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Knowledge and Practice of Nursing Staff towards Infection Control Measures in the Palestinian Hospitals

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Abstract: Health care professionals are constantly exposed to microorganisms. Many of which can cause serious or even lethal infections. Nurses in particular are often exposed to various infections during the course of carrying out their nursing activities. Therefore nurses should have sound knowledge and strict adherence to infection control practice. **Aim of the study:** The study aimed to assess the level of knowledge and practice of infection control among nurses in governmental hospitals of Palestine **Methods:** A cross sectional study was conducted between November, 2014 and January, 2015 in governmental hospitals found in North West bank districts. Data were collected using pre tested questionnaire on 271 nurses selected by purposive sample. Collected data were checked, coded and transferred to SPSS version 20 for analysis. Frequency, Mean and other statistics were calculated. P-value less than 0.05 were set as statistically significant. **Results:** the current study revealed that, approximately half (53.9%) of the studied sample had fair knowledge level (>80%). However, the majority (91.1%) of the studied sample had Good practice (>80%). No significant statistical differences were found between mean knowledge scores towards age, years of experience, and training course (f=2.263, 1.607, 0.210) respectively at $p < 0.05$(0.082, 0.188, 0.647) respectively. Significant statistical differences were found between mean knowledge scores towards gender and qualification ($F = 4.205, 4.531$) respectively at $p < 0.05$ (0.041, 0.012) respectively. No significant statistical differences were found between mean practice scores towards age, years of experience, training course, and qualification(f=1.482, 2.625, 0.129, 0.727) respectively at $p < 0.05$(0.220, 0.051, 0.720, 0.484) respectively. Significant statistical differences were found in mean practice scores only in relation to gender, ($F = 8.569$) at $p < 0.05$ (0.004). **Conclusion:** Based on findings of the current study, it can be concluded that inspite of having good practice level regarding infection control, nurses had fair knowledge level. **Recommendations:** Updating knowledge and practice of nurses through continuing in-service educational programs; emphasizing the importance of following latest evidence-based practices of infection control in continuing education / training program; providing training programs for newly nurses about infection control and at regular intervals; and a replication of this study using observation checklist should be done to assess the level of practice.
Keywords: Infection control, Knowledge, Practice, Nurse

1. Background: Health care professionals are constantly exposed to microorganisms. Many of which can cause serious or even lethal infections (Twitchell, 2003). Nurses in particular are often exposed to various infections during the course of carrying out their nursing activities (Kosgeroglu, Ayranci, Vardareli, & Dincer, 2004).

Nosocomial infection (NI), or hospital-acquired infection or Health-care-associated infection (HCAI) refers to infection that is acquired during the process of care and not manifested at the time of admission to a hospital or other health-care facility (Nejad, Allegranzi, Syed, Ellis, &Pittet, 2011). It has been estimated that the risk of health care-associated infection is 2 to 20 times higher in developing countries compared to developed countries and 5% and 10% of patients admitted to hospitals in developed countries acquire these infections (WHO, 2008).

Many infection control measures, such as appropriate hand hygiene and the correct application of basic precautions during invasive procedures are simple and of low-cost, but require staff accountability and behavioral change, in addition to improving staff education, reporting and surveillance systems (Bouallègue, Naija, Said, Nouria, Jaidane, Dhidah, & Boujaafar, 2013). To utilize these precautions, the human element plays an important role in increasing or decreasing the chances of catching HCAI (Cole, 2007). Therefore, adequate nursing staff is necessary because a higher patient-to nurse ratio increases the risk of nosocomial infection (Hugonnet, Chevrolet, & Pittet, 2007).

Transmission of infectious agents within a health care setting requires three agents; a reservoir, susceptible host, and a mode of transmission. Patients' health care workers and visitors are susceptible host in the hospital environment. The complex interrelationship between a potential host and an infectious agent produces infection. The mode of transmission may vary by type of organism as some types of organism may be transmitted more than one route. The complex interrelationship between a potential host and an infectious agent produces infection (Siegel, Rhinehart, Jackson, & Chiarello, 2007). Compliance on the part of healthcare workers with standard precautions has been recognized as an efficient and effective means to prevent and control health care-associated infections in patients and health workers (Garner,1996, Siegel; Rhinehart, Jackson, & Chiarello, 2007).

A survey of doctors' and nurses' knowledge, attitude and compliance with infection control guidelines in Birmingham teaching hospitals was conducted by Stein, Makarawo, & Ahmad (2003). The results of this study indicated that overall knowledge regarding blood-borne virus transmission from an infected patient after needles stick injury was low [44.0% for hepatitis B virus, 38.1% for hepatitis C virus, and 54.6% HIV]. According to the authors of this study; education, monitoring, improved availability of resources, and disciplinary measures for poor compliance are required to improve infection control practices in hospitals.

A study was conducted on role of hand hygiene in health care associated infection prevention and the study reveals that factors influencing hand hygiene compliance, the impact of hand hygiene promotion on healthcare-associated pathogen cross-transmission and infection rates, and challenging issues related to the universal adoption of alcohol-based hand rub as a critical system change for successful promotion (Allesranzi and pittet, 2009)

A cross-sectional study was conducted among nurses and physicians providing direct patient care in four hospitals in Hong Kong on perceptions of the importance and impact of health care associated infections and hand hygiene. Among respondents a total of 60% of the nurses and 46% of the physicians acknowledged that over 75% of healthcare-associated infections can be prevented by hand hygiene (Tai, Mok , Ching , Seto , Pittet, 2009)

A descriptive study was conducted on the level of knowledge and practice of prevention of hospital acquired infections among trained nurses in surgical wards and the factors that hinder this practice. The findings revealed that 98% of the respondents have heard about nosocomial infections while 2% have not. About 78% of the respondents practice prevention of hospital acquired infections while 22% do not. About 94% of the respondents expressed that they have hindrances to the practice of prevention of nosocomial infections. The hindrances include poor working environment among 26%, poor knowledge about prevention of nosocomial infection was 10%, and lack of water for hand washing and other material resources 58%. The Study reveals that majority of the trained nurses in surgical wards have knowledge about the prevention of nosocomial infections but not all practice it due to lack of equipments and poor working environment (Agaral and Thomas, 2003)

A study was conducted to assess the knowledge of health team in relation to infection control measures as well as their level of practice in the application of infection control measures at the endoscopy units in El-Kasr El-Ani Hospital, The New Kasr El-Ani Teaching Hospital (French), and the Internal Medicine Hospital, all hospitals are affiliated to Cairo University. The selected sample consisted of 40 doctors, 50 nurses, and 30 workers. The result revealed that 5% of physicians, 10% of nurses had satisfactory knowledge and 30% of physicians and just 4% of nurses had adequate level of performance, while none of the workers had satisfactory level of knowledge or practice. The study recommended an educational program for the endoscopy staff about infection and infection control measures application for the protection of staff and patients (Talaat and Shamia, 2010).

A quasi-experimental study was conducted among nursing personnel to identify the impact of a promotion programme on hand hygiene practices and its effect on hospital acquired infection rates in a neonatal intensive care unit of a university hospital in Thailand. The study samples were 26 nursing personnel. The study reveals that after implementing a hand hygiene promotion program, compliance with hand hygiene among nursing personnel improved significantly from 6.3% before the program to 81.2% ,7 months after the program . All participants agreed that promotion program implemented in this project motivated them to practice better hand hygiene (Picheansathian, Pearson, &Suchaxaya, 2008).

A prospective study conducted across three hospitals showed a significant drop in the rates of surgical site infections (SSI) and hospital-acquired urinary tract infection (UTI) by increasing the awareness of hospital-acquired infections among healthcare workers. An education program for the healthcare workers in the three different hospitals was included in the study. This showed a significant reduction rate of 8.1% for SSI ($P < 0.001$) and 3.9% for hospital-acquired UTI ($P < 0.001$). This reveals that linking of prevention efforts and continuous monitored infection rates are thus necessitated(Joyce and Nanjaiah, 2009).

An observational study was conducted among health care worker's including nurses to determine the hand hygiene practices. The intervention consisted of problem-based and task orientated hand hygiene education, enhancement of minimal handling protocol and clustering of nursing care, liberal provision of alcohol-based hand antiseptic, improvement in hand hygiene facilities, ongoing regular hand hygiene audit, and implementation of health care– associated infection surveillance. The observational study was repeated 6 months after the completion of the intervention program, which extended over 1-year period. The study reveals that there was improvement in most aspects of hand-washing technique in the post intervention stage and the health care–associated infection rate decreased from 11.3 to 6.2 per 1000 patient-days and it emphasize the need for a problem-based and task-orientated education program that can improve hand hygiene compliance (Barbara and Josephene, 2004).

A Study regarding nosocomial respiratory infections and nurses' performance related to infection control measures was conducted in artificially ventilated patients in Egypt to assess nurses' practices regarding

daily care activities, ventilator decontamination, use of universal infection control measures and the maintenance of the patients' care environment. The study revealed a high incidence of nosocomial respiratory infections. Also, it was revealed that pseudomonas was the causative agents in more than one fourth of the cases. Moreover, nurses' infection control practices were inadequate (Ahmed, Eshra, Nassar, &El-Shikh, 2000).

A recent descriptive study conducted by Eskander , Morsy, & Elfeky (2013) to assess critical nurses' knowledge and evaluate their practice regarding infection control standard precautions**.** The study revealed that, approximately two thirds (63.6%) of the studied sample had unsatisfactory knowledge level, more than half (57.1%) of the studied sample had satisfactory performance level. Negative significant correlations were found between mean knowledge scores, and age; mean knowledge scores and years of experience ($r = -.323$ & $r = -.325$ at $P < 0.004$ respectively); between mean practice scores and age; and mean practice scores and years of experience ($r = -.235$ & $r = -.291$ at $P < 0.39$, 0.010 respectively). However, positive correlations were found between mean knowledge scores and mean practice scores; age and years of experience ($r = 0.318$ & 0.794 at $P < 0.005$ & 0.000 respectively).

A descriptive study was conducted on nurses who worked at surgical wards in in Azady Teaching Hospital in Kirkuk city to assess the practices of nurses towards standard precautions. The study revealed that the majority (91.9%) of the nurses did not get training sessions regarding infecton control and (83.4%) of them had not participated continuous learning about infection control. According to the level of practices towards standard precautions, it has revealed that poor practices of standard precautions by surgical wards nurses had shown in surgical wards (Mahmud and Abdul Sahib, 2011).

1.1 Statement of the problem: Nosocomial infections have been recognized as a problem affecting the quality of health care and a principal source of adverse healthcare outcomes. It has been documented in the literature that within the realm of patient safety, these infections have serious impact. Increased hospital stay days, increased costs of healthcare, economic hardship to patients and their families and even deaths, are among the many negative outcomes (Klevens, Edwards, Richards, Horan, Gaynes, Pullock, &Cardo, 2007; Kaye, Anderson, Sioanne, Chen, Choi, Link, Sexton, &Schmader, 2009).

A systematic review of published literature on costs attributable to nosocomial infections among only 28 community hospitals in southeastern region of U.S. over a one-year period, revealed that the annual cost associated with nosocomial infections exceeded $26 million (Anderson, Kaye, Chen, Schmader, Choi, Sloan, &Sexton, 2009). These findings are indicative of the enormous economic burden associated with nosocomial infections. Findings from several epidemiological studies reveal that healthcare workers such as physicians, dentists and nurses are implicated in the transmission of nosocomial infections. It has also been reported that transmission frequently occurs during the performance of medical procedures, when these healthcare workers fail to follow aseptic precautions. Thus, noncompliance with recommended guidelines by healthcare workers expose patients to an abundance of pathogens (Racco &Hom, 2009; Eriksen, Saether, Vangen, Hjetland, Lundmark, &Aavitsland, 2009; Costello, Graham, Morrow, Morrow, Potter-Bynoe, Sandora, Pigula, &Lausse, 2010).

1.2 Significance of the Study: It has been documented in several epidemiological studies that healthcare workers such as physicians, dentists and nurses are implicated in the transmission of nosocomial infections. Literature that has explored the knowledge and practices of nurses is limited. Therefore, it is important to further investigate the impact of knowledge and practices of nurses with regard to the degree of the infection control. Assessing compliance with infection control measures in any health care setting is vital. Regular updating and strengthening of infection control practices should be one of the priority function of any place where health services are rendered. The findings from this study will add to the existing literature and may be used in developing interventions to increase infection control practices

2. Subjects and Method

2.1 Aim of the study: The study aimed to assess the level of knowledge and practice of infection control among nurses in governmental hospitals of Palestine

2.2 Research questions: the following two research questions were formulated to achieve the aim of the current study:

1. What are levels of nurses' knowledge about infection control at the selected governmental hospitals?
2. What are levels of nurses' practices of infection control at the selected governmental hospitals?
3. Are there relationship between infection control practices and age, gender, qualification, years of experience, working department and training on infection control practices.

2.3 Research design: A cross-sectional study was adopted for this investigation.

2.4 Study Setting: The data were collected from ICU, ER, Medical wards, and Surgical wards, pediatric, neonatal, and operational wards of four hospitals affiliated to ministry of health in North West Bank region, first; Rafedia and Al-Wattani hospitals in Nablus city, Second; Thabet Thabet hospital in Tulkarem city, and third; Khalil Sulaiman hospital in Jenin.

2.5 Study period: The study was conducted between November 2014 and January 2015 in the selected hospitals

2.6 Study Sample: A purposive sample consisted of 300 nurses, who work in the previously mentioned settings invited to participate in the study. Twenty nine nurses refused to participate without unknown in the study. So, the final participants were 271 nurses.

2.7 The inclusion criteria: The inclusion criteria set for sample selection were as follows: Palestinian nurses and working in the ICU, ER, Medical wards, and Surgical wards, pediatric, neonatal, and operational wards of Rafedia, Al-Wattani, Thabet Thabet, and Khalil Solaiman hospitals with full time employment.

2.8 Tool of the study: For data collection a self-administrative questionnaire was developed by researchers and used to assess:

a. Nurses' socio-demographic characteristic as regards their age, gender, marital status, Hospital, Nursing Qualification, Department of work, Working experience, hepatitis B vaccine, infection control training course
b. Participants' knowledge was assessed by 17 question as follows: each question had a group of answer points, one point was awarded for each correct answer; incorrect or I don't know answer took zero. Correct responses were summed up to get a total knowledge scores for each participant. Total score for all questions reached 17 grades. The knowledge scores were classified into Poor knowledge (≤50%), Fair knowledge (51- 80%), and (> 80) considered Good knowledge.
c. practice was assessed by 16 statement using a 5-item Likert scale (ranging from strongly agree 5 to strongly disagree, 1). The practice scores were categorized into good (≥80%), fair (59-79%), and poor (≤59%).

3. Validity and reliability of the study: The questionnaire was revised and validated by panel of 5 experts in academic and health field; they agreed and no comments. Internal consistency among the questionnaire items was 0.90 Cronbach's alpha (α) and it was considered within the acceptable range.

4. A pilot study: A pilot study was used to test the instrument. (Polit & Beck, 2012) defines pilot study as a smaller version of a proposed study conducted to refine the methodology. It is developed much like the proposed study, using similar subjects, the same settings, the same treatment, the same data collection and analysis techniques.

A pilot study was conducted with ten nurses in the medical and surgical wards from Rafedia hospital to determine the clarity of questions, effectiveness of instructions, completeness of response sets, time required to complete the questionnaire and success of data collection technique.

Pilot subjects were asked to comment on the applicability and appropriateness (validity) of the questionnaire. All questions were answered no clarity of questions was required. The researchers determined that it would take twenty (20) minutes to complete the questionnaire.

5. Ethical considerations: This study was approved by the nursing department, Arab American University. This emphasized by MOH agreement with their permission for the investigator to utilize the targeted hospitals. Approval from nurses were obtained. Several strategies were utilized to protect the nurse's rights who agreed to participate in this study. First, oral verbal consent of the nurses was obtained prior to the administration of the questionnaire. The nurses were informed of the purpose of the study, and that they had the right to refuse to participate. Also the voluntary nature of participation was stressed as well as confidentiality. Furthermore, the nurses were told that they can refrain from answering any questions and they can terminate at any time. Anonymity of the nurses was maintained at all times.

6. Results:

Table (1) presents demographic characteristics of the studied sample. It clarifies that most of the studied nurses were in the age group of 20-30 years, had bachelor degree in percentages of (64.2%, 55.4%) respectively. However, more than half was females, married, and had less than five years of experience, in percentages of (56.1%, 70.5% & 43.9%) respectively. Regarding attendance of training courses, around two thirds of the studied sample (63.8%) never attends any continuing education courses about infection control.

Table 1. Assessment the base line demographic and characteristics of the sample

Parameters		No.	%
Age	20-30 years	174	64.2
	31-40 years	65	24.0
	41-50 years	30	11.1
	51-60 years	2	0.7
Education	Nursing Diploma	101	37.3
	Bachelor	150	55.4
	Master	20	7.4
Gender	Male	119	43.9
	Female	152	56.1
Marital status	Single	77	28.4
	Married	191	70.5
	Divorced	3	1.1
experience	5 years or less	119	43.9
	6-15 years	116	42.8
	16-25 years	32	11.8
	more than 25 years	4	1.5
Sharp box	yes	264	97.4
	no	7	2.6
Training course	Yes	98	36.2
	No	173	63.8

Table (2) presents the selected hospitals and departments of the studied sample settings. It clarifies that most of the studied nurses were from Rafedia, Thabet Thabet, Khaleel Solaiman, and Al-Watani hospitals in percentages of (44.3%, 24.4%, 17.0%, 14.4%) respectively.

Table 2 Assessment the base line hospitals of the sample

Hospital	Neonate	Pediatric	Medical	Surgical	ICU	Operation room	Emergency department	Total
Rafedia	19	14	0	53	24	4	6	120(44.3%)
AlWatani	0	0	21	2	14	0	2	39(14.4%)
Khaleel Solaiman	14	3	12	7	10	0	0	46(17.0%)
Thabet Thabet	0	10	13	16	13	6	8	66(24.4%)
Total	33	27	46	78	61	10	16	271(100%)

Figures (1): shows percentage distribution of the studied sample according to received HB vaccinations. It clarifies that, the majority (80.8%) of the studied sample received vaccination

Figure 1. Assessment the base line hepatitis B vaccine received of the sample

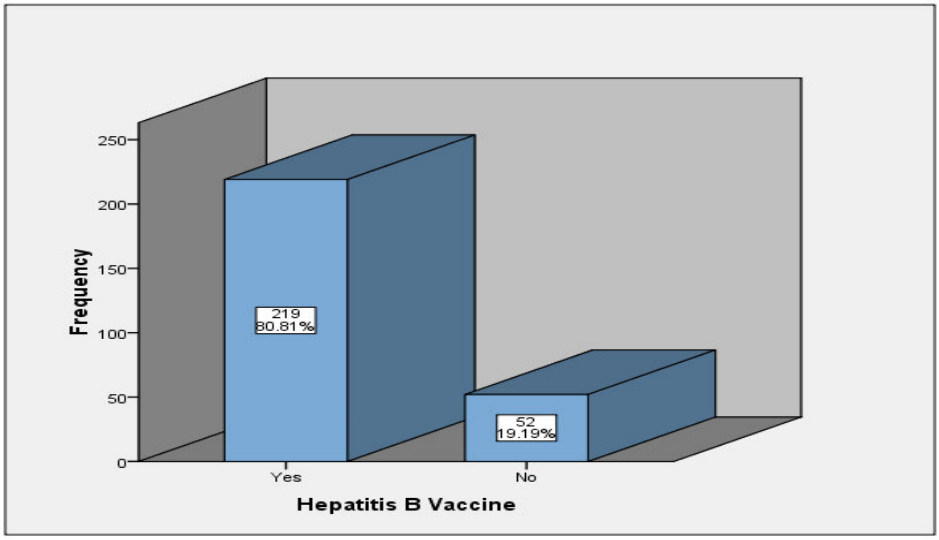

Figure (2): shows percentage distribution of the studied sample according to their knowledge about infection control practices. It clarifies that approximately half (53.9%) of the studied sample had fair knowledge level (50-80%).

Figure 2. Assessment of the nurses' infection control knowledge level of the sample

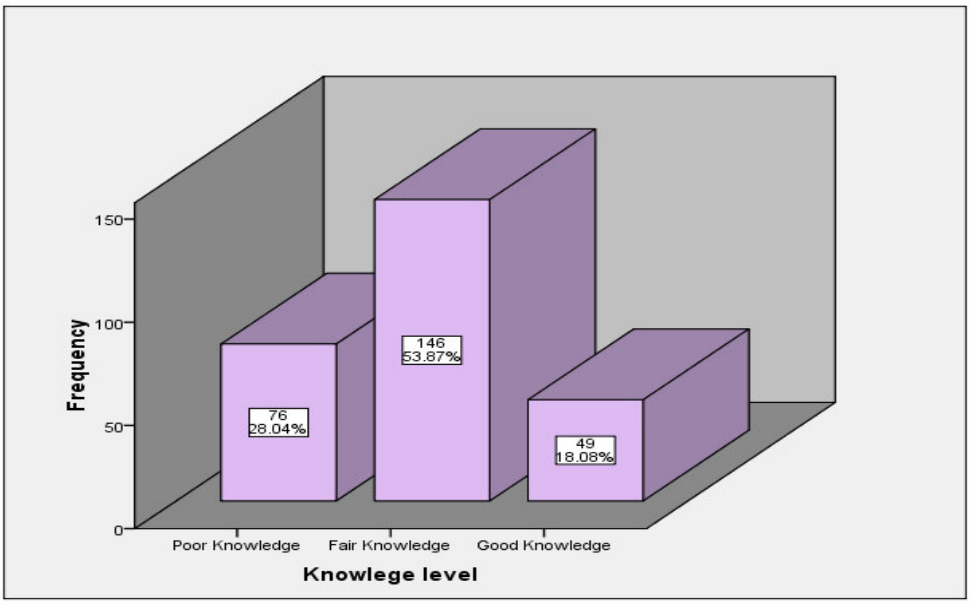

Table (3) shows comparison of knowledge level in relation to targeted hospitals and department of the studied sample. It displays that high poor knowledge level (Rafedia), high fair knowledge level (Thabet Thabet), and high good knowledge level (Khaleel Solaiman) with percentage of (35.9%, 66.7%, & 23.9%) respectively.

Table 3. Assessment the nurses' infection control knowledge level of the sample according to hospitals and department

	Hospital	Neonate	Pediatric	Medical	Surgical	ICU	Operation room	Emergency department	Total
Poor knowledge	Rafedia	4	7	0	22	7	0	3	43 (35.9%)
	AlWatani	0	0	9	1	1	0	0	11(28.2%)
	Khaleel Solaiman	2	2	3	5	3	0	0	15(32.6%)
	Thabet Thabet	0	0	2	2	1	0	2	7 (10.6%)
	Total	6	9	14	30	12	0	5	76(28.0%)
Fair Knowledge	Rafedia	9	6	0	24	15	3	3	60 (50.0%)
	AlWatani	0	0	12	1	8	0	1	22(56.4%)
	Khaleel Solaiman	6	1	5	2	6	0	0	20(43.5%)
	Thabet Thabet	0	8	9	11	11	0	5	44(66.7%)
	Total	15	15	26	38	40	3	9	146(53.9%)
Good Knowledge	Rafedia	6	1	0	7	2	1	0	17(14.1%)
	AlWatani	0	0	0	0	5	0	1	6 (15.4%)
	Khaleel Solaiman	6	0	4	0	1	0	0	11(23.9%)
	Thabet Thabet	0	2	2	3	1	6	1	15(22.7%)
	Total	12	3	6	10	9	7	2	49(18.1%)

Figure (3): clarifies percentage distribution of the studied sample according to their practice regarding infection control . It indicates that, the majority (91.1%) of the studied sample had good infection control practices level (>80%).

Figure 3. Assessment of the nurses' infection control practice level of the sample

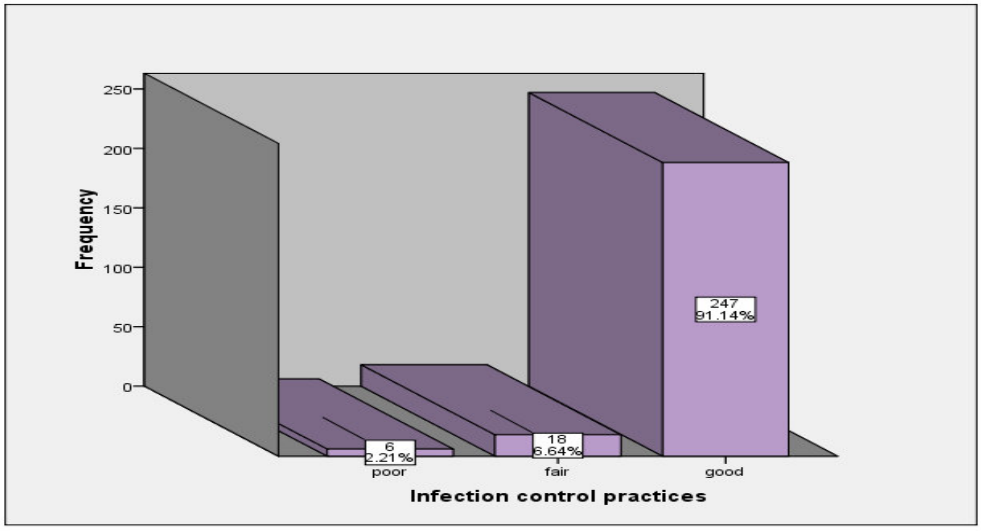

Table (4) shows comparison of practice level in relation to targeted hospitals and department of the studied sample. It displays that high poor practice level (Al-Watani), high fair practice level (Al-Watani), and high good practice level (Thabet Thabet) with percentage of (10.3%, 23.1%, & 98.5%) respectively.

Table 4. Assessment the nurses' infection control practice level of the sample according to hospitals and department

	Hospital	Neonate	Pediatric	Medical	Surgical	ICU	Operation room	Emergency department	Total
Poor practice	Rafedia	0	0	0	0	0	1	0	1(0.8%)
	AlWatani	0	0	3	0	0	0	1	4(10.3%)
	Khaleel Solaiman	0	0	0	0	1	0	0	1(2.8%)
	Thabet Thabet	0	0	0	0	0	0	0	0(0.0%)
	Total	0	0	3	0	1	1	1	6(2.1%)
Fair practice	Rafedia	0	1	0	1	4	0	1	7(5.8%)
	AlWatani	0	0	6	0	3	0	0	9(23.1%)
	Khaleel Solaiman	1	0	0	0	0	0	0	1(2.8%)
	Thabet Thabet	0	0	1	0	0	0	0	1(1.5%)
	Total	1	1	7	1	7	0	1	18(6.64%)
Good practice	Rafedia	19	13	0	52	20	3	5	112(93.3%)
	AlWatani	0	0	12	2	11	0	1	26 (66.7%)
	Khaleel Solaiman	13	3	12	7	9	0	0	44(95.7%)
	Thabet Thabet	0	10	12	16	13	6	8	65(98.5%)
	Total	32	26	36	77	53	9	14	247(91.14%)

Table (5) shows comparison of mean knowledge scores in relation to socio-demographic characteristics of the studied sample. It displays that high mean knowledge scores were found among those who were at the age group of 41-50 years, females, had years of experience 16-25 years, and hadn't attended training courses with means of (.6863, .6587, .6838, .6433) respectively. No significant statistical differences were found between mean knowledge scores towards age, years of experience, and training course (f=2.263, 1.607, 0.210) respectively at $p < 0.05$(0.082, 0.188, 0.647) respectively. Significant statistical differences were found in mean knowledge scores only in relation to gender, ($F = 4.205$) at $p < 0.05$ (0.041).

Table 5. The relationship between the nurses' age, gender, experience, and training course towards the Mean of the infection control knowledge scores

Items	Mean of	N	Std. Deviation	F	Sig
Age					
20-30 years	0.6366	174	0 .16885	2.263	0.082
31-40 years	0.6344	65	0.15890		
41-50 years	0.6863	30	0.21535		
51-60 years	0.3824	2	0.12478		
Gender					
Male	0.6154	119	0.16368	4.205	0.041
Female	0.6587	152	0.17873		
Experience					
5 years or less	0.6372	119	0.17300	1.607	0.188
6-15 years	0.6349	116	0.16502		
16-25 years	0.6838	32	0.19920		
more than 25 years	0.5000	4	0.15563		
Training course					
Yes	0.6333	98	0.18288	0.210	0.647
No	0.6433	173	0.16808		

Table (6) shows comparison of mean practices scores in relation to socio-demographic characteristics of the studied sample. It displays that high mean practices scores were found among those who were at the age group of 20-30 years, females, had years of experience 5 years or less, and attended training courses with means of (4.5934, 4.6336, 4.6444, 4.5593) respectively. No significant statistical differences were found between mean practice scores towards age, years of experience, and training course (f=1.482, 2.625, 0.129) respectively at $p < 0.05$(0.220, 0.051, 0.720) respectively.

Significant statistical differences were found in mean practices scores only in relation to gender (F = 8.569) at $p < 0.05$ (0.004) .

Table 6. The relationship between the nurses' age, gender, experience, and training course towards the Mean of the infection control practice scores

Items	Mean of	N	Std. Deviation	F	Sig
Age					
20-30 years	4.5934	174	0.46736	1.482	0.220
31-40 years	4.4548	65	0.74555		
41-50 years	4.4646	30	0.80084		
51-60 years	4.0938	2	0.48614		
Gender					
Male	4.4254	119	0.76953	8.569	0.004
Female	4.6336	152	0.37258		
Experience					
5 years or less	4.6444	119	0.42551	2.625	0.051
6-15 years	4.4580	116	0.65942		
16-25 years	4.5156	32	0.75602		
more than 25 years	4.1562	4	0.80768		
Training course					
Yes	4.5593	98	0.65454	0.129	0.720
No	4.5325	173	0.55053		

Table (7) shows comparison of the studied sample mean knowledge and mean practices scores in relation to their qualification. It reveals that nurses who had master degree displayed higher mean knowledge scores as compared to the other two groups (diploma & bachelor) (0.7147 & 4.6656) respectively. Significant statistical differences were found in mean knowledge scores only (F= 4.531) at $p < 0.05$ (.012)

Table 7. The relationship between the nurses' qualifications towards the Mean of the infection control knowledge and practice scores

Qualification	N	Knowledge scores				Practices scores			
		Mean	Std. Deviation	F	Sig	Mean	Std. Deviation	F	Sig
Nursing Diploma	101	0.6045	0.18037	4.531	0.012	4.5000	0.65771	0.727	0.484
Bachelor	150	0.6533	0.16486			4.5542	0.56404		
Master	20	0.7147	0.16885			4.6656	0.36740		

7. Discussion

Hospital acquired infection is a common problem all over the world. Therefore, up to date knowledge and nursing skills can play important roles in infection control. Nurses should have the opportunity to practice infection control on a day-to-day basis as an integral part of patients' care. That is why the current study was carried out. In our study that was conducted at four governmental hospitals in north West Bank districts, Palestine, revealed from the current study, nearly two thirds of the studied sample aged between 20 to 30 years old. This finding is in concordance with that of (Johnson *et al*., 2013; Janjua *et al*., 2007; Reda *et al*., 2010) emphasizing the need to protect this group of workers in the prime of their life from hospital infections.

The results of our study showed that approximately two thirds of the study group hadn't had previous courses on infection control. Education is a critical element in the training of all HCWs, particularly in countries where there is a lack of formal and well-organized infection control programs. Despite limited resources, developing countries, such as Palestine, still have to deal with complex issues related to occupational exposure to blood borne pathogens and enforcement of standard precautions. In this context, occupational exposure risk is increased, because of the inadequate supply of personal protective equipment, improper disposal of medical waste, and lack of effective needle disposal systems. The findings from this study provide that the majority of the study group had received hepatitis B vaccine, emphasizing the hospitals policies to be vaccinated when employed new nurses to deal with exposure to bloodborne pathogens and needlestick

About half of the respondents were found to have fair knowledge of infection control. Knowledge was found to be higher than what was reported in Northern Nigeria (Abdulraheem *et al.,* 2012), in the Federal Medical centre, Asaba (Isara and Ofili, 2010), and in (Talaat and Shamia, 2010)study, and lower than what was recorded in other studies (Johnson *et al*., 2013; . Vaz *et al*., 2010; Labrangue *et al*., 2010). However, the study revealed approximately one quarter of the respondents were with poor knowledge, this was found to be higher than what was reported in (Agaral and Thomas, 2003). This may due to lack of infection control training courses.

Concerning assessment of nurses' practice regarding infection controls, the current study demonstrates that, the majority of the studied sample had good practice level of infection control. Practice was found to be higher than what was reported in (Agaral and Thomas, 2003; Talaat and Shamia, 2010).

The study reported no relationship between knowledge or practice regarding infection control and age, years of experience, and training course of the studied group. In this regards Hamid et al (2010), indicated that, factors such as age and years of experience did not contribute to acquisition of knowledge about blood-borne illnesses or the practice of infection control. As well Gijare, (2012) reported no significant statistical difference in pre and post test knowledge and practice scores of various age groups and different years of experience.

Concerning the relationship between knowledge, practice and nursing qualification, the present study revealed that significant statistical difference in knowledge and no significant statistical difference in practice scores, inspite of having higher knowledge scores than the other two nursing qualifications, master degree nurses didn't reached the satisfactory practice scores. This reflects the need for enhancing knowledge of Diploma and Bachelor nursing qualification categories, and could emphasis the need for continuous training courses about infection control to facilitate adherence to infection control measures.

Nevertheless, the prevention of infection is a major concern of all health workers and health policy makers. Nursing is crucial to the success of any preventive program aimed at reducing the incidence of infections in our health care facilities. Nurses therefore, must possess adequate knowledge and demonstrate practices towards achieving the goal of prevention of infections.

8. Conclusion:

Based on the findings of this study, it can be concluded that nurses in the current study have good practice level regarding infection control. However, inspite of having knowledge about infection control, their overall knowledge didn't reach the good level.

9. Recommendations: The current study recommends the following:
• Updating knowledge and practice of nurses through continuing in-service educational programs.
• Emphasizing the importance of following latest evidence-based practices of infection control in continuing education / training programs.
• Providing training programs for newly nurses about infection control and at regular intervals.
• A replication of this study using observation checklist should be done to assess the level of practice.

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