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Effectiveness of an Educational Program on Nurses' Knowledge and Practice Regarding Standard Precautions for Hemorrhagic Fever

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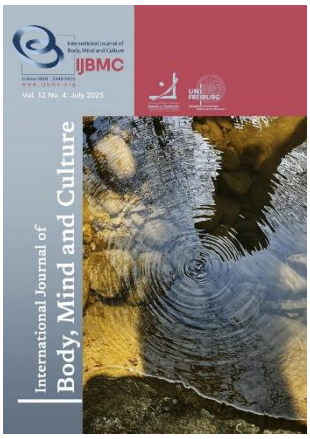

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ABSTRACT

Objective: This study aimed to determine the effectiveness of an educational program on nurses' knowledge and practices about preventive measures of hemorrhagic fever and to find a relationship between nurses' knowledge and demographic data

Methods and Materials: A quasi-experimental two-group pretest-posttest design was employed on a purposive sample of 100 nurses at Al Sadr Teaching Hospital in Basrah, with the study group receiving an "educational program" for two months. The data were gathered using a questionnaire that included demographics, knowledge, and practices about recommended precautions for hemorrhagic fever. The nurses' knowledge and practice scores were evaluated before and during the intervention.

Findings: The findings indicated a statistically significant difference in nurses' knowledge scores before and after the educational program (mean 6.4200 ± SD 0.64175, P-value 0.000) and in practice scores (mean 6.4800 ± SD 0.90891, P-value 0.000). Furthermore, no significant relationship was found between demographic data and nurses' knowledge and practice of standard precautions.

Conclusion: The nurses' knowledge and practice about standard precautions for hemorrhagic fever were markedly enhanced after the education program. Consequently, it is recommended that nurses attend frequent teaching seminars on conventional precautions.

Keywords: Educational Program, Nurses, Standard Precautions, Hemorrhagic Fever.

Introduction

Viral hemorrhagic fevers (VHF) include a variety of conditions that can vary in severity from moderate to life-threatening, marked by high mortality rates. The classification of these diseases encompasses four distinct families: Arenaviridae, Bunyaviridae, Flavivirus, and Filovirus (Bostik et al., 2015).

Because they are zoonotic, most viruses associated with these diseases require vectors to spread to humans. The majority of these illnesses are either transmitted by arthropods or rodents, and they are often restricted to the endemic areas inhabited by their hosts. Many VHF viruses possess infectious characteristics, with specific varieties, such as arenavirus and filovirus, exhibiting elevated infection rates. Transmission among persons

happens by direct contact with body fluids and contaminated blood (Srivastav et al., 2024).

Viral hemorrhagic fevers can cause nonspecific symptoms such as headache, fever, myalgia, and problems with the gastrointestinal or upper respiratory tract. According to the World Health Organisation (WHO), the Crimean-Congo hemorrhagic fever virus has been sporadically observed in major outbreaks in Iraq, Iran, Oman, Saudi Arabia, Kuwait, the United Arab Emirates, and Pakistan, all located in the Eastern Mediterranean area (Peters & Zaki, 2002).

Prevention is the most effective strategy for addressing such epidemics, given the limited therapeutic options available. This can be achieved by enhancing hospitals' readiness for VHF outbreaks, augmenting staff capabilities to identify hazards, and providing essential infrastructure for the safe care of infected individuals. The Infection Prevention and Control (IPC) methods implemented by hospitals are crucial for protecting healthcare providers, patients, and the environment. The implementation of fundamental IPC measures, such as standard precautions, is essential for ensuring safe healthcare delivery (Storr et al., 2017).

The transfer of infections to healthcare workers is highly avoidable when infection prevention and control techniques are used. The decline in the percentage of infected individuals during the recent Ebola outbreak in West Africa, from 12% in July 2014 to 1% in February 2015, was ascribed to enhanced infection prevention and control methods (Tremblay et al., 2017).

The most frequently cited deficiencies in IPC measures relate to administration, engineering, and environmental factors, including inadequate rules, substandard employment conditions, flawed IPC practices, insufficient personal protective equipment (PPE), and improper use of PPE (Boiano et al., 2014).

This study is considered the first of its kind at the University of Baghdad, College of Nursing, and the first program implemented in Basra Governorate for nurses on hemorrhagic fever and preventive measures.

Methods and Materials

This study employed a quasi-experimental design to evaluate the impact of an educational program on nurses' understanding and practices related to standard precautions for hemorrhagic fever. The program was administered to two sample groups: one served as a control group, and the other as a study group. July 10, 2024, to January 15, 2025, was the time frame of the study.

Setting: Study participants were recruited at Basrah's AL-Sadder Teaching Hospital.

Instrumentation: questionnaire consists of three domains:

- Nurses' Demographic Characteristics.
- Nurses' Knowledge About Standard Precautions for Hemorrhagic Fever.
- Nurses' Practices About Standard Precautions for Hemorrhagic Fever [12].

Population

The population consisted of nurses at the Al Saddar Teaching Hospital in Al Basra.

Sample & Sampling Procedures

The sample consisted of 114 participants, selected through a non-probability, purposive sampling procedure.

Determining Sample Size

Krejcie and Morgan (1970) introduced an alternative formula in computing sample size for categorical data based on the formula below (Krejcie & Morgan, 1970):

The researcher used an electronic application to calculate the minimum sample size to verify the accuracy of the result in the Steven K. Thompson equation, and it can be retrieved by visiting: http://www.raosoft.com/samplesize.html (Raosoft: Sample size calculator)

Reliability of the Questionnaire

The Cronbach's Alpha analysis in this table demonstrates a robust assessment for the knowledge scale (0.87), indicating that the questionnaires possess a notable degree of internal consistency and similar reliability.

Educational intervention

Instructional intervention: The executed infection control education program was administered to all participants. The initial interview was conducted to clarify the study's purpose, obtain participants' written consent, collect demographic data, and administer a pretest to assess their comprehension and compliance with the usual procedures.

The interview lasted for one hour. The second interview (implementation phase) comprised four meetings conducted monthly to encompass all nursing

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work shifts. Each session lasted 45 minutes and included various pedagogical approaches, such as lectures, discussions, brainstorming sessions, and the use of visual and instructional materials (posters and handouts), to provide a structured infection control educational program. The initial session provided information on emerging illnesses, including an overview of viral hemorrhagic fever. The second session included details about the diagnosis, management, and infection control of hemorrhagic fever. The third session included preventative strategies and routine precautions for hemorrhagic fever. The fourth session focused on the proper use of personal protective equipment (PPE). The entire instructional program lasted around two months. The posttest was administered during the assessment phase, requiring approximately 30 minutes to complete.

Scoring and Ranging

To score the items on the scale, a deterministic scale was used for the knowledge assessment. The scoring was done as follows: While a wrong response was given a score of 0, a correct response was given a value of 1.

Data analysis: The data were analyzed and interpreted in SPSS version 26.0.

- Descriptive statistics (F, %, M, SD).

Inferential statistics (Cronbach Alpha, Chi-square, t-test, Point-Biserial correlation, Rank-Biserial Correlation).

Findings and Results

According to the descriptive analysis, the study group's average age was M = 34.0 (SD = 8.216), whereas the control group's was M = 35.44 (SD = 9.725). The research group consisted of an equal number of male and female nurses (50%). At the same time, the control group exhibited a higher proportion of females (52%) compared to males (48%). The study group consisted of 40% single nurses and 60% married nurses, while the control group comprised 36% single nurses and 64% married nurses. The study group comprised the following departmental distributions: emergency (24%), ICU (30%), Internal Medicine (28%), and surgical ward (18%). In contrast, the control group exhibited the following distributions: emergency (28%), ICU (28%), Internal Medicine (20%), and surgical ward (24%). Regarding academic qualifications, the study group comprised nurses with a Bachelor's degree at 48% and those from the Institute of Nursing at 52%. In contrast, the control group included nurses with a Bachelor's degree at 52% and those from the Institute of Nursing at 48%. The study indicates that the highest percentage of work experience, specifically in the range of 3 to less than 6 years, is observed in both groups, with 48% and 58% in the control group and the study group, respectively. The research revealed that 80% of the experimental group and 84% of the control group were unaware of the standard precautions for healthcare policies within their institution. Concerning, have you ever encountered the term "standard precautions"? The majority of nurse participants were categorized as NO in two groups, with 72% in the study group and 74% in the control group. Most nurses responded affirmatively regarding standard precautions, with 92.9% in the study group and 69.2% in the control group, citing colleagues, friends, WhatsApp, and other sources as influences.

Table 1

Frequency distribution of the examined sample's demographic features (n=100)

		Study		Control		
		F	P	F	P	Sig.
Age	18-less than 26	13	26.0	6	12.0	Chi-square=15.581
	26-less than 34	15	30.0	21	42.0	Df = 16
	34-less than 42	11	22.0	10	20.0	P – Value = .413
	42-less than 60	6	12.0	9	18.0	NS
	>50	5	10.0	4	8.0	
	Total	50	100.0	50	100.0	
		M = 34.0 Sd = 8.216		M = 35.44 Sd = 9.725		
Gender	Male	25	50.0	24	48.0	Chi-square=0
	Female	25	50.0	26	52.0	Df = 1
	Total	50	100.0	50	100.0	P – Value = 1
						NS
Marital status	Single	20	40.0	18	36.0	Chi-square=0.982

	Married	30	60.0	32	64.0	Df = 1
	Total	50	100.0	50	100.0	P – Value = .470
						NS
Name of ward/department	Emergency	12	24.0	14	28.0	Chi-square=8.543
	ICU	15	30.0	14	28.0	Df = 9
	Internal Medicine	14	28.0	10	20.0	P – Value = .480
	surgical ward	9	18.0	12	24.0	NS
	Total	50	100.0	50	100.0	
Academic qualification	Bachelor	24	48.0	26	52.0	Chi-square=.742
	Institute of Nursing	26	52.0	24	48.0	Df = 1
	Total	50	100.0	50	100.0	P – Value = .389
						NS
Work experiences (in years)	<3	11	22.0	11	22.0	Chi-square=3.078
	3- less than 6	24	48.0	29	58.0	Df = 4
	>6	15	30.0	10	20.0	P – Value = .545
	Total	50	100.0	50	100.0	NS
		M = 4.74 SD = 1.126		M = 4.44 SD = 1.039		
Do you have standard precautions for health care policies in your institution?	Do not know	40	80.0	42	84.0	Chi-square=.335
	Yes	10	20.0	8	16.0	Df = 1
	Total	50	100.0	50	100.0	P – Value = .563
						NS
Have you ever heard the word “standard precautions”?	No	36	72.0	37	74.0	Chi-square=1.387
	Yes	14	28.0	13	26.0	Df = 1
	Total	50	100.0	50	100.0	P – Value = .238
						NS
If yes, mention the source of information	Colleague, friend, WhatsApp, and Others	13	92.9	9	69.2	Chi-square=1.938
						Df = 1
	Formal training	1	7.1	4	30.8	P – Value = .184
	Total	14	100.0	13	100.0	NS

The table showed that nurses' knowledge of standard precautions was not significantly different between the pre-test groups.

Table 2

Distribution of the knowledge on the standard precautions domain pretest for study and control groups among the studied sample (n=100)

Variables	Classification		Groups		Sig.
			Study	Control	
1	incorrect		37	38	NS
	correct		13	12	
	Total		50	50	
	Chi-square = 0.053	df = 1	P-Value = 0.817		
2	incorrect		38	39	NS
	Correct		12	11	
	Total		50	50	
	Chi-square = 0.056	df = 1	P-Value = 0.812		
3	incorrect		37	38	NS
	Correct		13	12	
	Total		50	50	
	Chi-square = 0.053	df = 1	P-Value = 0.817		
4	incorrect		39	38	NS
	Correct		11	12	
	Total		50	50	
	Chi-square = 0.056	df = 1	P-Value = 0.812		
5	incorrect		39	39	NS
	Correct		11	11	
	Total		50	50	
	Chi-square = 0.000	df = 1	P-Value =1.000		
6	incorrect		38	39	NS
	Correct		12	11	

	Total		50	50	
	Chi-square = 0.056	df = 1	P-Value = 0.812		
7	incorrect		36	41	NS
	Correct		14	9	
	Total		50	50	
	Chi-square = 1.412	df = 1	P-Value = 0.235		
8	incorrect		35	37	NS
	Correct		15	13	
	Total		50	50	
	Chi-square = 0.198	df = 1	P-Value = 0.656		

The table showed that nurses' practice of standard precautions was not significant for the pre-test in both groups.

Table 3

Comparison of the study and control groups' pretest knowledge on the standard precautions about hemorrhagic fever domain (n=100)

Variables	Classification		Groups		Sig.
			Study	Control	
1	incorrect		38	41	NS
	correct		12	9	
	Total		50	50	
	Chi-square = 0.542	df = 1	P-Value = 0.461		
2	incorrect		38	43	NS
	Correct		12	7	
	Total		50	50	
	Chi-square = 1.824	df = 1	P-Value = 0.202		
3	incorrect		35	39	NS
	Correct		15	11	
	Total		50	50	
	Chi-square = 0.832	df = 1	P-Value = 0.362		
4	incorrect		36	38	NS
	Correct		14	12	
	Total		50	50	
	Chi-square = 0.208	df = 1	P-Value = 0.648		
5	incorrect		39	39	NS
	Correct		11	11	
	Total		50	50	
	Chi-square = 0.000	df = 1	P-Value =1.000		
6	Incorrect		38	40	NS
	Correct		12	10	
	Total		50	50	
	Chi-square = 0.233	df = 1	P-Value = 0.629		
7	incorrect		40	37	NS
	Correct		10	13	
	Total		50	50	
	Chi-square = 0.508	df = 1	P-Value = 0.476		
8	incorrect		38	41	NS
	Correct		12	9	
	Total		50	50	
	Chi-square = 0.542	df = 1	P-Value = 0.461		

The table indicated that nurses' knowledge regarding standard precautions was not significant for questions (2, 4, 6, 8) and was significant for questions (1, 3, 5, 7) in the post-test across both groups.

Table 4

Comparison of the study and control groups' pretest knowledge on the standard precautions about hemorrhagic fever domain (n=100)

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Variables	Classification		Groups		Sig.
			Study	Control	
1	incorrect		8	19	S
	correct		42	31	
	Total		50	50	
	Chi-square = 6.139	df = 1	P-Value = 0.013		
2	incorrect		12	19	NS
	Correct		38	31	
	Total		50	50	
	Chi-square = 2.291	df = 1	P-Value = 0.130		
3	incorrect		10	20	S
	Correct		40	30	
	Total		50	50	
	Chi-square = 4.762	df = 1	P-Value = 0.029		
4	incorrect		10	17	NS
	Correct		40	33	
	Total		50	50	
	Chi-square = 2.486	df = 1	P-Value = 0.115		
5	incorrect		7	17	S
	Correct		43	33	
	Total		50	50	
	Chi-square = 5.482	df = 1	P-Value =0.019		
6	incorrect		12	18	NS
	Correct		38	32	
	Total		50	50	
	Chi-square = 1.714	df = 1	P-Value = 0.190		
7	incorrect		7	18	S
	Correct		43	32	
	Total		50	50	
	Chi-square = 6.453	df = 1	P-Value = 0.011		
8	incorrect		13	17	NS
	Correct		37	33	
	Total		50	50	
	Chi-square = 0.672	df = 1	P-Value = 0.383		

The table indicated that nurses' adherence to standard precautions was not significant for questions (1, 5), significant for questions (2, 3, 4, 7, 8), and highly significant for question (6) in the post-test across both groups.

Table 5

Comparison of the study and control groups' posttest knowledge on the standard precautions about hemorrhagic fever domain (n=100)

Variables	Classification		Groups		Sig.
			Study	Control	
1	incorrect		10	16	NS
	correct		40	34	
	Total		50	50	
	Chi-square = 1.871	df = 1	P-Value = 0.171		
2	incorrect		10	21	S
	Correct		40	29	
	Total		50	50	
	Chi-square = 5.657	df = 1	P-Value = 0.017		
3	incorrect		11	20	S
	Correct		39	30	
	Total		50	50	
	Chi-square = 3.918	df = 1	P-Value = 0.049		
4	incorrect		7	18	S
	Correct		43	32	
	Total		50	50	
	Chi-square = 6.453	df = 1	P-Value = 0.011		
5	incorrect		10	17	NS

	Correct	40	33		
	Total	50	50		
	Chi-square = 2.486	df = 1	P-Value =0.115		
6	Incorrect	9	23		HS
	Correct	41	27		
	Total	50	50		
	Chi-square = 9.007	df = 1	P-Value = 0.003		
7	incorrect	10	19		S
	Correct	40	31		
	Total	50	50		
	Chi-square = 3.934	df = 1	P-Value = 0.047		
8	incorrect	9	19		S
	Correct	41	31		
	Total	50	50		
	Chi-square = 4.960	df = 1	P-Value = 0.026		

The table showed that the comparison between nurses' knowledge and practice regarding standard precautions was not significant for the pre- and post-tests in the control group.

Table 6

Comparison between pre- and post-test control groups regarding nurses' knowledge about all domains for post-test (N = 100)

Variables	Groups	Mean	SD	T-test	Df	P-value	Sig
Knowledge of standard precautions	Pre	1.8200	.96235	-1.681	49	0.168	NS
	Post	2.69200	1.13744				
Practice standard precautions	Pre	1.6400	1.12050	-1.335	49	0.000	NS
	Post	1.9800	1.29733				

The results showed that the research group's nurses' knowledge and practice of conventional precautions changed significantly between the pre- and post-tests.

Table 7

Comparison between pre- and post-test study groups regarding nurses' knowledge about all domains for post-test (N = 100)

Variables	Groups	Mean	SD	T-test	Df	P-value	Sig
Knowledge of standard precautions	Pre	2.0200	.74203	-35.330	49	0.000	HS
	Post	6.4200	.64175				
Practice questionnaire on standard precautions	Pre	1.9600	.85619	-27.862	49	0.000	HS
	Post	6.4800	.90891				

Many of the relationships in the table between nurses' knowledge and practice about standard precautions and demographic information were not significant. However, the relationship between knowledge and the question "Do you have standard precautions for health care policies in your institutions?" was highly significant. There were also significant relationships between work experience in years and practice in both groups.

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Table 8

Relationship between socio-demographic characteristics and total nurses' knowledge level for study and control groups (N=100)

Demographic Variables		Knowledge of standard precautions	Practice standard precautions
Age	r(PB)	0.097	0.167
	P-value	0.505	0.245
	Sig	NS	NS
Gender	r(RB)	0.136	-0.094
	P-value	0.346	0.514
	Sig	NS	NS
Marital State	r(RB)	0.133	.106
	P-value	0.356	.464
	Sig	NS	NS
Name of ward/ Department	r(RB)	0.278	-0.005
	P-value	0.051	0.975
	Sig	NS	NS
Academic qualification	r(RB)	0.026	0.285*
	P-value	0.857	0.045
	Sig	NS	S
Work experience in years	r(PB)	0.073	0.269
	P-value	0.615	0.059
	Sig	NS	NS
Do you have standard precautions for health care policies in your institution	r(RB)	0.380**	-0.032
	P-value	0.007	0.826
	Sig	HS	NS
Have you ever heard of the term' standard precautions'?	r(RB)	-0.226	-0.029
	P-value	0.115	0.839
	Sig	NS	NS
If yes, mention the source of information	r(RB)	0.147	0.028
	P-value	0.308	0.845
	Sig	NS	NS

Discussion and Conclusion

This study examined the demographic characteristics, including age, gender, marital status, ward/department name, academic qualification, work experience (in years), whether standard precautions for healthcare policies are in place in your institution, and whether you have ever heard of the term "standard precautions." The findings of this study indicated that most participants belong to the middle-aged demographic. The aforementioned results are similar to those reported by El-Bahnasawy et al. (2015), who used convenient sampling to collect data from 75 nurses among all staff nurses on duty in the hospital. In contrast, their mean age was 31.2 years (mean + SD = 31.2 + 6.98), ranging from 25 to 40 years of age.

Correspondingly, results showed (Raab et al., 2020) that the findings agree with those reported, with a mean age of 31 (27–38) years. Nevertheless, the study's results were consistent with those of Hassan, Majeed, and Isam; a majority of the participants fall within the age range of 26 to 30 years (Hassan & Majeed, 2024). The study findings are consistent with those of Nashwan et al. (2021), who found that most participants fell within the 20-30-year age group. Additionally, the study results are consistent with another study, which found that most nurses were female and in the 20-29 age range (Jissir, 2017).

The findings agree with the study results that reveal the greater number of the nurses' age group was accounted for with the age group (23–27) years (Sana'a & Mahmud, 2011).

These results are supported by a study conducted by Tarrar and Mohammed, which found that most age groups (25-29 years old) (Rajih, 2020).

The majority of the sample in this study consisted of equal numbers of males and females, with a percentage of 50%. This result is supported by (Jamil et al., 2022). They reported that the percentage was equal between males and females (51.4%).

The results were similar to those of Al-Mayahi, Al-Jubouri, and Jaafar. Approximately 51.4% of the

participants were male, while 48.6% were female (Al-Jubouri & Jaafar, 2023).

According to the study's findings, regarding marital status, three-quarters of the study group were married, which is comparable to the findings of the research carried out by Sharma et al. (2021), which also reported that three-quarters of the study participants were married.

On the other hand, the study found similar results to those of Ubaid and Al-Jubouri in that three-quarters of the participants were married (Ubaid & Al-Jubouri, 2023).

Overall, the emergency and ICU departments accounted for more than a quarter of the survey participants, as indicated by the names of the wards and departments.

In contrast, the results of research conducted by (8) showed that one-third of the participants were working in the medicine department.

The results also showed that the reported percentage of academic qualification was (Bachelor and Institute of Nursing, representing almost equal (El-Bahnasawy et al., 2015) .to assess nurses staff knowledge and attitude regarding viral hemorrhagic fever VHFs in military hospital to prevent disease spread and improve the quality of nursing care, as the majority of the study sample was of diploma nursing school.

The results were similar to those of Bakey. Almost half of the participants were nursing college graduates (Bakey, 2019).

The study results align with those of Alwatifi and Hattab. Among them, 40.8% possessed a bachelor's degree in nursing(Alwatifi & Hattab, 2022).

Concerning work experiences (in years), most of the study sample were (3- less than 6), which constituted half of the sample. Similar results were reported by Ahmed et al. (2021), who studied. Findings indicated that half of the participants in the study were between 4 and 6 years old. Also, regarding this study, results supported the finding that half of the participants had experiences of (1-5) years (Bakey, 2009).

According to standard precautions, most nurses are unaware of or do not adhere to standard precautions in their healthcare institution's policies. Have you ever heard the word “standard precautions”? Both groups were (80%). In contrast, Sharma et al. (2021) found that their study results disagree with the finding that reported the majority of the study sample as 'Yes'. Concerning, if yes, mention the source of information, most nurses from' Colleagues, friends, WhatsApp, and Others. Unlike Sharma et al. (2021), the majority of nurses have formal training.

In the present study, the primary objective of the research, which aimed to assess nurses' knowledge scores regarding hemorrhagic fever and the potential improvement after intervention, was affirmative. The results revealed a significant enhancement across all knowledge domains following the educational program. The proportion of participants who correctly identified the definition of viral hemorrhagic fever increased considerably from pre-program to post-program assessments. An evident shift in knowledge was also noted regarding the mode of transmission, with a substantial increase from pre- to post-intervention. Moreover, the highest domain of knowledge in the post-intervention phase pertained to complications of viral hemorrhagic fever, followed by treatment and knowledge and practice for standard precautions, signifying positive outcomes for health professionals. The overall level of knowledge improved significantly, demonstrating the success of the educational program. These findings are consistent with those of a study conducted by Nyakarahuka et al. (2017) in Uganda, which found that a significant portion of participants exhibited good knowledge about Marburg virus diseases. These results underscore the importance of well-designed educational interventions in enhancing awareness among healthcare providers.

Similarly, the study aimed to assess the improvement in nurses' knowledge and practices regarding viral hemorrhagic fever and standard precautions following an educational intervention. The study's findings indicated a statistically significant increase in nurses' practices following the educational program, showcasing better adherence to proper practices compared to the pre-intervention phase. These results are consistent with those of the study carried out by Koo et al. (2016), which observed enhanced nursing practices after attending continuing nursing education sessions. Other research studies, including those by Ozekcin et al. (2015) and Elasrag et al. (2021), further supported the notion that nursing education programs have a positive impact on improving knowledge and practices among nurses. Additionally, the positive correlation between nurses'

knowledge and practices was demonstrated by Mahmoud et al. (2022), which highlights the interconnectedness of knowledge and implementation in healthcare practices.

The study's results, supported by Jaafar and Abed, indicate that the current educational program is effective in enhancing nurses' knowledge in critical care units (Jaafar & Abed, 2020).

This study, supported by Falih and Jasim, demonstrated that the understanding of critical care unit nurses was enhanced by interventional programs (Falih & Jasim, 2024).

Regarding the study results, Athbi and Mohammed found that the education program effectively improved the participants' knowledge, which supported the study's findings (Athbi, 2012).

The study results aligned with those of Abbas and Atiyah, demonstrating a notable improvement in nurses' practices regarding the use of personal protective equipment. The study sample exhibited a significant difference between pre- and post-test practices (Abbas & Atiyah, 2021).

The present study results also identified statistically significant relationships observed in the study. In the pre-tests, a significant correlation was found between nurses' total knowledge of viral hemorrhagic fever and their academic qualifications. Significant differences were also noted between nurses' practice of standard precautions in the pre-test and their academic qualifications. Additionally, statistically significant correlations were found between knowledge of standard precautions as measured by the pre-test and the question, "Do you have standard precautions for healthcare policies in your institution?" Furthermore, it shows the statistical relationships identified in the study. In the post-test, statistically significant correlations were found between the level of knowledge on standard precautions and age, gender, and marital status, with respective values. Additionally, the post-test showed statistically significant correlations between the nurses' knowledge of standard precautions and their work experience in years, which aligns with the findings (Zhang et al., 2020), emphasizing the role of knowledge in shaping attitudes and subsequent preventive practices among healthcare workers.

The study results indicated a correlation between years of experience and Nurses' understanding and behaviours about infection control in critical care units; greater experience correlated with improved knowledge and competencies (Hattab & Kadhim, 2021).

Results were consistent with those of Kale et al. (2020), which showed that gender, education level, and number of years working in hemodialysis units were not significantly correlated with nurses' practices. However, a significant link was found between marital status and nurses' practices.

The education program led to an increase in nurses' knowledge and practice regarding standard precautions for preventing hemorrhagic fever.

Nurses may participate in specialized training programs to guarantee full compliance with standard safeguards. These programs can enhance awareness and serve as an essential tool to achieve the necessary improvement in understanding and adherence to conventional precautions.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Declaration of Helsinki, which provides guidelines for ethical research involving human participants. Ethical considerations in this study were that participation was entirely optional. Ethical committee approval was obtained from the College of Nursing, University of Baghdad, Iraq, with the approval on 7 May 2024. Furthermore, the necessary formal approval was secured from the appropriate authorities at Al Sadder Teaching Hospital for the study. All study participants gave written consent following the review and approval of the document by the ethics committee. The objectives and characteristics of the study were elucidated to them. The team emphasized that participation in the research is entirely voluntary. The promise of privacy and secrecy was made.

Transparency of Data

Following the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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