Assessment of Nurses' Knowledge and Attitude toward Infection Standards Precautions in Primary Health Care Settings

Sahar Mohamed Soliman*

Abstract: Background: Standards precautions are designed to protect staff from risks resulting from exposure to blood and body fluids and to protect patients from potential cross infection. Knowledge of clinical infection control practices is continually growing and changing. **Objectives:** the present study was conducted to assess nurses' Knowledge about Infection control standards precautions in primary health care settings. **Methods:** This study was cross sectional study that was conducted in six primary health care settings (PHC) in Manzala District affiliated to the Ministry of Health and Population. PHC settings were selected by stratified random sample method**.** Seventy nine nurses were included in the study. Data were collected by using open ended questions sheet, which was self-administered. **Results:** The nurses showed a poor level of knowledge regarding most categories of standard precautions. **Conclusion and Recommendations:** Mandatory regular base educational program must be planned to overcome the weak level of knowledge and improve and update the nursing performance regarding standard precautions.

Key wards: Standard precautions; Knowledge; Attitude; Nurses

INTRODUCTION

Infection control practice is a corner stone of modern health care[1]. Universal precautions are simple infection prevention control measures that reduce the risk of transmission of blood borne pathogens through exposure to blood and body fluids among patients and health care workers (HCWs). Compliance with these universal precautions has significantly reduced the risk of exposure to blood and body fluids that workers will contract in the course of their work[2]. The term "standard precautions" is replacing "universal precautions," as it expands the coverage of universal precautions by recognizing that any body fluid may contain contagious and harmful microorganisms[3]. Standards precautions are designed to protect staff from risks that resulting from exposure to blood and body fluids and to protect patients from potential cross infection.

The level of knowledge and quality of training may influence practice of standard precautions.[4] Knowledge of clinical infection control practices is continually growing and changing. Nurses play a crucial role in

*Community Health Nursing, Faculty of Nursing Mansoura University

preventing and controlling infectious diseases through application of standard precautions and maintenance of the health care environment. All nurses, in all roles and settings, can demonstrate leadership in infection prevention and control by using their knowledge, skills and judgment to initiate appropriate and immediate infection control procedures.[5] Lack of knowledge regarding standard precautions was found among health care workers in general and specifically among nurses. Lack of knowledge among 48% of Nigerians health care workers, lead to poor adherence to standard precautions.[6]

In Egypt, it was reported that nurses' knowledge regarding universal precautions was below the average score.[7] Therefore, the present study was conducted to assess nurses' Knowledge about infection control precautions.

MATERIAL AND METHODS

Study design:

Cross-sectional study was used to assess the knowledge of nurses about infection control standard precautions.

Setting:

The study was conducted in Maternal and Child Health (MCH) centers affiliated to Ministry of Health and Population at Manzala District, Dakahlia Governorate. The studied settings were selected by random sample method to represent 6 MCH centers out of[18] centers, namely El-Hadary Center, Al-Kamel Health Center, El-Frosat Health Unit, El-Azizha Health Center, the Second Child Health Center, and El-Sabteha Health Unit.

Subject:

All nurses currently working during the study were included in the sample. Total number of nurses was 107 nurse, 97 were currently working during the study, only 79 complete the questionnaire. The involved nurses were 68 nurses who have diploma degree and 11 technical nurses with associate degree.

Tool:

Assessment tool consisted of four parts:

The first part included personal and occupational data; such as qualification, years

of experience, and receiving of training programs.

The second part included nine questions to describe the nurses' behavior regarding infection control measures.

The third part included 22 questions for knowledge with total score of 43 to assess the nurses' knowledge about the infection control standard precautions in MCH clinics. Components of infection control standard represented by one question (5 scores), hand hygiene (2 scores), and personal protective devices (3 scores). Methods of decontamination for instruments and surfaces were presented by 14 questions (14 scores). Handling of waste and linen consisted of 3 questions (7 scores). Knowledge about needle stick and its allied diseases consisted of 2 questions (8 scores).

The level of knowledge was categorized as poor <50% (21.4 scores), fair 50%- 65% (21- 27.9 scores), and good >65% (28 scores). Open-ended questions were used to avoid guessing. The fourth part included 3-Likert scale (agree, uncertain, and disagree) to assess nurses' attitude toward infection control measures. The scale included 14 items with total 28 scores, 11 questions measure the positive attitude about hand washing, protective measures, handling needles and its allied effect, and waste disposal, three of them had negative attitude. The level of attitude was categorized as poor <50% (14 scores), fair 50%- 65% (14- 18.2 scores), and good >65% (18.2 scores). Open-ended questions were used to avoid guessing.

Methods:

1-Administrative process:

a- Official approval was obtained from the Ministry of Health and Population

2-Development of the study tool:

a- The researcher developed the tool after reviewing of recent literatures.

c- Validity of tool was tested by experts in that field

b- A pilot study was carried out on 10 nurses were chosen randomly from MCH centers to ensure the clarity of the knowledge test.

3- Data collection: Data were collected by using the self-administered structured questionnaire sheet, during actual visit to MCH.

Statistical analysis*:*

SPSS package (version 0.9) was used for the statistical analysis of the obtained data; Independent t- test was used to estimate the significant differences between different variables.

RESULTS

Table (1) shows the distribution of nurses according to their occupational data, 68 (86.1%) of nurses have diploma degree and 11 (13.9%) have technical degree. Most of nurses 40 (50.6%) have less than 5 years experience while the 14 (17.7%) have more than 10 years of experiences. 51 (64.6%) of nurses received training about infection control. Only 5 (6.1%) of them received three doses of hepatitis B vaccine. Regarding the occurrence of needle stick injures during this year, 10 (12.7%) of nurses complained from needle stick injury that ranged from 1-8 times while their complained from needle stick injury during the years of work ranged from 1-10 times. The nurses' knowledge about infection control measures was presented in Table (2). Results revealed that 76 (96.2%) and 29 (36.7%) of nurses identified hand hygiene and decontamination as components of infection control measures, respectively; with mean score of 1.9± 1.2. Times of hand hygiene was correctly identified by most of nurses, 69 (87.3%), while 7 (9.9%) only describe correctly the proper technique of hand hygiene. Regarding personal protective measures, gloving is the most personal protective devices that nurses are knowledgeable about. 72 (97.1%) Nurses gained mean score of 2.8± 0.7 for hand hygiene and personal protective measures.

Three quadrants 60 (75.6%) of nurses mentioned correctly betadine as a type of disinfectant. About one-third of nurses, 25 (31.6%), was able to define sterilization, while 57 (72.2%) and 14 (17.7%) of them mentioned autoclave and hot oven as methods of sterilization respectively. But no one have knowledge about cleaning surfaces.

Nurses have a good knowledge about waste segregation namely, sharps 70 (88.6%) and infectious items 69 (86.1%). Concerning type of containers only 25 (31.6%) of nurses were knowledgeable about safety box as a containers for sharps, and 58 (70.8%) of nurses mentioned that red plastic bags were used as container for infectious items. On the other hand, only 14 (17.7%) described correctly the collection of wet linen with blood and secretions. Nurses gained mean score of 2.5±0.9 for handling waste and linen.

Table (3) shows knowledge of nurses about needle stick, as regards to nurses' action after needle stick 5 (6.3%) of nurses have knowledge about removing the glove immediately after needle stick, 3 (3.8%) of them mentioned washing hands, only one mentioned to disinfect the injury site, and no one have knowledge about incidence report. On the other hand, 71 (89.9%) of nurses have a correct knowledge about diseases transmitted by needle stick namely; hepatitis B, C, and HIV. It is apparent from table (4) that the majority of nurses 65 (82.3%) had poor

knowledge about infection control and 14 (17.7%) of them had fair knowledge. The over all mean of nurses score is 15.7±4.1

Table (5) revealed that the knowledge of nurses regarding infection control showed significant difference (<0.05) between diploma and technical nurses with mean of 15.1±3.9 and 19.5±3.4, respectively. Nevertheless, there is no significant difference between nurses who received training program about infection control and those who did not receive training program.

Table (6) illustrates nurses attitude toward infection control measures as regards to protective measures and hand hygiene's. The majority of nurses have positive attitude toward hand washing 75 (94.9%) and 74 (93.7%) of nurses mentioned that hand hygiene be replaced by gloving. Using protective measures can prevent transmission of infection to health care worker and from infected patient to other patient 72 (91.1%) and 70 (86%), respectively. Nurses score is 10.9±1.8 regarding to protective measures and hand hygiene. As regards to handling of needles and its allied effects 7 (8.9%) of

nurses have negative attitude toward covering needle after using. Most of nurses 77 (97.5%) agreed that diseases transmitted by needle stick are dangerous and all of them have positive attitude that these diseases can be prevented. Their score related to handling needle and its allied effect is 9.7±0.7. Concerning waste handling, the majority of nurses 68 (86.1%) have positive attitude toward waste segregation. Nurses gain 3.7±0.7 scores about this item.

Table (6) elaborates that the majority of nurses showed a good attitude toward infection control measures. The over all mean is 24.5±2.3.

DISCUSSION:

Standard precautions are effective strategies to prevent and control nosocomial infections. Nurses must be knowledgeable about the principles of standard precautions[3]. Despite of this, many studies attributed the poorness of adherence to universal precautions, to the lack of knowledge.[6-9] These researches support the present study, which revealed that most of nurses in general showed poor knowledge level regarding standard precautions.

Transmission of microorganisms from the hands of healthcare workers is the main source of cross-infection in health care settings and can be prevented by hand washing. Akyol (2007) revealed that nurses have a poor level of knowledge concerning quality of hand washing[8]. This study is in agreement with the present study which found a minor number of nurses described the appropriate technique of hand washing, although they have a good knowledge and attitude about appropriate times for hand washing.

A minor percentage of nurses mentioned personal protective equipment as one of the standard precaution components, although they showed a good level of knowledge regarding identification of these items. This is in agreement with a Brazilian study which revealed that 75.6% of nurses understand standard precautions as protective measures.[10] In addition to the reported results of Ganczak and Szych 2007, that

indicated low knowledge regarding personal protective equipment among nurses in Poland[11].

Regarding to decontamination process; the majority of nurses lacked in knowledge about the disinfection and sterilization process. These results are in agreement with Grillo *et al.*, (2004), who reported that a large number of nurses do not know the correct procedures of disinfection and sterilization procedures.[12]. Also, Beder and Michel (2004) found that only 12% of nurses have satisfactory knowledge level about sterilization process[13].

As regards to needle stick injury, studies showed that 40% out of 110 nurses reported multiple needle stick injuries but staff frequently don't report the injury despite their awareness of the risk of blood borne pathogenesis[14,15]. These findings supported the present results as nurses showed a poor knowledge about the action taken when needle stick occurred, although 12.6% exposed to multiple needle stick injury. In addition, Bennett and Mansell (2004) found

that the majority of community nurses reported compliance with standard precautions, although a small number of nurses stated that they re-sheathed needles and inadequately wore gloves[16]. In addition, most of the studied nurses have a good knowledge and attitude toward the occupational hazards that they are exposed such as hepatitis B, C, and HIV. This is in agreement with a study in Gaza done by Massrouje 2001 who found that nurses knew that viral hepatitis and HIV infection could be transmitted as a result of the improper management of medical waste.[17]

Regarding to infection control training the present result revealed insignificant difference between nurses who received training program about infection control and those who did not receive training program. The Royal College of Nursing believed that all health care staff should receive mandatory infection control training as part of their education and on an ongoing annual basis. It is important that knowledge and skills be continually updated. The training should cover all the general principles of infection

prevention and control to minimize the spread of infection[18]. El-Shafie *et al.*,[7] 1995, and Beder and Michel (2004)[13], reported that nurses need training programs in a regular-basis.

Conclusion and Recommendations

It was conclude that most of nurses who involved in the study showed poor knowledge level regarding standard precautions. The study recommended that:

1. An in-service- training program should be designed and applied on regular basis

2. Follow up; monitoring, and evaluation of the nurses' clinical infection control practice should be done

3. Nurses must apply measures to prevent and control transmission of infection.

Table 1: Distribution of nurses according to their occupational data

Items	Number 79	%
Educational level		
Diploma	68	86.1
Technical	11	13.9
Experience years		
≤5	40	50.6
-10	25	31.6
>10	14	17.7
Mean± S.D	7.8±6.1	
Training of infection control		
Received training	51	64.6
Receiving vaccine of hepatitis B		
3doses	5	6.1
<3 doses	9	11.3
Occurrence of needle stick this year		
1-3 time	5	6.3
4-8 time	5	6.3
Occurrence of needle stick during the years of work		
1-5 time	6	7.6
6-10 time	4	5

Table 2: Distribution of nurses according to their knowledge about infection control measures

Items	Number 79	%	Scores
Components of infection control measures			
Hand hygiene	76	96.2	
Decontamination	29	36.7	
Personal protective measures	10	12.7	1.9± 1.2
Waste disposal	6	7.6	
Aseptic techniques	1	1.3	
Hand hygiene			
Times	69	87.3	
Techniques	7	8.9	
Personal protective measures			2.8± 0.7
Glove	72	97.1	
Apron	12	15.2	
Mask	1	1.3	
Decontamination			
Definition of disinfection	7	8.9	
Types of disinfectants (Betadine)	60	75.9	
Definition of sterilization	25	31.6	
Types of sterilization			4.5± 2.0
Autoclave	57	72.2	
Hot oven	1	1.3	
Time & Temp of hot oven	14	17.7	
Waste			
Segregation			
Sharps	70	88.6	
Infectious	69	86.1	
Pathological waste	8	10.1	
Type of containers			2.5±0.9
Safety box for sharps	25	31.6	
Red plastic bags for infectious	58	70.8	
Linen			
Collection of wet linen with blood	14	17.7	

Table 3: Distribution of nurses according to their knowledge about needle stick

Items	Number 79	%	Scores
Action after needle stick			
Remove the glove	5	6.3	
Hand hygiene	3	3.8	2.6± 0.8
Disinfect the site of injury	1	1.3	
Common disease transmitted by needle stick			
Hepatitis B, C viruses, and HIV	71	89.9	0.9± 0.3

Table 4: Level of nurses' knowledge regarding infection control

Item	Number 79	%
Poor	65	82.3
Mean± S.**D**	14.4± 3.2	
Fair	14	17.7
Mean± S.D	21.7± 1.6	
Overall mean ± S.D	15.7± 4.1	

Table 5: Distribution of nurses about their attitude toward infection control measures

Items	Number 79	%	Scores
Personal protective measures and hand hygiene			
Washing hands is necessary	75	94.9	
Wearing gloves when dealing with patient is necessary	74	93.7	
Wearing gloves instated of hand washing	9	11.4	
Using personal protective measures can prevent transmission of infection to health care workers	72	91.1	**10.9± 1.8**
Using personal protective measures can prevent infection transmission from infected patient to others	70	86.0	
Changing personal protective measures between clients is necessary	66	83.5	
Handling of needles and its allied health effects			
Needle should be bent after using	1	1.3	
Covering the needle after using is necessary	7	8.9	
Diseases transmitted by needle stick are dangerous	77	97.5	**9.7± 0.7**
Nurses complain from these diseases can effect her life	78	98.1	
Infection can be transmitted from health care workers to patient	32	40.5	
Blood borne infection can be prevented	79	100	
Waste disposal			
Safety box is safe	77	97.5	**3.7± 0.7**
Segregate waste is necessary	68	86.1	

Table 6: Level of attitude of nurses regarding infection control measures

Item	Number 79	%
Fair	2	2.5
Mean± S.**D**	17± 1.4	
Good	77	97.5
Mean± S.D	24.5± 1.9	
Overall mean ± S.D	**24.5± 2.3**	

Table 7: Difference of nurses' knowledge regarding level of education and receiving training program in infection control

Item	Mean ± S.D	t-	P
Education			
Diploma	15.1± 3.9	3.6	0.001
Technical	19.5± 3.4		
Training			
Yes	15.8± 4.2	0.44	0.65
No	15.4± 4.0		

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