Nurses' Performance and barriers to Use Infection Control Standard Precautions in Emergency Unit

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Abstract

Background: Emergency nurse play one of the most critical roles in a health care setting, nurse is the frontline of triage and treatment for patients with everything from mild colds to extreme injuries. Nurses have the unique opportunity to reduce the potential for acquired infections. Utilizing the skills and knowledge of nursing practice, can facilitate patient recovery while minimizing complications related to infections **the aim:** the aim of this study is to evaluate nurses' performance and barriers to use infection control standard precautions in emergency unit **Design:** A Descriptive analytical research design **setting**: the study was conducted in emergency unit at Ain Shams University specialized hospital, Cairo Governorate, **Sampling**: A convenience sample, all nurses was taken, the total number (80) of nurses. (65 diploma nurses and 15 bachelor nurses) working in emergency unit. **Tools:** two tools were used in this study for data collection, **First**: an interviewing questionnaire divided into three parts: Part 1 nurses socio- demographic, Part 2 Nurses knowledge& Part 3 the barriers hindering the application of infection control standard precaution .**Second**: Observation checklist for assessing nursing performance regarding infection control standard precautions. **Results**: Reveals that 46.1% had correct knowledge about infection control, while77.5 had incorrect performance with infection control standard precaution. **Also** reveal that barriers related to nurses with mean47.5& barriers related to the facility with mean32.92.**Conclusion**: Nurse's current performance to use infection control standard precaution in emergency unit lack of nurse's knowledge and performance toward infection control standard precautions in emergency unit, and highly perceived barriers to use infection control standard precautions**. Recommendations**: the study recommended that Continuing training for nurses to demonstrate their compliance/ performance/ utilization of standard precautions of infection

Key words: Emergency Unit, Infection Control, Nurses Performance.

Introduction:

The emergency rooms are one of the main gateways to hospital network. Infections are the reason for a significant proportion of visits to the emergency department. Patients may carry various transmissible pathogenic microorganisms such as the influenza virus, norovirus, rotavirus**, (Ki et al., 2019).**

Infection prevention remains a major challenge in emergency care. Acutely ill and injured patients seeking evaluation and treatment in the emergency unit not only have the potential to spread communicable infectious diseases to health care personnel and other patients, but are vulnerable to acquiring new infections associated with the care they receive**, (Aysha et al., 2016).**

Infection prevention and control measures aim to protect those who might be vulnerable to acquiring an infection, both in the general community and while receiving care due to health problems. The basic principle of infection prevention and control is hygiene. Infection control is the discipline concerned with preventing nosocomial or healthcare associated infection, a practical (rather than academic) sub-discipline of epidemiology. It is an essential, though often under recognized and under supported, part of the infrastructure of health care, **(BARRE, 2018).**

Standard Precautions form the foundation for infection prevention and control. Because patients without symptoms can carry microorganisms, emergency nurses need to take appropriate actions to minimize transfer of those microorganisms to other patients or to

themselves .Implement all components of Standard Precautions during their clinical practice, and take all the appropriate measures to avoid occupational exposure to pathogens, **(Donati et al., 2019).**

The nurse is the member of the healthcare team in practicing prevention strategies to protect the patient from infection. Some of the most basic strategies resulting in positive patient outcomes include the practice and promotion of hand hygiene, consistent use of aseptic technique, cleaning and disinfection practices, use of standard precautions, patient assessment and additional precautions, patient education, use of safety devices, removal of unnecessary invasive devices use of bundle strategies for infection prevention, **(Cheng et al., 2020).**

Nurses have the most frequent patient care interactions, and thus more opportunities to practice hand hygiene. Hand hygiene is the simplest and most effective measure for preventing healthcare-associated infections in emergency unit The quality of patient care depends on the knowledge, skills and practices of nurses, **(Houghton et al., 2020).**

Barriers which impede nurses from practicing IPC were: lack of knowledge on IPC, lack of time to deliver proper infection control due to low nurse patient ratio, lack of equipment, Lack of resources as a factor impeding nurses from proper infection control practice. The most nosocomial infections in Egyptian hospitals result from lack of resources such as gloves and face masks, **(Banaser et al., 2019).**

Lack of knowledge is a major factor that impedes in proper infection control practice. The nurses have no adequate input on infection control principles. Nurses should get some in service training on the principles**, (Chu, 2018).**

Several intervention studies have sought to improve HCW adherence to standard precautions in the ER. Educational programs have employed in-service lectures, small-group discussions, and written materials highlighting the risks posed by blood borne pathogens, **(Refeai et al., 2020).**

Aim of the Study

The aim of this study is to evaluate nurses' performance barriers to use infection control standard precautions in emergency unit through:

-Assessing nurses' knowledge regarding infection control standard precautions in emergency unit.

-Assessing nurses' performance regarding infection control standard precautions.

-Assessing the barriers to use infection control standard precautions in emergency unit?

Research questions:

-What is the nurses' knowledge regarding infection control standard precautions in emergency unit?
-What is the nurses' performance regarding infection control standard precautions?
-What are the barriers to use infection control standard precautions in emergency unit?

Subjects and Methods

Research design: A descriptive analytical research design was utilized to fulfill the aim of this study.

Technical Design:

Setting: The study was conducted in emergency units at University Ain Shams specialized hospital, Cairo Governorate.

Sampling: A convenience sample, all nurses was taken, the total number (80) of nurses. (65 diploma nurses and 15 bachelor nurses) working in emergency unit, at the Ain Shams specialized hospital and all of them agree to participate in the study**.**

Data collection tools:

Three tools were used in this study, designed after reading related literature and taking expert's and supervisors' opinion, and written in Arabic language.

First tool:

Was prepared by the researcher after reviewing the related literature it was include the following parts:

First tool: A self-administered

questionnaire . This tool contains three parts as follow.

Part 1: Socio demographic characteristic data as age, sex, qualification and years of experience, job, number of working/hours, training and vaccination.

Part II: Nurses' knowledge regarding: infection control standard precautions. The questions were to assess the areas of cleaning disinfection, general infection, hand hygiene, needle stick injury, personal protective equipment, safe injection, and safe waste disposal.

❖ **Scoring system**

Related to nurses knowledge assessment a correct answer scored one and incorrect answer scored zero. Except for questions (No. 1, 2, 3, 19, 21&29) give 1 mark for more than50% correct answer and less than50% scored zero. The whole knowledge questions scored 43 points for each area of knowledge, a total of 70% and above were considered correct and less than 70% were considered incorrect.

Part III: The barriers hindering the application of infection control standard precaution. It included three categories of barriers; (1) barriers related to facility such as lack of guidelines for the nurse to apply standard, lack of infection control team and inefficiency of infection control team. (2) Barriers related to nurses such as work load, shortage of nurses, and increased numbers of patients. (3) And barriers related to patients such as false beliefs about infection and economic reasons.

❖ **Scoring system**

The rating scale was consisted of three points scale, it has a score ranging from zero to two distributed as the following; totally agree =2, agree = 1, disagree = 0, the scale included 14 statements as the highest score is two then the total scale scored 28 points. The nurse was considered to have a high perception of barriers if the total score obtained was 60 %or higher and a low perception if the total score was less than 60%.

Second tool: Observation checklists: This tool about nurses' performance toward standard precautions. It contained the nurses' practices in eight procedures; hand washing, gloving, masking, gowning, safe injection, waste management, sharps waste management and vaccination.

❖ **Scoring system**

The items observed to be done were scored one and the items not done were zero .For each area the scores of the item were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into percent scores. The practice was considered correct if the percent score was 60%or more and incorrect if less than 60%.

Operational design:

The study to be completed passed through different phases included: preparatory phase, pilot study and field work phase.

A-Preparatory phase:

A review of recent, current, national and international related literature in various aspects of the problems to design the study tools, then assessment was done to determine the nurse's needs by using pretest based on the collecting data on the nurses knowledge and their performance toward infection control in emergency unit. Then tools of data collection were tested for content validity.

B-Pilot study:

It was conducted on 8 nurses representing 10% of the total study sample, the aim of the pilot study was to evaluate clarity, visibility, applicability, as well as the time required to fulfill the developed tools. According to the obtained results, modifications such as omission, addition and rewording were done. The number of the pilot study was excluded from the study sample.

Content validity

Content validity was done for the tools by 5 experts from staff in community health nursing and infection control, Ain Shams University for face and content validation.

C- Field Work:

An official permission including the title and purpose of the study were submitted from the Dean of Faculty of Nursing Ain Shams University and directed to the director of Ain Shams specialized hospital, to get an approval for data collection to conduct the study that

forwarded to the director of emergency unit where the study was conducted.

- After obtaining a permit the researcher started to visit emergency unit, meet the director and explain the aim and program content.
- The study started from mid-January to mid-April 2020 the actual duration was ten months & a half, "as periods of examination and holidays were excluded". The assessment was done for (80) of nurses. (65 diploma nurses and 15 bachelor nurses) and took three month to be fulfilled.

Ethical consideration

Approval was taken from the Ethical Research committee of faculty of nursing, Ain Shams University before starting the study .Agreement of nurses to participate in the study after explaining the aim of the study. Anonymity and confidentiality & freedom to withdraw from the study at any time were assured. Then oral approval obtained from nurses to apply the study. Also a supervisor from the infection control units attended each session and obtained a copy of the data

III. Administrative Design

An official permission including the title and purpose of the study were submitted from the Dean of faculty of nursing Ain Shams University and forwarded to the director of Ain Shams specialized hospital, to get an approval for data collection to conduct the study that forwarded to the director of emergency unit where the study was conducted. After that the investigator was start to communicate with the study subjects and explain the aim of the study.

IV. Statistical Analysis:

Percentage, mean value, standard Deviation, chi-square (X2), T paired test, correlation test (r) and proportion probability (P-value).

Significance of results

- ✓ When P> 0.05 it is statistically not significant difference.
- ✓ When P< 0.05 it is statistically significant difference.
- ✓ When P< 0.01or P< 0.001 it is high statistically significant difference.

Result:

Table (1): shows that 46.4% of the study nurse's age was ranged from 30 to 39 years old, 71.3% were female, 76.2 % of them were married and 52.5% of them were nursing diploma, while 17.5% were Bachelor of nursing.

Table (2): Illustrates that86.2% of the study working nurses, 77.5% of the study nurses have >10 years of work experience, 95% were received training courses in infection control &52.5 were received three doses of hepatitis B virus vaccine.

Table (3): reveals that 100% of nurses disagree with lack of infection control team ,46.2% agree with insufficient supplies (PPE - hand washing requirements then 65% totally agree with increase the workload &60% totally agree with decrease the number of nursing and increase the number of patients.

Table (4): illustrates that 98% had incorrect knowledge about general infection control standards precautions. While 41% had correct knowledge about personal protective equipment.

Table (5): shows that 77.5% had done incorrectly performance related total practice with infection control standards precautions

Figure (1): reveals that barriers related to nurses with mean47.5& barriers related to the facility with mean32.92.

Table (6): reveals that there were no statistically significant differences related to nurses total knowledge scale, total practice scale and total Factors Scale.

Table (1): Distribution of study nurses according to their characteristics (n= 80).

Items	Frequency	Percent
Age		
< 20 years	5	6.2
20 –	21	26.2
30 –	37	46.4
40 –	14	17.5
≥ 50	3	3.7
Gender		
Male	23	28.7
Female	57	71.3
Social Status		
Married	61	76.2
Single	17	21.2
Divorced	0	0
Widowed	2	2.6
Academic qualification		
Nursing Diploma	42	52.5
Technician nursing Institute	24	30
Bachelor of nursing	14	17.5

Table (2): Distribution of study nurses according to their work Characteristics (n= 80).

Items	NO	%
Job		
Nurse	69	86.3
Head Nurse	11	13.7
Years of work experience		
From 1 to 5 years	4	5
from 5 to < 10 years	14	17.5
>10 years	62	77.5
Number of working / hours		
8-12 hours	80	100
> 12 hours	0	0
Attended training sessions about infection control precautions		
Yes	76	95
NO	4	5
Have been vaccinated against virus (B)		
One does	14	17.5
Two does	17	21.3
Three does	42	52.5
No vaccination	7	8.7

According to research question number (3) what are the barriers to use infection control standard precautions in emergency unit?

Table (3): Frequency distribution of nurses according to the barriers hindering the application of infection control standard precaution (N=80).

Items	disagree		agree		totally agree	
	No	%	No	%	No	%
A) Barriers related to the facility						
Lack of infection control team	80	100	0	0	0	0
The lack of infection control policies and instructions on	31	38.7	25	31.2	24	30
Insufficient supplies (PPE - hand washing requirements	17	21.2	37	46.2	26	32.5
NO infection control team round	57	71.2	14	17.5	9	11.2
Lack of punishment for non-compliance with infection control measures	33	41.2	30	37.5	17	21.2
Lack of explanatory methods for infection control measures, such as a poster.	35	43.7	22	27.5	23	28.7
B) Barriers related to nursing						
Increase the workload	9	11.2	19	23.7	52	65
Decrease the number of nursing and increase the number of patients	14	17.5	18	22.5	48	60
Lack of training in infection control measures	39	48.7	23	28.7	18	22.5
Forget about adhering to infection control procedures	53	66.2	15	18.7	12	15
Lack of supervision of application of standard precautions from superior	39	48.7	28	35	13	16.2
C) Barriers related to the patient						
Misconceptions about infection control measures	38	47.5	24	30	18	22.5
refuse to deal with him by wearing PPE such as masks	44	55	20	25	16	20
Increase the cost of health care	44	55	30	37.5	6	7.5

According to research question number (1) what is the nurses' knowledge regarding infection control standard precautions in emergency unit?

Table (4): Total scale and subscales of Nurses' knowledge regarding infection control standards precautions (n=80).

	Incorrect		**Correct**	
	Frequency	Percent	Frequency	Percent
General	79	98.75	1	1.25
Hand hygiene	65	81.25	15	18.75
Personal protective equipment	47	58.75	33	41.25
Safe injection	68	85.00	12	15.00
Sharp injury:-	72	90.00	8	10.00
Waste management	73	91.25	7	8.75
cleaning & disinfection	62	77.50	18	22.50
Isolation	79	98.75	1	1.25
cleaning disinfection	77	96.25	3	3.75
Preparation medication	73	91.25	7	8.75
Linen management	70	87.50	10	12.50

According to research question number (2) what is the nurses' performance regarding infection control standard precautions in emergency unit?

Table (5): Total scale and subscales of Observational checklist for nurses' compliance with infection control standards precautions (n=80).

	Incorrect		correct	
	Frequency	**Percent**	**Frequency**	**Percent**
Hand washing	61	76.25	19	23.75
Gloving	63	78.75	17	21.25
Gowning	66	82.50	14	17.50
Masking	61	76.25	19	23.75
safe Injection	76	95.00	4	5.00
Blood Sampling / Cannulation	39	48.75	41	51.25
Reprocessing of Medical Instruments and Equipment	25	31.25	55	68.75
Linen Management	21	26.25	59	73.75
Environmental Safety	42	52.50	38	47.50
Preparation of IV fluids and medication	41	51.25	39	48.75
Sharps waste management	59	73.75	21	26.25
waste management	21	26.25	59	73.75
Total Practice Scale	62	77.50	18	22.50

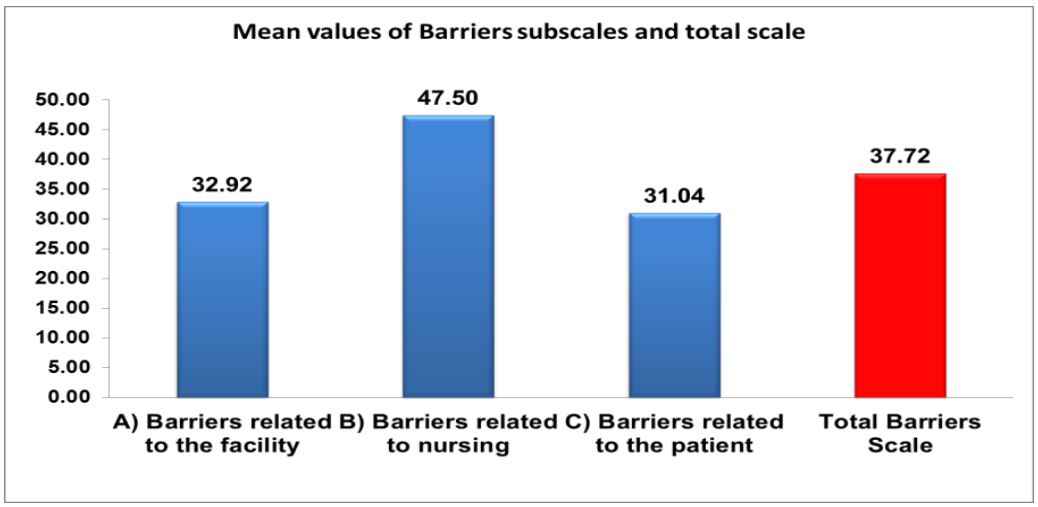

Figure (1): Mean values of barriers hindering the application of infection control standard precaution (n=80).

Table (6): Correlation between nurses correct knowledge, Total Factors Scale and Total Performance done score level (N=80).

Correlation of Total Scales	Pearson Correlation Coefficient r	P value
Total Knowledge scale & Total Practice scale	-0.08	0.46847
Total Barrier scale & Total Knowledge scale	-0.15	0.18562
Total Barrier scale & Total Practice scale	0.08	0.46952

Discussion

Emergency unit nurses' socio demographic characteristics the results of this study revealed that less than half of study nurses were in the age group 30 – < 39 years, regarding the majority of nurses gender were female**(Table 1)**, this result is agreement with, **(Mohamed et al.,2016)**, who study nurse knowledge attitude and practices regarding infection control , in Port Said Hospital, report that the majority of the nurses were females this result may be due to female were the majority of nursing staff in this hospital.

As regards nurses' socio-demographic characteristics the present study shows the majority of the nurses had work experience>10 years **(Table 2)** while all nurses working 8-12 hours. This finding disagree with **(Hammerschmidt et al., 2019),** who study Nurses' knowledge, behavior and compliance concerning hand hygiene in nursing homes in Germany, found that The majority of nurses had job tenures of ≤5 years in their institution (n = 46; 28%) and worked in day shifts (n = 104; 63%). may be due to the work in emergency units need more experience nurses.

As regard to the barriers hindering the application of infection control standard precaution, present study showed that more than half were agree with insufficient supplies, less than two third totally agree with increase the work load and decrease the number of nursing and increase number of patients**(Table 3, Figure1)**.This finding is in partially agreement with **(Refeai et al., 2020)**, study about perception and barriers regarding infection control measures among healthcare workers in Minia city, Egypt. Who findings revealed the most frequent barrier of practices of standard precaution was absence of enough gloves and gowns. And agrees with **(Barker et al., 2017)**, Study about barriers and facilitators to infection control at a hospital in northern India. Reported that person, task, and organizational level factors were the primary barriers to infection control. May be due to natural of the work in emergency units was critical.

the present study revealed that there were no statistically significant differences between nurse's total correct knowledge & total correct Practices and socio demographic characteristics**(Table 4,5)**, this result partial agree with **(Ayed, 2015),** as their study showed No significant statistical differences were found between mean knowledge scores towards age, years of experience, and training course &significant statistical differences were found between mean knowledge scores towards gender and qualification.

Related to correlation between study variables there was negative correlation between nurses total knowledge scale & total practices scale **(Table 6)** this disagree with **(Mohammed, 2016**), who study nursing guidelines and its effects on nurses' knowledge and patient safety regarding nosocomial infection control measures in burn unit there were a positive correlation between nurses' knowledge and practices with a high statistical significant difference after received intervention

Related to correlation between study variables there was negative correlation between nurses total practices & barriers related to the patient **(Table 6)** the previous results uncorrespond with **(Powers et al., 2016)**, who study Factors influencing nurse compliance with standard precautions. There was a significant relationship between susceptibility of HCV and compliance and between barriers to SP use and compliance.

Also disagree with the findings of **(Lee et al., 2012)**, Who study factors influencing compliance with standard precautions in intensive care unit and emergency room nurses in Korea.Reported that there were significant correlations of knowledge, attitude, and compliance with standard precautions attitude and work place were significant factors predicting compliance with standard precautions.

Conclusion

On the light of the results and research questions the study was concluded that:

Nurse's current performance to use infection control standard precaution in emergency unit lack of nurse's knowledge and performance toward infection control standard precautions in emergency unit, and highly perceived barriers to use infection control standard precautions.

Recommendations

The findings of this study highlight the following recommendations:

1.Updating knowledge and practices of nurses through continuing in-service educational programs.

2.Providing training programs for newly nurses about infection control and at regular intervals.

3.Availability of all facilities, materiales and of written guidelines required for applying standard precautions of infection control.

4.Further researches about nurse's performance about infection control in ambulatory care units.

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