

Evaluation of Compliance to Infection Control Protocols in the Governmental Hospitals in the West Bank/Palestine

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Abstract

Compliance with infection control protocols (ICP) can decrease nosocomial infections. The objectives of this study were to evaluate compliance of the hospitals' administration, doctors and nurses to ICP in the governmental hospitals in the West Bank. The heads of infection control departments in the hospitals were interviewed first. Then a descriptive cross-sectional study using a self-administered questionnaire was conducted between June and August, 2015. SPSS program (version 16) was used for data analysis. The study included 587 doctors and nurses. Only 150 (44.6%) said that there is a copy of ICP in their department and 221(38.0%) said that they had educational courses related to infection control. The nurses were more likely to receive educational courses; 47.4% nurses versus 24.5% doctors, P value <0.001. Most healthcare professionals (86.4%) received hepatitis B vaccination. Nurses were more likely to have vaccination; (90.7%) nurses versus (79.8%) doctors, P value <0.001. Among respondents, 72.1% said that they always wash their hands after examining the patients. However, 42.6% only said that they always wear gloves when they examine the patients. The limitations reported included absence of enough resources (55.0%), absence of enough training programs (49.6%), absence of clear protocols (44.1%) and large number of patients (44.0%). Clear ICP are absent; knowledge regarding these protocols is not enough. Compliance of healthcare providers with ICP is suboptimal. It is recommended to have standardized Palestinian ICP. Education and training programs are highly recommended.

Keywords: infection, protocols, healthcare providers, Palestine

Background

Infectious diseases are the leading cause of death in children and adolescents, and one of the leading causes in adults. According to the World Health Organization (WHO) statistics, three of the top ten causes of death, or sixteen percent of all deaths each year, are from infectious diseases (1). Infections can be either hospital-acquired or community-acquired infections. Nosocomial infections occur worldwide, both in the developed and developing world. They affect 1 in 10 patients admitted to hospitals (2). They are a significant burden to patients and public health. Not only they affect the general health of patients, but they are also a huge burden financially. The greatest part to the cost is due to the increased stays that patients with nosocomial infections require, in addition to medications and the need for isolation (3). These infections occur most commonly in

intensive care units and in acute surgical and orthopedic wards. Infection rates are also higher in patients with increased susceptibility such as old age, underlying disease, or chemotherapy (4). Infection control protocols (ICP) (especially, hand hygiene) show good results in decreasing nosocomial infection (5). Due to this, many countries have prepared their own protocols to reduce the number of nosocomial infection cases, these protocols include evidence-based ways in cleaning, disinfection and sterilization of operation theatre, departments of hospitals and equipments used in the hospitals (6, 7).

Several studies in many countries have documented lack of compliance with established guidelines for disinfection, sterilization and infection control (8-12).

Infections are one of the top ten causes of death in Palestine, according to health annual report, they caused 3.3% of all deaths in the West Bank in 2013 (13). Despite the

presence of international protocols in this field, in Palestine there are no clear protocols to control nosocomial infections, some projects tried to improve the health sector in Palestine such as (Flagship Project) that was prepared by the Ministry of Health (MOH) in 2004 (8). Unfortunately, none of them gives clear protocols on how to control these infections. Therefore, it is important to review the available ICP that are used now, evaluate the extent of compliance to these protocols which can be used as a base line data by the health care planners to develop preventive programs and training to improve the health status in our country. Accordingly, this study was carried out in order to evaluate the compliance of the hospitals' administration, doctors and nurses to infection control protocols in the governmental hospitals in the West Bank.

Method

Study design and setting

This study consisted of two parts: the first part was an interview with the head of infection control department in each hospital, the second part was a descriptive cross-sectional study using a self-administered questionnaire. The study was conducted in all the governmental hospitals in the West Bank; these include 13 hospitals in 12 cities.

Study population and sampling

The population for part one was the heads of infection control departments in the hospital. For part two, it was all the doctors and nurses working in the governmental hospitals in the West Bank, according to the MOH statistics in 2014, the numbers were 549 doctors and 1566 nurses (13). Raosoft sample size calculator was used to calculate the sample; it was 227 doctors and 309 nurses with 95% confidence level and 5% margin of error. The number of selected doctors and nurses was calculated for each hospital based on their numbers and percentage to the total in these hospitals. Convenient sampling was used to select participants.

Data Collection

In the first phase, the currently used protocols were evaluated using personal meeting with the head of infection control

department in each hospital using standardized form. After that a self-administered questionnaire was distributed to a representative sample of the doctors and nurses in the governmental hospitals.

The interview form for the head of infection control department in each hospital contained six parts, all the questions were open-ended. The first part asked about the currently used protocols in each hospital and if they meet WHO or standardized protocols in the West Bank, we asked them if they have special protocols in the hospital or not, and if they have a copy of these protocols. In the second part, we asked if doctors and nurses know these protocols, if they have copies of the protocols in each department and if training courses to increase the knowledge are held. In the third part we asked about the methods that they use to evaluate the compliance to these protocols. In the fourth part we asked about presence of enough antiseptic solution and examination gloves in each hospital and if they are used properly. In the fifth part we asked about obstacles that decrease the compliance to infection control protocols and the methods that can be used to improve the compliance. In the final part we asked about the methods used in cleaning and waste disposal in each hospital and if special cleaners are doing so.

Self-administered questionnaire for doctors and nurses included four parts; the first part included demographic data (age, gender, job, career level, department, hospital and years of experience). The second part was 8 yes or no questions related to the knowledge about ICP. The third part included 8 questions about the obstacles that decrease the compliance to these protocols, the respondents were given a list of possible obstacles and they were able to choose more than one choice. In the final part we asked about the compliance to the protocols used in hand washing, using gloves, sharp disposal and wearing uniform, this part included 13 questions. The questionnaire was modified from a previous study conducted in Gaza by Eljedi and Dalo (8), approval was obtained from the authors. The study protocol was authorized by An-Najah National University Institutional Review Boards (IRB) in addition to the Ministry of Health before initiation of this

study. Participants' verbal consent was also obtained.

Data collection was conducted between June and August, 2015, two to three days were spent in each hospital.

Statistical analysis

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS version 16). Mean \pm standard deviation was computed for continuous data. Frequencies and percentages were calculated for categorical variables. Categorical variables were compared using Chi-squared and Fisher's exact tests, as applicable. Probability (p) value of less than 0.05 was considered to be statistically significant for all analyses.

Results

Interview with the heads of infection control departments

The heads of infection control departments were 13 persons, their responsibility is to make sure everything regarding IC is Ok, we have one in each hospital. Their answers are presented in table 1. Regarding the protocols used, 6 out of 13 answered that they use special protocols in the hospital; 3 said that their protocols are derived from the WHO or CDC and modified according to the current status and 4 said that they use standardized protocols developed by the MOH. However, all of them said that the used protocols are not clear protocols and still in a draft form.

In the second part related to the knowledge about protocols, in 7 hospitals, they said that they put all of the protocols in hospital departments, the rest (6) said that they put only the related protocols for each department, all the health workers are supposed to read them and sign after that. In 9 hospitals, they said that their health workers are supposed to have enough knowledge about protocols and 4 said that the knowledge is not enough. In 11 of the hospitals, they said that they held workshops for learning protocols but they were not obligatory.

In the third part (evaluation of compliance to protocols), several methods were used and the most widely used methods were observation checklist for hand washing and cleaning habits (11 out of 13) and routine

microbiological check up of departments (10 out of 13).

In the fourth part (use of gloves and anti-septic solutions), 6 out of 13 said that they have enough antiseptic solutions. In 10 of these hospitals, they said that anti-septic solutions are used in a proper way. Regarding examination gloves, 12 said there were available in enough amounts and 9 said that they were used properly.

In the fifth part (methods to decrease nosocomial infections and obstacles to do so), in most hospitals they think that nosocomial infections can be decreased by increasing knowledge and having workshop about protocols (8) and increasing compliance to hand washing (7). The major obstacles reported included absent of enough resources (12), no enough learning and knowledge about the protocols (8), and high workload (4).

In the sixth and final part (cleaning and disinfection), all hospitals did not have special companies that are responsible for cleaning and disinfection in hospital environments. All of them were non-trained cleaners and had no special workshops when they were chosen. Regarding bed cleaning, 6 said that this was done by both nurses (for bedding and ensure the work of clean workers) and clean workers (for cleaning of the body of the bed), in 3 hospitals, this was done by nurses only and in 4 by clean workers only. Finally, regarding the method of waste disposal, the wastes were separated into medical and ordinary wastes, the ordinary wastes were put in the black bags and the medical wastes were also divided into sharps (in the sharp-box) and non-sharps (in yellow bags), this process was followed by all hospitals, after that the medical wastes were transferred by health workers to special containers and finally transferred into special areas by the municipal cars.

Self-administered questionnaire by doctors and nurses

Sociodemographic characteristics of the respondents

Convenient sampling was used to select participants. The questionnaire was distributed to 699 participants (doctors and nurses), 587 were returned with a response rate of 84.0%; among them, 411 (70.0%)

were males, the study group consisted of 242 (41.2%) doctors and 345 (58.8%) nurses. Years of experience ranged from 1 to 39 years with a mean of 9.98 ± 7.6 years. The age of the respondents ranged from 19 to 59 years with a mean of 35.02 ± 8.3 years.

Knowledge regarding infection control protocols in the hospitals

The respondents were asked a few questions to assess the current situation regarding ICP and their knowledge about this topic (Table 2). The study found that the majority 448 (77.0%) of the participants agreed that there are international ICP for hospitals and 432 (58.8%) agreed that national ICPs are available. However, only 150 (44.6%) said that there is a copy of these protocols in their departments, only 221 (38.0%) said that they had educational courses related to infection control. Unfortunately, a minority of them 77 (33.5%) felt that they achieved enough information during the course. The nurses were more likely to receive educational courses; 47.4% of nurses versus 24.5% of doctors, P value < 0.001 .

Limitations and obstacles that compromise the compliance to ICP

Limitations reported to affect the compliance to ICP included; a) absence of enough recourses 323 (55%), b) large number of patients 258 (43.9%), c) absence of clear protocols 259 (44.1%) and d) absence of enough training programs 291 (49.5%) (Figure 1). Healthcare professionals were asked other questions related to obstacles that limit compliance to ICP in the hospitals as reported in table 3. More than 90.0% said that enough sterile gloves, examination gloves and anti-septic solutions are present in their hospitals. Most healthcare professionals 507 (86.4%) received hepatitis B vaccination (HBV). Nurses were more likely to have vaccination as 313 out of 345 nurses (90.7%) received vaccination versus 193 out of 242 doctors (79.8%) did, P value < 0.001 .

Health care professionals' practice

The respondents were asked a few questions in order to evaluate their practice related to ICP the answers are shown in table 4. Among respondents, only 244 (42.1%) said that they always wash their hands before examining the patients while 418 (72.1%) said

that they always wash their hands after examining the patients. Moreover, only 299 (42.6%) only said that they always wear gloves when they examine the patients. Regarding needles, 541 (92.5%) said that they always dispose the needles and sharp objects in its suitable place (sharp box), 231 (39.5%) answered that they recap the needle before they throw it.

Finally the respondents were asked about the method they used to wash their hand. Around two third of healthcare professionals 377 (65.2%) were using running water and soap to wash their hands while 269 (46.5%) were using antiseptic solutions.

DISCUSSION

From the interview with the heads of infection control departments, it was found the ICP followed are not the same in all hospitals, they are not clear to workers and not enough training is provided regarding this topic. This was confirmed by the questionnaire to the healthcare providers as 77% of the participants thought that international protocols for ICP are present and 58.8% agreed that we have national ICP. In a study performed in three pediatrics hospitals in Gaza, 59.3% thought that there are international protocols and 34.2% thought that there are special Palestinian protocols (8), in another study conducted in neonatal intensive care units (NICU) in Gaza also, only 27.0% of the NICU workers thought that there are Palestinian protocols and 47.0% of them knew their contents (14), this shows that the situation regarding knowledge of ICP in the West Bank is better than that in Gaza. However, there is not enough knowledge about these protocols. This is a major obstacle to the application of the protocol in hospitals. Suitable education about the present protocols is needed.

Among respondents, 44.6% said that there is a copy of these protocols in their departments compared with 2.3% in Gaza study (8) but in our study no observation were performed this means that the actual number might be less than that. Only 38.0% of the participants received educational courses in ICP, this is better than Gaza situation where only 21.5% of the participants received courses (8), but it is worse than European

where a study was conducted in 169 acute care hospitals in 32 European countries and found that 77.0% of the centers had educational courses about infection control practice (15). In a study conducted by Paudyal et al. (16), who studied the knowledge, attitude and practice toward ICP in Nepal, only 27.0% of the participants (doctors and nurses) received infection control training. This finding reflects the real need for continuous training and education to enhance healthcare providers' knowledge, skills and practice of standard infection control precautions. There is a need to develop a system of continuous education for all categories of staff. Moreover, related courses could be included in the new faculty plans for medicine and health sciences students.

Regarding HBV vaccine, 86.4% of the respondents received the vaccine and 83.2% of them received the whole 3 doses of it, but only 39.9% examined the titer of anti-hepatitis B antibodies, compared with Gaza study only 63.2% of the health care workers received the whole 3 doses of the vaccine (8). Also, it is better than a study conducted in Egypt which showed that only 11.3% of the health care workers received the vaccine (17). In a study conducted by Dannetum et al. (18) in one university hospital in Sweden 79.0% of the participants received at least one vaccine, but only 40.0% received the three doses. In the USA, a study conducted by Simard et al. (19) between 2002 and 2003 showed that 75.0% of health care workers received 3 or more doses of HBV vaccine.

In this study there was a significant difference in having HBV vaccine; nurses were more likely to get vaccination (90.7% nurses vs. 79.8% doctors). In Zafir et al. study (20), which studied the knowledge, attitude and practice regarding needle stick injury in a tertiary care hospital in Pakistan, more doctors received vaccine compared with the nurses (97% of the doctors vs. 82% of the nurses). In summary, a good percentage of our healthcare providers received HBV, however, there is a room for improvement because all workers with direct contact with patients should have it.

The main obstacles found in this study that compromise the compliance of ICP were absence of enough financial and person

resources, absence of enough training programs, absence of clear protocol and heavy workload. This is consistent with the results found in studies performed in Gaza (8, 14). Efforts to improve should concentrate on these points.

In this study, 72.1% said that they always wash their hands after examining the patients. However, 42.6% only said that they always wear gloves when they examine the patients. In a study by Lim et al. (21), hand washing compliance was 40%. In Gaza, hand washing occurred 79.7% of the time between patient contact by nurses and physicians (8). More compliance with this practice is highly needed.

In this study, 77% stated that they always wore gloves when dealing with blood and other body fluids, and 42.6% always wore them when they examine patients, compared with 84.7 % of health care professionals reported wearing gloves when handling contaminated instruments in El-jedi and Dalo study (8) and 98% in a study from Jamaica (22). This practice is suboptimal also, and efforts are needed to improve this practice, it should be a part of the routine.

Regarding needles, 92.5% said that they dispose the needles and sharp objects in its suitable place (sharp box), 39.5% answered that they recap the needle before they throw it. In Gaza study 68.0% of health care professionals reported that they recapped, broke or bent used needles before disposal (8). It is recommended not to recap the needles at all but in some circumstances when there is no sharp container, workers can use on hand method for recapping (23). In our hospitals sharp containers were available so there is no need to recap needles.

An auditing program by Ministry of Health (MOH) is recommended in order to assess and train healthcare workers about the appropriate use of ICP protocols. In fact, similar auditing programs were carried out in the local pharmaceutical industries and resulted in a large improvement of the quality of the products of these companies since they achieved many international quality recognitions such as Standard Operating Procedure (SOP), Current Good Manufacturing Practice (CGMP) and Good Manufacturing Practice (GMP). This brought

these companies to export their products to the international pharmaceutical market including Brazil, Russia and European countries.

The major limitation of this study that it was a self-administered questionnaire, so answers cannot be validated, also no observation was done to evaluate the real situation.

CONCLUSION

Clear ICP are absent; knowledge regarding these protocols is not enough. It is recommended to have standardized Palestinian ICP which should be available in all departments of the hospitals. There is a need for improvement in the perception and practice of infection control measures among health-care workers. Education and training programs to promote the application of the precautions in these protocols are highly recommended.

Table (1): Answers of the heads of infection control departments (N=13)

Questions	Frequency	Percentage
Type of infection control protocols (ICP) used		
Special protocols in the hospital	6	46.2%
Derived from the WHO or CDC	3	23.0%
Standardized protocols developed by the MOH	4	30.8%
Knowledge about ICP		
They put all of the protocols in hospital departments	7	53.8%
They put only the related protocols for each department	6	46.2%
Health workers have enough knowledge about protocols	9	69.2%
Health workers do not have enough knowledge about protocols	4	30.8%
They have workshops for learning protocols	11	84.6%
They do not have workshops for learning protocols	2	15.4%
Evaluation of compliance to ICP		
Observation checklist	11	84.6%
Routine microbiological check up of departments	10	76.9%
Nasal swabs for referred patients	3	23.0%
Use of incidence reports	3	23.0%
Monitor use of antiseptic solution	1	7.7%
Water and air testing	1	7.7%
Use of gloves and anti-septic solutions		
They have enough antiseptic solution	7	53.8%
They do not have enough antiseptic solution	7	53.8%
Anti-septic solutions are used in a proper way	10	76.9%
Anti-septic solutions are not used in a proper way	3	23.0%
They have enough examination gloves	12	92.3%
They do not have enough examination gloves	1	7.7%
Examination gloves are used in a proper way	9	69.2%
Examination gloves are not used in a proper way	4	30.8%
Suggested methods to decrease nosocomial infections		
Having more workshops about protocols	8	61.5%
Increasing compliance to hand washing	7	53.8%
Increasing recourses to improve infection control	4	30.8%
Having special people in the infection control departments	3	23.0%

Obstacles reported		
Absence of enough resources	12	92.3%
No enough learning and knowledge about the protocols	8	61.5%
High workload	4	30.8%
Cleaning and disinfection		
Bed cleaning is done by nurses and clean workers	6	46.2%
Bed cleaning is done by nurses	3	23.0%
Bed cleaning is done by clean workers	4	30.8%
Medical and ordinary wastes were separated	13	100.0%

Table(2): Knowledge of the study group regarding Infection Control Protocols

	Question	N	Yes (n, %)	No (n, %)
1.	Do you think that there are international protocols for infection control in hospitals?	582	448 (77.0)	134(23.0)
2.	Do you think that there is a special Palestinian Protocol for infection control in hospitals?	583	342(58.8)	240(41.2)
3.	If the answer to Question 2 is Yes, do you have information about the content of this Protocol?	344	186(54.1)	158(45.9)
4.	If the answer to question 2 is Yes, is there a copy in your department of this protocol?	336	150(44.6)	186(55.4)
5.	Is there a continuous follow-up by the hospital or any other agency of the issues related to infection control?	579	441(76.1)	138(23.8)
6.	Did you receive any educational course or training related to the means used in infection control?	581	221(38.0)	360(62.0)
7.	If the answer of Question 6 is Yes, do you think you got enough information during the course?	230	77(33.5)	153(66.5)
8.	Are there brochures in your department about the proper practices of infection control?	579	314(54.2)	265(45.8)

* N: number of participants who answered the question

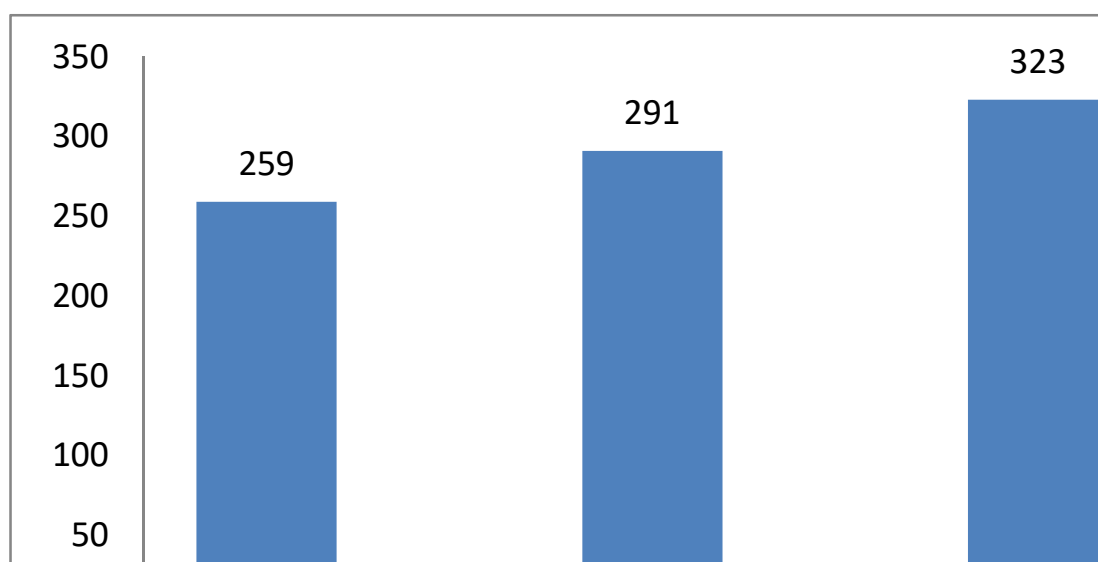
Table (3): Obstacles that limit the compliance to infection control protocol in the hospitals

	Question	N*	Yes (n,%)	No (n,%)
1.	Are there enough sterile gloves in your department?	586	533(91.0)	53(9.0)
2.	Are there enough examination gloves in your department?	586	545(93.0)	41(7.0)
3.	Is there enough antiseptic solution in your department?	585	527(90.1)	58(9.9)
4.	Is there a suitable place to get rid of sharp objects (needles and so on)-sharp box-?	587	576 (98.1)	11(1.9)
5.	Did you get Hepatitis B vaccine?	587	507(86.4)	80(13.6)
6.	If the answer of Question 6 is yes, did you get the whole 3 doses?	513	427(83.2)	86(16.8)
7.	Did you exam the titer of anti –hepatitis B antibodies?	576	230(39.9)	346(60.1)

* N: number of participants who answered the question

Table(4): Practice of the respondents regarding hand hygiene and other infection control protocols

Question	N	Always	Usually	Sometimes	Never
Do you wash your hands when you enter your department?	581	285(49.1)	173(29.8)	102(17.6)	21(3.6)
Do you wash your hands before examining the patients?	580	244(42.1)	195(33.6)	122(21.1)	19(3.3)
Do you wash your hands after examining the patients?	580	418(72.1)	118(20.3)	40(6.9)	4(0.7)
Do you wash your hands when you leave your department?	581	317(54.6)	152(26.4)	102(17.6)	9(1.5)
Do you wash your hands after removal of gloves?	581	402(69.2)	122(21.0)	53(9.2)	4(0.7)
Do you wear gloves when you work with blood and body fluids?	583	449(77.0)	88(15.1)	44(7.5)	2(0.3)
Do you wear gloves when you examine the patient?	585	249(42.6)	174(29.7)	140(23.9)	22(3.8)
If the answer of Q7 is (always, often, sometimes) do you use new gloves for every patient?	569	446(78.4)	82(14.4)	37(6.5)	4(0.7)
Do you dispose the needles and sharp objects in its suitable place (sharp box)?	585	541(92.5)	36(6.2)	7(1.2)	1(0.2)
Do you recap the needle before you throw it?	585	231(39.5)	99(16.9)	103(17.6)	152(26.0)
Do you separate the needle from syringe before you throw it?	583	294(50.4)	141(24.2)	99(17.0)	49(8.4)
Do you wear white coat or special clothes for your department at the hospital?	583	411(70.5)	88(15.1)	65(11.1)	19(3.3)

**Figure (1):** The limitations reported by healthcare providers that compromise the compliance to ICP

CONFLICT OF INTERESTS

The authors report no conflicts of interest in this manuscript

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