



Special oral care practices for intubated mechanically ventilated patients by nurses at Ha Dong General Hospital in 2025

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ABSTRACT

Objective: To describe special oral care practices for intubated mechanically ventilated patients by nurses at Ha Dong general hospital in 2025 and related factors. **Methods:** A cross-sectional descriptive study was conducted, encompassing 390 observations of SOC procedures performed by 15 clinical nurses in the Intensive Care Unit (ICU) of Ha Dong General Hospital from February to May 2025. Procedural compliance was evaluated using the standardized SOC checklist issued by the Vietnamese Ministry of Health (Decision No. 1904/QĐ-BYT). **Results:** The overall compliance rate for SOC procedures was 60.0%, while 40.0% of the observed practices were non-compliant. Factors including the nurse's age, gender, years of clinical experience, total patient-to-nurse ratio per shift, and the specific number of mechanically ventilated patients assigned per shift demonstrated statistically significant associations with compliant SOC practices ($p < 0.05$). **Conclusion:** The compliance rate with standard SOC protocols for intubated mechanically ventilated patients remains suboptimal. Nurse demographics and workload are significantly associated with procedural compliance. Enhanced training, continuous supervision, and optimal nurse staffing are imperative to improve the quality of oral care in the ICU.

Keywords: Special oral care, mechanical ventilation, endotracheal intubation, nursing care

INTRODUCTION

Globally, over 320 million patients undergo surgical procedures requiring endotracheal intubation annually ^{1, 2}. In the United States, approximately 30% of surgical interventions necessitate oral intubation ³. While elective intubation is generally a planned and controlled procedure, patients receiving mechanical ventilation via endotracheal intubation

are susceptible to severe, potentially life-threatening complications, with incidence rates ranging from 38% to 54% ⁴. Notably, ventilator-associated pneumonia (VAP) is among the most prevalent nosocomial infections affecting mechanically ventilated patients in intensive care units (ICUs) ⁵. Comprehensive respiratory care is essential for mitigating pulmonary infection risks and effectively preventing post-intubation complications ⁴.

Special oral care (SOC) is a critical component of nursing interventions aimed at supporting intubated mechanically ventilated patients and preventing VAP. However, clinical compliance with SOC protocols remains inconsistent. For instance, a study at Viet Duc Friendship Hospital reported a compliance rate of only 29% ⁶, whereas Vu et al. reported a higher SOC compliance rate of 68.2% ⁷. Furthermore, nursing clinical practice is heavily influenced by various individual and organizational factors. Previous literature indicates that age, gender, and clinical experience significantly impact protocol adherence, reflecting variations in clinical exposure, updated knowledge acquisition, and professional attitudes. Concurrently, nursing workload, measured by the overall patient-to-nurse ratio and the specific number of mechanically ventilated patients assigned per shift, directly affects the time, concentration, and capacity of nurses to execute all procedural steps comprehensively.

Despite its clinical significance, the systemic evaluation of these factors in relation to SOC practices among nurses at Ha Dong General Hospital remains undocumented. Therefore, this study was conducted to describe the current status of SOC practices for intubated mechanically ventilated patients and to identify associated factors among ICU nurses at Ha Dong General Hospital in 2025.

METHODS

Research subjects: The target population comprised clinical nurses directly providing patient care in the ICU. The observational subjects were the SOC procedures performed by these nurses on intubated mechanically ventilated patients.

Inclusion criteria: The registered nurses with a valid practicing certificate and at least six months of ICU experience who voluntarily consented to participate.

Exclusion criteria: Administrative, probationary, and trainee nurses, as well as those on extended leave

Study design: A cross-sectional descriptive study.

Study setting: the ICU of Ha Dong General Hospital.

Data collection period: From February to May 2025.

Sample size: The minimum required sample size was calculated using the formula for estimating a single population proportion:

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

Where: n: Minimum required sample size.

Z: Confidence level coefficient, Z = 1.96 for a 95% confidence interval ($\alpha = 0.05$).

p: an estimated compliance rate, referenced at p = 0.647 (64.7%) based on a previous study by Duong Thi Thu Huyen ¹.

d: a margin of error, d = 0.048

The calculated minimum requirement was 381 observational instances. Out of 19 ICU nursing staff members, 15 eligible clinical nurses were selected using convenience sampling. Each nurse was observed performing the SOC procedure 26 times, resulting in a final sample size of 390 observational instances.

Instruments: A standardized checklist based on the SOC technical guidelines issued by the Vietnamese Ministry of Health (Decision No. 1904/QĐ-BYT,

2014). The instrument evaluated general nurse information and a 27-step SOC procedural checklist. Each step was scored dichotomously (1 point for complete and correct execution, 0 points for incorrect or omitted execution). The overall procedural practice was strictly categorized into two levels of clinical compliance:

+ Compliant: Achieving a perfect score of 27/27 (100% adherence to all steps).

+ Non-compliant: Scoring ≤ 26 points ($< 100\%$ adherence).

RESULTS

Table 1. General characteristics of the observed nurses (n = 15) and observed shift workloads (N = 390)

Characteristic		n	%
Age (years)	≤ 30	2	13.3
	31-35	9	60.0
	≥ 36	4	26.7
	Mean \pm SD; (Min – Max): 33.20 \pm 4.36 (23 - 39)		
Gender	Male	2	13.3
	Female	13	86.7
Years of clinical experience	≤ 5 years	3	20.0
	5-10 years	6	40.0
	> 10 years	6	40.0
	Mean \pm SD; (Min – Max): 9.20 \pm 4.06 (1-15)		
Mechanically ventilated patients assigned per shift	< 3 patients	78	20
	≥ 3 patients	312	80

As detailed in Table 1, the majority of the participants were female (86.7%) and fell within the 31–35 age bracket (60.0%), with an overall mean age of 33.20 \pm 4.36 years. The mean duration of clinical experience was 9.20 \pm 4.06 years. Regarding the nursing workload evaluated across the 390 observational instances, nurses were assigned to care for ≥ 3 mechanically ventilated patients in the vast majority of the shifts (80.0%).

Table 2. Compliance with the preparatory steps of the SOC procedure (N = 390)

	Procedural Steps	Compliant	
		n	%
Nursing preparation	Wearing proper clinical attire	390	100.0
	Performing hand hygiene	390	100.0
Equipment Preparation	Gathering sterile gauze swabs	390	100.0
	Hand sanitizer and clean gloves	390	100.0
	Gallipot (stainless steel cup)	390	100.0
	Sterile forceps	390	100.0
	Chlorhexidine 0.12% solution	390	100.0
	Glycerin borax	390	100.0
	Cotton towel or paper towel	390	100.0
	Biohazard waste bag	390	100.0
Care record sheet	390	100.0	
Patient Preparation	Informing, encouraging, positioning the patient appropriately, and removing/cleaning dentures (if any)	364	93.3

As presented in Table 2, the preparatory steps demonstrated high compliance. Nurse preparation (proper attire and hand hygiene) and equipment assembly (gathering sterile gauze swabs, chlorhexidine 0.12%, gallipots, kidney dishes, etc.) both achieved a 100% compliance rate across all 390 observations. However, compliance concerning patient-centered preparation, specifically informing, encouraging, positioning the patient appropriately, and removing/cleaning dentures, was slightly lower at 93.3%.

Table 3. Compliance with the execution steps of the SOC procedure (N = 390)

Procedure Steps	Compliant	
	n	%
Pouring chlorhexidine solution into the gallipot	390	100.0
Donning clean gloves	390	100.0
Positioning the kidney dish appropriately	338	86.7
Placing a cotton towel around the patient's neck/chest	234	60.0

Procedure Steps	Compliant	
	n	%
Tilting the patient's head laterally towards the nurse	338	86.7
Opening the patient's mouth	390	100.0
Using forceps and chlorhexidine-soaked gauze to clean the oral cavity	390	100.0
Cleaning the palate, and the dorsal and ventral surfaces of the tongue	390	100.0
Drying the oral cavity with dry gauze	338	86.7
Applying glycerin borax to lubricate the patient's lips	286	73.3
Removing gloves	390	100.0
Repositioning the patient comfortably	390	100.0
Clearing away equipment	390	100.0
Performing hand hygiene	390	100.0
FDocumenting in the care record.	390	100.0

Several critical technical steps achieved 100% compliance, including donning clean gloves, opening the patient's mouth, utilizing forceps and chlorhexidine-soaked gauze to clean the oral cavity, and documenting the procedure. Conversely, notable steps with suboptimal compliance included placing a protective cotton towel across the patient's chest/neck (60.0%), applying glycerin borax to lubricate the lips (73.3%), positioning the kidney dish correctly, and tilting the patient's head laterally (86.7%).

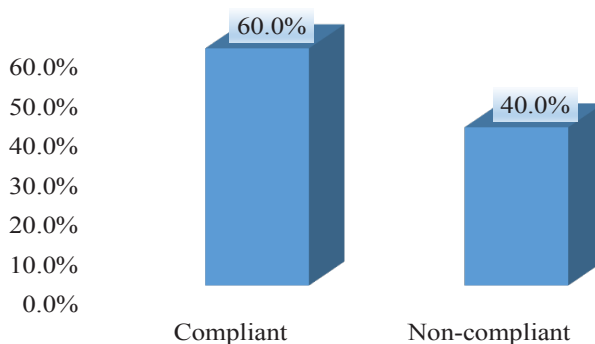


Figure 1. Classification of overall SOC procedural compliance (N = 390)

The overall compliance rate for the SOC procedures was 60.0%, while 40.0% of the observed practices were classified as non-compliant.

Table 4. Association between nurse demographics and SOC compliance (N = 390)

Variables		Compliant n (%)	Non-compliant n (%)	OR (95% CI)	p-value
Age (years)	≤ 30	50 (96.2%)	2 (3.8%)	20.92 (5.01 - 7.39)	0.002
	> 30	184 (54.4%)	154 (45.6%)		
Gender	Male	16 (30.8%)	36 (69.2%)	0.25 (0.13 - 0.46)	0.001
	Female	218 (64.5%)	120 (35.5%)		
Years of clinical experience	1-10 years	216 (92.3%)	18 (7.7%)	92.00 (46.27 - 82.94)	0.001
	> 10 years	18(11.5%)	138 (88.5%)		

Statistical significance determined by Chi-square and Fisher's Exact Test

Nurses aged ≤ 30 years demonstrated a significantly higher compliance rate compared to those > 30 years (96.2% vs. 54.4%, $p = 0.002$). Female nurses were significantly more compliant than male nurses (64.5% vs. 30.8%, $p = 0.001$). Furthermore, nurses with 1 to 10 years of clinical experience exhibited a superior compliance rate compared to those with over 10 years of experience (92.3% vs. 11.5%, $p = 0.001$).

Table 5. Association between nursing workload and SOC compliance (N = 390)

Variables		Compliant n (%)	Non-compliant n (%)	OR (95% CI)	p-value
Total patients assigned per shift	≤ 5 patients	75 (96.2%)	3(3.8%)	24.06 (7.43 - 77.91)	0.0012
	>5 patients	159 (51.0%)	153 (49.0%)		
Mechanically ventilated patients assigned per shift	< 3 patients	76 (97.4%)	2(2.6%)	37.04 (8.94 - 153.45)	0.001
	≥ 3 patients	158 (50.6%)	154 (49.4%)		

Statistical significance determined by Fisher's Exact Test

Observations where nurses managed ≤ 5 total patients per shift showed a 96.2% compliance rate, compared to a mere 51.0% when managing > 5 patients ($p = 0.0012$). Similarly, managing < 3 mechanically ventilated patients per shift resulted in a 97.4% compliance rate, whereas managing ≥ 3 such patients drastically reduced compliance to 50.6% ($p = 0.001$).

DISCUSSION

The classification of special oral care (SOC) practices among nurses revealed a suboptimal compliance rate of 60.0%, with 40.0% of observed practices being non-compliant. Although SOC is a fundamental

respiratory care technique, it plays a pivotal role in preventing ventilator-associated pneumonia (VAP), a prevalent complication among patients on invasive mechanical ventilation. This compliance rate is notably lower than the 96.6% reported by Nguyen

et al ¹⁰ and the 68.2% reported by Vu et al ⁷. This discrepancy can be attributed to variations in study contexts, ICU workloads, sample sizes, and differing levels of training, supervision, and procedural adherence across healthcare facilities. Furthermore, the stringent evaluation criterion applied in the present study - mandating 100% execution of all procedural steps for a “Compliant” rating - inevitably yielded a lower overall rate compared to prior studies utilizing more flexible scoring systems. Additionally, high occupational stress and the large number of mechanically ventilated patients assigned to each nurse per shift significantly impede the ability to execute the SOC procedure fully and accurately. These findings underscore the imperative to enhance training, professional supervision, and human resource allocation to elevate the quality of SOC practices, thereby reducing the risk of VAP and improving patient safety.

The compliance rate for the initial steps of the SOC procedure, specifically nurse and equipment preparation, reached 100%. This reflects strict adherence to infection control protocols and thorough pre-procedural readiness. This finding is highly consistent with Duong et al ¹¹, who similarly recorded a 100% compliance rate for hand hygiene and personal protective equipment adherence among healthcare personnel.

However, several subsequent procedural steps were not fully implemented. Specifically, the step involving informing, encouraging, and appropriately positioning the patient achieved a compliance rate of only 93.3%. This indicates the persistence of omitted pre-procedural communication - an essential component for securing patient

and family cooperation and alleviating anxiety. This rate is lower than the 100% compliance for correct patient positioning reported by Duong et al ¹¹, highlighting disparities in procedural adherence across institutions, particularly concerning patient-centered care. This omission may be linked to high work pressure and the heavy burden of mechanically ventilated patients per shift, compelling nurses to prioritize technical maneuvers over communication and preparatory steps. Additionally, some nurses may perceive the notification and encouragement step as non-mandatory or assume it has been indirectly fulfilled through other care activities, leading to incomplete adherence to the standard protocol. Differences in institutional training, supervision, and the emphasis placed on patient-centered care also contribute to this disparity. These results highlight the need for intensified training and supervision to ensure the comprehensive execution of all SOC steps, particularly those related to communication and patient preparation, to enhance holistic care quality.

Moreover, several technical execution steps exhibited suboptimal compliance rates. Specifically, positioning the kidney dish appropriately and tilting the patient’s head laterally achieved only 86.7% compliance; neglecting this can compromise the drainage of oropharyngeal secretions and elevate the risk of aspiration if fluids flow backward. Placing a protective cotton towel around the patient’s neck/chest was compliant in only 60.0% of cases. This is an alarming rate, as this crucial step prevents fluid splashing, protects the skin, and mitigates cervical infections. This result is substantially lower

than the 100% compliance rate for placing a submental towel reported by Duong et al ¹¹. This deficiency can be explained by differences in the research context and the intensive workload in the ICU, where caring for multiple critically ill patients often leads nurses to take shortcuts or omit steps perceived as “auxiliary”. Furthermore, some nurses may lack a comprehensive understanding of the infection-prevention role of these specific actions or may not receive regular training and supervision on standard procedures. This underscores the need for reinforced training that emphasizes the clinical significance of every technical step, alongside enhanced compliance monitoring, to elevate SOC practice quality.

Applying glycerin borax to protect the patient’s lips was compliant in only 73.3% of observations, indicating inconsistency in comprehensive oral cavity care. Lubricating the lips prevents cracking and mucosal ulceration, particularly in patients undergoing prolonged mechanical ventilation. Although seemingly a minor detail, it demonstrates refinement and thoroughness in nursing care.

While the primary procedural steps were executed proficiently, several detailed steps aimed at protection and patient comfort were inadequately implemented. This directly compromises the efficacy of hospital-acquired pneumonia prevention and the overall quality of holistic care. The overall compliance rate in this study is lower than the 76.8% reported by Duong et al ¹¹, where oral cavity cleaning steps achieved 100%, and preparation and documentation steps both exceeded 90%.

The primary causes of these procedural omissions likely include severe workload pressure, time constraints, or a lack of awareness among some nurses regarding the crucial role of supportive steps - such as draping towels or applying lip balm- which are often misconstrued as “minor” or “auxiliary”. However, according to respiratory care guidelines, these very details exert a profound positive impact on the patient’s quality of life and the prevention of mucosal ulcer complications in critically ill individuals. Therefore, to sustainably improve the quality of oral hygiene practices, hospitals must standardize procedures, develop detailed audit tools, and pay meticulous attention to these minor steps and patient communication. Concurrently, regular training sessions must be organized, particularly targeting younger nurses with limited clinical experience. Integrating criteria such as “towel draping,” “lip lubrication,” and “communication” into internal audit checklists will also facilitate sustainable improvements in the quality of this clinical technique.

Nurse age demonstrated a statistically significant association with SOC compliance ($p < 0.05$). Nurses aged ≤ 30 years exhibited a higher rate of compliant and complete practice compared to those > 30 years. This can be explained by the fact that younger, recently graduated nurses often possess freshly updated skills and knowledge regarding endotracheal intubation care protocols. Consequently, they adhere more strictly to updated guidelines and generally exhibit a higher proactive learning capacity and greater receptiveness to new knowledge at this age.

A statistically significant association was also found between gender and SOC compliance ($p < 0.05$). Specifically, the compliance rate of female nurses was substantially higher than that of male nurses (64.5% vs. 30.8%). This finding is consistent with Vu et al ⁷, who reported that female nurses complied with respiratory care protocols 2.7 times more often than males, a statistically significant difference. However, it contrasts with Tran et al ¹², who recorded no significant gender-based differences in procedural compliance ($p > 0.05$). This divergence might be explained by specific sample characteristics (e.g., a higher proportion of females), the prevailing professional culture, or the unique working conditions at each respective hospital.

Regarding clinical experience, nurses with 1 to 10 years of experience exhibited a significantly higher compliance rate compared to those with over 10 years of experience ($p < 0.001$). This finding differs somewhat from Hoang et al ¹³, where the highly tenured group (> 10 years) demonstrated a higher compliance rate than the less experienced group. In our study, the lower compliance among the highly experienced group may be attributed to professional conservatism, a reluctance to update new knowledge, or a loss of motivation due to accumulated occupational fatigue, all of which negatively impact practice efficacy. Conversely, the 1–10 years group typically consists of nurses in their professional development phase, characterized by proactive learning and strong adaptability to new technical procedures.

Workload metrics, specifically the total number of patients and the number of mechanically ventilated patients assigned per day, were both significantly associated with SOC compliance ($p < 0.05$). Nurses caring for ≤ 5 total patients and < 3 mechanically ventilated patients per day demonstrated better procedural compliance compared to those with heavier workloads. This result contrasts with Vu et al. ⁷, who found no statistically significant correlation between these workload factors and compliance ($p > 0.05$). Our finding underscores the critical importance of appropriate workload allocation to ensure the quality of care for mechanically ventilated patients. Therefore, hospitals must actively reduce the patient-to-nurse ratio and the number of ventilated cases assigned per shift in intensive care units, while supplementing staffing during peak hours to enhance care quality and patient safety.

This study has several limitations. The cross-sectional descriptive design precludes causal inferences. The small sample size and convenience sampling method may reduce the representativeness and generalizability of the findings. Data collection via direct, repeated observation on the same nurses may introduce observational bias. Furthermore, the evaluation criterion, requiring 100% adherence to all steps for a “Compliant” rating is exceedingly strict, and the study did not concomitantly assess the nurses’ knowledge and attitudes alongside their clinical practice.

CONCLUSION

The practice of special oral care for intubated mechanically ventilated patients

by nurses at Ha Dong General Hospital remains limited, with an overall compliance rate of 60.0%. Factors including the nurse's age, gender, years of clinical experience, total patient-to-nurse ratio per shift, and the specific number of mechanically ventilated patients assigned per shift were all statistically significantly associated with procedural compliance ($p < 0.05$).

Hospital administration must proactively supplement and optimally allocate nursing staff within the Intensive Care Unit to alleviate excessive workloads, particularly during shifts with a high volume of mechanically ventilated patients. Concurrently, it is imperative to organize regular training, continuing education, and periodic clinical supervision regarding the special oral care protocol. These initiatives should specifically target the technical and supportive steps that are currently underperformed, thereby enhancing the overall quality of care and ensuring patient safety.

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