Effectiveness of an Educational Program on Nurses' Knowledge Concerning the Infection Control Guideline in Baghdad Teaching Hospital

فاعلية برنامج تثقيفي على معارف الملاك التمريضي المتعلقة بدليل السيطرة على التلوث في مستشفى بغداد التعليمي

Saad Abdul-Rida Jissir, MScN *
Huda B. Hassan PhD**

*** Ministry of Health, e-mail:saadjissir@yahoo.com**
**** College of Nursing, University of Baghdad, e-mail:hudahassan560@yahoo.com**

المستخلص

الهدف: تهدف الدراسة الحالية إلى إيجاد أثر البرنامج ألتعلمي المتعلق بدليل السيطرة على التلوث على الممرضين وايجاد العلاقة بين أثر البرنامج وأنواع وحدات المستشفى وعمر الممرضين والمستوى العلمي وسنين الخدمة للممرضين .

المنهجية : دراسة شبه تجريبية أجريت في مستشفى بغداد التعليمي ، للفترة من ٢٠ كانون الأول ٢٠١٣ ولغاية ٣٠ من أب ٢٠١٤.، وتهدف الدراسة الحالية إلى تقييم معارف الممرضين العاملين في الردهات حول دليل السيطرة على التلوث ، وإيجاد أثر البرنامج التعليمي على معارف الممرضين .

تكونت عينة الدراسة من (٦٠) ممرض وممرضة والذين يعملون في الوحدات الباطنية وإمراض الدم والوحدات النفسية والوحدات العصبية لمستشفى بغداد التعليمي وقسمت العينة بشكل متساوي إلى مجموعة الدراسة والمجموعة الضابطة.

صمم الباحث البرنامج التعليمي واستمارة الاستبانة للوصول إلى أهداف الدراسة وشمل البرنامج عشر محاور رايسية تتعلق بدليل السيطرة على التلوث ولكل محور مجموعة من الفقرات لتقييم معارف الممرضين وتألفت الاستمارة من جزئيين ، حيث شمل الجزء الأول المعلومات الديموغرافية للممرضين، والجزء الثاني تضمن (١٠) محاور لتقييم معارف الممرضين المتعلقة بطرق السيطرة على التلوث.

تم تحليل البيانات من خلال تطبيق الإحصاء الوصفي (التكرارات، والنسب المئوية، والمتوسط الحسابي)، والتحليل الاستدلالي (تحليل التباين) وتم استخدام الحقيبة الإحصائية الإصدار رقم ٢٠ لإدخال البيانات لغرض تحليلها.

النتائج : أشارت نتائج الدراسة الحالية بأن معظم عينة الدراسة (٦٣,٣%) هم إناث ضمن الفئة العمرية ٢٠-٢٩ سنة وفيما يتعلق بالحالة الاجتماعية فان اغلب الملاك التمريضي من المتزوجين، وان الغالبية العظمى لعينة الدراسة هم خريجو معهد التمريض ولديهم من ١-٩ سنوات خبرة في التمريض وان أغلب عينة الدراسة شملوا بدورات تدريبية داخل العراق ولكن بعيدة عن موضوع السيطرة على التلوث. وبينت الدراسة بأن البرنامج التعليمي على مجموعة الدراسة كان مؤثرا". وأشارت النتائج أيضا بوجود دلالة إحصائية مؤثرة على معارف الممرضين المتعلقة بالسيطرة على التلوث قبل وبعد البرنامج التثقيفي لمجموعة الدراسة كذلك بين مجموعة الدراسة والمجموعة الضابطة بمستوى دلالة ≤ ٠،٠٥.

التوصيات : توصي الدراسة بتطبيق البرنامج الوطني للسيطرة على التلوث في جميع المؤسسات الصحية، والتأكيد على برامج التعليم الطبي المستمر لجميع الملاكات العاملة في المؤسسات الصحية والمتابعة المستمرة لتطبيق البرنامج للسيطرة على حالات التلوث في المستشفيات .

Abstract

Objectives: the study aims to findout the effectiveness of educational program concerning infection control guideline on nurses, and to find out the relationship between effectiveness of program and types of hospital unit, age, level of education, and years of experience of nurses.

Methodology: A quasi-experimental design study was carried out in Baghdad teaching hospital in the wards, for the period of December, 20th 2013 to September, 30th of July 2014, The study samples is composed of (60) nurses who have been actually working in the medical ward, blood disease, psychiatric ward, and neurological wards in Baghdad Teaching Hospital, those nurses are divided equally into the study and the control groups.

The researcher constructed the educational program and instruments in order to reach the aims of this study, the program deals with (10) main domains related to infection control, and each domains consist of many items to assess the nurses knowledge, and the questionnaires consist of two parts; first is concerned with the demographic data for nurses; and the second part is concerned with the assessment of the nurses' knowledge about infection control methods.

The data have been analyzed through the application of: descriptive frequency, percentages; mean of scores; and the inferential analysis that include: Analysis of variance, and the researcher used the SPSS version 20 to analysis of data. .

Results: Most of the nurses 63.3% was females at age (20-29), in relation to marital status most of the samples was married, and graduated from nursing institute as educational level, (53.3%) of nurses have (1-9) years of experience and majority of nurses included with training course in Iraq but not related to infection control program , and the findings of present study revealed that there were statistical differences about the infection control knowledge of nurses between pre and post program and between the post study and post control group also there are statistical differences between level of education of nurses and infection control knowledge at P ≥0.05.

Recommendation: The study recommends to application the world health organization (WHO) program of infection control program at all health centers and continuous medical educational program for all staff in the health center, and continuous follow up to applying the program to prevent spread of infection.

Key Wards:Nosocomial Infection, Infection, infection control, Hospital acquire disease, Disease

Introduction

Hospital infections are infections that are not present in the patient at the time of admission to hospital but develop during the course of the stay in hospital [(1)]. Healthcare-associated infections (HAIs) are infections that patients acquire while receiving treatment for medical or surgical conditions. HAIs occur in all settings of care [(2)]. Healthcare-associated infections are caused by a wide range of microorganisms. These are often carried by the patients themselves, and have taken advantage of a route into the body provided by an invasive device or procedure. Healthcare-associated infections can exacerbate existing or underlying conditions, delay recovery and adversely affect quality of life [(3)]. The entire spectrum of microbes from bacteria to viruses, fungi, and protozoa has been incriminated in hospital infection. Nearly 25 to 50 % of all hospital infections have been found to be due to gram negative organisms and 10 % of infections are due to staphylococci.[(4)] these are often carried by the patients themselves, and have taken advantage of a route into the body provided by an invasive device or procedure [(3).] HAIs are spread by numerous routes including surfaces (especially hands), air, water, intravenous routes, oral routes and through surgery. Interventions such as proper hand and surface cleaning, better nutrition, sufficient numbers of nurses, better ventilator management, use of coated urinary and central venous catheters and use of high-efficiency particulate air filters have all been associated with significantly lower nosocomial infection rates [(5)]. They are several reasons why the nosocomial infections are even more alarming in the 21st century. These include hospitals housing large number of people who are sick and whose immune system are often in a weak end state. Increased of outpatient treatment meaning that people who are in hospital are sicker on average, many medical procedures that bypass the body's natural protective barriers, medical staff move from patient to patient thus providing a way for pathogens to spread, inadequate sanitation protocols regarding uniforms equipment sterilization, washing and other preventive measures that may either be unheeded by hospital personnel or too lax to sufficiently isolate patients from infectious agents, and the routine use of anti‑microbial agents in hospitals creates selection pressure for the emergence of the resistant strains of microorganisms [(6)]. Health care workers are at risk of exposure to a variety of infectious diseases which may cause them illness and which may be transmitted from them to other staff and patients. Occupational Health Departments that work closely with the infection control department may minimize this risk by maintaining necessary records, performing immunizations, educating staff about risk and prevention, and conducting exposure management and investigation [(7).] Infection prevention and control' has been defined as the clinical application of microbiology in practice. More simply, it is a collective term for those activities intended to protect people from infections. Such activities are carried out as part of daily life by most individuals; for example, people wash their hands before eating to protect themselves from infection. The term is most often used in relation to healthcare, in particular with reference to preventing patients acquiring those infections most often associated with healthcare (such as wound infection) and preventing the transmission of micro-organisms from one patient to another (sometimes referred to as cross-infection) [(8).] to prevent an infection, links in the chain of events must be broken. If an infection occurs, treatment focuses on breaking the chain of infection to prevent the spread of infection to others. [(9)] The infection control is a policies and procedure used to minimize the risk of spreading infections, especially in hospitals and health care facilities [(10 & 11)].

Methodology

Design of the Study: A quasi-experimental design study is carried out through the application of pre-test and post-test approach for the study and control groups, from the period of December, 20th 2013 to, 30th of Jun 2014.

Setting of the Study: The present study is carried out in medical ward of the Baghdad Teaching Hospital. The ward which included in present study was medical ward, blood disease, Psychiatric, and neurological wards.

Sample of the Study: A purposive (Non probability) sample of (60) nurses are selected. The sample is divided into two groups; (30) nurses (study group) are exposed to the nursing instructional program and (30) nurses are not exposed to the program, considered as the control group, the selection of nurses was randomly chooses with three nurses of each ward for a study and control group.

Instrument: The test covers all domains and aspect for instructional program. For the purpose of present study, the number of correct responses or the knowledge questionnaire is used as the measure of the level of knowledge. Each question is comprised of 3 alternative. To evaluate the effectiveness of instructional program, the researcher was constructed the instrument, which consists of two parts:

Part I: The demographic data which included the nurses' characteristic, such as age, gender, income, level of education, years of experience, marital status, training course and related training course

Part II: is concerned the assessment of the nurses' knowledge toward guideline to infection control program (standard precaution) that consists of 10 main parts of:

1. Nosocomial infection (8) items.
2. Hand washing (15) items.
3. Personal protective equipment (PPE) that consist of:
   - 3.1. Use glove (wearing and removing) (15) items.
   - 3.2. Use mask (wearing and removing) (12) items.
   - 3.3. Use gown (wearing and removing) (14) items.
   - 3.4. Use apron (wearing and removing) (12) items.
   - 3.5.Use face and eye protection (wearing and removing) (9) items.
4. Safe handling and disposal of sharps equipment (15) items.
5. Routine management of the physical environment (14) items.
6. Reprocessing of reusable instruments and equipment (19) items.
7. Aseptic technique (non -touch technique) (15) items.
8. Waste management (13) items.
9. Handling of linen (12) items.
10. Safety-engineered devices (7) items.

Validity: The content validity of the instructional program and the study instruments are established through a panel of (15) experts.

Reliability of the Knowledge Items: Test-retest has been obtained through evaluating 10 nurses selected from Baghdad Teaching Hospital (medical ward). According to the knowledge test questionnaire, and Pearson correlation coefficients is used which = (0.84).

Statistical Methods: Data have been analyzed through the use of Statistical Package for Social Science (SPSS version 20 application). Descriptive Data Analysis (Frequencies, Percentages, Mean of Scores) and Inferential Statistical (Pearson Alpha Correlation Coefficient, Analysis of Variance).

Results:

Table (1): Socio-demographic Characteristics of Study and Control groups N=30

Variables	Classification	Study group		Control group	
		F	%	F	%
Hospital units	Medical ward	18	60	18	60
	Blood disease	6	20	6	20
	Psychological ward	3	10	3	10
	Neurological ward	3	10	3	10
Age	20-29 years	13	43.3	15	50
	30-39 years	8	26.6	9	30
	40-49 years	5	16.6	4	13.3
	50-59 years	3	10	2	6.6
	>60 years	1	3.3		
Gender	Male	13	43.3	11	36.6
	Female	17	56.6	19	63.3
Marital status	Single	5	16.6	7	23.3
	married	23	76.6	22	73.3
	unrestrained	1	3.3	1	3.3
	windowed	1	3.3	٠	0.0
Income	High level of income	21	70	21	70
	Middle level of income	5	16.6	3	10
	Low level of income	4	13.3	6	20
Level of education	Intermediate nursing school	4	13.4	2	6.6
	Secondary nursing school	8	26.6	2	6.6
	Nursing institute	10	33.3	21	70.0
	Nursing collage	7	23,4	4	13.4
	High nursing education	1	3.3	1	3.4
Year of experiences	1-9 years	16	53.3	16	53.3
	10-19 years	8	26,6	8	26.6
	20-29 years	4	13.3	4	13.3
	>40 years	3	10	1	3.3
Training course	In Iraq	26	86.6	28	93.3
	Out the Iraq	2	6.6	1	3.3
	Without course	2	6.6	1	3.3
Training related course	Related	9	30	9	30
	Unrelated	21	70	21	70

F=Frequency; % = Percentage

Table (1) presents the demographic characteristics of the study sample are 60% of nurses from the medical wards, (43.3%) of them at age (20-29) years old, (56.6%) of them was females, (76.6%) was married, (70%) of the nurses at high level of income, (33.3%) was graduated from nursing institute, (53.3% of them have (1-9) year of experiences, (86.6%) of nurses their training course in Iraq was unrelated to infection control, and the demographic characteristics of the control group was (60%) of them from the medical wards, (63.3%) was females, (50%) of them at age (20-29) years old, (73.3%) of them was married, (70%)of them at high level of income, (70%) of them graduated from nursing institute, (53.3%) have (1-9) year of experiences, and (93.3%) have training course in Iraq was unrelated to infection control.

Table (2):Comparison between Study Group (Pre and Post) Response toward Infection Control Knowledge

Domains	classification	Pre study		classification	Post study	
	degree	F	%	degree	F	%
Nosocomial infection	Excellent	**11**	**36.6**	Excellent	30	100
	Very good	14	46.6	Very good		
	Good	5	16.6	Good		
Hand washing	Excellent	9	30	Excellent	30	100
	Very good	16	53.3			
	Good	5	16.6			
Gloves uses	Excellent	15	50	Excellent	30	100
	Very good	10	33.3			
	Good	5	16.6			
Mask uses	Excellent	10	33.3	Excellent	30	100
	Very good	12	40			
	Good	7	23.3			
	medium	1	3.3			
Gown uses	Excellent	12	40	Excellent	29	96.6
	Very good	10	33.3	Very good	1	3.3
	Good	6	20			
	medium	2	6.6			
Apron uses	Excellent	6	20	Excellent	30	100
	Very good	16	53.3			
	Good	6	20			
	medium	2	6.6			
Face and eye protection uses	Excellent	4	13.3	Excellent	29	96.6
	Very good	12	40	Very good	1	3.3
	good	7	23.3			
	medium	7	23.2			
Safe handling and disposable of sharp	Excellent	4	13.3	Excellent	30	100
	Very Good	19	63.3			
	Good	7	23.3			
Routine management of the physical environment	Excellent	3	10	Excellent	29	96.6
	Very good	22	73.3	Very good	1	3.3
	Good	4	13.3			
	medium	1	3.3			
Reprocessing of reusable instrument and equipment	Excellent	1	3.3	Excellent	29	96.6
	Very good	24	80	Very good	1	3.3
	Good	5	16.6			
Aseptic technique (non -touch technique)	Excellent	2	6.6	Excellent	30	100
	Very good	19	63.3			
	good	7	23.3			
	medium	2	6.6			
Waste management	Excellent	2	6.6	Excellent	30	100
	Very good	23	76.6			
	Good	4	13.3			
	medium	1	3.3			
Handling of linen	Excellent	1	3.3	Excellent	30	100
	Very good	22	73.3			
	Good	6	20			
	medium	1	3.3			
Safety engineering device	Excellent	14	46.6	Excellent	29	96.6
	Very good	7	233	good	1	3.3
	Good	6	20			
	medium	1	10			

F=Frequency; %= Percentage

Table (2) shows the effectiveness of educational program for infection control domains for the study group through the excellent nurses responses.

Table (3): Statistical Differences between Nurses Knowledge Related to Infection Control and Type of Hospital Wards (Posttest for Study Group)

Domains	Classification	Sum of Squares	df	Mean Square	F	Sig. P>0.05
Nosocomial infection	Between Groups	4.9	3	1.6	.6	.600
	Within Groups	68.0	26	2.6		N.S
	Total	72.9	29			
Hand washing	Between Groups	49.467	3	16.489	1.568	.221
	Within Groups	273.333	26	10.513		N.S.
	Total	322.800	29			
Gloves use	Between Groups	74.800	3	24.933	2.100	.125
	Within Groups	308.667	26	11.872		N.S.
	Total	383.467	29			
Mask use	Between Groups	76.889	3	25.630	3.717	.024
	Within Groups	179.278	26	6.895		S.
	Total	256.167	29			
Gown use	Between Groups	47.967	3	15.989	1.249	.312
	Within Groups	332.833	26	12.801		N.S.
	Total	380.800	29			
Apron use	Between Groups	118.000	3	39.333	4.395	.013
	Within Groups	232.667	26	8.949		H.S.
	Total	350.667	29			
Face and eye protection use	Between Groups	213.422	3	71.141	4.378	.013
	Within Groups	422.444	26	16.248		H.S.
	Total	635.867	29			
Safe handling and disposable of sharp	Between Groups	64.522	3	21.507	1.713	.189
	Within Groups	326.444	26	12.556		N.S.
	Total	390.967	29			
Routine management of the physical environment	Between Groups	48.356	3	16.119	1.202	.329
	Within Groups	348.611	26	13.408		
	Total	396.967	29			N.S.
Reprocessing of reusable instrument and equipment	Between Groups	33.189	3	11.063	.684	.570
	Within Groups	420.278	26	16.165		
	Total	453.467	29			N.S.
Aseptic technique(non - touch technique)	Between Groups	46.189	3	15.396	.891	.459
	Within Groups	449.278	26	17.280		N.S.
	Total	495.467	29			
Waste management	Between Groups	54.700	3	18.233	1.392	.268
	Within Groups	340.667	26	13.103		N.S.
	Total	395.367	29			
Handling of linen	Between Groups	49.089	3	16.363	1.079	.375
	Within Groups	394.278	26	15.165		N.S.
	Total	443.367	29			
Safety engineering device	Between Groups	60.189	3	20.063	2.295	.101
	Within Groups	227.278	26	8.741		N.S.
	Total	287.467	29			

df= Degree of freedom ; Sig = level of Significance; H.S= High significant ; N.S= Not significant; P=Probability level; F: F- Statistics

Table (3) shows that there are significant differences between hospital units and mask use, apron use, and face and eye protection use domain of Infection control for case study at P≥0.05 value.

Table (4): Statistical Differences between Nurses Knowledge Related to Infection Control Domains and the Age (Posttest for Study Group)

Domains	Classification	Sum of Squares	df	Mean Square	F	Sig.P≥0.05
Nosocomial infection	Between Groups Within Groups Total	18.5 54.5 72.9	3 26 29	6.2 2.1	2.9	.050 S.
Hand washing	Between Groups Within Groups Total	119.950 202.850 322.800	3 26 29	39.983 7.802	5.125	.006 H.S.
Gloves use	Between Groups Within Groups Total	221.011 162.456 383.467	3 26 29	73.670 6.248	11.790	.000 H.S.
Mask use	Between Groups Within Groups Total	17.4 238.7 256.2	3 26 29	5.8 9.2	.6	.600 N.S
Gown use	Between Groups Within Groups Total	164.261 216.539 380.800	3 26 29	54.754 8.328	6.574	.002 H.S.
Apron use	Between Groups Within Groups Total	8.9 341.7 350.8	3 26 29	2.9 13.1	.2	.876 N.S
Face and eye protection use	Between Groups Within Groups Total	38.978 116.489 155.467	3 26 29	12.993 4.480	2.900	.050 S.
Safe handling and disposable of sharp	Between Groups Within Groups Total	176.483 214.483 390.967	3 26 29	58.828 8.249	7.131	.001 H.S.
Routine management of the physical environment	Between Groups Within Groups Total	218.483 178.483 396.967	3 26 29	72.828 6.865	10.609	.000 H.S.
Reprocessing of reusable instrument and equipment	Between Groups Within Groups Total	61.267 108.100 169.367	3 26 29	20.422 4.158	4.912	.008 H.S.
Aseptic technique(non -touch technique)	Between Groups Within Groups Total	201.428 294.039 495.467	3 26 29	67.143 11.309	5.937	.003 H.S.
Waste management	Between Groups Within Groups Total	49.7 345.7 395.4	3 26 29	16.6 13.3	1.3	.313 N.S
Handling of linen	Between Groups Within Groups Total	187.061 256.306 443.367	3 26 29	62.354 9.858	6.325	.002 H.S.
Safety engineering device	Between Groups Within Groups Total	140.883 146.583 287.467	3 26 29	46.961 5.638	8.330	.000 H.S.

df= Degree of freedom; F= F- Statistics; Sig= level of Significance; H.S= Highly significant; ;N.S= Not significant; P= Probability

Table (4) presents that there were significant differences between age of study group and domains of nosocomial infection hand washing, gloves, gown uses, face and eye protection use, safe handling and disposable of sharp, routine management of the physical environment, reprocessing of reusable instrument and equipment, aseptic technique, handling of linen, and safety engineering device at P≥0.05 value.

Table(5):Statistical Differences between Nurses Knowledge Related to Infection Control Domains and Level of Education (Posttest for Study Group)

Domains	classification	Sum of Squares	df	Mean Square	F	Sig P≥0.05
Nosocomial infection	Between Groups	29.7	4	7.4	4.3	.009
	Within Groups	43.3	25	1.7		H.S.
	Total	72.9	29			
Hand washing	Between Groups	144.883	4	36.221	5.090	.004
	Within Groups	177.917	25	7.117		H.S.
	Total	322.800	29			
Gloves use	Between Groups	242.729	4	60.682	10.779	.000
	Within Groups	140.738	25	5.630		H.S.
	Total	383.467	29			
Mask use	Between Groups	80.179	4	20.045	2.847	.045
	Within Groups	175.988	25	7.040		S.
	Total	256.167	29			
Gown use	Between Groups	204.229	4	51.057	7.229	.001
	Within Groups	176.571	25	7.063		H.S.
	Total	380.800	29			
Apron use	Between Groups	95.929	4	23.982	2.354	.081
	Within Groups	254.738	25	10.190		N.S.
	Total	350.667	29			
Face and eye protection use	Between Groups	238.831	4	59.708	3.760	.016
	Within Groups	397.036	25	15.881		H.S.
	Total	635.867	29			
Safe handling and disposable of sharp	Between Groups	257.431	4	64.358	12.049	.000
	Within Groups	133.536	25	5.341		H.S.
	Total	390.967	29			
Routine management of the physical environment	Between Groups	205.264	4	51.316	6.692	.001
	Within Groups	191.702	25	7.668		H.S.
	Total	396.967	29	51.316		
Reprocessing of reusable instrument and	Between Groups	225.157	4	56.289	6.164	.001
	Within Groups	228.310	25	9.132		H.S.
	Total	453.467	29			
Aseptic technique(non - touch technique)	Between Groups	204.014	4	51.004	4.375	.008
	Within Groups	291.452	25	11.658		H.S.
	Total	495.467	29			
Waste management	Between Groups	70.379	4	17.595	1.353	.278
	Within Groups	324.988	25	13.000		N.S.
	Total	395.367	29			
handling of linen	Between Groups	217.200	4	54.300	6.002	.002
	Within Groups	226.167	25	9.047		H.S.
	Total	443.367	29			
Safety engineering device	Between Groups	201.764	4	50.441	14.714	.000
	Within Groups	85.702	25	3.428		H.S.
	Total	287.467	29			

df = Degree of freedom; F= F- Statistics; Sig= Significant; H.S= Highly significant; N.S= Not-significant; P= Probability level

Table (5) indicates that there were significant differences between nurse's level of education and all infection control domains unless waste management and apron use at P≥0.05 value.

Table (6): Statistical Differences between Nurses Knowledge Related to Infection Control Domains and Years of Experiences (Posttest for Study Group)

Domains	Classification	Sum of Squares	df	Mean Square	F	Sig. P≥0.05
Nosocomial infection	Between Groups Within Groups Total	16.1 56.9 72.9	3 26 29	5.3 2.2	2.4	.087 N.S.
Hand washing	Between Groups Within Groups Total	101.418 221.382 322.800	3 26 29	33.806 8.515	3.970	.019 S.
Gloves use	Between Groups Within Groups Total	159.592 223.875 383.467	3 26 29	53.197 8.611	6.178	.003 H.S
Mask use	Between Groups Within Groups Total	55.7 200.5 256.2	3 26 29	18.6 7.7	2.4	.090 N.S.
Gown use	Between Groups Within Groups Total	185.682 195.118 380.800	3 26 29	61.894 7.505	8.248	.001 H.S
Apron use	Between Groups Within Groups Total	56.7 294.1 350.7	3 26 29	18.9 11.3	1.8	.198 N.S.
Face and eye protection use	Between Groups Within Groups Total	251.337 384.529 635.867	3 26 29	83.779 14.790	5.665	.004 H.S
Safe handling and disposable of sharp	Between Groups Within Groups Total	202.937 188.029 390.967	3 26 29	67.646 7.232	9.354	.000 H.S
Routine management of the physical environment	Between Groups Within Groups Total	261.400 135.566 396.967	3 26 29	87.133 5.214	16.711	.000 H.S
Reprocessing of reusable instrument and equipment	Between Groups Within Groups Total	181.062 272.404 453.467	3 26 29	60.354 10.477	5.761	.004 H.S.
Aseptic technique (non -touch technique)	Between Groups Within Groups Total	167.900 327.566 495.467	3 26 29	55.967 12.599	4.442	.012 H.S.
Waste management	Between Groups Within Groups Total	49.3 346.1 395.4	3 26 29	16.4 13.3	1.2	.318 N.S.
Handling of linen	Between Groups Within Groups Total	222.800 220.566 443.367	3 26 29	74.267 8.483	8.754	.000 H.S.
Safety engineering device	Between Groups Within Groups Total	175.077 112.390 287.467	3 26 29	58.359 4.323	13.501	.000 H.S.

df = Degree of freedom; F = Statistics; Sig= level of Significance; H.S= Highly significant ; N.S= Not-significant; P= Probability level

Table (6) presents that there are significant differences between most of infection control domains and nurses experiences which of hand washing, gloves and gown uses, face and eye protection use, safe handling and disposable of sharp, routine management of the physical environment, reprocessing of reusable instrument and equipment, aseptic technique, handling of linen, and safety engineering device at P≥0.05 value.

Discussion

Our study indicated that the study control and sample were (60%) of nurses from the medical wards, Blood disease (20%), Psychological ward (10%), and Neurological ward (10%) this findings supported evidence is available in the study stated that (40%) of nurses worked in medical/surgical floors, (26%) in intensive care units, (18%) in pediatric units, and (15%) in operation rooms [(12)].

Our study revealed that the study sample were (43.3%)of nurses at age 20-29 years old, (56.6%) of them was females, (76.6%) was married, (70%) of the nurses at high level of income, (33.3%) was graduated from nursing institute, (53.3%) of them have 1-9 year of experiences, (86.6%) of nurses their training course in Iraq,(70%) was unrelated to infection control, and the socio-demographic characteristics of the control group was (50%) of them at age 20-29 years old, (63.3%) was females, (73.3%) of them was married, (70%) of them at high level of income, (70%) of them graduated from nursing institute, (53.3%) have 1-9 year of experiences, and (93.3%) have training course in Iraq, (70%) was unrelated to infection control, this finding supported evidence is available in the study that the greater number for nurses' age group was accounted with age group (23–27) years which constitute (37.8%), two-third of these nurses were male which represent (75.7%), about one third of nurses have (1-5) years of experience which constitute (29.7%) Concerning the nurses' level of education, the findings revealed that half of those nurses were graduated from medical institutes (51.4%),majority of nurses (91.9%) have not attended training sessions regarding infection control [(10)].

Our study revealed that the effectiveness of educational program for 10 infection control domains for the study group through the excellent nurses responses for post program. The present findings supported evidence is available in the study stated that all their sample was nurses working in Jordanian hospitals which of 889 nurses, (52.6%) were females, Their results revealed that (65.0%) of them was high compliance, (32.3%) weak compliance, and (2.7%) unsafe compliance, one-third (30.3%) always used eye protection to protect their eyes when they performed activities or nursing care that might lead to a spout of blood and body fluids, the nurses who received infection control training in the hospital demonstrated higher compliance of infection control program than those who never received such training[(13)].

Our study revealed that there were significant differences between hospital units and mask use, apron use, and face and eye protection use domains of infection control for study group at P≥0.05 value this findings supported evidence is available in the study that the staff working in a pediatric unit was less likely to put on all PPE as compared with HCWs working in an ICU, an ED, or a medical unit ,eye protection (7%), gown (70%), gloves (77%), or mask(79%), the majority of HCWs put on gloves (88%) majority correctly removed their gloves (87%), and (26%) of HCWs performed hand hygiene after removing their gloves, the majority of HCWs put on mask (88%) a correctly removed their mask (72%), and (57%)of HCWs performed hand hygiene after removing their mask, the majority of HCWs put on gown (83%) majority correctly removed their gown (82%), and 46% of HCWs performed hand hygiene after removing their gown, only(37%) were observed to have put on eye protection. majority correctly removed their eye protection (74%). And (57%) of HCWs performed hand hygiene after removing their eye protection[(15)].

Our study revealed that there were significant differences between age and all infection control domains unless mask, apron use and waste management at P≥0.05 value this

finding supported evidence is available in the study that the younger age group had a mean score of (23.57) and the older age group had a mean score of (23.15), the p value of (0.58) shows that there is no significant relationship between age group and knowledge of standard precaution[16].

Our study indicate that there were significant differences between nurses level of education and all infection control domains unless waste management and apron use at P≥0.05 value, and there were significant differences between nurse's experience and all domains unless nosocomial infection knowledge, mask use, apron use and waste management at P≥0.05 value. this finding supported evidence is available in the study that which reported that the level of education has a positive impact on knowledge, attitudes and practices in all the categories of staff, and the years of experience in the hospital significantly correlated to increased knowledge, attitudes and practices among the various categories of staff [17].

Recommendations

1. The study recommends to application for national program infection control, and continuous medical educational program for all staff is the most important point.
2. More programs can be designed and implemented on the other department in hospital.
3. Developing tools to assess the effectiveness of interventions

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