cleans secretions to clear the respiratory tract and maintain ventilation, facilitates air circulation and prevents infection due to phlegm stagnation, contributing to quick recovery of patients. Nurses' practice of oral care and sputum suction for patients with endotracheal tubes and mechanical

ventilation will affect the patient's treatment results <sup>3</sup>. According to research by Dang Thi Quynh Hoa et al (2021), oral care and sputum suction activities of nurses may help prevent pneumonia <sup>4</sup>. Improper suctioning results in 25% of lower respiratory tract infections and 3.3% of patients with respiratory mucosal damage <sup>5</sup>.

At Vinh Phuc General Hospital, the percentage of healthcare-associated infections is 3.6%, of which the proportion of pneumonia related to mechanical ventilation at the Intensive Care and Poisoning Control Department is 15.6% <sup>6</sup>. To assess the level of compliance with oral hygiene and sputum suction care procedures for intubated patients by nurses and find out influencing factors thereby propose intervention measures to improve the care situation and help to reduce the proportion of healthcare-associated infections for patients to improve hospital quality, the research was conducted to describe the status of the practice of oral care and sputum suction for patients with intubation and mechanical ventilation among nurses at Vinh Phuc Provincial General Hospital and associated factors.

## PARTICIPANTS AND METHODS

**Participants:** Nurses working at the Intensive Care and Poisoning Control Department of Vinh Phuc General Hospital performed the technical procedure of sputum suction and oral hygiene for patients on mechanical ventilation through endotracheal tube.

**Inclusion criteria:** Nurses signed a labor contract with the Hospital for 6 months or more; and agreed to participate in the study.

**Exclusion criteria:** Nurses do not directly participate in patient care.

**Research time and location:** The research was conducted at the Department

of Intensive Care and Poison Control of Vinh Phuc General Hospital from March 2023 to the end of June 2023

**Research design:** A cross-sectional descriptive study was employed.

**Sample size and sampling method:** The formula was applied to calculate sample size:

$$n = Z_{1-\alpha/2}^2 \frac{p(1-p)}{d^2}$$

In which

$\alpha$ : is the level of statistical significance, choose  $\alpha = 0.05$ .  $Z_{\alpha/2}^2$  in here  $Z_{(0.05/2)} = 1.96$ .  $p = 0.891$  (the proportion of nurses' performance of oral care and sputum suction techniques is at a satisfactory level) <sup>7</sup>.  $d$ : is margin of error, choose  $d = 0.05$

The minimum sample size of the study was 150 care activities. To ensure objectivity, each nurse would be evaluated through 5-6 times of performing care practice activities including performing oral hygiene and sputum suctioning technical procedures at 4 different work shifts during the research period. The total number of nurses who met the criteria was 34 people. A total of 211 times of nurses' satisfactory performance of oral care and sputum suction activities for patients on ventilators, exceeded the set sample size.

**Measurement:** The measurement which comprised general information and a checklist for observing nurses performing technical procedures for oral care and sputum suction for patients was developed based on the technical procedures by the Ministry of Health <sup>8</sup> and a questionnaire by Vu Thi En <sup>9</sup>. The checklist included the technical procedure of sputum suction (27 steps) and the technical procedure of special oral hygiene (27 steps) for patients with intubation mechanical ventilation. Each correct step received 1 point; the wrong

step received 0 points. Sputum suction and oral hygiene activities for patients with intubation and mechanical ventilation at a satisfactory level were 20 points or more; unsatisfactory < 20 points.

**Data collection:** Nurses who met the criteria were selected. Nurses' performance of technical procedures for oral care and sputum suction for patients was observed directly and assessed by using the checklist. Nurses participating in the study were informed about the purpose and benefits of the participants, not specifically informed about time to observe and evaluate the performance of the technical procedures. Each nurse performed the technical procedure 5-6 times according to the checklist during their work shifts under the observation of the researcher. Each performance lasted about 10-20 minutes with a checklist. After completing each checklist, the researcher calculated the total steps, collected, checked, and completed the form. To ensure objectivity when collecting data, there was always a supervisor who observed and recorded his observations and then compared them with the researcher's checklist. The checklist with dishonest assessments was rejected.

**Research ethics:** The research had the consent of the participants and was approved by the Ethics Committee of Nam Dinh University of Nursing under Decision No. 994/QĐ-ĐĐN and permitted for data collection by Vinh Phuc General Hospital. All the information given by the participants was used for research purpose only and would be kept confidential.

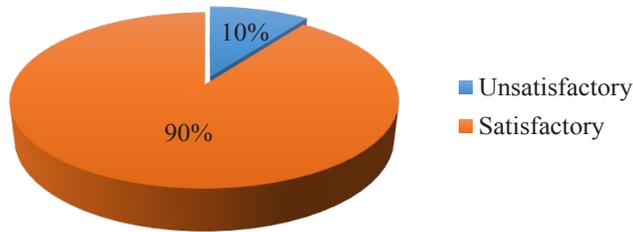
**Data analysis method:** The checklist after being collected would be rechecked to assure the accuracy and adequacy of the information. Data were coded and analyzed using software SPSS 20.0. Algorithms used in research were descriptive statistics, Chi square test.

## RESULTS

**Table 1. General information about participants**

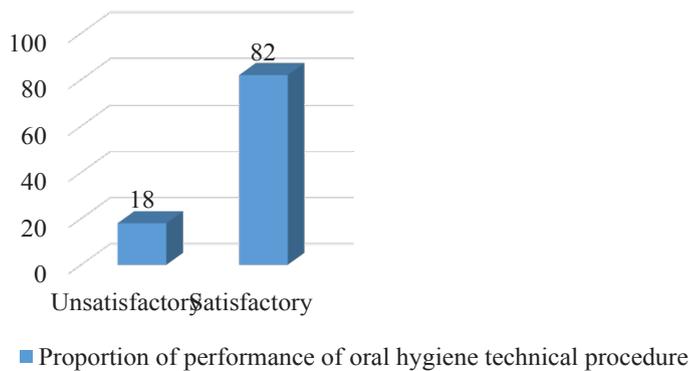
Demographic information	n	%
<i>Age</i>		
18 - 40 years old	30	88.2
41 - 50 years old	4	11.8
Mean ± Std.D	32.15 ± 5.9	
<i>Working seniority</i>		
< 5 years	4	11.8
5 - 10 years	19	55.9
> 10 years	11	32.4
<i>Gender</i>		
Male	6	17.6
Female	28	82.4
<i>Qualification</i>		
College	26	76.5
University	8	23.5
<i>Time to perform care activities</i>		
Daytime	140	66.4
Night	71	33.6
<i>Number of patients cared for/day</i>		
Caring for 1-2 patients/day	5	14.7
Caring for 3-5 patients/day	29	85.3

There was a high percentage of participants with an average age of 32.15 ± 5.9 years and a working seniority of 5-10 years. Female nurses accounted for a high proportion. Professional qualification at College level was the highest percentage. The proportion of nurses' performance of care activities during the daytime was 66.4%, and at night was 33.6%. The number of nurses taking care of 3-5 patients on a ventilator/day accounted for 85.3%, followed by taking care of 1-2 patients on a ventilator/day with a proportion of 14.7%. No nurse must care for more than 5 patients on ventilators/day



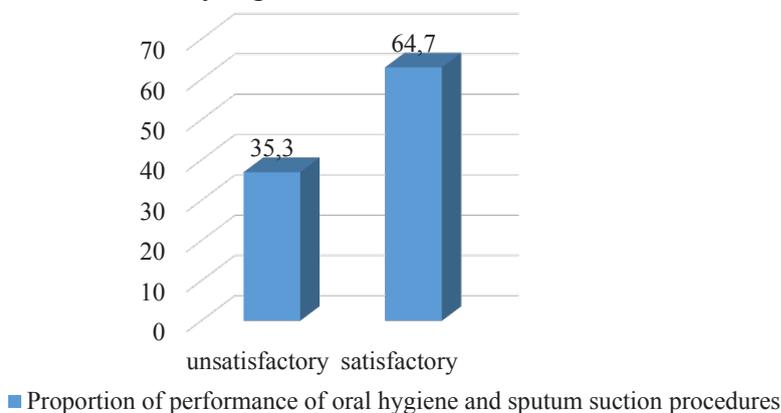
**Chart 1. Classify the level of performance of the sputum suction procedure**

Nurses' performance of technical procedures for sputum suction for patients with intubation and mechanical ventilation at a satisfactory level was 189 operations, accounting for 90%. The proportion was very high.



**Chart 2. Classify the level of performance of oral hygiene procedure**

Nurses' performance of hand hygiene technical procedures for patients with intubation and mechanical ventilation at a satisfactory level was 173 operations, accounting for 82%. The proportion was relatively high.



**Chart 3. Classification the level of performance of oral hygiene and sputum suction procedures**

The percentage of nurses who fully and correctly performed both oral hygiene and sputum suction technical procedures at a satisfactory level was 64.7%. There were 35.3% of nurses who performed technical procedures at an unsatisfactory level.

**Table 2. Associated factors of nurses' care activities**

Associated factors		Level of care performance				$\chi^2$ ; p
		Satisfactory		Unsatisfactory		
		n	%	n	%	
Age group	18 - 40	18	53	12	35.3	$\chi^2 = 4.47$ p = 0.01
	41 - 50	4	11.7	0	0	
Professional qualification	College	13	38.2	12	35.3	$\chi^2 = 6.67$ p = 0.001
	University	9	26.5	0	0	
Working time	Daytime	12	35.3	5	14.7	$\chi^2 = 8.24$ p = 0.001
	Night	10	29.4	7	20.6	
Working seniority	< 5 years	2	5.9	2	5.9	$\chi^2 = 8.8$ p = 0.001
	5 - 10 years	12	35.3	7	20.6	
	11 - 20 years	8	23.5	3	8.8	
Number of ventilator patients cared for/day	1 - 2 patients	4	11.7	1	2.9	$\chi^2 = 3.56$ p = 0.001
	3 - 5 patients	18	53	11	32.4	

Age group of nurses ( $\chi^2 = 4.47$ ;  $p < 0.05$ ); Qualification ( $\chi^2 = 6.67$ ;  $p < 0.05$ ); Working time ( $\chi^2 = 8.24$ ;  $p < 0.05$ ); Seniority ( $\chi^2 = 8.8$ ;  $p < 0.05$ ); Number of patients on ventilators cared for /day by nurses ( $\chi^2 = 3.56$ ;  $p < 0.05$ ) were related to the level of performance of sputum suction care and oral care for patients on mechanical ventilation through endotracheal tubes.

## DISCUSSION

Research results presented that 88.2% of nurses aged from 18 to 40 years old accounted for the majority, the remaining were 41-50 years old with 11.8%; There were no nurses over 50 years old. The age of nurses in the study was similar to the age of participants in the study by Nguyen Ngoc Bich (2021), with 84% of nurses under 40 years old <sup>7</sup>. The participants with 5-10 years of experience accounted for the highest percentage of 55.9%; Followed by the group of nurses with > 10 years of experience, accounting for 32.4%. The group of nurses with < 5 years of seniority was the lowest

proportion at 11.8%. The research results were similar to the research by Vu Thi En et al (2019) <sup>9</sup>. Professional qualification of the participants at college level accounted for the highest proportion (76.5%), followed by nurses at university level (23.5%). None of the participants had intermediate or postgraduate levels. The research results were higher than the findings by Vu Thi En, Nguyen Ngoc Bich, Le Van Duy <sup>7, 9, 10</sup>.

The proportion of nurses performing sputum suction and oral hygiene procedures for patients on mechanical ventilation at a satisfactory level was 64.7%; 35.3% of nurses performed unsatisfactorily. The

results of our study were lower than the findings by Dang Thi Quynh Hoa (2021) at Bach Mai Hospital <sup>4</sup> with a satisfactory percentage of 85.2%, and findings by Nguyen Ngoc Bich (2021) at the private hospital system but similar to findings by Vu Thi En at Nam Dinh Provincial General Hospital <sup>9</sup>. This result may be due to the different professional qualifications, the number of patients to be cared for, and the seniority of the nurses working in the field of intensive care; due to the characteristics of the study area <sup>7</sup>.

After analyzing associated factors of sputum suction care and oral hygiene for patients ventilated through endotracheal tubes, the following results were obtained: Age group of nurses ( $\chi^2 = 4.47$ ;  $p < 0.05$ ); Qualification ( $\chi^2 = 6.67$ ;  $p < 0.05$ ); Working time ( $\chi^2 = 8.24$ ;  $p < 0.05$ ); Seniority ( $\chi^2 = 8.8$ ;  $p < 0.05$ ); Number of patients on ventilators cared for /day by nurses ( $\chi^2 = 3.56$ ;  $p < 0.05$ ) were related to the level of performance of sputum suction care and oral care for patients on mechanical ventilation through endotracheal tubes. The results were similar to findings by Vu Thi En (2019), Nguyen Ngoc Bich (2021), Le Van Duy (2020) <sup>7,9,10</sup> when identifying factors of seniority and working time of nurses were related to the performance of care activities.

From the research results, it may be seen that all patients in the Intensive Care and Poison Control Department are seriously ill, requiring complete care from medical staff in general and nurses in particular. Oral care and sputum suction for patients are also performed by nurses. The large number of patients is the first obstacle for nurses to fully implement the steps of the oral hygiene procedure and the sputum suction procedure because of a lack of human resources.

## CONCLUSION

The average age of nurses at the Intensive Care and Poison Control Department of Vinh Phuc General Hospital was:  $32.15 \pm 5.9$ ; Work experience ranged from 5-10 years and College degrees accounted for a high percentage.

Nurses performing oral hygiene and sputum suction techniques for patients with intubation and mechanical ventilation had a satisfactory percentage of 64.7% and a unsatisfactory percentage of 35.3%.

The age group of the nurse, professional level, working time, seniority, and number of patients to be cared for were related to the level of performance of the technical procedures of sputum suction and oral care for patients with intubation and mechanical ventilation.

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