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Awareness of Infection Control and Barriers among the Healthcare Workers in Sulaymaniyah City, Iraq

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ABSTRACT

Background: Healthcare workers (HCWs) are at risk of exposure to blood-borne pathogens such as human immunodeficiency virus and hepatitis B and C viruses through sharps injuries and contact with body fluids. Standard infection control practices are critical to preventing such exposures. **Objectives:** This study aimed to assess the awareness of infection control measures and perceived barriers among HCWs in Sulaymaniyah governorate, Iraq. **Patients and Methods:** A cross-sectional survey was conducted between June 2021 and May 2022 among 557 HCWs working in different hospitals in Sulaymaniyah. Data were collected using a self-administered questionnaire with 44 items covering awareness, standard precautions, and barriers to infection control. Descriptive and inferential statistics were applied to analyze the data. **Results:** Overall, 79% of participants demonstrated adequate awareness of infection control practices, and 82% reported compliance with standard precautions. A significant association was observed between participation in infection control training and higher awareness levels ($P < 0.05$). Despite this, 52% of respondents acknowledged barriers to consistently applying standard precautions within their hospital units. **Conclusions:** Although awareness and compliance with infection control practices among HCWs in Sulaymaniyah were generally high, notable barriers remain. Regular training and institutional support are recommended to enhance adherence to standard precautions and strengthen infection prevention in healthcare facilities.

Keywords: Awareness, standard precaution, health care workers, barriers, cross-sectional survey

1. INTRODUCTION

Healthcare-associated infection (HCAI) offerings constitute a significant concern for patient safety, and their anticipation must be the priority for institutions and individuals committed to making health care safer for concerned individuals. The menace of obtaining HCAI by patients or caregivers is worldwide and includes all healthcare facilities; the global load is unknown due to the difficulties in gaining reliable, indicative data [1].

The need of the time is a standard shift from a tapered, separate patient-based attitude to a more comprehensive approach, pointing to infection control during the health care process. In this way, a substantial improvement in this

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energetic area of healthcare is possible. Alteration is essential at the organizational/administrative stages to incorporate all influential factors that impact economic infection control [2].

HCW obedience with ordinary protections was revealed to decrease the exposure risk to blood and body fluids [3]. Hand hygiene is among the most imperative factors of infection control that can diminish the risk of cross-transmission in healthcare agencies. Consequently, the hindrance of HCAIs is the accountability of all people and facilities offering health care [4].

The Centers for Disease Control and Prevention has mentioned, "It is well-documented that one of the most important measures for preventing the spread of pathogens is effective hand washing." The foremost medical aim of hand washing is to clean the hands of pathogens and chemicals, which can cause particular harm/disease [5]. Maximum HCAIs are mainly conveyed by the hands of HCWs by direct contact, especially when pathogenic microorganisms are transferred between individuals and the environmental reservoirs [6].

Barriers to the implementation of infection prevention and control (IPC) measures are multifactorial. Studies elsewhere in Iraq and in comparable settings have identified resource limitations such as shortages of personal protective equipment (PPE), inadequate facilities for handwashing or sterilization as recurrent obstacles [7]. Furthermore, lack of continuous training, insufficient institutional support, high workload, and staff shortages also emerge frequently in the literature [8].

The HCWs comprise a crucial outline of the hospitals, which is vigorous to its functioning, and subsequently, their awareness of infection control and proper performance is serious to averting HCAIs. Hence, numerous reasons affect poor compliance with standard guidelines. Therefore, this study was planned to throw more highlights to take appropriate actions. The present study aimed to assess the awareness and practices regarding standard precautions for infection control among healthcare workers (HCWs) [9].

2. MATERIALS AND METHODS

2.1. Design of the Study

This cross-sectional, interview-based study was conducted on 557 HCWs, from June 1st, 2021, to May 31st, 2022, in different hospitals in Sulaimaniyah governorate, Iraq.

2.1.1. Questionnaire

The questionnaire comprises three parts: internal review, target population input, and expert external review. Regarding the information for the target population, HCWs were randomly selected to answer the questions freely to frame and re-arrange the questionnaire. The number of questions to measure sociodemographical characteristics was 8, questions about the infection control part were 30, and items regarding barriers to practising standard infection control precautions in HCWs were 14. Specific codes (Table 1) were used for respondents' answers.

2.2. Ethical Considerations

Appropriate guidelines and regulations belonging to the Declaration of Helsinki were followed to conduct this research study on HCWs. The Scientific and Ethics Committees of the College of Nursing, University of Sulaimani, Sulaimaniyah, Iraq, revised and approved the study protocol (No. 58/30/04/2023/UoS). Before collecting data, formal authorization was obtained from health and government authorities. Written informed consent was obtained. The participation was voluntary, their data were kept confidential, and nurses had the right to withdraw at any time during the data collection period without giving a reason.

2.3. Statistical Analysis

Statistical Package for Social Science (SPSS, version 27) was used for data analysis. The mean and standard deviation were presented for variables using descriptive analysis. The independent t-test and analysis of variance test were used to analyze variables, and a $P \leq 0.05$ was considered statistically significant.

3. RESULTS

Among 556 studied HCWs, 124 (22%) were male and 432 (78%) were female, with ages varying from 20 to 59 years. Most of them were from the emergency unit (27%), aged between 34 and 40 years (26%), worked as a nurse (58%), had around 8 years of experience, and had not participated in a training course for infection control (62%) (Table 2).

TABLE 1: Specific codes used for respondents' answers

Option	Code	Option	Code
True	3	Agree	2
I don't know	2	Disagree	1
False	1		

TABLE 2: Descriptive statistics of sociodemographic variables among respondents

Variable	Frequency	%
Age (years)		
≤26	68	12
27–33	104	19
34–40	144	26
41–47	100	18
48–54	112	20
>55	28	5
Gender		
Male	124	22
Female	432	78
Occupation		
Doctor	120	22
Nurse	324	58
Laboratory assistant	92	17
Others	20	4
Unit		
Intensive care unit	24	4
Cardiac care unit	12	2
Medical ward	84	15
Surgical ward	88	16
Emergency	148	27
Premature unit	16	3
Labor room	72	13
Neurology	72	13
Laboratory	40	7
Experience (years)		
<1	30	5
4	146	26
8	334	60
>8	46	8
Infection control training course		
Yes	212	38
No	344	62

The mean arithmetic ratio, in general, was 2.78 ± 0.58 (importance of glove), and the general trend of this variable as a whole was toward (True). These results indicated that the research community members knew awareness regarding infection control and standard precautions variables are of great importance, and 81% and 87%, respectively, at the level of (True), from their point of view, and also that 15% of the research sample don't have information ultimately on awareness regarding infection control and standard precautions or not sure about them, 16% and 3%, respectively at the level of (False) (Table 3).

Regarding the barriers to the practice of standard precaution variables, the arithmetic mean ± SD ratio at the general level was 1.5 ± 0.5, and the general trend of this variable was towards (Agree). These results indicated that the research community members agreed that the barriers to the practice of standard precautions exist within hospital units. About 52% of the research samples were at the level of (Agree) according to their point of view. As for each question separately within this variable, the explanation was as follows: For the item (it is unimportant to follow SPs guidelines (item 11), the highest value of the arithmetic mean appears, and it reached 1.75, which means that they are entirely agreed. The standard deviation earned 0.43, and this paragraph indicated that 74.8% of the research samples were at the level of (Agree) (Table 4).

Table 5 shows the correlations between factors behind infection control and sociodemographic information. According to occupation, $P = 0.039$ for awareness and $P = 0.314$ for standard precautions. This means that H_0 can be rejected according to the status that the mentioned factors are not statistically significant differences overall about the occupation. At the same time, the standard precautions were not substantial overall (cannot be rejected null hypothesis, which states that this factor has no significant difference overall about occupation).

The t-test results revealed a significant difference between the male and female genders regarding standard precautions at the level of $\alpha = 0.05$. It was noted that a *P*-value of 0.004 is smaller than the level $\alpha = 0.05$. This means that H_0 can be rejected as stated that the standard precaution is the same for males and females (Gender) with a significant difference between them ($P = 0.05$). While a significant difference between male and female gender of factor awareness at the level of $\alpha = 0.10$ was seen ($P = 0.067$). This means H_0 can be rejected as stated that the awareness regarding infection control is the same for males and females (gender) with a significant difference between them ($P = 0.10$). On the other hand, there was a significant difference according to taking training courses on factors (infection control and standard precautions) at the level of $\alpha = 0.05$ (Table 6).

4. DISCUSSION

This study assessed HCWs' awareness of day-to-day Integrated Physician Practice Sections. Based on the sociodemographic data, most participants (78%) were female, which aligns with trends in many countries where the health workforce is predominantly female in nursing and allied professions. Recent studies have similarly reported higher proportions of female HCWs, for example, in studies of PPE usage and infection control perceptions [10].

In this study, more than half of HCWs were aged 34–44 years; fewer than half had 8 years or less of work experience; and

TABLE 3: Standard precaution knowledge and standard precaution of the studied participants

Awareness regarding infection control	True	False	I don't know	Mean±SD	Coefficient of variance	Relative importance
	%					
Hand hygiene	4928	844	344	2.66±0.65	25.21	88.92
	80	14	6			
Needle stick injury prevention	1684	408	132	2.57±0.75	29.86	85.79
	76	18	6			
Standard precautions	3148	632	128	2.65±0.67	26.28	88.49
	81	16	3			
Proper usage of surgical masks	1792	356	76	2.64±0.70	27.23	88.19
	81	16	3			
Importance of glove	972	100	40	2.78±0.58	21.11	92.8
	87	9	4			

TABLE 4: Barriers to the practice of standard precaution (SP) variables among studied participants

Item	Agree	Disagree	Mean±SD	Coefficient of variance	Relative importance
	Number, %				
1. There is no enough glove	254	302	1.47±0.51	35	72.84
	45.7	54.3			
2. Others do not follow SPs measures	209	347	1.4±0.51	37	68.79
	37.6	62.4			
3. There is no enough gowns	226	330	1.42±0.5	35.8	70.32
	40.6	59.4			
4. Guidelines of SPs are vague	274	282	1.5±0.52	34.3	74.64
	49.3	50.7			
5. There is no enough hand washing facilities	268	288	1.48±0.5	33.8	74.1
	48.2	51.8			
6. Requirements of SPs are costly	268	288	1.48±0.5	33.8	74.1
	48.2	51.8			
7. Gloves cause skin irritation	400	156	1.72±0.45	26.2	85.97
	71.9	28.1			
8. Hepatitis B vaccine is unavailable	276	280	1.5±0.5	33.3	74.82
	49.6	50.4			
9. Following SPs takes long time	280	276	1.5±0.5	33.3	75.18
	50.4	49.6			
10. PPE are uncomfortable with use	280	276	1.5±0.5	33.3	75.18
	50.4	49.6			
11. It is unimportant to follow SPs guidelines	416	140	1.75±0.43	24.8	87.41
	74.8	25.2			
12. Following SPs makes work harder	312	244	1.56±0.49	31.9	78.06
	56.1	43.9			
13. Trash bins available in hospital	288	268	1.52±0.5	32.9	75.9
	51.8	48.2			
14. Do you have a designated place to dispose of waste products outside the hospital?	264	292	1.47±0.5	34	73.74
	47.5	52.5			
Total	4015	3769	1.5±0.5	32.6	75.79
	52	48			

most had not received sufficient training in infection control measures. The finding that training strongly influences knowledge is consistent with recent literature. For instance, in Qatar in 2022, HCWs who had received training in the previous year showed significantly higher knowledge of IPC measures [11]. Furthermore, older studies during the COVID-19 pandemic highlight that a lack of recent or repeated training is linked to gaps in both knowledge and compliance [12], [13].

Some HCWs may lack sufficient knowledge because their organizations have invested little in staff training, have weak systems for reinforcing safe clinical practices, or are due to complacency. Despite educational efforts, practice often remains suboptimal due to poor retention, inconsistent adherence to guidelines, and information overload. Recent reviews echo this, showing that knowledge alone is not enough–ongoing reinforcement, auditable compliance, and

TABLE 5: The correlations between factors behind infection control in relation to sociodemographic information using ANOVA test

Variable	Awareness regarding infection control	*P*-value	Standard precautions F (sig.)	*P*-value
Age group	8.202	0.000	2.805	0.016
Occupation	2.802	0.039	1.186	0.314
Years of experience	25.574	0.000	6.540	0.000
Unit	16.853	0.000	12.496	0.000

ANOVA: Analysis of variance

TABLE 6: Comparison between factors in the infection control using t-test

Variable	Gender		Training course	
	T-test	Sig. (2-tailed)	T-test	Sig. (2-tailed)
Awareness regarding infection control	1.841	0.067	0.744	0.457
Standard precautions	2.873	0.004	3.382	0.001

institutional safety culture play large roles [14], [15]. Moreover, in the current study, we observed significant associations between HCWs' knowledge of infection control and variables such as age, gender, years of experience, and whether or not they had attended training courses. This is supported by more recent evidence: for example, the Qatar study found male HCWs, those with more training, and those who had exposure to COVID-19 (e.g., via colleagues or relatives) had higher perceived effectiveness and knowledge of IPC measures [16], [17].

Other studies have similarly found that younger age, less experience, and recent IPC or PPE training correlate with better knowledge and compliance [18]. Regarding protective barriers and PPE usage: HCWs reduce their risk of exposure by using protective barriers; yet many report limited availability of protective materials. In this study, only face masks and gloves were consistently available, and only about 52% of respondents agreed with the importance of using these. Comparable findings emerge more recently: a study from Qatar reported that while most HCWs recognize the effectiveness of various PPE and hand hygiene, actual consistent use is lower and is heavily influenced by training, perceived effectiveness, and resource availability [19]. In addition, non-compliance has been attributed to high workload, discomfort, lack of training, forgetfulness, norms, and co-worker behavior. These barriers are again confirmed in more current studies [20].

5. CONCLUSION

It is concluded that the knowledge and practice of standard precautions are acceptable with general standards to guarantee infection safety in health workers and patients. Regular training or sponsorship for workshops and seminars is needed. However, barriers to the practice of standard precautions prevent the improvement in the high-quality preparation of infection control. This is the most effective and long-lasting means to improve health workers' knowledge and foster compliance with standard precaution measures.

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7. CONFLICTS OF INTEREST

The author affirms that they have no conflicts of interest.

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