

**Infection control strategies between knowledge and practice: a study in hussein
medical city-karbala**

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ABSTRACT:

Background: Infection control strategies designed to prevent the spread of healthcare-associated infections can be grouped into two categories: vertical and horizontal. Vertical strategies focus on a single organism while horizontal strategies aim to control the spread of multiple organisms simultaneously. Objective: To assess nurse's knowledge and practice of infection control strategies during work in primary health care. Methodology: A descriptive quantitative study design was conducted to assess knowledge and practice about infection control strategy among nursing staff in Imam Hussein Medical City. The study was initiated from the period of 8ht July (2024) to 19th September (2024) (2024). A non-probability (convenience sample) consists of thirty males and female from nursing staff. The data collected through the utilization of a questionnaire and, by an interviewing technique with the nurses. Content validity for the study instrument was determined by using the panel of experts to investigate the clarity, relevancy, and adequacy of the questionnaire to achieve the present study's objectives. The results: The study findings show the nursing staff have a prominent level of knowledge and practice about infection control strategies in Imam Hussein medical city. Conclusion: The conclusion of the study is that there is an elevated level of knowledge and practice between nursing staff in imam Hussien medical city Recommendation: researchers recommended in importance to assess nursing practice to prevent infection transmission between staff and patients.

Keywords: Infection control, Hospital acquired infections, Nurses practice, Strategies

1. Introduction:

The infiltration and growth of microorganisms that are not typically found in the body, such as bacteria, viruses, and parasites, is known as an infection. An infection may be subclinical and symptomless, or it may be clinically evident and symptomatic. An infection-related sickness can either stay localized or spread through lymphatic or blood arteries to become systemic, or body-wide [1]. Infections do not include microorganisms that are naturally present in the body. For instance, there is no infection of the bacteria that typically reside in the mouth and intestine [2]. Hospital acquired infections (HAIs), also known as nosocomial infections, are infections that a patient contracts 48 hours after being admitted to a hospital or healthcare facility for non-infection-related reasons, or before the patient was admitted to the facility and had no prior infections [3]. Healthcare systems and organizations must prioritize preventing healthcare-associated infections (HAIs), which pose a serious threat to the safety of both patients and healthcare workers (HCWs) [4]. HAIs can impact 9–37% of patients admitted to intensive care units (ICUs) and affect 5–15% of hospitalized patients [5].

1.1. The importance of studying:

Hospital-acquired infections (HAIs) continue to be a hazard despite improvements in the healthcare system. According to the Centers for Disease Control and Prevention (CDC), 99,000 deaths are linked to an estimated 1.7 million infections that take place in US hospitals each year [6]. To the best of our knowledge, no research has been done on nurses' understanding of infection prevention in the study area of Iraq. Since evaluating current infection prevention practices is the first step in creating an effective infection control program, the purpose of this study was to gauge the nurses' understanding of infection control prevention strategies in Al-Hussein Medical City, Iraq. The current study will be crucial for policymakers and decision makers as they create strategic plans and programs to reduce HAIs. Additionally, the findings assist nurses and other healthcare professionals in raising the standard of care.

provision of services and initiatives to avoid infections. Lack of awareness is one of the main causes of poor compliance. Although different institutional levels have implemented strategies, a major contributing factor to the rise in nosocomial infection rates is noncompliance. [7].

1.1.1 The problem descriptions

Assessment of nurse knowledge and practice of infection control techniques by nurses while they are employed at Imam Hussein Medical City.

1.1.2 The study's goal

1. Evaluate the nurse's proficiency with infection control strategies while they are employed at Imam Hussein Medical City.

2. Determine the connection between nurses' sociodemographic information and their level of expertise.

1.2. Strategies for infection control:

There are two types of infection control techniques that are intended to stop the spread of infections linked to healthcare: vertical and horizontal. Hand washing, selective digestive tract decolonization, universal decolonization, antimicrobial stewardship, and environmental cleaning are examples of horizontal techniques. There are benefits and drawbacks to both horizontal and vertical infection prevention techniques. Vertical interventions are helpful in some circumstances, even if horizontal solutions are preferred. Local epidemiology should be taken into consideration while selecting infection control measures. [8]. Crucially, there are two different categories of infection prevention and control measures: standard precautions and transmission-based precautions. Standard precautions consist of the bare minimum of infection prevention strategies intended to shield healthcare workers and patients from infections linked to healthcare in all contexts. Regardless of a person's diagnosis or suspected

infectious status, all healthcare workers must follow these standard precautions because: people can be infectious before they exhibit symptoms or laboratory test confirmation; certain procedures increase the risk of infection transmission; and people are susceptible to catching infectious agents from surfaces and equipment in the environment [9].

The Ministry of Health in Iraq has been working tirelessly to increase the scale of the infection prevention program and to compile all current information and useful interventions in the field of infection prevention and patient safety as part of a healthcare reform initiative. However, despite these efforts, the high burden of HAIs in Iraq is a major concern, and infection prevention activities are low. Furthermore, despite the sharp rise in the construction of healthcare facilities, there is a dearth of national statistics on infection prevention. The majority of the few studies that have been done are case studies that are restricted to a small number of healthcare facilities that are close to one another [10].

1.2.1 Hand hygiene is part of the infection control, prevention, and biosecurity (ICPB) program.

- Disinfection and cleaning.
- The order in which PPE is put on and taken off.

Asking the right questions when scheduling appointments will help you identify high-risk patients.

- Setting up and caring for urine and intravenous catheters.
- Going into and going out of high-risk patient isolation or designated places.
- Necropsy techniques.
- It is well recognized that checklists of essential duties, like as infection control and HAI reduction, increase compliance across the practice environment [11]. Checklists

are recommended for pre- and postoperative surgery, cleaning and disinfection, and any other routine task that can benefit from a communication and reminder system [12].

1.3 The idea of the hierarchy of controls:

When thinking about infection control techniques, the hierarchy of controls concept—which is frequently applied to measures taken to prevent workplace hazards—is helpful. The "Hierarchy of Controls" pyramid below can be used to identify effective ICPB practices, such as wearing protective gear and making modifications to facility design, rules, or procedures. Figure 1. The highest tiers are thought to be more successful than the lower ones at reducing risks (such exposure to pathogens). 15, 16 Effective exposure reduction frequently requires a combination of control methods [13].

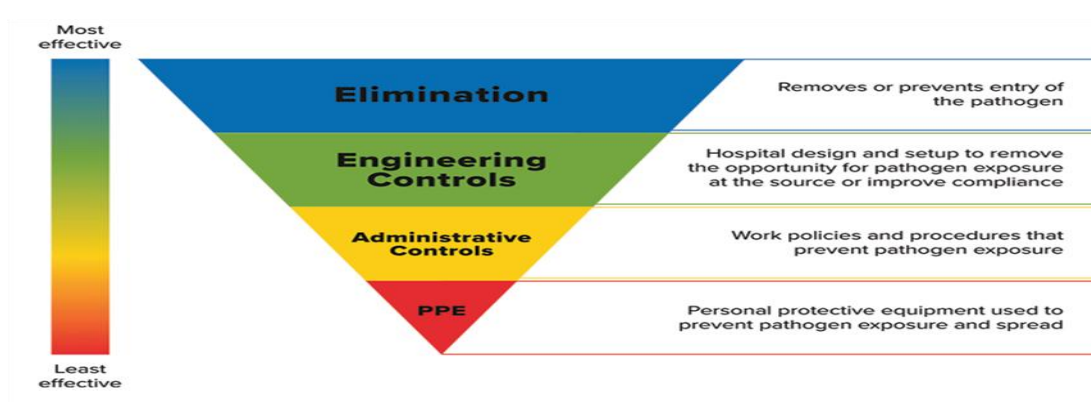


Figure (1). “Hierarchy of Controls” (Gibbins and MacMahon 2015).

1.4. Hand Hygiene and Infection Control Policies:

Hand hygiene requires a multifaceted intervention strategy to establish it as a sustainable practice in hospital settings. [14] contends that hand hygiene is not solely the obligation of the Infection Control Department and advocates for a multidisciplinary strategy: hospital management, essential leaders, and nursing leaders are pivotal to achieving hand hygiene compliance inside a hospital. Furthermore, [15] propose that the culture of healthcare workers and the hospital environment should

regard the Infection Control Department as a resource and collaborator rather than merely an enforcer. Consequently, infection control personnel can significantly contribute to hand hygiene adherence by promoting patient observation of hand hygiene practices.

2. Methodology

2.1. Design of the study:

A descriptive quantitative study design was conducted to assess knowledge and practice about infection control strategies among nursing staff in imam Hussein medical city. The study was initiated from the period of eight July (2024) to 19th September (2024).

2.2. Administrative Arrangements:

An official permission (Appendix A) is obtained from the college of nursing in university of Warith Al-Anbiyaa and from Imam Hussein medical city, also agreement was obtained from the nurses to participate in the study.

2.3. Setting of the study:

The study was conducted at the imam Hussein medical city, located in the province of Karbala.

2.4. The sample of the study:

A non-probability (convenience sample) consists of thirty males and female from nursing staff.

2.5. Data Collection:

The data collected through the utilization of a questionnaire and, by an interviewing technique with the nurses, by using the Arabic version of the questionnaire and by observation technique. The questionnaire was distributed to the nursing staff; each person spends approximately (7– 10) minutes to complete the interview.

2.6. The Study Instrument:

After reviewing the related literature and relevant studies, a draft instrument was developed and adopted by the researchers. A questionnaire (Appendix-B) consisting of closed ended questions to assess knowledge, and the practice was obtained by observation of the nurses. It consists of two main parts as follows:

2.6.1. Part one: Socio-demographic characteristics: This part of the study instrument represents the socio-demographic data that consist of five items, which include {age, gender, marital status, academic achievement, experience years}.

2.6.2. Part two: Knowledge about infection control techniques: This part of the questionnaires consists of twenty-three closed-end questions that are related to knowledge about infection control techniques.

2.7. Rating and Scoring:

The questionnaires items have been rated and scored according to the following patterns: (1). The questionnaire items that are related to the nurse's knowledge about infection control strategies were scored with (2) for agreement responses, and (1) for disagreement responses.

2.8. Validity of the questionnaire:

Content validity for the study instrument was determined by using an expert (Appendix B) to investigate the clarity, relevancy, and adequacy of the questionnaire to achieve the present study's objectives. A copy of the questionnaire is presented to (9) experts, they were faculty members from the College of Nursing / University of Warith Al-Anbiyaa, they were asked to review the questionnaire. Most experts had agreed. In addition to the experts' responses, their suggestions were taken into consideration.

2.9. Reliability of the questionnaire:

Reliability assessment was conducted according to the internal consistency of the questionnaire the result of the reliability was($r=0.75$) by using the computation .and

such an estimation was statistically adequate which means that the questionnaire had an adequate level of internal consistency and equivalence measurability

2.10. Pilot study:

A pilot's study consisted of (10) nurses. It was conducted from the period of 8th July (2024) to 19th September (2024). The pilot study sample was excluded from the original sample of this study. The purposes of pilot study area. To know whether the respondents understand the questions. b. To determine the reliability of the questionnaire. c. To determine the average time required for the data collection.

2.11. Statistical data analysis:

The data collected was entered into the computer to be analyzed using the statistical package for social science (SPSS) version 24. The statistical procedures which are applied for the data analysis and assessment of the results include the following:

2.11.1. Descriptive statistics: Statistical tables include frequencies (F), Percentages (%), cumulative percent, mean of score (M.S), were used to summarize the data.

3.11.2. Inferential statistics:

Alpha Cronbach, correlation between forms, to assess questionnaire reliability according to internal consistency.

One-way ANOVA test to detect the association between the level of nurse knowledge and practice about needle stick injuries and post exposure prophylaxis with their socio-demographic characteristics.

3. The Results:

Table (1): Distribution of participants by their socio-demographic characteristics (n=30).

Socio-demographic characteristics		Frequency (F)	Percentage (%)	Cumulative Percentage %
Age Groups (years)	20>	13	43.3	43.3
	20-30	13	43.3	86.7
	30-40	3	10.0	96.7
	40<	1	3.3	100.0
	Total	30	100.0	
Gender	Female	15	50.0	50.0
	Male	15	50.0	100.0
	Total	30	100.0	
Marital Status	Single	13	43.3	43.3
	Married	17	56.7	100.0
	Total	30	100.0	
Academic achievement	Master's degree & more	2	6.7	6.7
	Nursing college	8	26.7	33.3
	Diploma	12	40.0	73.3
	Nursing school	8	26.7	100.0
	Total	30	100.0	
Experience years	1>	11	36.7	36.7
	1_5	12	40.0	76.7
	5_10	5	16.7	100.0
	10>	2	6.6	13.6
	Total	30	100.0	

The results in table 1 show that more of study sample was from 20-30 age group and equal number of the participant’s female and male (50%), 56.7% of participants were married, and 40% of them got a diploma in nursing science. In addition to that approximately one quarter of participants (40.0%) had 1-5 experience years

Table (2): Statistical results of participant's knowledge about infection control strategies (n=30):

Adherence items		Responses				M.S	Level
		Yes		No			
		F	%	F	%		
1.	There are programs prepared by the health institution to control infection	18	60.0	12	40.0	1.4	L
2.	There are training programs for workers within the health institution	14	46.0	16	53.3	1.5	H
3.	Staff adherence to standard infection control measures	20	66.7	10	33.3	1.3	L
4.	Hand hygiene reduces the spread of infection	20	66.7	10	33.3	1.3	L
5.	Respiratory hygiene and cough etiquette reduce the spread of infection	24	80.0	6	20	1.2	L
6.	Safe injection methods help control infection	23	76.7	7	23.7	1.2	L
7.	Waste treatment management is important in maintaining infection control	12	40.0	18	60.0	1.6	H
8.	Commitment to wearing personal protective equipment is important in controlling infection	20	66.7	10	33.3	1.3	L
9.	Not wearing jewelry, as well as artificial nails, reduces the spread of infection	9	30.0	21	70.0	1.7	H
10.	Strict restriction of hand hygiene for everyone is important in controlling infection	20	66.7	10	33.3	1.3	L
11.	You have contracted the covid 19 virus	10	33.3	20	66.7	1.6	H

12.	Lengthy period of injury	10	33.3	20	66.7	1.8	H
13.	Symptoms and signs of infection appear when infected	5	16.7	25	83.3	1.8	H
14.	Floors, work surfaces and furniture are clean and free of pollution, reducing the spread of infection	2	6.7	28	93.3	1.9	H
15.	The store is clean, sterile, and well ventilated, which helps control infection	5	16.7	25	83.3	1.8	H
16.	Laundry shop Disinfection equipment in working condition is an infection control strategy	4	13.3	26	86.7	1.7	H
17.	Bed rails and all equipment around the bed clean reduces the spread of infection	9	30.0	21	70.0	1.8	H
18.	All work surfaces are clean to help control infection	8	26.7	22	73.3	1.8	H
19.	Disinfectant liquid soap and paper inhaler available in all sinks	10	33.3	20	66.7	1.7	H
20.	Bed linen and the patient's gown are changed daily, which is important in controlling infection	9	30.0	21	70.0	1.7	H

M.S = Mean of score; H=Prominent level of adherence (M. S \geq 1.5); L=Low level of adherence (M. S<1.5); F=Frequency; % = Percentage.

The result in table (2) shows the result of a prominent level of knowledge about infection control strategies between nursing staff in imam Hussein medical city.

Table (3): Statistical results of participant's practice about infection control strategies (n=30):

Adherence items	Responses		M.S	Level
	Yes	No		

		F	%	F	%		
1	There are programs prepared by the health institution to control infection	11	36.7	19	63.3	1.6	H
2	There are training programs for workers within the health institution	23	76.7	7	23.3	1.2	L
3	Staff adherence to standard infection control measures	8	26.7	22	73.3	1.7	H
4	Hand hygiene reduces the spread of infection	20	66.7	10	33.3	1.3	L
5	Respiratory hygiene and cough etiquette reduce the spread of infection	17	56.7	13	43.3	1.4	L
6	Safe injection methods help control infection	22	73.3	8	26.7	1.2	L
7	Waste treatment management is important in maintaining infection control	7	23.3	23	76.6	1.7	H
8	Commitment to wearing personal protective equipment is important in controlling infection	16	53.3	14	46.7	1.4	L
9	Not wearing jewelry, as well as artificial nails, reduces the spread of infection	6	20.0	24	80.0	1.8	H
1	Strict restriction of hand hygiene for everyone is important in controlling infection	16	53.3	14	46.7	1.4	L
1	You have contracted the covid 19 virus	16	53.3	14	46.7	1.4	L
1	Lengthy period of injury	3	10.0	27	90.0	1.8	H
1	Symptoms and signs of infection appear when infected	6	20.0	24	80.0	1.4	L

1	Floors, work surfaces and furniture are clean and free of pollution, reducing the spread of infection	2	6.7	28	93.3	1.4	L
1	The store is clean, sterile, and well ventilated, which helps control infection	3	10.0	27	90.0	1.9	H
1	Laundry shop Disinfection equipment in working condition is an infection control strategy	4	13.0	26	86.7	1.8	H
1	Bed rails and all equipment around the bed clean reduces the spread of infection	6	20.0	24	80.0	1.9	H
1	All work surfaces are clean to help control infection	5	16.7	25	83.3	1.9	H
1	Disinfectant liquid soap and paper inhaler available in all sinks	6	20.0	24	80.0	1.8	H
2	Bed linen and the patient's gown are changed daily, which is important in controlling infection	7	23.3	23	76.7	1.8	H

M.S = Mean of score; H=Prominent level of adherence (M. S \geq 1.5); L=Low level of adherence (M. S<1.5); F=Frequency; % = Percentage.

The results in table 3 show an elevated level of practice about infection control strategies between nursing staff in the imam Hussein medical city.

Table (4): Association between the level of nursing staff knowledge about infection control strategies with their demographic characteristics

Items	Comparative pattern	Df	F	Sig.
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Age	Between Groups	6	0.456	0.833 N. S
	Within Groups	23		
	Total	29		
Gender	Between Groups	6	1.288	0.302 N. S
	Within Groups	23		
	Total	29		
Marital status	Between Groups	6	0.492	0.808 N. S
	Within Groups	23		
	Total	29		
Academic achievement	Between Groups	6	1.819	0.140 N. S
	Within Groups	23		
	Total	29		
Experience years	Between Groups	6	0.575	0.042 S
	Within Groups	23		
	Total	29		

S= (Significant at $P \leq 0.05$ to > 0.01); N. S= (non-significant. at $P > 0.05$).

The result in table (4) exposed significant association between knowledge of nursing staff and their experience years which $P < 0.05$, but there are no significant between knowledge and other characteristics such as age, gender, marital status, academic achievement.

Table (5): Association between the level of nursing staff practice about infection control strategies and their demographic characteristics

Items	Comparative pattern	Df	F	Sig.
Age	Between Groups	7	2.897	0.026 S
	Within Groups	22		
	Total	29		
Gender	Between Groups	7	1.016	0.447
	Within Groups	22		N. S

	Total	29		
Marital status	Between Groups	7	0.629	0.727
	Within Groups	22		N.S
	Total	29		
Academic achievement	Between Groups	7	0.921	0.509
	Within Groups	22		N. S
	Total	29		
Experience years	Between Groups	7	0.393	0.896
	Within Groups	22		N. S
	Total	29		

S= (Significant at $P \leq 0.05$ to > 0.01); N. S= (non-significant. at $P > 0.05$).

Table 5 show There are no significant association between practice of nursing staff about infection control strategies and their demographic characteristic, except one item the age where was a significant where $p < 0.05$.

4. Discussion:

The presents a systematically organized, interpreted, and derived discussion of the results with support of the available related studies.

4.1. Discussion of the socio-demographic characteristics of the study sample:

The study thirty of staff nurses in the medical imam Hussein city were participated in this study to measure the knowledge and practice about the infection control technique. After the analysis of participant's socio-demographic characteristics as shown in table (1), the results indicate that are equal ratio of participant from male and female, more of study sample was from 20-30 age group and equal number of the participant's female and male (50%), 56.7% of participants were married, and 40% of them got a diploma in nursing science. In addition to that approximately one quarter of participants (40.0%) had 1-5 experience years. This finding agrees with [16]. who reported that more than

half of nurses were less than twenty-five years old, less than half of them have experience less than 5 years. And this does not agree with [17].

5.2. Discussion of knowledge of nursing staff about infection control strategies:

After the analysis of statical finding about knowledge respondents of nursing staff about infection control strategies, the result in table (2) demonstrates that there is a high level of knowledge about infection control strategies among nursing staff, this finding agreement with [18]. this study conducted in Palestine showed fire knowledge level. And with many other studies.

4.3. Discussion of practice of nursing staff about infection control strategies:

After the analysis of statical finding about practice respondents of nursing staff about infection control strategies, the result in table 3 demonstrates that there is a high level of practice about infection control strategies among nursing staff, this finding agreement with [18]. this study conducted in Palestine showed good practice level of infection control strategies between nursing staff. And this finding does agree with [19] study conducted in Port Said Hospitals which IC practices' level of the nursing staff was also low.

4.4. Discussion of knowledge of nursing staff about infection control strategies with their demographic characteristics

The results in table (4) exposed significant association between knowledge of nursing staff and their experience years which $P < 0.05$, this finding doesn't agree with [18] this study conducted in Palestine showed no significant between knowledge but there are no significant between knowledge and other characteristics such as age, gender, marital status, academic achievement. [20]. this study corresponding with our study finding.

4.5. Discussion of practice of nursing staff about infection control strategies with their demographic characteristics

Table (5) shows the age item where was a significant where $p < 0.05$. This study doesn't agree with [6] this study showed no significant between practice and other characteristics such as age, gender, marital status, academic achievement but agree with [19]. study conducted in Egypt.

5. CONCLUSION

According to the study findings, the researchers enabled us to draw the following conclusions:

1. Most of the age of respondents involved in this study ranges between 20-30 years.
2. The ratio of respondents involved in this study were equal between male and female
3. Most of the study samples were with a diploma and academic achievement and more of them with 1-5 years of experience
4. There is an elevated level of knowledge about infection control strategies among nursing staff in medical Imam Hussein city.
5. There is an important level of practice towards infection control strategies among nursing staff in medical Imam Hussein city.

6. Recommendation:

According to the results of the study, the researcher recommended. that:

1. It is particularly important to conduct another study to evaluate the staffing knowledge to prevent infection transmission and evaluate the level of performance of infection control strategies.
2. Another study should be done to detect factors that increase nursing commitment to infection control strategies among medical colleges' students.
3. Further studies on a large scale are needed to determine the rights routes to infection control strategies.

4. Training courses about infection control strategies should be done consistently between Nursing staff.

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Appendix

❖ **Hospital name: Imam Hussein Medical City**

❖ **A. Socio-demographic characteristics**

Socio-demographic characteristics	
Age Groups (years)	20>
	20-30
	30-40
	40<
Gender	Female
	Male
Marital Status	Single
	Married
Academic achievement	Master's degree & more
	Nursing collag
	Diploma
	Nursing school
Experience years	1>
	1_5
	5_10
	10>

❖ B. A Questionnaire

Adherence items		Responses				M.S	Level
		Yes		No			
		F	%	F	%		
1.	There are programs prepared by the health institution to control infection						
2.	There are training programs for workers within the health institution						
3.	Staff adherence to standard infection control measures						
4.	Hand hygiene reduces the spread of infection						
5.	Respiratory hygiene and cough etiquette reduce the spread of infection						
6.	Safe injection methods help control infection						
7.	Waste treatment management is important in maintaining infection control						
8.	Commitment to wearing personal protective equipment is important in controlling infection						
9.	Not wearing jewelry, as well as artificial nails, reduces the spread of infection						
10.	Strict restriction of hand hygiene for everyone is important in controlling infection						

11.	You have contracted the covid 19 virus					
12.	Lengthy period of injury					
13.	Symptoms and signs of infection appear when infected					
14.	Floors, work surfaces and furniture are clean and free of pollution, reducing the spread of infection					
15.	The store is clean, sterile, and well ventilated, which helps control infection					
16.	Laundry shop Disinfection equipment in working condition is an infection control strategy					
17.	Bed rails and all equipment around the bed clean reduces the spread of infection					
18.	All work surfaces are clean to help control infection					
19.	Disinfectant liquid soap and paper inhaler available in all sinks					
20.	Bed linen and the patient's gown are changed daily, which is important in controlling infection					