

## Nurses' Performance Regarding Isolation Precaution Measures Application in Emergency Department

Galal Mohamed Zain-El-Aabedin <sup>(1)</sup>, Tahany Al-Sonosy <sup>(2)</sup>, Samar Faltas <sup>(3)</sup>

<sup>1</sup>Clinical Instructor of Technical Institute , Faculty of Nursing, Fayoum University,

<sup>2</sup> Professor of Critical Care Nursing, Faculty of Nursing – Ain Shams University ,

<sup>3</sup> Assistant Professor of Critical Care Nursing, Faculty of Nursing – Ain Shams University.

### Abstract

**Background:** Infection prevention and control are challenging in most health care settings, and rising rates of infectious diseases are a major concern for patients and health care professionals. **Aim :** this study aimed to assess nurses' performance regarding isolation precaution measures application in emergency department. **Subjects and method:** A descriptive design was used. The study was conducted in emergency departments at El-Fayoum university hospitals. A convenient sample of all available nurses (60 nurses) in previous mentioned setting to achieve the aim of the study. Two data collection tools was utilized in this study: Self-administered questionnaire, and observation checklist. **Results:** 66.7% of the studied nurses had unsatisfactory total level of knowledge. 75% of the studied nurses had unsatisfactory total level of performance. **Conclusion:** The current study concluded that more than two third studied of nurses had unsatisfactory level of knowledge. While, three quarters of them had unsatisfactory level of performance. **Correlation:** There is a highly statistically significant positive correlation between nurses' total knowledge and their total performance. **Recommendations:** The current study recommended that providing training programs for nurses regarding application of isolation precaution measures in emergency department and further studies should be conducted in different settings.

**Keywords:** Emergency Department, Isolation Precaution Measures, Nurses' Performance.

### Introduction

Infections are a major cause of morbidity and mortality despite advances in antibiotic therapy. As the population increases, clinicians are seeing increasing numbers of cases of infectious disease particularly in emergency department due to the over load and urgency of the demanded care (*Scannapieco & Cantos, 2017*).

Infectious diseases occur worldwide and affect both developed and developing countries. In developed countries, between 5% and 10% of patients acquire one or more infections and 15–40% of patients are thought to be affected. In resource-poor settings, rates of infection can exceed 20% but available data are scanty and more research is urgently needed to assess the burden of disease in developing and transitional countries for patients and their families (*Wood, 2019*).

Infections can be presented in the form of catheter-associated urinary tract infections, blood stream infections and pneumonia (often associated with mechanical ventilation). Central to the elimination of these infections is proper hand hygiene. A variety of non-specific changes in functional status may occur as a result of infection. These changes may be the only indication that infection is present. For example, patients may present with confusion, delirium, or falling, or they may have anorexia and decreased oral intake. people may experience exacerbations of an underlying chronic illness, such as worsening of atrial fibrillation (*Kilpatrick, et al., 2019*).

Infection prevention and control are challenging in most health care settings, and rising rates of infectious diseases are a major concern for patients and health care professionals. The organization has a collaborative process to develop policies and procedures that adapt or adopt currently published and generally accepted hand hygiene

guidelines and for the implementation of those guidelines when dealing with peoples who have infectious diseases (*Russell, et al., 2018*).

Early detection of infection can be difficult due to the frequent absence of typical signs and symptoms. In particular, fever, the most recognized symptom of infection, may not be present. Instead, patients may present only with non-specific symptoms. Clinicians must balance the risks and benefits of initiating or withholding antibiotics with non-specific or atypical signs and symptoms (*Scannapieco & Cantos, 2017*).

According to 2018 statistical report, 15 million Egyptians out of total population of 91 million carry hepatitis C, or around 22 percent of the population. Over the past three years, Egypt has been successful in the intensive use of a variety of new medications to combat hepatitis C. In 2016, the Ministry of Health (MOH) achieved a 96 percent cure rate of the disease nationwide. Ministry of health promised to completely eliminate the disease in Egypt by 2021 (*MOH conference report, 2018*).

### **Significance of the Study**

Patients admitted to emergency department acquire new infections that were not present or incubating at the time of admission at a rate sufficient to present major concerns in terms of excess morbidity, mortality, personal distress, and cost. Recent surveys of the frequency of occurrence of these infections have recorded large apparent differences among hospitals and patient groups (*Montoya & Cassone, 2018*).

Previous studies estimated that at least 2.1 million health care acquired infections occurred annually among 37.7 million admissions in United States hospital. The combination of increased comorbid conditions and the decrease in activity of the immune system can make people more prone to infections. Risk factors of infections needs more attention from the health care providers using different assessment methods to provide accurate findings, also nurses needed updated

knowledge regarding prevention of infections (*Rawson, et al., 2017*). So, the purpose of the current study is to nurses' performance regarding infection control measures application in emergency department.

On arrival at ED, the patient should be evaluated for infection status, especially of potentially transmissible infection of the respiratory pathways, and important immunodepression. If the initial evaluation is performed by nursing staff using a specific questionnaire, the patient should also be questioned about cough, expectoration, rhinorrhea, sneezing, diarrhea or fever, and disease associated with severe immunodepression should be ruled out (*Kotkowski, et al., 2017*).

The waiting department should have an area where patients with possible respiratory infection can be kept at least one meter apart from other patients. In addition, such patients should be provided with a standard face protection mask and instructed on correct use, as well as single-use tissues, and the area should be equipped with disposal bins. A useful way to instruct patients about these precautions is to exhibit explanatory pamphlets consisting of simple images indicating the desired precautions without need for text in different languages. The waiting area should have bottled alcohol solution available for hand hygiene, distributed in easily accessible and visible places. Patients with important immunodepression should be attended as soon as possible, but should anyway (*Hamill, et al., 2017*).

### **Aim of the study:**

This study aimed to: assess nurses' performance regarding isolation precaution measures application in emergency department

### **Research questions:**

1. What is the level of nurses' knowledge regarding isolation precaution measures application in emergency department?

2. What is the level of nurses' performance regarding isolation precaution measures application in emergency department?
3. What is the relation between nurses' knowledge and performance regarding isolation precaution measures application in emergency department?
4. What is the effect of nurses demographic characteristics on their knowledge and performance regarding application of isolation precaution measures in emergency department?

### Subject and Methods

#### Study Design:

Descriptive exploratory research design was used to achieve the aim of the current study.

#### Study settings:

The study was carried out at El-Fayoum university hospitals emergency departments in two different setting :

1- Emergency departments in El-Fayoum surgical university hospital present in ground floor. It consists of three rooms (three rooms don't receive isolated patients); each room has six beds.

2- Emergency departments in El-Fayoum medical university hospital present in ground floor. It consists of two rooms (two rooms for receive isolated patients); each room has four beds.

#### Subjects:

A convenient sample of all available nurses (60 nurses) who were working in the above mentioned setting from both gender.

#### Tools of data collection:

Two tool were use to collect the necessary data and fulfill the study aim.

#### Tool (I) Self-administered questionnaire (Appendix I) :

It was developed by the investigator after reviewing the related literature and reviewed by the supervisors. It was written in an Arabic

language for gathering data in relation to the following parts :

#### Part 1:Nurses Demographic Characteristics:

This part used to assess nurses' demographic data which involved 7 items including age, gender, marital status, educational level, past experience, residence, training courses.

#### Part 2: Nurses knowledge

This part concerned with the assessing nurses' level of knowledge regarding isolation precaution measures application in emergency departments. This part consists of 72 questions in form of closed, ended and multiple-choice questions. It was adopted from (Bryce, 2007; Peate & Wild, 2018; Nasiri et al., 2019). This part consisted of 10 part to assess nurses' knowledge about infection control measures 9 question, hand hygiene 8 question, triage 4question , personal protective equipment 6 question , isolation contact precautions measures 6 question , isolation droplet precautions measures 6 question , isolation air born precautions measures 6 question , environmental services 11 question , types of infectious diseases 6 question , general isolation precautions measures 10 question ,

#### ❖ Scoring system:

This part were consist of 72 question, the total score of the questionnaire were 72 grades, the correct answer was scored as (one) degree and the incorrect answer was scored as (zero).The nurses knowledge was checked with a model key answer and accordingly the nurses knowledge was categorized into either correct or incorrect.The scores were summed and converted into a percent score and classified into two categories:

- Satisfactory level of knowledge if scores  $\geq 80\%$
- Unsatisfactory level of knowledge if scores  $< 80\%$

### **Tool II: Nurses' Observation checklist (Appendix II) :**

It was adapted from (Berman, 2010; Weston, 2013; Peate & Wild, 2018).and used to assess nurses' practical level regarding isolation precaution measures application in emergency departments and consists of five parts as the following: nurses' practice toward themselves and health care team (19 items), nurses' practice for their patients (12 items), nurses' practice toward machines &equipment (5 items), nurses' practice toward the environment (12 items), and nurses' practice toward safe waste management(17 items).

#### **❖ Scoring system:**

This tool consist of 65 items or skills, the total score were 65 grades, each skill was assigned a score (done) was scored as one degree and (not done) was taken zero score. The scores were summed and converted into a percentage score and classified into two categories:

- Satisfactory level of practice if the scores are  $\geq 80\%$
- Unsatisfactory level of practice if the scores are  $< 80\%$

#### **Preparatory phase:**

It includes reviewing of the related literatures, and theoretical knowledge of various aspects of the study using books, articles, internet search and magazine yn order to develop tools for data collection.

#### **Testing validity and reliability:**

Testing validity of the tool were done by revised from a panel of seven experts from faculty of nursing, Ain Shams University. Jury members were from different academic categories (three professors, two assistant professors and two lecture) working at the critical care nursing department and Medical surgical nursing department, they reviewed the content of the tools for clarity, relevancey, comprehensiveness. Modifications of tools were done according to the panels judgment and advise.

#### **Testing reliability:**

The reliability of the tools was tend to determine the extent to which the questionnaire items are related to each other. The Cronbach's Alpha model for assessing reliability was used in the current of study tools which related to the knowledge and practice reliability for the both tools were (0.791 and 0.821 respectively)

### **III- Administrative Design**

An official letter requesting permission to conduct the study was directed from the dean of the faculty of nursing Ain Shams University to director of El Fayoum University Hospital to obtain their approval to carry out this study. This letter included the aim the study and photocopy from data collection tools in order to get their permission and cooperation in data collection.

#### **Ethical Consideration**

The ethical consideration in the study included the following:

- Approval of the research protocol was obtained from the scientific research ethical committee at Faculty of Nursing Ain Shams University before starting the study.
- The investigator clarified the objectives and aim of the study to the nurses included in the study.
- The investigator assured maintaining anonymity and confidentiality of the data collected from the study sample.
- The Study sample were informed that they are allowed to choose to participate or not in the study and they had the right to withdraw from the study at any time without giving any reasons

#### **Pilot study:**

The pilot study was carried out on 10% (6) of nurses that working in the emergency departments in order to the applicability of the constructed tools and the clarity of the questions related to nurses' knowledge and performance regarding isolation precaution measures application in the emergency departments. The pilot study has also served to estimate the time needed for each subject to fill in the

questionnaire .According to the result of the pilot, no correction and omissions of items were performed, so the nurses included in the pilot study sharing in the study sample.

#### Field work:

- An approval was obtained from the emergency departments in El-Fayoum university. A letter was issued to them from the faculty of nursing, Ain Shams University for explaining the aim of the study in order to obtain their permission and cooperation for data collection. Data were collect in four months, from the beginning of June 2020 to the end of September 2020.
- The researcher firstly meet with the nurses working at the previously mentioned setting , explaining the purpose of the study after introducing himself to them.
- The investigator was visiting the study setting 3 days (Sunday , Monday and Thursday) per week at morning shift (8:0 am-2:0 pm) and after noon shift (2:0 pm -8:0 pm) to collect data.
- The questionnaire for knowledge was filled by nursing staff with in take 20-25 minutes , while the checklist for assessing practice was filled by the investigator in 40-50 minutes while nurses giving care to patients.

#### IV- Statistical Design:

- Data collected from the study sample was revised, coded and entered using personal computer (PC).Computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 22.
- Data were presented using descriptive statistics in the form of frequencies and percentage. Chi-square ( $X^2$ ) test was used for comparisons between qualitative variables.

#### Results:

**Table (1):** shows that, (71.7%) of nurses under the study were aged from 20 to less than 30 years old, (56.7%) of them were female, (46.7%)of nurses were single &married respectively. Also (60%) of nurses had nursing technical institute and also didn't take training courses. While (55%) of them had experience less than 5 years. In addition, 60% of nurses weren't attend training courses about infection control and or isolation Also (53.3%) of them were lived in rural areas.

**Table (2):** illustrates that there is a statistically significant relation between nurses' total knowledge and their educational level, their experience, and attending training courses about infection control and isolation at  $p < 0.05$  . While, there is no statistically significant relation between nurses' total knowledge and their ages, gender, marital status, and residence at  $p < 0.05$  .

**Table (3):** shows that there is a highly statistically significant positive correlation between nurses' total knowledge and their total performance

**Figure (1):** shows that 66.7% of the studied nurses had unsatisfactory level of knowledge, while 33.3% of them had satisfactory level of knowledge regarding isolation precaution measures application in emergency department.

**Figure (2):** shows that 75% of the studied nurses had unsatisfactory level of performance regarding isolation precaution measures application in emergency department.

**Table (1):** Percentage distribution of demographic characteristics of the studied nurses (n=60).

Items	No.	%
<b>1. Age</b>		
- <20 years	10	16.7
- 20:<30 years	43	71.7
- 30:<40 years	7	11.7
- >40 years	0	0
- Mean $\pm$ SD	38.6 $\pm$ 4.27	
<b>2. Gender</b>		
- Male	26	43.3
- Female	34	56.7
<b>3. Marital status</b>		
- Single	28	46.7
- Married	28	46.7
- Divorced	4	6.7
- Widowed	0	0
<b>4. Education</b>		
- Diploma nurse	16	26.7
- Nursing technical institute	36	60
- Bachelor in nursing	6	10
- Master in nursing	2	3.3
- Doctorate in nursing	0	0
<b>5. Residence</b>		
- Urban	28	46.7
- Rural	32	53.3
<b>6. Past experience</b>		
- < 5 years	33	55
- 5-10 years	17	28.3
- >10 years	10	16.7
<b>7. Do you attend training courses about infection control and isolation?</b>		
- Yes	24	40
- No	36	60

**Table (2):** The relation between nurses' demographic characteristics and their total knowledge (n=60).

Demographic characteristics	NO	Satisfactory knowledge		Unsatisfactory knowledge		F/t	P-Value
		NO	%	NO	%		
<b>Age</b>						3.58	0.166
- <20 years	10	3	5	7	11.7		
- 20:<30 years	43	5	8.3	38	63.3		
- 30:<40 years	7	0	0	7	11.7		
<b>Gender</b>						1.38	0.214
- Male	26	5	8.3	21	35		
- Female	34	3	5	31	51.7		
<b>Marital status</b>						1.27	0.528
- Single	28	3	5	25	41.7		
- Married	28	5	8.3	23	38.3		
- Divorced	4	0	0	4	6.7		
<b>Education</b>						5.19	0.37*
- Diploma nurse	16	0	0	16	26.7		
- Nursing technical institute	36	6	10	30	50		
- Bachelor in nursing	6	2	3.3	4	6.7		
- Master in nursing	2	0	0	2	3.3		
<b>Residence</b>						1.74	0.157
- Urban	28	2	3.3	26	43.3		
- Rural	32	6	10	26	43.3		
<b>Past experience</b>						4.12	0.11*
- < 5 years	33	7	11.7	26	43.3		
- 5-10 years	17	1	1.7	16	26.7		
- >10 years	10	0	0	10	16.7		
<b>Attending training courses about infection control and isolation</b>						7.35	0.006*
- Yes	24	4	6.7	20	33.3		
- No	36	4	6.7	32	53.3		

(\*) statistically significant  $p < 0.05$  (\*\*) highly statistically significant  $p < 0.001$

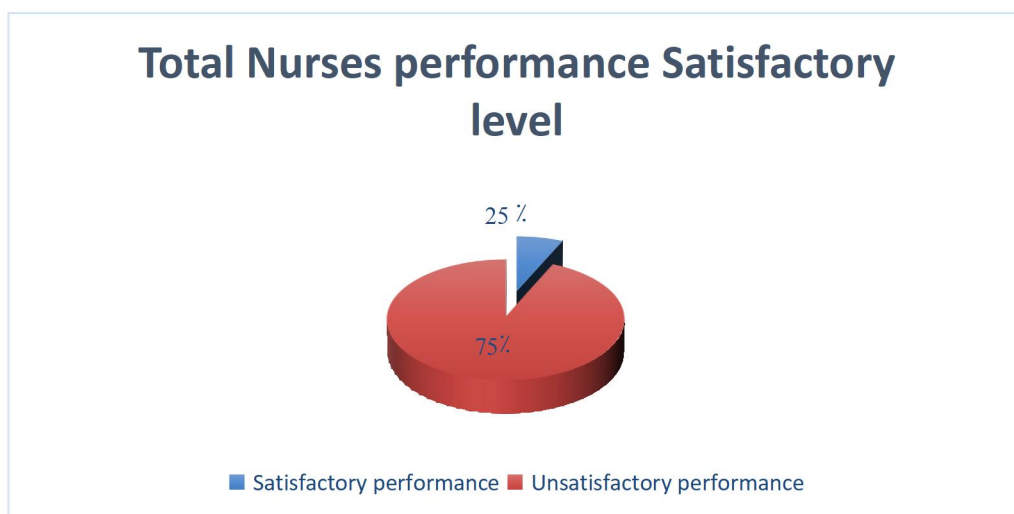
**Table (3):** Correlation between nurses' total knowledge and their total performance (n=60).

		Total knowledge	Total performance
Total knowledge	R	1	.416
	P	-	.000**
Total performance	R	.416	1
	P	.000**	-

(\*) statistically significant  $p < 0.05$  (\*\*) highly statistically significant  $p < 0.001$



**Figure (1):** Number and Percentage distribution of nurses' total satisfactory level of knowledge regarding isolation precaution measures application in emergency department.



**Figure (2):** Number and Percentage distribution of total nurses' performance regarding isolation precaution measures application in emergency department.

#### **Discussion:**

In regarding to age's the current study showed that, nearly three quarters of nurses under the study were aged from 20 to less than 30 years. This result may be due to majority of nurses that participated in this study were newly graduated. This result was in agreement with **Kim, & Lee, (2021)** who conducted a study entitled "Factors Influencing Emergency Department Nurses' Compliance with Standard Precautions Using Multilevel Analysis" and found that majority of nurses had ages ranged from 20: 30 years. Conversely, this result was in disagreement with **Kang, et al., (2019)** who conducted a study entitled "Comparison of fit

factors among healthcare providers working in the Emergency Department Center before and after training with three types of N95 and higher filter respirators" and found that majority of nurses had ages ranged from 20: 25 years.

In regarding to age gender's, the current study showed that more than half of nurses were female. This result may be due to females were more accepted to career of nursing about male. This result was supported with **Austin, et al., (2021)** who conducted a study entitled "Identifying Constraints on Everyday Clinical Practice: Applying Work Domain Analysis to Emergency Department Care" and found that more than half of nurses were female.



On the other hand, this result was in disagreement with **Abukhelaif, (2019)** who conducted a study entitled “Personal Protective Equipment Knowledge and Practices among Nurses Working at Al-Baha King Fahad Hospital, Saudi Arabia” and found that majority of nurses were female.

Regarding marital status’s nurses, the current study showed that nearly half of nurses were single and married. This result may be due to nurses in this period were consisted family and had children. This result was accordance with **Lim, et al., (2019)** who conducted a study entitled “Association between Hospital Nurses’ perception of patient safety management and standard precaution adherence” and found that more than one third of nurses were single. In contrast, this result was congruent with **Buettner, (2021)** who conducted a study entitled “Fast Facts for the ER Nurse: Guide to a Successful Emergency Department Orientation” and found that more than half of nurses were married.

Regarding level of education’s nurses, the current study showed that more than half of nurses had nursing technical institute. This result may be due to majority of participants were graduated from technical nursing institute. This result was supported with **Jeanes, et al., (2018)** who conducted a study entitled “The development of hand hygiene compliance imperatives in an emergency department” and found that more than half of nurses had technical nursing institute. Conversely, this result was in disagreement with **Yeon, & Shin, (2020)** who conducted a study entitled “Effects of education on the use of personal protective equipment for reduction of contamination” and found that three quarters of nurses had technical nursing institute.

Regarding experiences’ nurses, the current study showed that more than half of them had experience less than 5 years. This result may be due to majority of nurses had technical nursing institute thus their experiences were less than from five years. This result was in agreement with **Sharif, et al., (2018)** who conducted a study entitled “Evaluation of Nurses’ Performance Regarding Personal

Protective Equipment at Rania Teaching Hospital” and found that more than half of nurses had experience less than 5 years. On the other hand, this result was in disagreement with **Krein, et al.,(2018)** who conducted a study entitled “Identification and characterization of failures in infectious agent transmission precaution practices in hospitals” and found that more than half of nurses had experience more than 5 years

Regarding training courses’ nurses, the current study showed that more than half of them weren’t attend training courses about infection control and isolation. This result may be due to nurses had low experiences and they were nwly graduated. This result was accordance with **Marey, et al., (2020)** who conducted a study entitled “Efficacy of Implementation Management program about Infection Control practices for Nursing Staff” and found that more than half of them weren’t attend training courses about infection control. On the other hand, this result was in disagreement with **Berning, et al.,(2020)** who conducted a study entitled “Interventions to improve older adults' Emergency Department patient experience” and found that half of them were attend training courses about infection control

In regarding to residences’ nurses, the current study showed that more than half of nurses were lived in rural areas. This result may be due to people in rural areas were interested to join with nursing career. This result was accordance with **Faheim, et al., (2019)** who conducted a study entitled “Effect of Triage Education on Nurses’ Performance in Diverse Emergency Departments” and found that more than half of nurses were lived in rural areas.. On the other hand, this result was in disagreement with **Lam, et al.,(2019)** who conducted a study entitled “Emergency nurses' perceptions of their roles and practices during epidemics” and found that more than half of nurses were lived in urban areas

Regarding nurses’ total satisfactory knowledge, the current study showed that majority of the studied nurses had unsatisfactory total knowledge while minority

of them had satisfactory total knowledge. This result may be due to nurses needed to training program about isolation and infection control.

This result was supported with **Hoes, (2019)** who conducted a study entitled “Factors influencing Nurses’ decisions and actions when applying Standard Precautions for infection prevention in a private hospital in Namibia” and found that majority of nurses had unsatisfactory total knowledge about infection control. Conversely, this result was in disagreement with **Omar, et al., (2020)** who conducted a study entitled “Effectiveness of Training on Isolation Precaution Measures at Public Hospitals Khartoum State–Sudan” and found that majority of nurses had satisfactory knowledge about isolation precautions

Regarding nurses' total performance, the current study showed that majority of the studied nurses had unsatisfactory total performance while minority of them had satisfactory total performance. This result may be due to staff nurses in emergency department needed to training courses about infection control.

This result was accordance with **Lim, et al., (2019)** who conducted a study entitled “Association between Hospital Nurses’ perception of patient safety management and standard precaution adherence” and found that majority of nurses had unsatisfactory total performance about infection control. In contrast, this result was congruent with **Buettner, (2021)** who conducted a study entitled “Fast Facts for the ER Nurse: Guide to a Successful Emergency Department Orientation” and found that more than half of nurses had satisfactory total performance about infection control

Regarding relation between nurses' demographic characteristics and their total knowledge, the current study illustrated that there is a statistically significant relation between nurses' total knowledge and their educational level, their experience, and attending training courses about infection control and isolation. While, there is no statistically significant relation between nurses'

total knowledge and their ages, gender, marital status, and residence.

This result was supported with **Jeanes, et al., (2018)** who conducted a study entitled “The development of hand hygiene compliance imperatives in an emergency department” and found that there is a significant relation between nurses' demographic characteristics and their total knowledge. Conversely, this result was in disagreement with **Yeon, & Shin, (2020)** who conducted a study entitled “Effects of education on the use of personal protective equipment for reduction of contamination” and found that there is no statistically relation between nurses' demographic characteristics and their total knowledge

Regarding relation between nurses' demographic characteristics and their total performance, the current study illustrated that there is a highly statistically significant relation between nurses' total performance and attending training courses about infection control and isolation. Also, there is a statistically significant relation between nurses' total performance and their educational level. While, there is no statistically significant relation between nurses' total performance and their ages, gender, marital status, residence, and residence.

This result was in agreement with **Sharif, et al., (2018)** who conducted a study entitled “Evaluation of Nurses’ Performance Regarding Personal Protective Equipment at Rania Teaching Hospital” and found that there is a statistically relation between nurses' demographic characteristics and their total performance. On the other hand, this result was in disagreement with **Krein, et al.,(2018)** who conducted a study entitled “Identification and characterization of failures in infectious agent transmission precaution practices in hospitals” and found that there is no statistically relation between nurses' demographic characteristics and their total performance

Regarding Correlation between nurses' total knowledge and their total performance, the current study showed that there is a highly statistically significant positive correlation

between nurses' total knowledge and their total performance.

This result was accordance with **Marey, et al., (2020)** who conducted a study entitled "Efficacy of Implementation Management program about Infection Control practices for Nursing Staff" and found that there is a highly statistically significant positive correlation between nurses' total knowledge and their total performance. On the other hand, this result was in disagreement with **Berning, et al.,(2020)** who conducted a study entitled "Interventions to improve older adults' Emergency Department patient experience" and found that there is no statistically significant positive correlation between nurses' total knowledge and their total performance

### **Conclusion:**

The current study concluded that most of the studied nurses had unsatisfactory total performance while minority of them had satisfactory total performance regarding application of isolation precaution measures in emergency department. Majority of the studied nurses had unsatisfactory total knowledge while minority of them had satisfactory total knowledge regarding application of isolation precaution measures in emergency department. There is a highly statistically significant positive correlation between nurses' total knowledge and their total performance.

### **Recommendations:**

**In the light of results of this study, the following recommendations were suggested:**

- Periodic assessment of nurses' knowledge and performance regarding application of isolation precaution measures in emergency department.
- Providing training programs for nurses regarding application of isolation precaution measures in emergency department.
- Provide sufficient supplies and equipment for nurses for facilitating application of isolation precaution measures in emergency department.
- Provide full support for nurses who comply with isolation precaution measures

- Further studies should be conducted in different settings.

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