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The Performance Of Healthcare Providers Concerning Infection Control Measures In Primary Healthcare Facilities In Saudi Arabia 2024

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Abstract:

Background: Health care–associated infections (HAI) and antimicrobial resistance (AMR) remain a major challenge to patient safety worldwide, leading to adverse patient outcomes, increased health care costs, and additional burden on the health care system. Healthcare providers (HCPs) can perform basic infection prevention measures to prevent infection. Proper safety measures are intended to shield patients from possible cross-infection as well as to shield employees from hazards brought on by contact with bodily fluids like blood. The body of knowledge regarding clinical infection control procedures is always expanding and evolving. Therefore,

The study aimed: To assess HCPs' performance regarding infection control precautions in primary health care centers.

Method: A descriptive analytical design was used. A total of 379 healthcare providers (HCPs) were engaged from January to May 2024, at selected primary health care centers in Kang of Saudi Arabia (KSA). Tools of data collection: three tools were used to collect data: a structured self- administrated HCPs' questionnaire, observational check list, and environmental assessment checklist.

Results: According to the findings, 58.6% of the nurses in the study practiced inept infection control measures, while 44.6% of them had mediocre overall understanding. Additionally, there was a highly significant positive linear association between the practice of nurses and their overall understanding of infection control measures in primary health care centers ($r = 0.317$, and $p = 0.000$).

Conclusion: According to the findings of the current study, over one-third of the nurses had an average overall knowledge score, and over half of them practiced infection control procedures incompetently. It was shown that there was a highly statistically significant positive linear link between the practice of nurses and their overall knowledge of infection control measures in primary health care facilities. In order to address the lack of information and to update nursing practice regarding standard precautions for infection control, an obligatory regular base educational program must be designed.

Keywords: Infection Control; HCPs performance; Precautions; Primary Health Care Centers.

Introduction:

Primary care plays a key role in the delivery of health care and contributes to disease prevention, improving health outcomes and health security and safety of communities [1, 2]. Given the potential for

infections to spread within primary care settings, where a diverse array of patients seeks health care, it is imperative to ensure infection prevention and control (IPC) measures are evidence-based in these settings. Yet, limited guidance and evidence synthesis exist at the global level on IPC interventions to reduce the spread of HAI and AMR in primary care facilities [3, 4].

Additionally, primary health care (PHC) is crucial medical care that is made widely available to people and families in the community using methods that they find acceptable, with their complete cooperation, and at a price that the community and nation can afford. It is essential to the nation's health system, of which it is the core, as well as to the general social and economic advancement of the populace [5]. Infections have a serious impact on the quality of patient health care outcomes, and increased morbidity, leading to unnecessary deaths and additional cost [6].

'The application of procedures that decrease the risk of transmission of infectious agents' is considered the primary approach for reducing Health Associated Infections (HAI). The best practices for preventing healthcare-associated infections (HAIs) include surveillance, transmission-based precautions, personal protective equipment (PPE) availability, reusable equipment sterilization and cleaning, environmental cleanliness, and antimicrobial stewardship [7].

Using the fundamentals of infection control, the universal precaution practice includes the washing of hands and the use of suitable protective gear, such as gloves, masks, gowns, and eye protection, as well as the safe handling and disposal of sharp objects, linen, waste, and disinfection [8]. The Centers for Disease Control and Prevention (CDC) defined standard precautions as "the minimum infection prevention measures that should be applied to all patient care," regardless of whether they are used in any setting where health care is provided and whether they are suspected or confirmed to be infected. Assuming that patients' blood, bodily fluids, secretions, and excretions have the potential to spread infection, these measures ought to be implemented in every environment where healthcare services are provided [9].

Health care facilities have long been responsible for the professional practice of infection prevention and control, albeit this is usually thought of in terms of patient protection. The goal of infection prevention and control is to stop infections from being acquired in medical facilities, whether they are spread by inhalation or contact with bodily fluids or tissue [10]. Compared to other HCPs, nurses are largely in charge of carrying out the daily patient care tasks at hospitals and other healthcare facilities that require more interaction with patients. As a result, nurses are more likely to contract certain infections and are also responsible for spreading them [6].

Nurses have a vital role in limiting the spread of organisms in two ways. Firstly, because they spend the most time with patients, they have a considerable chance of spreading organisms. Nurses must wash their hands before and after interacting with patients, as well as after engaging in potentially infectious activities. The second way nurses lessen hand-to-hand distribution is by promoting patients with numerous social insurance specialists [11].

Healthcare-acquired infections are a global issue. According to the World Health Organization, infections contracted during the provision of healthcare are believed to be between 5% and 10% in industrialized nations, but the risk of infection is 2–20 times higher and the percentage of patients affected can surpass 25% in underdeveloped nations [12]. Therefore, this study aimed to assess HCPs' performance regarding infection control precautions in primary health care centers. Research questions: What is the HCPs' knowledge and practice regarding infection control in primary health care centers?

Methods:

A descriptive analytical design was used to conduct this study at selected primary health care centers in Kang of Saudi Arabia (KSA). A Multistage simple random sample, the estimated sample size was 379 nurses who working at previous mentioned setting, at confidence level 95% by using Steven Thompson equation, Since the total number of nurses was 3000 nurses [13].

In the present study used three tools for data collection: The first tool: A structured self-administrated HCPs' questionnaire: Part one: Demographic characteristics of HCPs such as age, gender, marital status, level of education, experiences, workplace, residence and training for infection control

program. Part two: HCPs' knowledge toward infection control precautions in primary health care centers. It was modified by the researchers after reviewing the literatures built on Kandeel, (2016) [14].

The questioner consisted of 41 closed ended questions in form of "Yes or No". The total questioner (41 questions) divided into three sections as: 11 questions about hand hygiene; 7 questions about personal protection tools and respiratory precautions; 10 questions about safe injection and vaccinations against virus B; 7 questions about cleaning, disinfection & sterilization and 6 questions about health care waste management and textile reprocessing. Scoring system: The right answer was scored as a single point and the wrong answer was scored as a zero point. These scores were summed and were converted into a percent score. It was classified into 2 categories: Good knowledge if score > 75%. Average knowledge if score from 60-75%. Poor knowledge if score < 60%.

The second tool: Observational check list: It was modified by the researchers after reviewing the literatures built on Harder, (2014) [15] in English and it revised by supervisors. This checklist was used to assess the HCPs' performance toward infection control precautions in primary health care centers. Scoring system was followed to assess HCPs' performance toward infection control precautions in primary health care centers. The total checklist was contained of 59 steps divided as: 18 steps on hand washing technique; 5 steps on personal protective equipment and Respiratory precautions; 17 steps on cleaning, disinfection, and sterilization; 12 steps on safe injection and precautions for handling of medicines; 7 steps on safe disposal of waste and Dealing with textiles. Each checklist was assigned a score according to sub-items. The total score of nurses' practices were 59 grades, each item was evaluated as "done" was taken one score and "not done" was taken zero score. These scores were summed up and were converted into a percentage score. It was classified into 2 categories: Competent if score ≥ 75%. Incompetent if score < 75%.

The third tool: Environmental assessment checklist: It was modified by the researchers after reviewing the literatures based on Centers for Disease Control and Prevention, (2014) [16] to assess the environment infrastructure at study setting. The environment assessment was contained of 43 statements; the total score was 43 grades. Each statement was scored as "Yes" was taken one score and "No" was taken zero score. The scores of the items were summed up and were converted into a percentage score. It was classified into 3 categories: Good if score ≥ 75%. Average if score 60% - 75%. Poor if score < 60%.

Validity was ascertained by five experts' professors in specialty field of study. Their opinions elicited regarding the format, layout, consistency, accuracy and relevancy of the tools. Reliability analysis was measured the internal consistency of the tool through Cronbach's Alpha test. Pilot Study carried out on 10% of HCPs. Test the applicability and clarity of the constructed tools. The pilot also served to estimate the time needed for each subject to fill in the questions. According to the results of the pilot, some modification was performed so the pilot HCPs were not included in the main study sample.

The research approval was obtained from the Ethical Committee before starting the study. An official permission to conduct the study obtained from the director of primary health centers. The researchers met with the HCPs, explained the purpose of the study. The researchers were clarified the objectives and aim of the study to HCPs included in the study before starting. Approval was obtained from the HCPs before inclusion in the study; a clear and simple explanation was given according to their level of understanding. They secured that all the gathered data was confidential and used for research purpose only. The researchers were assuring maintaining anonymity and confidentiality of subjects' data included in the study. The subjects were informed that they are allowed to choose to participate or not in the study and they had the right to withdrawal from the study at any time.

Data collected from the studied sample was revised, coded and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the SPSS version 28. Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test (X2) was used for comparisons between qualitative variables. Spearman correlation measures the strength and direction of association between three ranked variables. Statistically significant was considered at p-value <0.05.

Results:

Table (1): exposed that, 41.2% of the studied sample their age ranged from 30-<40 years. Related to gender, 85.8% of the studied nurses were females. In relation to the educational level of the studied sample, it was found that, 55.7% of them had Technical Institute of Nursing. Also, 54.1% of the studied sample was residing in rural areas and 51.5% of working in urban center respectively. Moreover, 50.4% of the studied sample their years of experience were ≥ 10 year. Also, 63.6% of the studied sample under study was not attending training courses related to infection control.

Table (1): Frequency and percentage of distribution of the studied sample according to their demographic characteristics (n=379).

Items		N	%
Age (year)			
20-<30		102	26.9
30-<40		156	41.2
≥ 40		121	31.9
Mean SD	**38.94 ± 6.32**		
Gender			
Female		325	85.8
Male		54	14.2
Educational level			
Nursing school		118	31.1
Technical Institute of Nursing		211	55.7
Bachelor of Nursing		38	10
Post graduate		12	3.2
Place of residence			
Urban		174	45.9
Rural		205	54.1
Work place			
Urban center		195	51.5
Rural unit		184	48.5
Years of Experience			
<5		88	23.2
5-<10		100	26.4
≥ 10		191	50.4
Mean SD	**17.69 ± 1.75**		
Training for infection control program			
Yes		138	36.4
No		241	63.6

Table (2): revealed that, 62.5% of the studied sample was competent related to hand washing technique. While, 59.1% of them were incompetent related to use Alcohol-Based Hand rub and personal protective equipment also 55.7% of them were incompetent related to respiratory precautions respectively. Also, 54.9% of them were incompetent related to clean, disinfection and sterilization and 76.3% of them were incompetent related to disinfection of thermometer respectively.

Moreover, 73.6% of the studied sample was incompetent related to clean the bloody spillage and safe injection and precautions for handling of medicines respectively. 70.4% of the studied nurses were incompetent related to Safe injection and precautions for handling of medicines; while, 58.3% of the studied sample was safe disposal of waste and Dealing with textiles respectively.

Table (2): Frequency and percentage of distribution of the studied nurses according to their total practice related to infection control precautions in primary health centers (n=379).

Items	Competent		Incompetent	
	N	%	N	%
Hand washing technique	237	62.5	142	37.5
Using Alcohol-Based Hand rub	155	40.9	224	59.1
Personal protective equipment and respiratory precautions	168	44.3	211	55.7
Cleaning, disinfection and sterilization	172	45.4	207	54.9
Disinfection of thermometer	90	23.7	289	76.3
Bloody spillage	100	26.4	279	73.6
Safe injection and precautions for handling of medicines	112	29.6	267	70.4
Safe disposal of waste and Dealing with textiles	221	58.3	158	41.7

Table (3): showed that, 58.6% of the studied sample had incompetent practice regarding infection control precautions in primary health centers; while, 41.4% of them had competent practice.

Table (3): Frequency and percentage distribution of the studied sample according to their total practice regarding infection control precautions in PHCCs (n=379).

Total practice	N	%
Competent	157	41.4
Incompetent	222	58.6

Table (4): revealed that, there were highly statistically significant relation between total knowledge of the studied sample about infection control precautions in primary health care centers and their demographic data such as, educational level, years of experience and attend training courses related to infection control at (P= < 0.01). Also, there were statistically significant relation with their age and work place at (P= < 0.05). While, there were no significant relation with their gender and place of residence at (P= >0.05).

Table (4): Relation between demographic characteristics of the studied sample and their total knowledge about infection control precautions in PHCCs (n=379).

Items		Total knowledge						X2	P- Value
		Good (n=100)		Average (n=169)		Poor (n=110)			
		N	%	N	%	N	%		
Age (year)	20-<30	60	60	30	17.8	12	10.9	13.69	0.01*
	30-<40	22	22	84	49.7	50	45.5		
	≥ 40	8	8	55	32.5	48	43.6		
Gender	Female	82	82	155	91.7	88	80	6.693	0.138
	Male	18	18	14	8.3	22	20		
Educational level	Nursing school	6	6	26	15.4	86	78.2	25.07	.000**
	Technical	46	46	141	83.4	24	21.8		
	Institute of								
	Nursing								
	Bachelor of	36	36	2	1.2	0	0.0		
	Nursing								
	Post graduate	12	12	0	0.0	0	0.0		
Place of residence	Urban	46	46	80	47.4	48	43.6	7.680	0.094
	Rural	54	54	99	58.6	62	56.4		
Work place	Urban center	74	74	76	45	35	31.8	10.29	0.041*
	Rural unit	26	26	93	55	75	68.2		
Years of Experience	<5	8	8	44	26.1	36	32.7	22.28	.003**
	5-<10	74	74	70	41.4	26	23.7		
	≥ 10	18	18	55	32.5	48	43.6		
Training	Yes	92	92	44	26.1	2	1.8	26.94	.000**

Items		Total knowledge						X2	P- Value
		Good (n=100)		Average (n=169)		Poor (n=110)			
		N	%	N	%	N	%		
courses related to infection control	No	8	8	125	73.9	108	98.2		

Table (5): exposed that, there were highly statistically significant relation between total practice of the studied sample about infection control precautions in PHCCs and their demographic data such as, educational level and attend training courses related to infection control at (P= < 0.01). Also, there were statistically significant relation with their age and years of experience at (P= < 0.05). While, there were no significant relation with their gender, place of residence and work place at (P= >0.05).

Table (5): Relation between demographic characteristics of the studied sample and their total practice regarding infection control precautions in primary health care centers (n=379).

Items		Total practice				X2	P- Value
		Competent (n=157)		Incompetent (n=222)			
		N	%	N	%		
Age (year)	20-<30	82	52.2	20	9		
	30-<40	65	41.4	91	41	13.69	0.01*
	≥ 40	10	6.4	111	50		
Gender	Female	133	84.7	192	86.5	5.854	0.201
	Male	24	15.3	30	13.5		
Educational level	Nursing school	18	11.5	100	45	24.95	.000**
	Technical Institute	93	59.2	118	53.2		
	of Nursing						
	Bachelor of	34	21.7	4	1.8		
	Nursing						
	Post graduate	12	7.6	0	0.0		
Place of residence	Urban	84	53.5	90	40.5	8.965	0.081
	Rural	73	46.5	132	59.5		
Work place	Urban center	80	51	115	51.8	8.317	0.088
	Rural unit	77	49	107	48.2		
Years of Experience	<5	18	11.5	70	31.5	15.24	0.01*
	5-<10	24	15.3	76	34.2		
	≥ 10	115	72	76	34.2		
Training courses related to infection control	Yes	130	82.8	8	3.6	25.98	.000**
	No	27	17.2	214	96.4		

Table (6): showed that, there was highly significant positive correlation between total HCP`s knowledge about infection control precautions in primary health care centers and their practice.

Table (6): Correlation between the HCPs` knowledge about infection control precautions in primary health care centers and their practice

Items	Total practice
Total knowledge	r = 0.317 P = .000**
Total practice	

Statistically significant at p<0.05 highly significant at p<0.01

Discussion:

The results of the current study revealed that majority of the studied HCPs were females. This finding agreed with the study done by Henderson et al., (2021) [7] found that majority of the studied sample was females and only one fifth of the study participants were males, on the other hand, a study conducted by Phan et al., (2019) [17] found that about two third of the study participants were females and nearly one third were males. These study results may be due to that nursing occupation is more common among females more than males and that the numbers of female nurses are more than male nurses.

The result of the current study revealed that around one half of the studied sample aged between thirty to less than forty years with a mean age 38.94 ± 6.32. This result nearly agrees with results of a study done by Akande, (2020) [18] stated that mean age of intervention group was 43.9 years old and the mean age of the study group was 43.6 years old. These results may be due to increased age of the current study participant could be a risk factor for poor adherence to infection control intervention and precaution due to decreased knowledge about the appropriate practice.

The result of the current study revealed that about two third of the studied sample were not received training about infection control. This result was contradicted with the study done by Wong (2021) [19] reported that the majority of the studied sample received training about infection control precaution. The results of the current study may be due to the nature of the setting require that all the health care team members to be well trained about infection control procedure and precautions.

The result of the current study showed that one half of the studied sample had ten years or more of experience. This study result was contradicted with a study done by Alrubaiee et al., (2021) [6] found that two third of the studied sample had experience more than five years. These results may be due to years of experience affect their abilities to work and empower them, enhance HCP's practice in all fields and specifically in infection control and handling infectious agents and adherence to infection control standard precautions.

Regarding distribution of the studied sample according to their total knowledge infection control precautions in PHCCs, the current study showed that that, nearly about half of the studied sample had average level of total knowledge about infection control precautions in PHCCs. Also, about quarter of them had good level of total knowledge. While, more than one quarter of them had poor level of total knowledge. This finding is in contrast with the results of the study, which was conducted by Hassan et al., (2020) [20] mentioned that, the most of the studied sample had good level of total knowledge about infection control precautions post infection control program. Hence, education has a positive impact on retention of knowledge and practices of staff and has a positive effect on their compliance with infection control practices.

According total practice, the current study detected that more than half of the studied sample had incompetent practice regarding infection control precautions in PHCCs. While, more than one third of them had competent practice. These results were cohort with the study conducted by Kerity & Naji, (2017) [21] explained that only one quarter of studied sample had good knowledge about infection control precautions in PHCCs.

The current study revealed that there were highly statistically significant relation between total knowledge of the studied sample about infection control precautions in PHCCs and their demographic data such as, educational level, years of experience and attend training courses related to infection control at (P= < 0.01). Also, there were statistically significant relation with their age and work place at (P= < 0.05). While, there were no significant relation with their gender and place of residence at (P= >0.05). These results explained as nurses attended training program related using illustrative educational method during training program.

These results were consistent with the study conducted by Geberemariyam et al., (2018) [22] clarified that Healthcare workers were more likely to have infection prevention knowledge if they worked longer ten years or more. In addition, regular with the study performed by Shrestha et al., (2017) [23] revealed that training program had positive effect on their knowledge level with p value <0.01**.

The current study there were highly statistically significant relation between total practice of the studied sample about infection control precautions in PHCCs and their demographic data such as,

educational level and attend training courses related to infection control at (P= < 0.01). Also, there were statistically significant relation with their age and years of experience at (P= < 0.05). While, there were no significant relation with their gender, place of residence and work place at (P= >0.05).

These results agree with the study by Patil et al., (2018) [24] reported that work experience and qualification had significant improving their practice level with p value <0.01**. Also, similar with the study by Desta et al., (2018) [25] mentioned that older age, lengthy work experience and higher educational status were significantly associated with both practice of infection prevention.

Related to correlation between the HCPs` knowledge about infection control precautions in PHCCs and their practice and environmental assessment, the current results showed that, there was highly significant positive correlation between total HCP`s knowledge about infection control precautions in PHCCs and their practice. These results supported with the study by van Rensburg et al., (2018) [26] stated that there was positive correlation between HCPs' knowledge and their practice with p value <0.01**. In addition, consistent with the study by Assefa et al., (2020) [27] presented that there was significant correlation between nurses' practice and their knowledge with p value <0.05*.

Conclusion:

Based on the findings of this study, it can be concluded that ,more than one third of HCPs in the current study had average overall knowledge score, while more than one half of them had incompetent practice regarding infection control precautions. A highly statistically significant positive linear correlation between total HCPs' knowledge about infection control precautions in PHCCs and their practice was pointed up. In conclusion, healthcare managers need to supervise the staff on the practicing infection prevention standards and techniques and monitor adherence to policies of PHCCs. The Administrators should promote feedback on practice, up dated. In the light of the research findings, recommended that updating knowledge and practice of HCPs through continuing in-service educational training programs should be designed and applied on regular basis.

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