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Application of infection control guidelines among nurses working in surgical units: A cross-sectional study in Sudan

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ABSTRACT

Background: Infections are a permanent risk to patients in surgical units after surgical intervention. *Aim:* The current the survey aimed to determine how preventing infection guidelines are implemented in surgical units. *Methods:* It was a descriptive cross-sectional study. The study population includes eighty-one nurses working in surgical departments, they were assigned to the study as total coverage style, the data was gathered using a self-administered questionnaire and an observational checklist, the frequency, mean were generated and analyzed using SPSS version 23. Statistical significance was defined as a P-value of 0.05 or less. *Results:* Eighty nurses participated in the study, the study participants had given their responses according to the self-administered questionnaire and checklist, the result indicates that their presence of a difference that is statistical significance at 0.05 (0.01) and (75%) of respondents had good knowledge and practice about guidelines for infection control. *Conclusion:* The results of the present research conclude the nurses had good knowledge and practice about infection control guidelines.

Keywords: Infection control, Guidelines, Nurses, Surgical units

1. INTRODUCTION

Surgical units are units for patients who receive medical care after undergoing surgical interventions such as general surgery, orthopedics, hernia, appendectomy, laparoscopy intervention and other surgical cases (Al-Omari et al., 2020; Parmeggiani et al., 2010). Therefore, the nurse's work in the surgical units must be fully aware of the infection control guidelines, due to the seriousness of the cases in those units and their susceptibility to infection (Umscheid et al., 2019). The Centers for Disease Control and Prevention (CDC) offers specific audit tools and checklists for surgical unit cleaning, which should be followed. Several infection prevention techniques, such as hand cleanliness, catheter exit site care, and injectable medicine preparation, are strongly recommended by theCenters for Disease Control and Prevention (CDC) (William, 2019). The occurrence of infection after surgical interventions, one of the reasons is the failure to follow infection control methods in surgical procedures (Haque et al., 2018).

As a result, nurses playing a major role in the implementation of infection control guidelines, and they should be well-versed in the subject and incorporate it into their practice to minimize the negative consequences (Dawson, 2017). The (CDC), the Association of Professionals in Infection Control (APIC) and the European Best Practice Guidelines are among the international organizations that have developed recommendations and suggestions for preventing and controlling infections in use by patients after intervention surgery. However, these guidelines are extensive and sometimes differ among different guideline-producing bodies, by examining, extracting, and comparing the main parts of guidelines and recommendations on infection prevention and control in surgical units, we hope to make them more accessible, raise awareness, and encourage implementation among nurses who work in surgical units (Karkar, 2018).

Surgery, invasive procedures and immunosuppressive medicines, organ transplants, and other factors make hospitalized patients more vulnerable to infection, furthermore, bacteria thrive in health-care settings, and gaps in infection-control protocols and practices, as well as patients' reduced defense mechanisms, contribute to the development of nosocomial infections, patients' hospital stays are lengthened by nosocomial infections, which increase morbidity and mortality, furthermore, detecting and treating these illnesses places a significant strain on health services and the healthcare budget (Mehta et al., 2014). In order to be able to control and avoid any disease, we must understand the ways of entering the cause, infection has six known entry and exit routes, the transmission of the kit takes place in six known ways, so we must break that chain to stop the transmission of the causative germs (Ahmad et al., 2019).

The most efficient strategy to avoid transmission by the touch route is to wash your hands, stopping the transmission of the infection also depends on not direct contact of wounds with contaminated objects this is known as indirect contact, in health-care settings, nearly any device, such as endoscopes, breathing equipment, could be infected with bacteria, in order, we can control the infection that occurs from health care places by sterilization by following the methods of sterilization and surgical disinfection in the care of patients (Philip et al., 2018).

2. MATERIALS AND METHODS

The current study aimed to determine how infection control guidelines are implemented by the nurses in surgery units at Khartoum teaching hospital.

Research questions

What depth of expertise of the nurses about application infection control guidelines in the surgical units?
What are nurse practice regarding application infection control guidelines in surgical units?
Is there a significant relationship between a nurse practice and knowledge regarding application infection control guidelines in surgical units?

Study design

Our descriptive cross-sectional study was conducted at Khartoum teaching hospital

Study setting

This study was conducted at Khartoum teaching hospital in the surgical departments of the hospital, such as (Intensive care units for surgical cases, operating room, emergency room and injuries)

Study duration

This study was conducted in the period from March to May 2021.

Study Sample

The study sample consisted of eighty nurses, who work in surgical departments in Khartoum teaching hospital in many surgical units.

Inclusion criteria

Sudanese nurses working in the Khartoum teaching hospital staff of Intensive care units for surgical cases, operating room, emergency room and injuries.

Exclusion criteria

Nurses of non-Sudanese nationalities, nurses who work in non-surgical units

Data collection techniques

Data collection by self-administrative questionnaire, participants' knowledge was assessed by fifteen questions about infection control guidelines, each question had a set of possible answers, and the correct response received one point while the incorrect or "I don't know" response received zero. The knowledge scores were divided into three categories: low knowledge (less than 50%), reasonable knowledge (between 51% and 75%), and good knowledge (more than 75 %). Using a 5-item Likert scale, thirteen areas of infection control guidelines were used to evaluate practice (ranging from strongly agree 5 to strongly disagree, 1). The practice test results were divided into three categories: good (more than 80%), fair (59%- 79%), and poor less than 59%.

Data analysis

Data were analyzed by using (SPSS) version 23. The deferent statistical measure was used, for relationship studies; frequency, percentage, mean with standard deviation (SD), and a P-value of 0.05 were deemed statistical significance.

3. RESULTS

Table 1 shows the demographic characteristics of the study participants 80. Most of the subjects 50% were 31 - 35 years old, 80% percent of the participants were female, 45% of the participants had a bachelor's degree, and only 4% had a doctorate, 40% of the participants have experience ranging from (1-2 years) and 81% of the participants had attended training courses on infection control.

Table 1 Demographic characteristics of study

	Variables	Frequency	Percentage
Age of study participants	20 - 30 year	15	19%
	31 - 35 year	39	49%
	36 - 40 year	22	27%
	41 - 50 year	5	6%
Gender of study participants	Male	18	21%
	Female	63	79%
Level of education	Diploma	11	14%
	Bachelor	46	56%
	MSc	21	26%
	PhD	3	4%
Years of experience among participants	Less than one year	17	21%
	1 - 2 years	40	45%
	3 - 5 years	17	21%
	More than 5 years	7	9%
Last attend training courses about infection control	Less than 1year	13	16%
	1-2 year	29	36%
	More than 2 years	28	34%
	Never attended	11	14%

Table 2 Distribution of correct and incorrect answers regarding knowledge of guideline for infection control

Nurses' knowledge regarding guidelines for infection control	Correct N%	Incorrect N%	*t*	*P*
Disinfection	64 (79)	17 (21)	-03.5	0.02
Sterilization	72 (89)	9 (11)	-11.2	0.01
Environmental infection control	48 (59)	33 (41)	-02.9	0.32
Hand hygiene	68 (84)	13 (16)	-10.0	0.03

Isolation precautions	38 (46)	43 (45)	-08.0	0.15
Chain of infection	50 (61)	31 (39)	-07.2	0.03
Strategies to control health infection	54 (66)	27 (34)	-07.0	0.02
Personal protective equipment	62 (76)	19 (24)	-09.0	0.01
Overall knowledge	57 (70)	24 (30)	-05.0	0.00
Mean ± SD	0.87 ± 0.34		-03.0	0.01

Table 2 shows the result the mean value of nurses' correct knowledge of guidelines for infection control was 89% while the incorrect knowledge of the nurses was 11%, there is a significant difference ($P < 0.05$). Table 3 and 4 shows there is no statistical significance at a P-value of 0.5 regarding relationship between age and knowledge of nurses regarding Infection control guidelines. Table 5 shows there is no statistical significance at a P-value of 0.5 regarding the relationship between gender and knowledge of nurses regarding Infection control guidelines.

Table 3 Frequency and percentage of nurses practice of infection control guidelines

	Never Practice N%	Sometimes Practice N%	Always Practice N%
I do hand hygiene, before and after every episode of patient contact	14 (16)	9 (11)	58 (73)
I use clean and disinfect surfaces	6 (6)	11 (14)	64 (80)
I use of personal protective equipment (PPE)	3 (2)	27 (34)	51 (64)
I use protect against Airborne Infections	8 (9)	18 (22)	55 (69)
I use contact precautions	2 (2)	33 (41)	46 (57)
I use droplet precautions	4 (4)	45 (56)	32 (40)
I use airborne precautions	8 (9)	29 (36)	44 (55)
I use eye protection	6 (6)	37 (46)	38 (47)
I use respiratory hygiene	10 (11)	27 (34)	44 (55)
I use sharps safety (safe injection practices)	12(1)	21 (26)	58 (73)
I use sterile instruments and devices	0 (0)	7 (9)	73 (91)
Overall	6 (6)	22 (28)	53 (67)

Table 4 Relationship between age and knowledge of nurses regarding Infection control guidelines

		knowledge			*P*- value
Age of study participants	Variables	Poor N%	Medium N%	Good N%	0.09
	20 - 30 year	3 (4)	6 (8)	6 (8)	
	31 - 35 year	4 (5)	8 (10)	28 (34)	
	36 - 40 year	3 (4)	7 (9)	12 (14)	
	41 - 50 year	0 (0)	3 (3)	3 (4)	

*There is no significant difference at the 0.05 level.

Table 5 Relationship between gender and knowledge of nurses regarding Infection control guidelines

		knowledge			*P*- value
Gender of study participants	Variables	Poor N%	Medium N%	Good N%	0.07
	Male	3 (4)	9 (11)	5 (6)	
	Female	11 (14)	24 (30)	46 (56)	

*There is no significant difference at the 0.05 level

Table 6 Relationship between level of education and knowledge of nurses regarding Infection control guidelines

		knowledge			*P*- value
Level of education	Variables	Poor N%	Medium N%	Good N%	0.00*
	Diploma	1 (1)	4 (5)	6 (8)	
	Bachelor	9 (11)	17 (21)	20 (24)	
	MSc	5 (6)	9 (11)	7 (9)	
	PhD	0 (0)	0 (0)	3 (4)	

*There is significant difference at the 0.05 level

Table 6 shows the statistical significance at a P-value of 0.5 regarding the relationship between the level of education and knowledge of nurses regarding Infection control guidelines. Table 7 shows the statistical significance at a P-value of 0.5 regarding the relationship between Years of experience among participants and knowledge of nurses regarding Infection control guidelines. Table 8 Show statistical significance at a P-value of 0.5 regarding the relationship between Last attended training courses about infection control and knowledge of nurses regarding Infection control guidelines (figure 1 and 2).

Table 7 Relationship between Years of experience among participants and knowledge of nurses regarding Infection control guidelines

		knowledge			*P*- value
Years of experience among participants	Variables	Poor N%	Medium N%	Good N%	0.01*
	Less than one year	3 (4)	5 (6)	9 (11)	
	1 - 2 years	11 (14)	13 (16)	16 (19)	
	3 - 5 years	3 (4)	5 (6)	9 (11)	
	More than 5 years	1 (1)	1 (1)	5 (6)	

*There is significant difference at the 0.05 level

Table 8 Relationship between Last attend training courses about infection control and knowledge of nurses regarding Infection control guidelines

		knowledge			*P*- value
Last attend training courses about infection control	Variables	Poor N%	Medium N%	Good N%	0.02*
	Less than 1year	1 (1)	7 (9)	5 (6)	
	1-2 year	3 (4)	11 (14)	16 (19)	
	More than 2 years	7 (9)	7 (9)	13 (16)	
	Never attended	9 (11)	2 (3)	0 (0)	

*There is significant difference at the 0.05 level

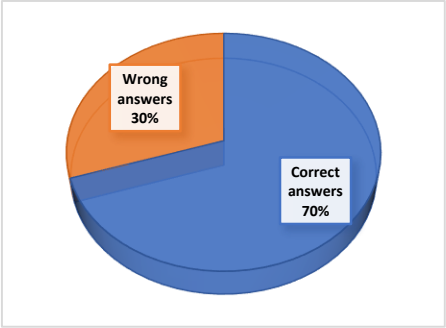

Figure 1 Percentage distribution of the participant's total knowledge regarding guidelines for infection control.

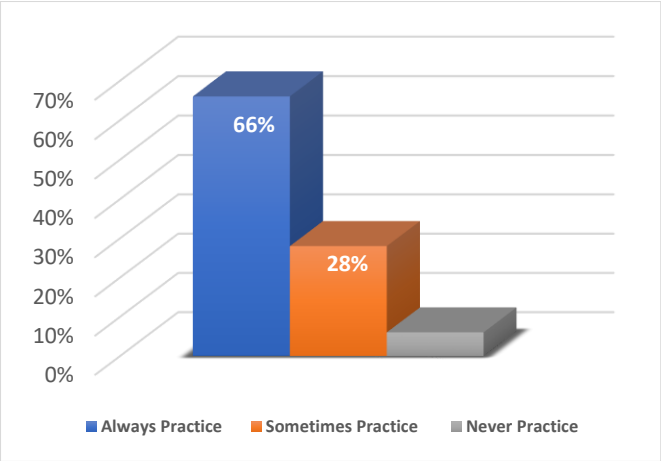

Figure 2 shows the nurses practice of infection control guidelines

4. DISCUSSION

Surgical units are places where infection control guidelines are required to be most effective for cases, so nursing awareness and nursing practices can play important roles the prevention of infections. This is a descriptive study, was conducted aims to identify the application of infection control guideline among nurses working in surgical units, eighty nurses were included in this study, the majority of them are female 79%, their age ranged between 31 - 35-year-old, more than half are educated (Bachelor 56%), this finding is supported by studies on infection control guidelines (Alhumaid et al., 2021; Alaa et al., 2021). Our study's findings revealed that more than 75% of them have taken courses on infection control and 45% years of experience among participants, this result is supported by two study which found that the courses and training courses are directly related to the enhancement of knowledge and practical experience (Kim et al., 2021; Alhumaid et al., 2021). In this study, 70% of nurses had good knowledge about all aspects of guidelines for infection control at ($p < 0.05$ 0.01), this result was supported by a study conducted in Northeast Ethiopia, and 80% of nurses were a good knowledge (Gezie, 2021).

Regarding nurse's practice of infection control guidelines was 73% of nurses they do hand hygiene, before and after every episode of patient contact, the result was similar to a study conducted about infection control guidelines (Sickbert et al., 2016; Abdella et al., 2014). In practice of nurses regarding standards for infection control are the standard of care about disinfect surfaces, use of personal protective equipment (PPE), sharps safety and use sterile instruments and devices, the results were as follows, respectively, 6% never practice, 28% sometimes practice, 67% always practice, these results are consistent with several studies conducted on infection control guidelines (Sham et al., 2021; Marche et al., 2021; Naghdi et al., 2021). The study shows there are no relation between the gender, age, and knowledge at p-value 0.05, this result is similar to the two studies conducted on infection control guidelines (Biniyam et al., 2018; Geber, 2018).

The study shows a positive relationship between the degree of qualifications and years of work experience and last attend training courses about preventing infection and knowledge among participants at p-value 0.05, this result was supported by a study conducted in Ethiopia and found that the degree of qualification has a positive relationship with knowledge (Geber et al., 2018; Shelley, 2012).

5. CONCLUSION

The study concluded that the nurse's work in surgical units had sufficient knowledge and practice about infection control guidelines, the study shows a positive relationship between the degree of qualifications and years of work experience and last attend training courses about preventing infection and knowledge among participants at p-value 0.05, and there are no relation between the gender, age, and knowledge at p-value 0.05.

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Author Contributions

The manuscript was written by all of the contributors equally in all sections of the research from data collection, analysis and interpretations.

Ethical approval

Ethical approval letter has been obtained from Khartoum teaching hospital issued a written official letter to do the study, verbal consent from participants after explaining of research objectives (The ethical approval code: is KH-0013.SUD/2019).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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