https://doi.org/10.15218/ejnm.2025.09 Erbil j. nurs. midwifery, Vol. 8, No. (1), May 2025
Original Article

Knowledge, Attitude, and Practice of Nurses Concerning Hospital Acquired Infections in Surgical Specialty Hospital- Erbil Cardiac Center

Niyan Anwar Omar; *Ataya Emarati Maternity and Childhood hospital, Erbil Directorate of Health, Ministry of Health, Kurdistan Region, Iraq.* (Correspondence: niyananwar1990@gmail.com)

Karwan Mohammed M-Amen; *Department of Nursing, College of Nursing, Hawler Medical University, Erbil, Kurdistan Region, Iraq.*

ABSTRACT

Background and Objectives: Hospital-acquired infections also called nosocomial infections refer to infections acquired by patients during their period in the hospital, in which they were not infected before entering the hospital, and the patient is admitted for a reason other than that infection, and whose symptoms appear only 48 hours or more after entering the hospital. This study assessed the nurses' knowledge, attitude, and practices regarding hospital-acquired infections.

Methods: A descriptive cross-sectional study was conducted from September 2021 to September 2022. A non-probability convenience sampling technique was used among 170 nurses who worked in the Surgical Specialty Hospital Erbil- Cardiac Center in Erbil City. Data collected through a self-report questionnaire composed of three parts: part 1, socio-demographic characteristics, part 2 knowledge and part 3, attitude of participating nurses. The nurses' practice was observed through a checklist. Data were analyzed using SPSS-26.

Results: Most of the participants (59.4%) were aged 31 to 40 years old and more than half of them (56.5%) were male. About 66% of the participants had a diploma degree in nursing. Approximately (69%) of the nurses had 5.1 to 14 years of clinical experience. Less than half of nurses had good overall knowledge and practice, (43.5%) and (38.2%) respectively. While the majority of them (87.6%) had a positive attitude.

Conclusion: A remarkable number of nurses had good knowledge and the majority of them had a positive attitude about HAIs. Also, the nurses had acceptable practice scores. Formulation and administration of an extensive program for infection control in hospitals is recommended to facilitate healthcare professionals to follow written instructions for using safety procedures against HAIs.

Keywords: Nosocomial Infection; Knowledge; Attitudes; Nurses.

Received: 23/11/2022 *Accepted: 08/02/2023* *Published: 30/05/2025*

INTRODUCTION

Hospital Acquired Infections (HAIs) refer to infections acquired by patients during their period in the hospital, in which they were not infected before entering the hospital and the patient admitted for a reason other than that infection, and whose symptoms appear only 48 hours or more after entering the hospital [1]. The incidence of HAIs is approximately 5–8% of admitted patients in the world and one-third of these infections are preventable [2]. HAIs occur worldwide and affect all countries [3]. HAIs are present in both developed and developing countries, but 75% of this burden occurs in developing countries [4].

Several epidemiological types of research have described the causes of HAIs and mentioned that HAIs are caused by pathogens which are existing in all places, for example, viruses, bacteria, and fungi [5]. The pathogens are not present or incubated before the patient's admission into the healthcare facility and are most likely transmitted by direct person-to-person contact during invasive medical procedures [6]. Within the hospital, transmission happens by cross-contamination of patients, infected hands of healthcare personnel who have regular interaction with patients, or contaminated objects [7]. HAIs are disease forms that may be transmitted from the healthcare staff to the patients or from patients to healthcare staff. In addition, the infection might have occurred due to the spread of infection from one patient to another patient [8]. Some of the pathogens are highly resistant to antimicrobial agents, and this necessitates the prescription of more potent and costly antimicrobial agents [9].HAIs led to slow patient recovery and increased patient relatives suffering due to the difficulties related to HAIs [10]. The HAIs can lead to an over consideration of the additional duration of hospital admission between 2-28 days, according to the type of infection, the duration of hospitalization differs [11]. HAIs are generally attributable to pathogens including bacteria, fungi, viruses, and parasites spread from one patient to another via direct or indirect contact [12].Nurses' or healthcare team members' knowledge regarding HAIs is the indicator for the spread of the HAIs at hospital and health care facilities. Inappropriate information about infection control measures performance by healthcare professionals reduces the submission of infection control practices appropriately, and this leads to continuous risk from HAIs as health workers do not follow infection control measures completely [13]. Despite instituted infection control guidelines, till now HAIs cannot be avoided due to a shortage of regulations on the application of these guidelines [1]. Various research has correspondingly recommended that appropriate knowledge and attitude could be vital aspects of a suitable prevention strategy and infection control [8].To the researcher's best knowledge, there have been few studies conducted to explore the nurses' knowledge, attitude, and practices regarding HAIs globally, and no studies in the Kurdistan region-Iraq, particularly. Therefore, conducting this study is deemed essential. This study was conducted to assess the nurses' knowledge, attitude, and practices regarding hospital-acquired infections.

METHODS

A descriptive cross-sectional study was conducted from September 2021 to September 2022 among 170 nurses working at the Surgical Specialty Hospital Erbil- Cardiac Center in Erbil City. The population size was 300 nurses working at Surgical Specialty Hospital Erbil- Cardiac Center. Therefore, the calculated sample size was 169, but the researcher decided to select 170 nurses as a sample size to be a more accurate representative sample. The Epi info version 7 program (issued by CDC and WHO) was used for sample size estimation. The expected frequency (50%) based on a study conducted in India and a 95% confidence interval [14]. The inclusion criteria included nurses (both genders) who provide direct care to patients in the hospital, as well as having more than one year of experience. Nurses who were not available during the period of the study were excluded. The researcher constructed the questionnaire after an extensive review of the relevant literature. The socio-demographic characteristics of nurses involved age, sex, marital status, educational status, monthly income, employment years in the hospital, employment status, nurses' current specialty unit, participation in training courses on prevention and control of hospital-acquired infections, and their source of information. Nurses' knowledge concerning hospital-acquired infections consisted of 10 questions and included two options (1= incorrect and 2=correct). The calculation of the overall nurses' knowledge concerning HAIs (ten items) was categorized into three groups: poor knowledge if the score is between (0–3), fair knowledge if between (4-6), and good knowledge if between (7-10). In addition, nurses' attitudes concerning hospital-acquired infections consisted of 10 statements and included three options (0=Disagree, 1= Neutral, and 2= Agree). The calculation of the overall nurses' attitude concerning hospital-acquired infections was categorized into three groups: poor attitude if the score is between (0 – 0.66), fair attitude if between (0.67 – 1.33), and good attitude if between (1.34 -2). Furthermore, nurses' practice was observed and scored as (0=Never, 1= Sometimes, and 2= Always). The calculation of the overall nurses' practice concerning hospital-acquired infections (10 items) was categorized into three groups: poor practice if the score is between (0 – 0.66), fair practice if between (0.67 - 1.33), and good practice if between (1.34 -2). A panel of experts in various fields examined the questionnaire's content for its clarity, appropriateness, and relevancy and validated the study tool. The modification in the study tool was typically in the attitude and practice section, where the experts removed and changed some questions. The reliability of the study was assessed by using a pilot study on a purposive sample of eleven nurses who worked at different units in the Surgical Specialty Hospital Erbil - Cardiac Center. The pilot study was conducted from 5th January to 21st January/2022, and as a result, some questions from the questionnaire were added and others were removed from the questionnaire form. The data were collected using non-probability, convenience sampling techniques. For each questionnaire form, a different code with a specific number was used. The data about nurses' knowledge and attitude were collected through a questionnaire form, and each nurse was observed for evaluation of his/her practice daily between 7:30 am and 4:00 pm during their working shifts at the hospital. The researcher obtained an approval letter from the Ethics Committee at Hawler Medical University/College of Nursing (Code No.107, date 7/10/2021). Permission was

also obtained from the General Directorate of Health/Erbil as well as the administration of Surgical Specialty Hospital Erbil-Cardiac Center. Before the definite start of data collection, the potential participants were asked to give a verbal consent showing their readiness to be included in the study. The data analysis was performed through the application of a Statistical Package for Social Sciences (SPSS) version 26 for calculating descriptive statistical data analysis (frequency and percentage).

RESULTS

In this study, 170 nurses were recruited, most of the nurses (59.4%) were aged between 31 and 40 years old, ranging from 22 to 55 years, and more than half of them (56.5%) were male. Approximately (67%) of the participants had a diploma degree in nursing. Moreover, out of the total 170 nurses, more than half of them (54.7%) were full-time nurses, and 68.8% of the nurses had clinical experience between 5.1 - 14 years. Most of the nurses (66.5%) reported that they have sufficient monthly income. More than half (57.1%) of the nurses have not received any training courses. The Internet was the main reported source of information, as shown in Table 1.

Table 1: Sociodemographic characteristics of the study participants

Variables		No. (%)
Age (years)	30 – 21	57 (33.5)
	40 -31	101 (59.4)
	+ 41	12 (7.1)
Gender	Male	96 (56.5)
	Female	74 (43.5)
Marital status	Single	38 (22.4)
	Married	132(77.6)
Level of education	High school diploma/nursing	2(1.1)
	Diploma	113(66.5)
	Bachelor	51 (30)
	Master and PhD	4 (2.4)
Employment years in hospital	5.0 =>	36 (21.2)
	14.0 - 5.1	117 (68.8)
	+ 14.1	17 (10)
Employment status	Full time	93 (54.7)
	Contract	77 (45.3)
Have you participated in training courses on the prevention and control of hospital-	No	97 (57.1)
	Yes	73 (42.9)
If yes, how long ago? (months)		
If yes, what was the duration of the course? (months)		
What is your source of information?	Self-reading	34 (20)
	Training courses and workshops	19 (11.1)
	Departmental seminars	20 (11.7)
	Internet	72 (42.3)
	Self-reading and internet	25 (14.7)

Regarding the nurses' knowledge about HAIs, the data depicts that the nurses answered most of the knowledge questions correctly, 6 out of 10. The item involving factors that influence HAIs was ranked first (77.1%) (i.e., the most correctly answered question), and the item related to standard precaution of infection control applied to all patients all of the time was ranked second (72.4%). Furthermore, the item concerning wearing the same pair of gloves for multiple patients was ranked third with (71.8%) (see Table 2).

Table 2: Knowledge of nurses regarding HAIs

Items	Correct answer No. (%)	Incorrect answer No. (%)
Hospital-acquired infections definition?	76 (44.7)	94 (55.3)
Factors influencing the hospital-acquired infections	131(77.1)	39 (22.9)
The most common way of hospital-acquired infections transmission	89 (52.4)	81 (47.6)
Standard precautions for infection control applied to all patients all of the time	123(72.4)	47 (27.6)
The most effective way to stop the transmission of hospital-acquired infections is washing hands	72(42.4)	98 (57.6)
Hand hygiene should be performed before and after direct patient contact.	116 (68.2)	54 (31.8)
Washing hands with soap or an alcohol-based antiseptic decreases the risk transmission of HAIs.	104 (61.2)	66 (38.8)
Wearing gloves decrease your chance of getting HAIs.	66 (38.8)	104 (61.2)
When there is a risk of a splash of blood or body fluid the nurse should wear gloves, mask, goggle, and gown.	60 (35.3)	110 (64.7)
I can't wear the same pair of gloves for multiple patients as long as there is no visible contamination on the gloves.	122 (71.8)	48 (28.2)

Regarding the attitude of the nurses towards HAIs, the highest percentage (94.1%) agreed with the statement 'use of antiseptic is necessary to prevent HAIs, followed by 'I believe the infection control policies and guidelines will reduce rates of HAIs' (83.5%). The majority (84.7%) of the nurses disagreed with the statement 'It is not my responsibility to comply with the HAIs control guidelines' as shown in Table 3.

Table 3: Attitude of nurses regarding HAIs

Items	Disagree No. (%)	Neutral No. (%)	Agree No. (%)
Health worker's hands are a vehicle for the transmission of the hospital-acquired pathogen	31 (18.2)	40 (23.5)	99 (58.2)
I don't have to wash my hand if used gloves.	112 (65.9)	14 (8.2)	44 (25.9)
Hand hygiene after removing gloves is a hospital-acquired infection control measure.	26 (15.3)	15 (8.8)	129 (75.9)
The use of antiseptic is necessary to prevent hospital-acquired infections	3 (1.8)	7 (4.1)	160 (94.1)
I believe invasive procedures are not a risk factor for infectious organisms	131 (77.1)	18 (10.6)	21 (12.4)
I feel needles should not be recapped after use and before disposal.	126 (74.1)	3 (1.8)	41 (24.1)
I believe the infection control policies and guidelines will reduce rates of hospital-acquired infections	9 (5.3)	19 (11.2)	142 (83.5)
It is not my responsibility to comply with the hospital-acquired infection control guidelines.	144 (84.7)	15 (8.8)	11 (6.5)
Changing mask before going to another patient is a hospital-acquired infections control measure	42 (24.7)	46 (27.1)	82 (48.2)
I should attend in-service training/workshops related to infection prevention and control regularly.	9 (5.3)	36 (21.2)	125 (73.5)

Regarding the nurses' practice concerning HAIs, the majority (91.2%) received the COVID-19 vaccine. Besides, it is just under three-quarters (73.5%) of the sample washed their uniform/white coat weekly.

Sixty percent of participants never discarded infectious materials and leftover samples according to the guideline as shown in Table 4.

Table 4: Practice of nurses regarding HAIs

Items	Never No. (%)	Sometimes No. (%)	Always No. (%)
I wash my hands before and after direct contact with the patient.	39 (22.9)	63 (37.1)	68 (40)
I put on a mask and glasses when performing invasive and body fluid procedures.	57 (33.5)	62 (36.5)	51 (30)
I change my gloves before starting to handle a new patient	11 (6.5)	55 (32.4)	104 (61.2)
Surgical operation sites are shaved with razors.	26 (15.3)	54 (31.8)	90 (52.9)
I wash my uniform/ white coat weekly	0 (0)	45 (26.5)	125 (73.5)
I discard infectious materials and left-over samples according to the guideline	102 (60)	43 (25.3)	25 (14.7)
I received the COVID-19 vaccine.	15 (8.8)	0 (0)	155 (91.2)
I clean my stethoscope/ equipment with antiseptic (e.g., 70% alcohol).	58 (34.1)	37 (21.8)	75 (44.1)
I clean my mobile phone with antiseptic (e.g., 70% alcohol).	93 (54.7)	44 (25.9)	33 (19.4)
I attend in-service training/workshops related to infection prevention and control yearly.	60 (35.5)	67 (39.6)	42 (24.9)

Less than half of nurses had good overall knowledge regarding HAIs (43.5%). While the majority of them (87.6%) had a fair attitude overall regarding HAIs.

Besides, about half of the participants (50.6%) had fair overall practice regarding HAIs (see Table 5).

Table 5: Overall knowledge, attitude, and practice of nurses regarding HAIs

Overall Score		F. (%)
Overall knowledge	Poor knowledge	40 (23.5)
	Fair knowledge	56 (32.9)
	Good knowledge	74 (43.5)
Overall Attitude	Positive attitude	149 (87.6)
	Negative attitude	21 (12.4)
Overall Practice	Poor practice	19 (11.2)
	Fair practice	86 (50.6)
	Good practice	65 (38.2)

DISCUSSION

The present study assessed the nurses' knowledge, attitude, and practices regarding hospital-acquired infections. The finding of the present study showed that most of the nurses had good overall knowledge about HAIs. The results of the present study are in accordance with a study conducted in India [13]. However, these results are higher than the results of a study conducted in Yemen [15]. Although most of the nurses obtained a good knowledge score, continuous and regular scientific seminars and workshops incorporating evidence-based practice regarding HAIs need to be undertaken to consolidate the knowledge and improve the practice. The findings showed that the majority of nurses were knowledgeable about "factors that influence HAIs" (77.1), followed by "standard precautions for infection" (72.4%). Likewise, a research study conducted in India in 2016 had a similar outcome [16]. However, this disagrees with the results of a study done in Nigeria [17]. Regarding nurses' source of information, less than half of nurses (42.4%) got their information from the Internet. This is in disagreement with a study done in India that found nurses' common source of information about HAIs was seminars (39.7%) [18]. This suggests that the nurses rely highly on different online resources to obtain information concerning the HAIs. It is critical to state that this is of considerable concern, due to the fact that some information obtained from the Internet might contain unreliable information from unreliable sources, and this may be as a result mislead the nurses' responses towards the HAIs. Concerning the overall nurses' attitude concerning HAIs, the majority of nurses had a positive attitude towards HAIs. The results of the present study are supported by a study carried out . on 172 healthcare providers in India [16]. However, these results are higher than the results of an interventional study conducted in Malaysia [19]. Most of the nurses achieved a fair to good overall score in practice concerning HAIs. The results of the present study are lower than a study conducted in Egypt, which was conducted among 77 nurses working at the ICU [20]. Nevertheless, current study findings are more assuring than a study conducted in Ethiopia on 191 healthcare providers [21]. In addition, it is more assuring than a study conducted in Saudi Arabia (226 healthcare providers) [2]. Only 40% of nurses always washed their hands before and after direct contact with the patient. The figure of the present study is higher than a study done in Ethiopia, which showed only 18.2% and 27.8% washed their hands pre- and post- interaction with the patient [22]. Nevertheless, the findings of the current study are lower than a study done in Ogun State, Nigeria that showed the majority of participants (99.6%) performed hand-washing techniques before and after dealing with patients [23]. It is worth mentioning that the current data were collected during the COVID-19 outbreak and eventually the staff's practice may have been affected by it due to the fact that precautionary measures such as hand washing and wearing face masks were made essential to mitigate the spread of the infection The results of this study suggest that HAIs practice should be improved on a broader scale. In order to improve the quality of healthcare with relation to infection prevention, the healthcare system and policymakers should make an effort. Even though the majority of healthcare providers have gained positive attitudes and good knowledge about HALs, the management system still needs to be improved. As a result, the health system and policymakers

should take action to raise the knowledge, attitude, and practice of the medical staff towards HAIs. Training programs about HAIs should be provided by the hospital specifically for newly hired healthcare professionals.

CONCLUSION

A large proportion of nurses working in Surgical Specialty Hospital Erbil- Cardiac Center had good knowledge and attitude about HAIs. In addition, they had acceptable practice scores. Formulation and administration of an extensive program for infection control in hospitals to assist healthcare professionals to follow written instructions for using safety procedures against HAIs. Further research might be necessary as researchers should also continue discovering the aspects that may suggestively impact the knowledge of nurses concerning the prevention of HAIs using well-designed research.

CONFLICT OF INTEREST

The authors report no conflicts of interest.

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