Internal Medicine: Open Access

Research Article   **Open Access**

Knowledge, Attitude and Practices Regarding Standard and Isolation Precautions Among Vietnamese Health Care Workers: A Multicenter Cross-Sectional Survey

Truong Anh Thu*, Nguyen QuocAnh, Ngo QuyChau and Nguyen Viet Hung

Department of Infection Control, Bach Mai Hospital, 78 Giai Phong, Dong Da, Hanoi, Vietnam

Abstract

Introduction: Standard and isolation precautions may prevent healthcare-associated infections, which have been associated with poor clinical outcomes, increased medical costs and depletion of available infection prevention and control resources. Few published articles have included data about knowledge of attitude, toward the practices of infection control and prevention in developing countries.

Objectives: To determine the knowledge, attitude and practices regarding the standard and isolation precautions among healthcare workers in 36 hospitals across Vietnam.

Study design: Cross-sectional survey

Methods: During 2008 to 2009, a total of 629 healthcare workers were randomly selected and interviewed using a standardized questionnaire.

Results: The percentage score for knowledge of and attitude toward standard and isolation precautions were acceptable: 79.1% for knowledge and 70.0% for attitude. Physicians had the lowest level of attitude. The low percentage score for practice was recorded, only 46.1% of the maximum score. HCWs from National (49.6%) and Provincial hospitals (46.9%) obtained higher percentage score compared to those from district level hospitals (39.8%) (p<0.05). After adjusting for covariates by using linear regression analyses, we found that HCWs who had higher scores of knowledge were more likely to be obtained higher scores of practices and HCWs with a correct attitude were also more likely to have reported correct practices. There was a medium correlation between practices, knowledge and attitude regarding standard and isolation precautions (r=0.56, p<0.001).

Conclusion: Our findings highlighted the need for continuing intensive education combined with strict supervision of healthcare workers compliance and provision of basic facilities for standard and isolation precautions in Vietnamese hospitals.

Background

Healthcare Associated Infections (HAIs) has now become a global medical challenge. At any time, more than 1.4 million people worldwide acquire infectious complications in hospitals [1]. Rosenthal [2] reported the rates of device-associated infections ranging from 8.2 to 16.1 per 1,000 device-exposed-days in developing countries- at least 3 to 5 times higher than international standards. In a recent study at some Vietnamese hospitals, a crude overall HAI rate was of 7.8% [3]. HAIs not only constitute an importance cause of morbidity, mortality, prolonged stay and economic burden but also the appearance of increased antibiotic uses and multidrug-resistant microorganisms [4,5]. Abundant literatures are consistent with the notion of HAIs could be prevented by standard and isolation precautions [4,6]. However, many prior studies suggested that Health Care Workers (HCWs) did not strictly follow these practices [4,7,8]. Inadequate knowledge of most HCWs and their senior managers about recommended infection control precautions could explain why infection control activities are often carried out with poor results in health care settings. In Vietnam, most studies in infection control field focused on HAI magnitude. To date, there has been no published report on knowledge of attitude toward and practices of infection control and prevention among Vietnamese HCWs. The objectives of this cross-sectional survey were to determine the knowledge, attitude and practices regarding standard and isolation precautions among HCWs of Vietnamese hospitals.

Methods

Setting and sampling

Participating hospitals for this cross-sectional survey were selected from various districts, provincial and national facilities that provide clinical services across Vietnam during 2008 to 2009. We aimed to cover 5% of total beds from general hospitals by using stratified random sampling technique so that it adequately represents national, provincial and district level hospitals. Based on the number of beds in the general hospitals and their willingness to participate in the survey, a total of 36 general hospitals were included in this survey. We randomly selected 2 hospitals from 18 national level hospitals, 18 from 177 provincial level hospitals and 16 from 128 district level hospitals national. We recruited Health Care Workers (HCWs) from all clinical wards of selected hospitals. 1 representative physician, nurse and nursing assistant from

each ward were randomly selected and interviewed resulting in a final sample size of 629 HCWs.

Questionnaire design

Our questionnaire was adapted from that of the Vietnamese Ministry of Health (MOH) and was prepared by a team of infection control experts, including an infectious diseases physician. The MOH questionnaire was usually used for infection control's supervision activities in Vietnamese health care facilities and developed based on current WHO guidelines. The questionnaire consisted of 3 sections that included: (1) items regarding demographic information, (2) 9 items regarding knowledge of, attitude toward, practice of standard precautions and (3) 6 items regarding knowledge of, attitude toward, practice of isolation precautions. The questionnaire items about knowledge of standard and isolation precautions were assigned a score of 1 and 0 for correct and false responses, respectively. A 4-category response was provided for items about attitude (from "extremely important" with a score of 4 to "no importance" with a score of 0). The questionnaire items about practices of HCWs were also assessed on a 4-category response (from "always" to "never").

Evaluation of the knowledge, attitude and practices regarding standard and isolation precautions among HCWs

We defined knowledge, attitude and practices of HCWs as due to either "correct" or "incorrect". First, HCWs were evaluated "correct knowledge" when their answer was in agreement with the correct question or in disagreement with the false question. Second, responses about attitude were dichotomized into "correct" (comprising the responses "extremely important" to "important") and "incorrect" (comprising the responses "somewhat importance", "low importance and "no importance"). Third, we defined "correct" practice in HCWs with the responses "always" and "mostly" and "incorrect" in those with the responses "sometimes," "rarely," and "never".

Data collection

The aggregated data including characteristics and knowledge, attitude and practices of HCWs were collected by trained infection control practitioners through direct interview questions to recruited HCWs. Completed data collection forms were checked by the principal researcher for accuracy and completeness. This study was approved by the Ethics and Health Research Review Committee, Ministry of Health, Vietnam.

Statistical analyses

Analyses were performed using Statistical Package for the Social Sciences, version 18 (SPSS Inc., Chicago, IL, USA). Responses to knowledge, attitude and practices questions were reported as frequencies. The percentage score was calculated as total achieved scores divided by total maximum scores, times 100. We compared differences in percentages by using Chi-square tests. Linear regression analyses were used to compute the correlation between knowledge, attitude and practice. All reported p-values are two-sided and p-value <0.05 is considered statistically significant.

Results

HCW demographics

A total of 629 HCWs were interviewed in 36 hospitals (national 2, provincial 18 and district 16). Among them 319 (50.7%) were male and 310 (49.3%) were female. The mean age of HCWs was 37.3 ± 14.8 years (range 23-56 years). Of the HCW surveyed, there were 235 (37.4%) doctors, 264 (41.9%) nurses and 130 (20.7%) nursing assistants. Few participants (8.7%) had attended educational or training courses on standard and isolation precautions.

Knowledge, attitude and practices regarding standard and isolation precautions

We found the large percentages of correct responses to the items about knowledge of standard precautions (range for individual items, 83.9%-99.2%). Correct answers were less frequent for attitude than knowledge, which mostly ranged from 54.5% to 76.3%. Attitude questionnaire items about hand hygiene indications such as before glove use, after touching patient surroundings and before patient contact were answered correctly by 54.5%, 54.8% and 64.2% of HCWs, respectively. Only 58.8% of HCWs believe that patient care activities require the use of a single pair of gloves. The small percentages of correct responses to most items about knowledge of and attitude toward isolation precautions were observed. Regarding the knowledge question about the use of N95 mask and the safe distance from patients with droplet spread disease, correct answers were found in 10.8% and 17.8% of HCWs, respectively. There were less than 25% of HCWs with correct attitude toward N95 mask use and waste management from the room of a patient with SARS/AI infection (Table 1). For practice questions about standard precautions, only small number of correct responses to items about hand hygiene indications (before patient contact: 29.1%, before using gloves: 14.5%, and after touching patient surrounding: 14.3%) and about the use of surgical mask (18.0%) and goggles (7.2%) when procedures likely to generate splashes and sprays of blood or body fluids. With the exception of the question about waste management, correct practices of isolation precautions were reported in less than 10.2% of HCWs (Table 2). The percentage scores for knowledge of and attitude toward standard and isolation precautions were acceptable: 79.1% for knowledge and 70.0% for attitude. No difference in these scores was observed by hospital types (p>0.05). The percentage score for practice was low, only 46.1% of the maximum score. HCWs from national (49.6%) and provincial hospitals (46.9%) obtained higher percentage score compared to those from district level hospitals (39.8%) (p<0.05). Nurses had a significantly higher percentage score (%) for attitude than did physicians (%) and nursing assistants (%), but there were no significant differences between the percentage scores by professional activity with regard to knowledge and practices (Table 3).

Correlation between knowledge, attitude, and practices regarding standard and isolation precautions

Our findings show that there was a strong correlation between knowledge and attitude regarding standard and isolation precautions (r=0.76, p<0.001). Respondents who had higher knowledge scores had better attitude scores. After adjusting for covariates by using linear regression analyses, HCWs who had higher scores of knowledge were more likely to obtain higher scores of practices and HCWs with a correct attitude were also more likely to have reported correct practices. There was a medium correlation between practices, knowledge and attitude regarding standard and isolation precautions (r=0.56, p<0.001) (Table 4).

Discussion

Knowledge, attitude and practices regarding standard and isolation precautions

We observed that the large percentages of correct responses to the

Questionnaire items	Knowledge (n = 629)		Attitude (n = 629)	
	Number	(%)	Number	(%)
Standard precautions				
Hands should be cleaned before patient contact	571	90.8	404	64.2
Hands should be cleaned after patient contact	595	94.6	455	72.3
Hands should be cleaned before using gloves	528	83.9	343	54.5
Hands should be cleaned after using gloves	576	91.6	449	71.4
Hands should be cleaned after touching patient surroundings	558	88.7	345	54.8
Gloves should be worn when touching mucous membranes and non-intact skin	624	99.2	613	97.5
Do not wear the same pair of gloves for the care of more than one patient	560	89.0	370	58.8
Goggles should be worn to protect mucous membranes of the eyes when procedures and activities likely to generate splashes and sprays of blood or body fluids	596	94.8	480	76.3
Surgical should be worn when procedures and activities likely to generate splashes and sprays of blood or body fluids	549	87.3	514	81.7
Isolation precautions				
Patients with contact spread disease should be isolated in a private room	538	85.5	113	18.0
Patients with droplet spread disease should be kept apart at least 150 cm	68	10.8	481	76.5
HCW entering the isolation room for patient on contact precautions should wear gloves	572	90.9	47	7.5
HCW caring for patient on airborne precautions should wear N95 mask	112	17.8	113	18.0
HCW caring for patients with suspected or confirmed AI* infection should wear surgical mask	151	24.0	586	93.2
All waste resulting from the care of SARS**/AI patient should be removed in yellow containers or bags	360	57.2	153	24.3

**: Avian Influenza
*: Severe Acute Respiratory Syndrome

Table 1: Proportion of correct responses to items about attitude and practices regarding standard and isolation precautions.

Questionnaire items	No. of HCWs with correct responses	(%)
Standard precautions		
Hands should be cleaned before patient contact (n = 629)	183	29.1
Hands should be cleaned after patient contact (n = 629)	386	61.4
Hands should be cleaned before using gloves (n = 629)	91	14.5
Hands should be cleaned after using gloves (n = 629)	116	18.4
Hands should be cleaned after touching patient surroundings (n = 629)	90	14.3
Gloves should be worn when touching mucous membranes and non-intact skin (n = 626)	324	51.8
Do not wear the same pair of gloves for the care of more than one patient (n = 615)	216	35.1
Surgical mask should be worn when procedures and activities likely to generate splashes and sprays of blood or body fluids (n = 510)	92	18.0
Goggles should be worn to protect mucous membranes of the eyes when procedures and activities likely to generate splashes and sprays of blood or body fluids (n = 501)	36	7.2
Isolation precautions		
Patients with contact spread disease should be isolated in a private room (n = 528)	54	10.2
Patients with droplet spread disease should be kept apart at least 150 cm (n = 6 21)	15	2.4
HCW entering the isolation room for patient on contact precautions should wear gloves (n = 623)	12	1.9
HCW caring for patient on airborne precautions should wear N95 mask (n = 618)	9	1.5
HCW caring for patients with suspected or confirmed AI infection should wear surgical mask (n = 121)	10	8.3
All waste resulting from the care of SARS/AI patient should be removed in yellow containers or bags (n = 85)	34	40.0

Table 2: Proportion of correct responses to items about practices of standard and isolation precautions.

items about knowledge of standard precautions (range for individual items, 83.9% - 99.2%), whereas the percentages of those about knowledge of isolation precautions were seen much smaller. Only 10.8% and 17.8% of respondents had correct answers with regard to the use of N95 mask and the safe distance from patients with droplet spread disease. The insufficient knowledge of isolation precautions among HCWs in this study was similar to findings reported in previously published studies [8-10]. High magnitude of HAIs is commonly occurred in health care settings where there is a lack of adequate education/training on standard/isolation precaution practices in daily patient encounters [8,10]. Although education/training is prerequisite to improve knowledge of HCWs and the educational rationale for preventing HAI are published, most the senior management of healthcare facilities may not be entirely convinced that education is important and one of the main reasons is that there are no local

surveillance data available to assess the scale of the problem [5,11]. Our results suggest that supervision for HCWs' knowledge combined with continuing intensive education may be effective methods to resolve the problem of limited infection control knowledge among Vietnamese HCWs. Moreover, the findings of this study were able to reveal physicians, nurses and nursing assistants of all hospital types were similar in their level of knowledge. Thus, it is necessary to include standard/isolation precautions in medical training/education for all HCWs. Respondents in our study who had smaller number of correct answers for attitude than knowledge (range 54.5-76.3%). The lowest level of attitude was found in physicians (p<0.05). Inadequate attitude among HCWs, physicians in particular, have been reported previously [8]. According to the results of the compliance study in Germany and Austria (2002), 44% of doctors and 22% of nurses did not know any regulations concerning hand disinfection. This study also confirms

Variables	The percentage score					
	Knowledge	p	Attitude	p	Practices	p
Hospital type						
National (n = 84)	77.4 ± 9.1	-	68.0 ± 12.4	-	49.6 ± 12.8	-
Provincial (n = 438)	79.8 ± 9.8	>0.05	70.6 ± 11.4	> 0.05	46.9 ± 11.2	< 0.05
District (n = 107)	77.7 ± 8.6	>0.05	68.7 ±10.6	>0.05	39.8 ± 9.2	< 0.05
Professional activity						
Physician (n = 235)	79.4 ± 7.1	-	67.0 ± 7.4	-	46.2 ± 11.5	-
Nurse (n = 264)	77.8 ± 11.6	>0.05	72.3 ± 9.3	< 0.05	44.7 ± 10.7	>0.05
Nursing assistant (n = 130)	77.3 ± 9.4	>0.05	70.7 ± 8.9	<0.05	44.5 ± 9.6	>0.05
Total (n = 629)	**79.1 ± 9.5**		**70.0 ± 11.5**		**46.1 ± 11.5**	

Table 3: Percentage score s of knowledge, attitude and practices regarding standard and isolation precautions.

Variables	α	β	r^2	r	p
Attitude					
Knowledge	0.76	1.84	0.57	0.76	< 0.001
Practice					
Knowledge	0.13	1.25	0.32	0.56	< 0.005
Attitude	0.45				< 0.001

Table 4: Correlation between knowledge, attitude, and practice of HCWs regarding standard and isolation precautions.

that 45% of doctors and 43% of nurses did not occupy themselves with this topic [8,12]. Our study found similar results. Questionnaire items about the importance of hand hygiene indications such as before glove use, after touching patient surroundings, and before patient contact were answered correctly by 54.5%-54.8% of HCWs. Knowledge affects attitude and it is required to initiate the process that culminated in attitude [7,8]. The change of positive attitude, therefore, is critical to the control and prevention of HAIs. However, the initiation and maintenance of attitudinal change can be very difficult. It requires a long-lasting process, not an event. This emphasizes the need for continuous educational intervention in infection control and prevention. It should be noted that although acceptable knowledge and attitude regarding standard/isolation precautions were observed in this study, the percentage score for practice was low, only 46.1% of the maximum score. The poor practices of HCWs in this study could be related to several factors. In Vietnam, infection control activities have just gained recognition from the leadership in recent years, especially since SARS outbreak occurred. The absence of appropriate training curricula in infection control as well as in standard/isolation precautions for HCWs in hospitals and medical training facilities could be an issue as well. Although surveillance/audits are considered one of the key components of effective infection control to identify issues and areas of concern, however, these activities have not become routine due to lack of trained infection control practitioners. Our study also found that HCWs from district hospitals obtained lowest level of practices. This could involve a lack of appropriate incentives or medical equipment in this hospital level. Previous studies by others support our finding that a combination of education and provision of basic infection control facilities played an integral role in avoiding relapses to prior habitual behaviours of HCWs [8,10]. Moreover, the multimodal and multidisciplinary approach has been considered as the important strategies, which includes regular monitoring of hospital staff's compliance with proper precautions, provision of feedback to both individual and organizational levels about their practices and about the reason for poor compliance to achieve lasting behavioural change. Correlation between knowledge, attitude and practices regarding standard and isolation precautions. Our data indicated that there was a strong correlation between knowledge and attitude regarding standard and isolation precautions (r=0.76, p<0.001), which is similar to results found in the literature [7,8,12]. Thus, provision of education/training courses on standard/isolation precautions to HCWs could be an important way to change negative attitude. We found that respondents who had higher scores of knowledge were more likely to obtained higher scores of practices and those with a correct attitude were also more likely to have reported correct practices. These findings seem to be consistent with previous research which found attitude and knowledge is important factors that affect practices [7,8,10]. A study in Iran showed that areas of poor knowledge, such as washing hand before and after using gloves, correlated with poor attitude and poor practices. Compliance with standard and isolation precautions along with active screening for isolation of colonized patients has resulted in significant reduction in the endemic level of drug-resistant bacteria in healthcare facilities [7,8]. One of the limitations to this study was the method for assessing the practice of the precaution. We could not supervise the respondents' practice and, therefore, had to rely on their subjective self-assessment. So the responses might have not accurately reflected the true practice and the reported level of practice might have been higher than the real level. Despite these limitations, we believe that our findings are an important contribution to understanding the patterns of knowledge, attitude and practices of HCWs based on representative general hospitals in Vietnam. In conclusion, pandemics such as SARS, avian influenza, cholera, etc., have recently occurred in Vietnam, which requires much more efforts in infection control as well as in standard/isolation precautions. Our study showed acceptable knowledge and attitude but poor practices regarding standard/isolation precautions among Vietnamese HCWs. In addition, the correlation between practices, knowledge and attitude that we identified suggest the need for intensive education combined with strict supervision of HCWs' compliance and provision of basic facilities for standard and isolation precautions. Finally, our results emphasize to develop a national database system to assess knowledge, attitude and practices regarding standard and isolation precautions, which provide us with necessary data to targeted educational interventions.

Acknowledgements

References

1. http://www.infectioncontroltoday.com/

2. Rosenthal VD (2008) Device-associated nosocomial infections in limited-resources countries findings of the International Nosocomial Infection Control Consortium (INICC). Am J Infect Cont 36: S171.e7-12.

3. Thu TA, Hung NV, Quang NN, Archibald LK, Thuy LTT, et al. (2011) A Point-Prevalence Study on Healthcare-Associated Infections in Vietnam: Public Health Implications. Infect Control Hosp Epidemiol 32: 1039-1041.

4. Lynch.P, Pittet D, Borgc MA, Mehtard S (2007) Infection control in countries with limited resources. J Hosp Infect 65: 148–150.

5. Thu TA, Rahman M, Coffin S, Harun-or-Rashid M, Sakamoto J, et al. (2012) Antibiotic use among Vietnamese hospitals: a multicenter point-prevalence study. Am J Infect Control.

6. http://www.ncbi.nlm.nih.gov/pubmed/21146207

7. Askarian M, Mirzaei K, Mundy LM, McLaws ML (2005) Assessment of knowledge, attitudes and practices regarding isolation precautions among Iranian healthcare workers. Infect Control Hosp Epidemiol 26: 105-108.

8. Kuzu N, Ozer F, Aydemir S, Yalcin AN, Zencir M (2005) Compliance with hand hygiene and glove use in a university-affiliated hospital. Infect Control Hosp Epidemiol 26: 312-315.

9. Apisarnthanarak A, Babcock HM, Fraser VJ (2006) Compliance with universal precautions among medical students in a tertiary care centre in Thailand. Infect Control Hosp Epidemiol 27: 1409-1410.

10. Sofola OO, Savage KO (2003) Assessment of the compliance of Nigerian dentists with infection control: a preliminary study. Infect Control Hosp Epidemiol 24:737- 740.

11. Damani N (2007) Simple measures save lives: an approach to infection control in countries with limited resources. J Hosp Infect 65: 151-154.

12. Hung NV (2008).Thuctrangphuong tien, awareness and thuchanh born your hands health   workers in a socoso Medical khuvucphia. Journal of Clinical Medicine 6: 6-13.