

# PHYSICIANS' AND NURSES' ADHERENCE TO STANDARD PRECAUTIONS IN A TERTIARY HEALTH CARE FACILITY IN THE EASTERN PROVINCE, SAUDI ARABIA.

By

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## Abstract

**Introduction:** Health care workers (HCW) may avoid healthcare-associated infections through adherence to Standard Precautions (SP) resulting in better clinical outcomes and decreased medical costs. Reduction of that must be considered for all blood borne pathogens through adherence to standard precautions, using personal protective equipments, appropriate use of safety devices, and providing a needle disposal system in the work place. Some articles have involved data about adherence of healthcare workers to standard precautions toward infection control and prevention in developing countries. **Aim of work:** To assess Knowledge, Attitude, and Practices of HCW to SP of infection control guidelines in one of the major tertiary health care facilities in the Eastern Province, Saudi Arabia. **Materials and methods:** A cross-sectional study was conducted to assess Knowledge, Attitude, and Practices related to SP among 202 medical staff; physicians and nurses, using a standardized self-administered questionnaire based on CDC (Center for Disease and Control) guidelines to Standard Precautions from May to July 2015. **Results:** physicians achieved higher score of Knowledge compared to nurses ( $P < 0.05$ ). The mean score of Knowledge, Attitude and Practices among females is higher than males with statistically significant difference, and higher scores of Knowledge were associated with higher scores of Practices. **Conclusion:** Findings of the present study highlighted the need for continuing training programs to target nurses and physicians to establish acceptance of appropriate practices that enable them to adopt and adhere to SP.

**Keywords:** Health care workers, Adherence, Standard Precautions, Knowledge, Attitude and Practices.

## **Introduction**

A keen considerate of blood-borne diseases transmission in the mid-1980s to healthcare workers (HCWs), counting nurses and physicians and the value of adherence to standard precautions (SP) is well established (Gordon et al., 2001 and Chan et al., 2002). The reported risk of acquiring HIV by health care workers after body fluid exposure is 5%. Reduction of that must be considered for all blood borne pathogens through adherence to standard precautions, using personal protective equipments, appropriate use of safety devices, and providing a needle disposal system in the work place (Askarian, 2007). Adherence to SP gains more importance with the emergence of many infectious diseases, for example severe acute respiratory syndrome, avian influenza, and bioterrorism threat (Messmer et al., 1998). One of the problematic diseases is methicillin-resistant staphylococcus infection as it contains drug resistant organisms (Chadwick, 1999 and Farr et al., 2001) as well as vancomycin-resistant enterococci, these infections give an endless alarm to HCWs that adherence to SP is also essential for

preventing healthcare-associated infections and consequently assuring patient safety.

In 1996, the Centers for Disease Control recommended Isolation Precautions Guidelines for Hospitals as new, two-tiered best practice of infection control precautions that are standard for all patients regarded to be potential carriers of pathogenic microorganisms (Gordon et al., 2001). Education of all staff who have the potentiality for exposure to blood and blood products, regarding methods of common transmission and preventive measures must be provided continuously (Garner, 1996).

Strict adherence of nurses and physicians to SP guidelines is crucial to avoid potentially life-threatening infections (Askarian et al., 2007). Yet a thorough compliance with SP has been known to be challenging worldwide (Askarian and Ghavanini, 2002).

## **Aim of work**

The current study aimed to assess Knowledge, Attitude, and Practices of HCW to SP of infection control guidelines in one of the major tertiary health care facilities in Saudi Arabia.

## Materials and methods

**Study design:** A cross-sectional study

### Place and duration of the study:

The study was conducted in a private tertiary health care hospital, Eastern province, Saudi Arabia. This hospital has both in-patient and outpatients compartments. It provides clinical and preventive services to Saudi citizens and non-Saudi residents. The hospital has infection control committee in order to organize application and adherence of health care workers to standard precautions of infection control. It was performed over 8 weeks (May and June 2015).

**Study sample:** The target group was physicians and nurses working in outpatient clinics of the hospital. Inclusion criteria: Physicians and nurses (health-care workers) with work experience equal or more than one year at the same hospital. Exclusion criteria: hospital workers other than physicians and nurses, as well as health-care workers suffering from allergic or contact dermatitis as these dermatological disease may prevent

them from using anti-septic solutions frequently or following hand hygiene guidelines (confounding variable) which may give false low results of their adherence to SP guidelines.

**Study method:** - A self-administered questionnaire was distributed and filled by the study participants during their monthly departmental meeting and collected in the same setting. It was in English as it is the main language used in the hospital due to presence of multiple nationalities. It included questions on Knowledge, Attitude, and Practices of the CDC (Center for Disease Control) guidelines to Standard Precautions (Siegel et al., 2007). The questionnaire was adopted from other researches (Barikani and Afaghi, 2012). The questionnaire was distributed among pilot sample (not included in the full-scale study) to ensure feasibility and understanding of questions.

### The questionnaire was divided into four parts:

- The first part included demographic data, gender, age, job title, previous SP education and work experience.

- The second part included ten items pertaining Knowledge to personal protective equipments, hand-washing, disposal method for used syringes and use of antiseptic solution. Responses to items for Knowledge were “Yes”, “No”, or “I don’t know”. In accordance to CDC guidelines, respondents gain one score for each correct answer and zero for wrong answers. The total scores for all Knowledge items ranged from 0-10.
- The third part included items for Attitude .They were designed in the form of three point Likert scale with answers as “Highly important” (score 2), “Low important” (score 1) and “Not important”(score 0). The total scores for all Attitude items ranged from 0-20.
- The fourth part included items for Practices. The Likert scale was checked on a four- point scale from ‘Always’ (score 3), Often”(score 2), “Sometimes” (score 1), and ‘Never” (score 0) to self-assess the Practice of subjects. The total scores for all Practice items ranged from 0-30.

Knowledge, Attitude and Practice items were analyzed for mean scores with standard deviations.

### **Consent**

Verbal consent was obtained from all study participants before administering the questionnaire. No personal identifiers were included in the form. They were informed that all collected data will be confidential and used for scientific purposes only.

### **Ethical approval**

Formal consent was obtained from hospital management with request of confidentiality of the hospital name in the published paper. The study was approved by Institutional Review Board (IRB) of Faculty of Medicine, Mansoura University.

### **Data Management**

Data were analyzed using SPSS software (version 17.0 for Windows; SPSS Inc., Chicago, IL, USA). For univariate analysis, the descriptive portion, the quantitative variables were presented as means and standard deviations .On the other hand, qualitative variables were described

as frequencies and percentages. For the analytic portion, Chi-square test was done for categorical data and Student's t-test for continuous data. Finally, the multivariate analysis was done for finding correlations between Knowledge, Attitude and Practices among the study group. The statistical significance level was set at  $\leq 0.05$  and highly statistical level was set at  $\leq 0.01$ .

## Results

Out of 202 individuals, only 189 accepted to participate in the study. The questionnaires were distributed among participants. Out of 189 questionnaires distributed, 147 returned with response rate of 77.7%. Nine questionnaires were incomplete so they were excluded. The remainder was 138 completed questionnaires.

**Table (1): Socio-demographic characteristics of the studied HCW (No =138)**

Variables	No	%
<b>Sex</b>		
Male	46	33.33
Female	92	66.66
<b>Age group (years)</b>		
25-	66	47.82
35-	42	30.43
45-	27	19.56
55-65	3	2.17
<b>Mean <math>\pm</math> SD (years)</b>	34.38 $\pm$ 9.5	
<b>Range (years)</b>	(25.0-55.0)	
<b>Occupation</b>		
Nurses	100	72.46
Physicians	38	27.54
<b>Work experience (years)</b>		
1-	62	44.93
5-	54	39.13
10-	10	7.24
15-	12	8.70
<b>Previous SP training</b>	71	51.44

SP: Standard Precaution

Table (1) shows the demographic data of the participants. The majority were females (66.7 %), the age of participants ranged from 25 to 55 years with Mean  $\pm$  SD 34.38 $\pm$ 9.5. Most of the participants (47.8%) have an age ranged from 25 to less than 35 years. Nurses constituted 72.5 % of the study group. Nearly half of the participants (44.9%) had work experience from one to less than five years. The vast majority (89.13%) had previous training on standard precautions of infection control.

**Table (2): Percentages of respondents' correct answers to Knowledge, Attitude and Practices (KAP) questions regarding standard precautions (No=138)**

Standard precautions items	Knowledge No (%)	Attitude No (%)	Practice No (%)
1. Hand washing before and after patient care	126(91.3)	90(65.2)	86(62.3)
2. Hand washing before and after using gloves	72(52.17)	70(50.72)	52 (37.68)
3. Hand washing after accidental contact with blood, bloody fluid, secretions, or contaminated item	138(100)	114(82.60)	104(75.36)
4. Gloves should be worn when touching mucous membranes or non-intact skin	137(99.27)	122(88.40)	107(77.53)
5. Goggles should be worn to protect mucous membranes of the eyes	126(91.30)	108(78.26)	52(37.68)
6. Washing hands with betadine after exposure to patients' blood, bloody fluids, secretions or contaminated items	93(67.39)	73(52.89)	37(27.53)
7. A surgical mask should be worn to protect the nose and mouth from invasive processors and activities	125(90.57)	107(77.53)	95(68.84)
8. Gown should be worn when there is a risk of contamination with aggressive process and activities	103(74.63)	89(64.49)	61(44.20)
9. Do not wear the same pair of gloves for care of more than one patient	123(89.13)	81(58.69)	51(36.95)
10. Needles should not be bent or recapped before disposal	92(66.66)	29(21.01)	16(11.59)

Table 2 shows that the Knowledge of “hand washing after accidental contact” and “Gloves should be worn when touching mucous membranes” had highest correct responses (100% and 99.2 % respectively), while the lowest percentage (52.1%) of correct answer regarding Knowledge was observed in the item of “hand washing before and after using gloves”.

In addition, the highest percentage for Attitude and Practices were obtained for wearing gloves when touching mucous membranes or non-intact skin and hand washing after accidental contact (89%, 82.4% for Attitude and 77.1%, 75.7% for Practices respectively).

The lowest percentage of correct answer (27.5 %) was in Practice of “washing hands with betadine after exposure to patients’ blood, bloody fluids, secretions or contaminated items”

**Table 3: Knowledge, Attitude and Practice scores of health care workers**

	<b>Knowledge Possible maximum score =10</b>	<b>Attitude Possible maximum score= 20</b>	<b>Practice Possible maximum score= 30</b>
<b>Gender</b>			
• Female	8.1±1.3	16.1±2.8	19.2±4.6
• Male	7.2±2.5	14.4±5.3	13.6±3.9
p value <sup>#</sup>	<0.001**	<0.05*	<0.001**
<b>Job</b>			
• Physician	6.2±1.6	15.2±4.3	17.8±3.8
• Nurse	5.5±1.4	16±3	18.1±5.2
p value <sup>#</sup>	<0.05*	0.22	0.75

#: p value was calculated using Student t test.

\*: Significant

\*\* : Highly significant

Table 3 shows that physicians gained higher score of Knowledge (6.2±1.6) than nurses (5.5±1.4) with p<0.05. Females achieved higher score of Knowledge, Attitude and Practice than males.

**Table (4) Correlation between Knowledge, Attitude, and Practice of HCWs regarding standard precautions.**

Variables	r	p value#
<b>Attitude</b>		
Knowledge	0.75	<0.001**
<b>Practices</b>		
Knowledge	0.69	<0.005*
Attitude	0.59	<0.001**

#: p value was calculated using Pearson correlation coefficient

\*: Significant

\*\*: Highly significant

The study showed that there was a strong correlation between Attitude and Knowledge regarding standard precautions ( $r=0.75$ ,  $p<0.001$ ), and respondents who had higher Knowledge scores had better Attitude scores. There was a moderate correlation between Knowledge and Practice ( $r=0.69$ ,  $p<0.001$ ), and obtaining higher scores for Knowledge was associated with higher scores for Practice. However, there was a correlation between Practice and Attitude ( $r=0.59$ ,  $p<0.001$ ).

### Discussion

Teaching HCWs about the infection control guidelines is a crucial element of an effective program for infection control. Standard precaution adherence is universally suboptimal, despite being a core component of healthcare-associated infection (HCAI) prevention and healthcare worker (HCW) safety (Hessels and Larson, 2016). The current study revealed opportunities for

improvement of the score of Attitude and Practice regarding Standard Precautions among HCWs, where 51.4% of the HCWs reported prior training in the principles of Standard Precautions (Table 1).

Remarkably, the level of Knowledge among the physicians was significantly higher than that among nurses ( $P<0.05$ ) (Table 3). These results were not in agreement with those of Kim et



al. (2001) from a survey administered among nursing and medical students in Korea. As well as the study done by Crow and King (1990) had different results to the current study. The differences in Knowledge may be due to ward-based, non-uniform peer education (Chen et al., 2003). Poor Practices echo a potential association with poor Attitudes. (Crow and King, 1990; Kim et al., 2001; Meunier et al., 2001 and Vidal-Trecanet al., 2001).

On the other hand, there is no statistically significant difference between both groups regarding Attitude and Practices (Table 3). This result revealed that, although in general, improving Knowledge and Attitude positively affect Practices and behavior, but it is not the only predictor as seen in differentiation in mean score of Knowledge between the two groups.

In the current study, females achieved higher score of Knowledge, Attitude and Practices than males (Table 3). These results agreed with other researches, which stated that women appear to be more respectful to SP than their male counterparts (Meengs et al., 1994 and Gershon et al., 1995). On the

contrary, Beghdadi et al., (2008) in their study about the "Standard Precautions" Practices among nurses in a university hospital in Western Algeria, found that male nurses wear gloves more often than females (77% and 53% respectively).

Our study revealed that Knowledge is strongly correlated with Attitude regarding Standard Precautions ( $r=0.75$ ,  $p<0.001$ ) (Table 4). Respondents who had higher Knowledge scores had better Attitude scores. Thus, provision of education/training courses on standard precautions to HCWs could be an important way to change negative Attitude. In addition, we found that respondents who had higher scores of Knowledge were more likely to obtain higher scores of Practices ( $r=0.69$ ,  $p<0.005$ ) and those with a correct Attitude were more likely to have reported correct Practices (Table 4). These findings seem to be consistent with previous research which found Attitude and Knowledge is important factors that affect Practices (Sofola and Savage, 2003; Askarian et al., 2005 and Kuzu et al., 2005).

Table 2 highlighted percentage of respondents' correct answers to KAP

questions regarding SP. In the current study, although all the participants knew that they should wash their hands after accidental contact with blood, bloody fluid, secretions, or contaminated item, only 75.7% Practice it. While in similar study conducted in Vietnam among 629 HCWs in 36 hospitals, they found that (83.9%-99.2%) of the participants responded correctly to the individual items about Knowledge of Standard Precautions. Additionally, 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 (Thu et al., 2012).

The current work showed that the least correct answers of Knowledge were in the item of “hand washing before and after using gloves”. While the least correct answer of Practices was in item “wearing the same pair of gloves for care of more than one patient” (Table 2). This was in disagreement to Thu et al. (2012)

in their study to asses KAP regarding standard and isolation precautions among Vietnamese HCW. They showed the least correct Knowledge answers in item “Hands should be cleaned before using gloves “and least correct Practice answer in “Surgical mask should be worn when procedures and activities likely to generate splashes and sprays of blood or body fluids “. Comparing our results to that of Askarian and his colleagues, 2005 who performed a study among Iranian HCWs, they revealed that areas of poor Knowledge, such as washing hands before and after using gloves and bending of used needles, correlated with poor Attitudes and poor Practices. As just more than half of the Iranian HCWs indicated positive Attitudes about hand washing before and after glove use and just fewer than half reported routine Practice of this infection control recommendations.

One of the limitations to this study was using self-reporting Questionnaire instead of observational assessment for evaluating the Practice regarding the precautions .We could not observe the respondents’ Practices during the whole working shift therefore, had to depend

on their personal self-assessment. Therefore, the responses might have not precisely echoed the true Practices and the informed level of Practices might have been higher than the actual level. Despite these limitations, findings of the current study could be an important contribution to understand the patterns of Knowledge, Attitude and Practices of HCWs.

### **Conflict of interest**

The authors declare that no conflicts of interest existed.

### **Acknowledgement**

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