

Assessment of doctors' knowledge, attitude and practice for hepatitis C virus infection control guidelines in Egypt

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Submitted: 1 December 2018

Accepted: 25 March 2019

Arch Med Sci Civil Dis 2019; 4: e34–e40

DOI: <https://doi.org/10.5114/amsd.2019.86739>

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Abstract

Introduction: Hepatitis C virus is a blood-borne infection and one of the major global problems. In Egypt, the prevalence is reported to be the highest. Infection through unsafe medical procedures is considered now the primary cause of infection. The study aims to assess the knowledge, attitude and practice of doctors regarding infection control guidelines in Ismailia governorate.

Material and methods: A cross sectional study was conducted on a sample of physicians (355) in Ismailia governorate using a questionnaire to collect data on their knowledge and attitude concerning the control measures related to their years of experiences.

Results: Most of the physicians (89.6%) regardless of their years of experience have had contact with blood products. Those who had a history of needle stick injury accounted for 56.3%, with a statistically significant difference as to the highest number being middle career physicians. Concerning knowledge about infection control policies in their hospitals, it was relatively low among all groups.

Conclusions: Despite all efforts exerted by the infection control professionals, infections still remain a major unpleasant side effect of health care, often causing harm to patients. Although Egypt has made great progress in implementing the infection control procedures and policies, there is still a huge problem as the practices of physicians do not really reflect their knowledge and they still do not follow the infection control policies. Education, monitoring, improved availability of resources and disciplinary measures are necessary to improve infection control in health facilities that should be applied to all physicians.

Key words: infection control, hepatitis C, Egypt.

Introduction

Worldwide, there are 350 million persons suffering from chronic hepatitis B (HBV), and 125 million infected with hepatitis C (HCV), which places them among the world's major infectious diseases [1]. In Egypt, 8–10 million are living with viral hepatitis [2]. The HCV threatens more than 185 million individuals worldwide [3]; and leads to 350,000–500,000 related deaths [4]. While the prevalence reaches > 2% in Latin America and Eastern Europe, it is reported to be the highest (> 10%) in Egypt [5]. What makes the situation more complicated is that there are > 150,000 new cases of HCV annually and 45–85% of infected persons are unaware of their infection until symptoms occur [6].

In 2008, the Egyptian Demographic Health Survey (EDHS) conducted a survey including HCV on a large nationally representative sample [6] and found that the prevalence of HCV was 10% in people aged from 15 to 59 years [7]. So, it is very clear that Egypt HCV prevalence is the highest in the world [5, 8–10]. The HCV infection is the major cause of chronic liver disease with an estimated 15,000 deaths in the United States (USA) in 2007 [10] and it was estimated that the number of patients suffering from cirrhosis will reach 1.0 million in 2020 [11]. Health care workers (HCWs) are potentially at risk due to exposure to blood and body fluids (BBFs) [12].

Blood-borne infections are transmitted through sharing drug-injection equipment, unsterilized blood transfusion, untreated BBFs, tattooing and during unsafe sexual contact. In developing countries, the problem arises from the usage of unsterile medical and bad injection practices [13].

Faulty disinfection techniques, non-proper sterilization of medical, surgical and dental equipment as well as the reuse of contaminated equipment and unsafe injection practices are among the reported causes for HCV transmission. Clinicians who do not follow the standard precautions and the proper infection-control (IC) procedures washing hands, using latex gloves, cleaning and disinfecting surfaces and instruments, care of sharp are at great risk of getting infected and transmitting the infection. IC techniques minimize this occupational hazard for physicians, if performed adequately and properly [14–16].

Our research confirms the reported result of Iran Kabir *et al.* that knowledge and performance of physicians about needle stick injuries (NSI), dealing with contaminated instruments and the proper usage of the preventive measures were moderate to low [17].

With 8 out of 10 new infections occurring in hospitals and clinics, Egypt is working to improve training on IC for doctors and nurses. Yet the

fragmented health system has made it difficult to maintain and reinforce national standards in health. But the national hepatitis plan for 2014–2018, drawn up by the National Viral Hepatitis Committee, the Ministry of Health and supported by health partners, places a strong emphasis on prevention [6].

In Ismailia governorate, there is lack of available data concerning the knowledge, compliance and performance of physicians on the proper IC. This study aimed to assess the knowledge, attitude and practice of doctors in health facilities in Ismailia governorate regarding IC guidelines.

Material and methods

A cross sectional study was conducted on a random sample of physicians from health facilities in Ismailia in the period from May 2015 to April 2017. The questionnaire was developed by a team of sociologists, epidemiologists and clinicians who are familiar with the modes of transmission of HCV and its risk factors. It was prepared in the Arabic language and validated by piloting it on 20 physicians. The questionnaire was a paper form that was administered by a trained interviewer.

Physicians from different specialties (Clinical Pathology, Urology, Emergency Medicine, Surgery, Anesthesia, Gynecology and Obstetrics, Pediatrics, Dermatology, and Family Medicine) were included in the study. A simple random sample was recruited using a computer-generated randomization table. They were classified into three groups based on the years of experience. Group 1 comprised newly graduated physicians with experience of less than 5 years. Group 2 comprised doctors who had completed their master degree and had experience ranging from 5 to 10 years. Group 3 comprised consultant and doctors who had completed their doctorate degrees and had experience of more than ten years. The Ethics Committee in the Faculty of Medicine, Suez Canal University approved this work according to the Declaration of Helsinki.

Studied groups

The studied population comprised physicians from health facilities in 4 hospitals, 2 blood banks and 11 primary health care centers. These facilities represent Suez Canal University hospitals, Ministry of Health hospitals and Suez Canal Authority hospitals.

Statistical analysis

The data were analyzed using SPSS (SPSS, Inc., Chicago, IL, USA) version 18. Descriptive statistics were produced such as frequencies, percentages, means, standard deviations, medians and percentiles. Cross-tabulations of pairs of variables were

Table I. Academic qualifications and demographic data of the studied groups

Group	Academic qualification	Gender (%)		Age years (%)				Total	%
		Male	Female	20–29	30–39	40–49	50+		
1	New graduates with experience less than 5 years	25.6	24.8	45.0	6.5	0	0	179	50.4
2	Masters with experience ranging from 5 to 10 years	26.5	13.8	5.0	23.4	5.3	6.5	143	40.3
3	Doctorates with experience more than 10 years	4.8	4.5	0	3.3	3.0	2.1	33	9.3
Total		56.9	43.1	50.0	33.1	8.3	8.6	355	100

Table II. Exposure to HCV infection by years of experience

Exposure to HCV infection	Group 1	Group 2	Group 3	Total (%)	P-value
	Experience less than 5 years (n = 179)	Experience from 5 to 10 years (n = 143)	Experience more than 10 years (n = 33)		
Exposure to BBFs	87.2	90.9	97	89.6	0.12
Exposure to spills or leakage during surgical procedures	78.8	82.5	75.8	80.0	0.58
History of NSI	50.8	64.3	51.5	56.3	0.04*

*Statistically significant: < 0.05.

produced and assessed using the χ^2 test. Throughout, statistical significance was assessed at $p < 0.05$.

Results

The total sample included 376 physicians; 21 (5.6%) questionnaire forms were excluded from the analytical process due to incomplete information, leaving a total of 355 physicians. One

hundred forty-148 (41.7%) physicians worked at university hospitals and 207 (58.3%) worked in the Ministry of Health facilities.

Out of the 355 physicians 56.9% were male and 43.1% were female. Out of the 355 physicians 17 (5%) did not state their age and accordingly they were removed. Based on the 338 physicians with known age, the mean age was 32.28 ±8.6 with a range from 23 to 64 years.

The studied population was divided into three categories according to their years of experiences. Group 1, newly graduated physicians with experience of less than 5 years, numbered 179 (50.4%); group 2, numbering 143 (40.3%), had experience ranging from 5 to 10 years; lastly, group 3 numbered 33 (9.3%), with more than 10 years' experience (Table I).

Table II and Figure 1 show the difference among the studied groups regarding their exposure to the HCV infection by years of experiences. Most of the physicians (89.6%) regardless of their years of experience have had contact with BBFs. 56.3% had a history of NSI and 79% had been exposed to blood spills regardless of their educational level.

There was no significant difference by years of experience regarding the exposure to blood and its

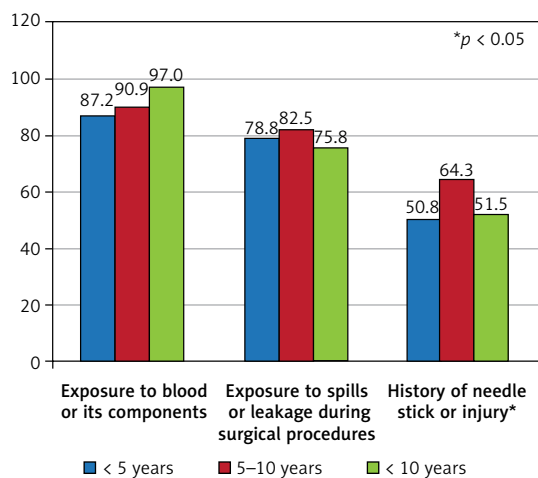


Figure 1. Exposure of doctors to HCV infection by years of experience

components and exposure to blood spillover during surgical procedures, which accounted for 90% and 80% respectively in the studied groups. The only significant difference was found in NSI and was highest among middle career physicians, 64% as compared to 50% in other groups ($p = 0.04$).

Data concerning the knowledge about IC policies, committee and policy of NSI or exposure to blood are presented in Table III.

Most of the physicians (73.5%) knew that there is an IC committee in their hospitals, with 88% of the most senior group forming a statistically significant difference compared to the other two groups. The total number of physicians who knew about the evaluation committee in their hospitals was 44%. While 48% knew there was a policy for IC at their hospitals, 32.7% knew that there is a policy for NSI or exposure to blood. Knowledge of IC policies is relatively low among all groups, with the exception of the presence of the IC committee. Other aspects of policies were known to less than 60% of all physicians. The middle career physicians showed more knowledge than the

other two groups, with a statistically significant difference. Group 2 showed a higher percentage than the other two groups except for the knowledge about the presence of the IC committee.

Table IV shows the practices related to IC including a pre-employment medical examination, history of regular medical checkups, history of HBV vaccination and seeking post-exposure prophylactic measures. The studied groups showed no statistically significant differences concerning these practices. Only 24.5% of all the physicians included in the study had a pre-employment medical examination. Yet 79.4% of the studied groups regardless of their years of experience have regular checkup, with no significant difference between the studied groups. Out of the 355 physicians, 72.4% received HBV vaccination. Group 1, the newly graduated physicians, showed the highest percentage among the studied groups (76%) with no statistically significant difference. Concerning measures taken for their protection in case they were exposed to NSI, 9.3% of the studied groups took measures. Group 1 was the

Table III. Knowledge of the institutional IC policies by years of experience

Institution policies	Group 1	Group 2	Group 3	Total (%)	P-value
	Experience less than 5 years (n = 179)	Experience ranging from 5 to 10 years (n = 143)	Experience more than 10 years (n = 33)		
Presence of IC committee	67	78.3	87.9	73.5	0.01*
Evaluation of the hospital from IC	38.5	52.4	36.4	43.9	0.03*
Presence of policy of IC	43.6	54.5	42.4	47.9	0.12
Presence of policy of NSI or exposure to blood	25.7	41.3	33.3	32.7	0.01*

*Statistically significant: < 0.05 .

Table IV. Infection control practices by years of experience

Institution policies	Group 1	Group 2	Group 3	Total (%)	P-value
	Experience less than 5 years (n = 179)	Experience from 5 to 10 years (n = 143)	Experience more than 10 years (n = 33)		
Pre-employment medical examination	17.3	32.2	30.3	24.5	0.5
Annual medical check-up	77.1	82.5	78.8	79.4	0.12
IC procedures in case of exposure	6.1	12.6	12.1	9.3	0.06
Vaccination against HBV	76	69.9	63.6	72.4	0.24

*Statistically significant: < 0.05 .

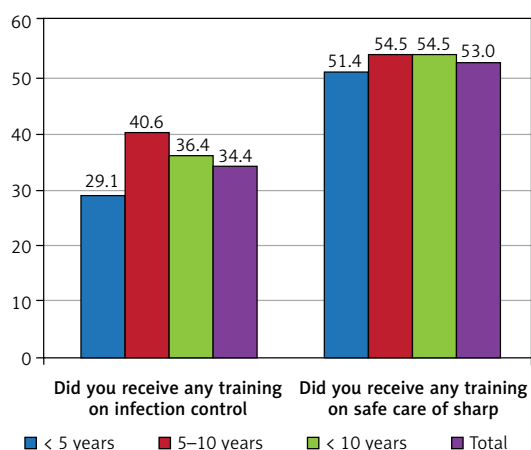


Figure 2. Doctors who received training in infection control and care of sharp instruments

lowest in this matter (6.1%) with no statistically significant difference among the different groups.

Figure 2 shows those who had training courses among the 3 groups in the field of IC as part of the hospital policy or on individual basis. The total percentage of physicians who, regardless of their years of experience, had training related to IC was 34.4%, with the higher percentage of those had this training being in group 2. The total percentage of those who had training on handling sharp instruments and needles was 53%. There was no statistically significant difference between the studied groups according to the years of experience and obtaining training in both mentioned fields.

Discussion

Physicians are targets for blood-borne diseases. Unsafe practices in health care facilities were found to be among the risk factors, as shown by Kandeel *et al.* They stated that although there is a national program to promote IC implemented by the Ministry of Health in their Hospitals since 2002 in 356 hospitals, the healthcare system in Egypt is huge and complex and requires human and financial resources to strengthen it [18].

This present study aimed to assess physicians' knowledge, attitude and practice regarding the IC guidelines in health care facilities in Ismailia governorate.

The studied population consisted of 355 physicians, divided into three categories according to their years of experience.

HCWs are exposed to BBFs carrying infection [12]. Ninety percent of the physicians in this study were exposed to BBFs during their work with no significant difference between the studied groups. Regarding the exposure to spoilage, 80% of the total studied physicians were exposed. It was alarming to find that 56% of the studied

groups had a history of NSI with a statistically significant difference among the different groups. The group which had experience between 5 and 10 years had a significantly higher percentage than the other two groups. Joukar *et al.* agreed with our work as their study group had average experiences of 7.5 years and 49% of the doctors had a history of NSI [12].

Holla *et al.* confirmed our study results as the analysis of the NSI exposure based on the work experience of the HCWs, as those who had 5 years or more work experience were exposed to NSI more than those who had less than 5 years, which was a result of longer duration of service [19]. Their study was supported by the results from two other studies in Pakistan and Malaysia [20, 21].

Other studies agreed with our study that the NSI is the most common risk HCWs are exposed to, but they differed with regard to the years of experiences or they did not mention it. Kermode *et al.* reported that the highest incidence of BBFs and NSI was among newly graduated doctors [22]. Wada *et al.* found that the occupational exposure to infection varied from 55% for first year interns and 31% for second year interns [23]. Varying views according to different countries were reported. In a Korean study conducted in a tertiary hospital in 2008 the intern doctors were at the highest risk for NSI [24], whereas in India the highest incidence was for the NSI among first year interns [25]. This is explained as newly graduated doctors lacked experience, skill and confidence [24]. In agreement with Kanari, Al-Zahrani *et al.* reported that 96.5% of the interns included in their study in Taif, KSA were exposed to NSI [23].

This difference between our study and others may be due to different study design, tools of data collection or the different population studied. But we also suggest that the young physicians in Egypt have a chance during their undergraduate studies to get familiar with the IC so when they start working they are more aware of how to protect themselves and are more cautious, whereas those in the mid-career are more confident and careless about it. Also the older physicians usually have assistants to carry out most of the procedures for them so the chances of getting injured decreases with time. The mid-career physicians are more responsible for surgical procedures than the new graduates, who usually work under supervision. Also older physicians start to have fewer duties or working hours. The midcareer and senior physicians also work extra hours through their private practices, increasing the chances of exposure to injuries.

Egyptian researchers studied the occupational exposure to NSI and HBV vaccination coverage among HCWs. They reported that 35.6% of HCWs

were exposed to at least 4.9 NSI/worker. Overall 15.8% of HCWs reported receiving 3 doses of HBV vaccine. According to their results, they recommended that prevention of HBV should be a priority in the national program for promotion of IC [18]. Training of HCWs on safe handling and collection of needles and sharps as well as HBV vaccination for all HCWs is required to reduce transmission. Others studied safe injection practice among HCWs in Egypt [6]. Their study revealed that there was lack of both IC policy and most of the supplies needed for safe injection practices. Many safe practices were infrequent, such as proper needle manipulation before disposal (41%), safe needle disposal (47.5%), reuse of used syringe and needle (13.2%) and safe syringe disposal (0%). Exposure to NSI was common among the HCWs (66.2%) and hand washing was the common post-exposure prophylaxis measure (63.4%). Only 11.3% of HCWs had a full course of HBV vaccination [6]. These studies were almost ten years ago and the present situation in many hospitals concerning the IC precautions is different.

Moreover, research indicated that 59.8% of surgeons with work experience of five or more than 5 years had been exposed to at least one NSI [23].

In agreement with this present study, a study conducted in Ethiopia reported that a high proportion of health care participants (HCPs) were exposed to BBFs, which was solved by the use of gloves without complying with standard precautions. They concluded that ensuring the availability of gloves, training on standard precautions, and motivation of HCPs to implement standard precautions should be emphasized to avoid such exposures [24].

Also in other studies, researchers assessed the awareness of physicians of the universal precautions and their results agreed with the present study. These results indicate that programs for IC implemented in several hospitals were not enough to reduce the risk of exposure, suggesting that it is more a knowledge and behavior problem rather than facilities issue, yet that does not exclude the non-availability of IC requirements or their minimal presence [25].

Concerning the practice of universal prevention precautions at the personal level, our study showed that the physicians received pre-employment checkups (79%) and vaccinations (72.4%). However, a very small percentage of physicians seek either IC help (24.5%) or annual medical checkup (9.3%), with no difference according to years of experience. Supporting the current study, Kabir *et al.* reported complete HBV vaccination in 88.1% of the participants and 60% of them had checked their HBV surface antibody (anti-HBs) level [17]. The vaccination rate in this study was

higher than that reported by others [21–26], who found that 11.5% of their studied group had vaccination. This could be explained by the presence of campaigns offered by hospital administration and different health care facilities to vaccinate the health workers including physicians.

As to the IC-related training, Joukar *et al.* reported that 72% of physicians had HCV control related training [12]. Karani *et al.* stated that in South Africa 91% of the young interns had IC-related training [26]. Our study showed lower values, at 40%, and less than 55% received training on safe care of sharps, with no differences according to years of experience.

Although there is growing knowledge of IC systems and many hospitals have begun to implement infection surveillance and control programs all over the country, there is still a gap between the written documents and policies and real practice based on the researchers' experiences in Ismailia. This observation was confirmed in our study as the knowledge of IC policies was relatively low among all the studied groups. Most of the physicians (73.5%) knew that there is an IC committee in their hospitals yet only less than half of them knew that this committee evaluating their hospitals (44%) has policies (48%). Knowledge about policies such as post-NSI or BBFs policy was relatively low (32.7%). Other aspects of policies were known to less than 60% of all physicians. The middle career group showed more knowledge than the other two groups except for the knowledge about the presence of the IC committee. It was highest among the senior physicians; 88% of them knew that their hospital has an IC committee. Most of the studies related to the knowledge and behavior of HCWs used questions related to knowledge about mode of transmission, ways of protection or the IC facilities, infrastructures complying with the universal precautions in the places of work and the practices of the HCWs regarding them. We were not able to find studies to compare with our study regarding IC committee and policy knowledge and personal practices. Yet, all the work cited confirmed the same conclusion reached that there is still a gap between knowledge and practice.

In conclusion, despite all efforts exerted by the IC professionals, infections still remain a major unpleasant side effect of health care, often causing harm to patients. Although Egypt has made great progress in implementing the IC procedures and policies, there is a huge problem as the practices of physicians do not really reflect their knowledge and they still do not follow the IC policies. The high level of exposure of doctors to BBFs and NSI highlights the need for improvement in health safety to prevent transmission of infections. Education,

monitoring, improved availability of resources and disciplinary measures are necessary to improve IC in health facilities that should be applied to all physicians whatever their years of experience or specialty.

Acknowledgments

It was carried out under the Research Grant Agreement (TC/4/Health-2010-hep-3271) between the Science and Technology Development Fund (STDF) of Egypt and the Faculty of Medicine, Suez Canal University.

Conflict of interest

The authors declare no conflict of interest.

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