

**COMPLIANCE WITH STANDARD PRECAUTIONS AMONG PEDIATRIC  
NURSES IN SELECTED GOVERNMENT HOSPITALS:  
A CROSS-SECTIONAL STUDY**

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**ABSTRACT**

**Background:** Healthcare-associated infections (HAIs) are complex conditions that appear in any healthcare facility. They truly become an economic and financial burden for the family and healthcare service system, particularly in developing countries. Nurses directly provide care for patients because they can be the cause of the spread of HAIs in healthcare institutions. Thus, nurses' compliance with standard precautions plays a critical role in HAIs prevention efforts, especially in caring for children. **Objectives:** to examine compliance with standard precautions among pediatric nurses and related factors. **Materials and methods:** A cross-sectional descriptive correlational design was used. Sample size comprised of 285 pediatric nurses at selected government hospitals who have at least 6 months of experience as a nursing professional. Nurse's adherence to standard

precautions in caring was examined by using a 4-likert questionnaire including 20 items divided into 4 subscales as use of protective devices, disposal of sharps and waste, decontamination of spills and used articles, and prevention of cross-infection. **Results:** The age mean of nursing participants was 31.2 years. The overall compliance score was 3.16 (SD = 0.47) with 83.2% of nurses having good compliance with standard precautions. Among subscales of compliance, nurses' practices with decontamination of spills and used articles had the highest scores. In contrast, the use of protective devices was the lowest. Besides, the study results showed a statistically significant relationship between nurses' attitudes regarding HAIs prevention and their compliance with standard precautions ( $p < 0.001$ ). Meanwhile, there was no association between gender, level of education, experience in the year and standard precautions compliance. **Conclusions:** infection control practices with standard precautions among pediatric nurses were good. However, there were some aspects that should be improved. More related continuous training programs for nurses should be developed. Additionally, hospital administration and nurse managers should establish a system to regularly monitor and sustain compliance with infection control procedures among staff nurses as well as evaluate the suitability of HAIs prevention guidelines.

**Keywords:** Compliance, Infection Control, Standard Precautions, Pediatric Nurses.

## I. INTRODUCTION

Healthcare-associated infections (HAIs) are infections people acquire while they are given healthcare services for another condition developed in a hospital or other healthcare institutions [1]. They are serious problems in healthcare services worldwide. Each year, 1,400,000 people suffer from signs and symptoms related to HAIs. The prevalence of HAIs among developed countries ranges from 3.5 to 12% while developing countries present a two- to 20-times higher prevalence of HAIs [2]. In Vietnam, patient safety, particularly HAIs, is a critical health problem. The situation of HAIs in Vietnam has been estimated to affect 5%–15% of hospitalized patients and up to 50% of patients in the critical care units [3]. It is one of the leading causes of increased morbidity and mortality, financial costs, prolonged hospitalization, and decreased quality of care. Standard precautions are a set of practical guidelines designed to minimize the risks of acquiring infection from both known and unexpected sources in healthcare institutions [4].

Nurses who have essential roles in patients' recovery and health strongly contribute to patient-centered care, patient safety, and quality of care. Thus, nursing adherence to infection control plays a critical role in HAIs prevention efforts. Benefits of compliance with infection control procedures include protecting healthcare workers and patients from exposure to infections, supporting cost-effective care, ensuring patient safety, and improving patient care outcomes. By enhancing infection control practices in compliance with standard precautions among pediatric nurses, the incidence of HAIs could be minimized and the quality of care could be maximized. Therefore, strict compliance with infection control procedures among critical care nurses has been recognized as an efficient means to create a culture of safety for patients and control the spread of HAIs. Thus, they play a central role in improving the quality of care.

The role of adherence to standard precautions among nurses could be understood by previous studies [5], [6]. However, the practices with standard precautions among nurses varied according to studies and literature. Besides, there is a lack of investigation into the level of compliance with standard precautions among Vietnamese nurses, especially those who work in children's hospitals. Therefore, it is important to examine compliance with standard precautions among pediatric nurses to enhance infection control.

## II. METHODS

### 2.1. Study population and setting

The study sample has been drawn from pediatric nurses who work full-time, have experience as nursing professionals for at least 6 months, and are willing to participate in the study. Following the inclusion criteria, nurses who were on leave during the period of the study were excluded from the study.

Power analysis was used to compute the sample size with  $\alpha=0.05$ , and power=0.80. Based on the calculated sample size by Gpower, there were 285 respondents in this study. The sample was randomly selected from the pool of nurses who worked in the selected government children's hospitals in the Mekong Delta, Vietnam.

### 2.2. Study design:

A cross-sectional descriptive design was used to achieve the study objectives.

### 2.3. Study instruments

(1) Demographic Questionnaire: nursing participants' demographic data was collected by using a self-report questionnaire, including information on age, gender, level of education, experience in years, and their attitude regarding HAIs prevention.

(2) Nurses' compliance with standard precautions was examined by using the Compliance with Standard Precautions scale (the CSPS). This scale consisted of 20 items and was developed by Lam (2014) to measure healthcare workers' adherence to infection control practices in their healthcare behaviors. The use of protective devices, disposal of sharps and waste, decontamination of spills and used articles, and prevention of cross-infection were assessed by 6, 4, 3, and 7 items, respectively. The responses for each item were reflected on a 4-point Likert scale from 1 (never) to 4 (always). The total score was calculated as the sum of each item's score. A higher score indicated better infection control practices among nurses. The total score was interpreted into two groups, including compliance (2.51-4.00 score) and non-compliance (1.00-2.50 score) [7]. The original instrument in English was translated into Vietnamese by using the back-translation method. Then, the questionnaire was distributed to 30 nurses who had the same characteristics as the study participants for the pilot study. The internal consistency reliability was 0.88.

### 2.4. Statistical Analysis

To achieve the objectives of the current study, the data were analyzed using Statistical Package for Social Science (SPSS) version 26.0. Descriptive statistics in terms of frequency, percent, mean, standard deviation, and range were used to examine demographic characteristics and compliance with standard precautions among nursing respondents. A chi-square test was used to determine relationships between nurses' compliance with standard precautions and related factors. Statistical significance was considered to be lower than 0.05.

### 2.5. Ethics Approval

The study was approved by the Ethical Review Board of Trinity University of Asia, the Philippines (Decision No. TUA.IERC.015.R02 August 12, 2022). The participants were assured of their privacy and the confidentiality of all gathered personal information.

## III. RESULTS

The mean age among respondents was  $31.2\pm 4.5$  years. Most of the participants were female (70.5%). Half of the study participants (49.1%) hold a bachelor's degree in nursing and have 5 to 10 years of experience as nursing professionals. In addition, 94% of nurses had a

positive attitude toward HAIs prevention; otherwise, only 6% of nurses had a negative attitude.

### 3.1. Compliance with standard precautions among pediatric nurses

Table 1. Compliance with standard precautions among pediatric nurses

	Number of items	Mean	S.D.
Compliance with standard precautions	20	3.16	0.47
<i>Subscales</i>			
Use of protective devices	6	2.99	0.58
Disposal of sharps and waste	4	3.12	0.56
Decontamination of spills and used articles	3	3.46	0.55
Prevention of cross-infection	7	3.20	0.49

Pediatric nursing had high mean scores of compliance with standard precautions 3.16/4.00 (SD = 0.47).

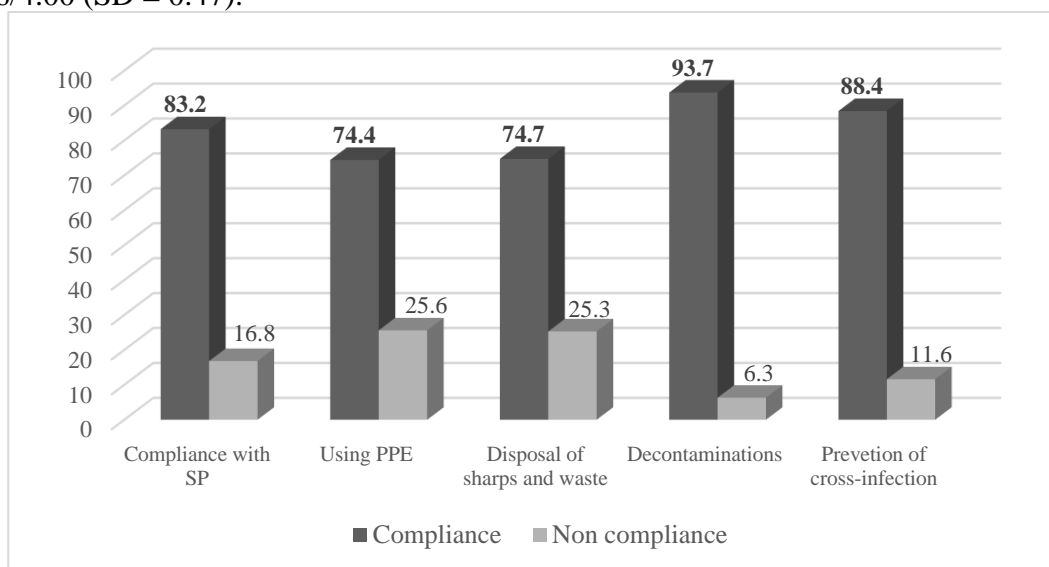


Figure 1. Classification of compliance with standard precautions among pediatric nurses

Most nursing participants had good practice of compliance with standard precautions in HAIs prevention.

### 3.2. Factors related to compliance with standard precautions among pediatric nurses

Table 2. Associations between gender, level of education, and compliance with standard precautions among pediatric nurses

Variables		Compliance with standard precautions		Total	P-value
		Compliance (n, %)	Non-Compliance (n, %)		
Gender	Male	70 (83.3)	14 (16.7)	84	0.96
	Female	167 (83.1)	34 (16.9)	101	
Level of education	Intermediate	26 (72.2)	10 (27.8)	36	0.24
	College	66 (83.5)	13 (16.5)	79	
	Bachelor	118 (84.3)	22 (15.7)	140	
	Postgraduate	27 (90.0)	3 (10.0)	30	

There was no association between gender, level of education, and compliance with standard precautions among pediatric nurses.

Table 3. Association between experience in the year and compliance with standard precautions among pediatric nurses

Variable		Compliance with standard precautions		Total	P-value
		Compliance (n, %)	Non-Compliance (n, %)		
Experience in year	<3 years	7 (63.6)	4 (36.4)	11	0.19
	3-5 years	47 (83.9)	9 (16.1)	56	
	5-10 years	98 (81)	23 (19)	121	
	>10 years	85 (87.6)	12 (12.4)	97	

Experience in the year was not associated with compliance with standard precautions among nursing participants.

Table 4. Associations between attitude regarding HAIs prevention and compliance with standard precautions among pediatric nurses

Variable		Compliance with standard precautions		Total	P-value
		Compliance (n, %)	Non-Compliance (n, %)		
Attitude	Positive	232 (86.6)	36 (13.4)	268	<0.001
	Negative	5 (29.4)	12 (70.6)	17	

There was a significant relationship between attitude regarding HAIs prevention and compliance with standard precautions among pediatric nurses ( $p < 0.01$ ).

#### IV. DISCUSSIONS

##### 4.1. Compliance with standard precautions among pediatric nurses

Nurses are at high risk of cross-infection. Transmission of infectious diseases can occur when handling body fluids, treating wounds, and touching an individual, especially on the nose, eyes, mouth, and hands. Our study indicated a good level of practice with standard precautions among pediatric nurses (mean = 3.16/4.00). This finding is consistent with previous studies.

According to Al-Faouri et al. (2021), the total compliance with standard precautions score among nurses was 49.15/80.00 and among the participants, there were 61.4% of nurses complied with standard precautions [8]. Similarly, a descriptive cross-sectional study conducted with 408 registered nurses at hospitals in Jordan showed that nurses' compliance with standard precautions was intermediate, with an overall mean score of  $59.65 \pm 14.57$  out of 80.47% of nursing participants had a high degree of compliance [9].

Considering subscales of compliance with standard precautions, the nurse respondents demonstrated the highest scores for "decontamination of spills and used articles". Meanwhile, the subscale of "use of protective devices" was the lowest one. A study conducted by Ather et al. (2020) revealed a similar finding. This study found that, among the measures, the adherence to using personal protective equipment was at a low level. About 33.3% of nurses responded that they sometimes or never wear personal protective equipment when drawing blood samples [10]. In addition, a study with 408 registered nurses in Jordan found that about 40% of nurses reported non-adherence to the use of eye protection, suit protection, hair and shoes, and face masks [9]. This result suggests that nurse leaders should ensure the availability of personal protective equipment and regular supervision and evaluation of nurses' compliance with infection control prevention.

#### 4.2. Factors related to compliance with standard precautions among pediatric nurses

In the present study, demographic characteristics were not related to nurses' compliance. Meanwhile, a statistically significant positive association was revealed between nurses' attitudes regarding HAIs prevention and their compliance with standard precautions. In other words, pediatric nurses who had positive attitudes related to HAIs prevention had better compliance with infection control measures in comparison with others who had negative attitudes. This study findings were relevant to previous studies.

According to these studies, having a positive attitude towards HAIs prevention that supports and promotes safety efforts has been identified as a key element in healthcare for improving safety relating to sharp disposal [11], [12]. In other words, nurses' attitude regarding HAIs prevention is also viewed as a significant factor in their infection control performance. Working in a healthcare unit with a positive attitude toward HAIs control, staff nurses experience respect, open discussion, effective sharing of information, support from management and administration, and proper working conditions. These issues may result in better care performance and strict compliance with procedures of HAIs prevention [13]. Likewise, nurses who have a high level of perceived safety culture are motivated to practice more safely and to adhere to infection prevention more properly. However, in this study demographic characteristics were not associated with compliance with standard precautions among nurses. The reason might come from the study inclusion criteria, which included nurses who had more than 6 months of experience caring for children. Thus, they had similar professional backgrounds for practices.

*Limitation:* This study only included pediatric nurses who worked in government hospitals. Thus, the study findings may not be appropriate for other groups of nurses.

#### V. CONCLUSIONS

In the present context, it could be said that most of the pediatric nurses had a high mean score of compliance with standard precautions to control HAIs. Moreover, a positive association between attitudes regarding HAIs prevention and compliance with standard precautions has been presented. However, there were some aspects that should be improved. Hopefully, continuing education and training towards HAIs prevention and standard precautions will be provided more so that negative attitudes as well as poor practices are reduced.

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