ORIGINAL PAPER

Knowledge, attitude, and practice of blood-borne diseases among healthcare providers in two selected educational hospitals in Southwest Iran

Anahita Sanaei Dashti[1], Reyhaneh Joulaei[2], Sanaz Amiri[3], Hassan Joulaei[3]

[1]Alborzi Clinical Microbiology Research Center, Namazi Hospital, Shiraz University of Medical Sciences, Shiraz, Iran
[2]Health Policy Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran
[3]HIV/AIDS Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Introduction: Blood-borne infections continue to be a major problem throughout the world, and healthcare providers are at risk of being infected by this infections. Probability of transmission of disease through blood among healthcare personnel was estimated to be 2.6% for hepatitis C virus (HCV), 5.9% for hepatitis B virus (HBV), and 0.5% for human immunodeficiency virus (HIV). Moreover, studies show high prevalence of needle stick in Iran, ranging from 38% to 71%. Hence, the present study was done to investigate knowledge, attitude, and practice (KAP) of healthcare personnel in two large educational hospitals, i.e., Namazi and Faghihi, Southwest Iran.

Material and methods: This was a cross-sectional and analytical study, with randomly selected sample. Study tool was a researcher-made questionnaire based on previous similar studies. Collected data were analyzed using SPSS version 24.0 software.

Results: In the present study, knowledge has been similar in both sexes, with weak to medium score in average. Average of attitude score was 25.82 out of 50, and average of practice score was 27.47 of 60. However, attitude and practice were significantly higher among women compared with men ($p < 0.001$). In terms of practice, majority of participants rated as weak. Besides, there was significant relation between knowledge and practice.

Conclusions: Low level of knowledge in all job categories indicated that participating in training courses did not provide desired efficiency. Therefore, applying more effective training methods instead of lecture-based techniques are necessary.

HIV AIDS Rev 2022; 21, 3: 256-260
DOI: https://doi.org/10.5114/hivar.2022.117216

Key words: healthcare provider, hepatitis B, hepatitis C, HIV/AIDS, educational hospitals, infection control.

Introduction

Blood-borne infections continue to be a major problem throughout the world. Hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) are the most common pathogens encountered [1]. Occupational risk of blood-borne infection in healthcare workers and students, collectively termed 'healthcare professionals'

Address for correspondence: Hassan Joulaei, HIV/AIDS Research Center, Institute of Health, Shiraz University of Medical Sciences, Shiraz, Iran, e-mail: joulaei_h@yahoo.com

Article history:
Received: 15.09.2020
Received in revised form: 08.06.2021
Accepted: 09.06.2021
Available online: 02.06.2022

(HCPs), is significant, especially in the developing world [2]. According to a WHO report, probability of being infected with diseases transferred through blood among HCPs was 2.6% for HCV, 5.9% for HBV, and 0.5% for HIV. Moreover, HCV is responsible for nearly 16,000 and HBV for 66,000 infections of healthcare personnel all over the world [3].

HCPs are infected by blood and other body liquids due to needle stick or any other sharp tool, such as surgery knife, or pouring liquids in the eye. About 6-8 million cut injuries occur annually in hospitals and healthcare centers throughout the world, among which 50% are not reported [4, 5].

Approximately 29% of healthcare personnel in Ethiopia have reported injuries by sharp objects [6]. Two third of healthcare personnel in Alexandria have experienced injuries by sharp objects at least once in the past 12 months [7]. In Germany, annually 500,000 cases of injuries by sharp objects occur in HCPs [8]. The rate of needle stick in Iran varies between 38% and 71% in different reports [9-11]. However, because of various reasons, such as fear of being accused of having injured oneself, needling, and other injuries, those are less reported [12, 13]. America's Center for Control and Prevention of Disease (CDC) has estimated that 80% of such injuries are preventable. In 1987, this center advised materials separation instruction. One of the main proceedings in standard precaution advised by CDC was putting on the needles cap [14].

In order to prevent the transmission of blood borne diseases, standard precaution proceedings presented by WHO must be applied. Accomplishment of these standards requires that HCPs believe that blood and body secretions of all patients are the potential source of infection, irrespective of diagnosis and probable infective conditions. Standard precaution proceedings include washing hands and using disinfections (hands sanitation), using personal protective equipment during bloodletting and contacting patients body secretions, use of appropriate equipment when taking care of patient, changing and displacement of dirty clothes, prevention of the needle head droop, clean environment, managing drinkable water, and suitable control of trashes [15].

Studies shown almost that all job categories had knowledge, attitude, and practice at medium and weak level of blood-borne diseases [16, 17]. Thereby, according to the importance of holistic precautions in the prevention of diseases' transmission from patients to HCPs, and on the other hand, educational role of hospitals in this issue, the present study was conducted to investigate knowledge, attitude, and practice (KAP) of teachers, students, and healthcare personnel in two large educational hospitals of Namazi and Shahid Faghihi affiliated to Shiraz University of Medical Sciences, located in Southwest of Iran.

Material and methods

The present study was a cross-sectional and analytical study, with randomly selected sample. Study settings were two referral educational hospitals, Namazi and Shahid Faghihi in Shiraz, with nearly 2,000 beds and 4,500 healthcare personnel. Sample size by G_pover3 software was calculated as 2,000 cases. Number of samples from each job categorizes was determined based on stratified sampling. Study tool was a researcher-made questionnaire based on previous similar studies and examination of health personnel's KAP about preventing transmission of blood-borne diseases performed by infection control unit. Questionnaires were completed by 2,000 HCPs, including physicians, medical students, nurses, nursing students, and nurse assistant of all wards of Namazi and Shahid Faghihi hospitals. Inclusion criteria was being employed in Namazi or Shahid Faghihi hospitals (physicians, medical students, nurses, nursing students, and nurse assistant of all sections of the hospital), and individual's agreement to participate in the study. Those not willing to answer the questions included in the questionnaire, even at the end of the study, were excluded.

The questionnaire consisted of four parts: 1) demographic questions regarding age, sex, and type of career; 2) nine questions evaluating knowledge; 3) five questions assessing attitude; and 4) five questions evaluating practice.

Correct answer to each question was 10 scores. To determine Likert scale of the questionnaire, according to professionals in this field, answering higher than 70% was considered as 'good'. Answering between 70% and 50% of the questions was considered as 'average', and below 50% was regarded as 'weak'. Knowledge score was 90, where score higher than 63 was considered as 'good', score between 45 to 63 as 'average', and score below 45 was considered as 'weak'. Attitude score was considered as 50 where a score above 35 was accounted for 'good attitude', between 35 and 25 as 'average attitude', and below 25 as 'weak attitude'. In terms of practice, the overall score was 50 where scores above 42 were considered as 'good practice', above 30 as 'average practice', and below 30 as 'weak practice'.

Validity of the questionnaire was guaranteed based on attitudes of a group of infection specialists, and its' reliability given as 0.64 based on estimated Cronbach's α 10%.

In order to comply with ethical principles, all the participants were assured that the received information would be kept confidential, and there was no need for mentioning their names. It should be noted that this proposal has been presented in Shiraz University of Medical Sciences and proven under a code of IR.sums.med.rec.1396.s371.

After data collection, information were analyzed using SPSS software version 24.0. Independent sample *t*-test was applied for assessing the differences in KAP scores according to sex of the participants. Association between knowledge, attitude, and practice was also evaluated using correlation test.

Results

Among 2,000 questionnaires distributed in Namazi and Shahid Faghihi hospitals, 1,912 were completed (response rate of 95.6%). The mean and standard deviation of the participants' age was 30.43 ± 9.44 years, among whom 51.7% were females. In terms of career, most of them were nurses (65%), and the least of them were nursing students (1.8%).

Table 1. Mean and standard deviation of knowledge, attitude, and practice by different job categories in healthcare professionals of Namazi and Shahid Faghihi hospitals

Job category	Knowledge	Attitude	Practice
Physician	32.11 ± 10.75	15.66 ± 12.42	24.38 ± 10.83
Medical student	32.57 ± 11.72	21.77 ± 13.65	26.26 ± 10.14
Nurse	29.47 ± 11.87	27.13 ± 12.30	27.94 ± 10.53
Nursing student	32.00 ± 11.76	31.66 ± 11.14	31.71 ± 11.24
Nurse assistant	31.13 ± 13.06	26.50 ± 12.00	27.76 ± 10.68

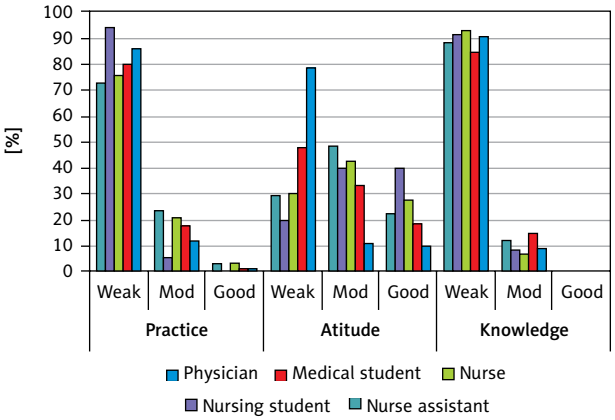

Figure 1. Frequency of knowledge, attitude, and practice levels in different job categories in healthcare professionals of Namazi and Shahid Faghihi hospitals

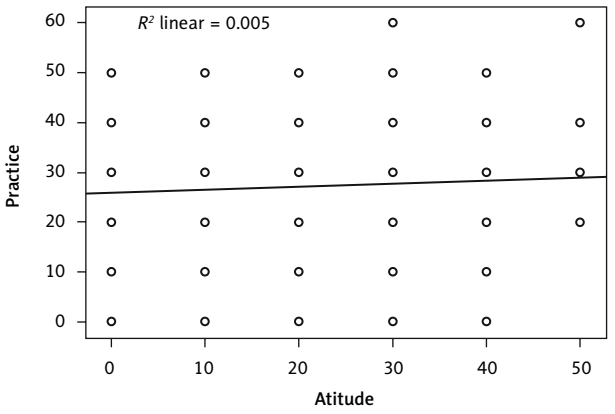

Figure 2. Correlation between practice and attitude scores in healthcare professionals of Namazi and Shahid Faghihi hospitals

In other job categories, 9.4% were physicians, 5.5% medical students, and 13.5% were nurse assistants. Knowledge score average was 30.8 of 90. Attitude score average was 25.82 of 50, and practice score average was 27.47 of 60. Knowledge has been similar in both sexes, with no significant difference. However, attitude and practice were significantly higher among women compared with men ($p < 0.001$).

KAP average score by the participants' job categories is presented in Table 1. The highest knowledge score average was among medical students, and the highest average of attitude and practice was among nursing students.

In terms of KAP levels among different job categories, various levels were gained, which are shown in Figure 1.

In terms of knowledge, only 8 (0.4%) participants achieved 'good' score (one physician, 5 nurses, and 2 students). In practice, 64 (3.2%) persons had 'good' score, including 44 (2.3%) nurses; 384 (20.1%) individuals achieved medium score, among whom 364 specified their job category, and the majority of them were nurses (260 persons).

One-way ANOVA test was applied between knowledge, attitude, practice scores, and different job categories. There was a significant relation between the physicians and nurses knowledge average score ($p = 0.005$), and the average score of physicians' knowledge was higher than nurses' knowledge. Also, knowledge of medical students was significantly higher than the average score of nurses ($p < 0.001$). Moreover, nurse assistants' knowledge was significantly higher than nurses ($p = 0.04$), and no significant relation among other groups was observed.

In terms of the attitude score, a significant difference was seen among averages in different job categories, and the average physicians' attitude was less than that in other groups ($p < 0.001$). No significant difference among other groups was observed, and no significant difference among different groups in terms of practice was noted.

Moreover, no significant relation between knowledge and attitude scores of all job categories ($p = 0.1$) was observed. In other words, attitude did not change with increase in knowledge; however, a weak significant relation between attitude and practice was noted ($p = 0.01$, $r = 0.07$). Individuals with higher attitude score presented more suitable practice (Figure 2).

There was a significant relationship between knowledge and practice ($p < 0.001$). In other words, the better the practice, the better the knowledge (Table 2).

The least correct reporting and follow-up after needling could be observed among physicians, followed by medical students, with the weakest attitude seen in these two groups (Figure 1).

Discussion

The present study revealed that healthcare providers, regardless of their job categories, job position, or working

Table 2. Frequency of correct answers in different job categories in healthcare professionals of Namazi and Shahid Faghihi hospitals

Questionnaire items	Job categories				
	Nurse assistant, *n* (%)	Nursing student, *n* (%)	Nurse, *n* (%)	Medical student, *n* (%)	Physician, *n* (%)
Which disease has more risk of transmission (HIV, HBV, or HCV)?	72 (28.2)	13 (37.1)	425 (34.2)	80 (74.8)	140 (77.8)
How transmission of HIV could be prevented?	68 (26.7)	1 (2.9)	304 (24.5)	54 (50.5)	114 (63.3)
How transmission of HAV could be prevented?	9 (3.5)	0 (0.0)	21 (1.7)	0 (0.0)	2 (1.1)
How transmission of HCV could be prevented?	131 (51.4)	23 (65.7)	706 (56.8)	67 (62.6)	156 (86.7)
How much is the effect of post-exposure prophylaxis (PEP) of HIV?	117 (45.9)	18 (51.4)	481 (38.7)	19 (17.8)	31 (17.2)
How do you follow and report your needling?	129 (50.6)	14 (40.0)	567 (45.6)	31 (29.0)	37 (20.6)
Do you use latex gloves or safety box during blood sampling?	141 (55.3)	22 (62.9)	734 (59.1)	73 (68.2)	105 (58.3)

place (Namazi or Faghihi hospitals) presented weak to medium average score in all three areas of KAP.

Knowledge

In this study, knowledge had weak to medium average score in healthcare providers, which is in line with results of other studies. Compared with previous research, this investigation indicated that almost all job categories had knowledge at medium and weak levels, although more than 94% of participants have taken part in training courses on post-exposure prophylaxis (PEP) [16, 17]. A study conducted in Singapore showed that scientific knowledge about transmissibility of HIV infection healthcare workers was considered as 'poor' [18]. Even people knowledge in terms of pursuing needle stick injury was weak, with only 19.8% of physicians correctly pursuing this matter. Similarly, as other studies have revealed, a high percent of those injured through needling had not reported and appropriately pursued this issue [19, 20]. Additionally, average score of participants' knowledge to prevent hepatitis B was weak, which could be itself a proof of low coverage of vaccination against this disease. In terms of knowledge on which pathogen type has the highest risk of transmission, in almost all job categories, knowledge score was ranked as 'good', which is consistent with similar study from U.A.E. [21]. It seems necessary to provide theoretical classes for healthcare providers on knowledge of transmitting blood-borne diseases.

Attitude

According to Miriam Webster, definition 'attitude' is a mental position with respect to (or a feeling or an emotion toward) a fact or state' [22]. Also, based on theory of planned behavior, the connection between people's attitudes and practices is well established (the link between KAP). In line with these facts, the present study showed an improved attitude towards better practice [22].

In a study, participants were trained in terms of transmission of hepatitis B and C, and HIV infection. They were then observed whether the knowledge gained was applied during examination of infected patients. Unfortunately, no changes were seen in their behaviors due to lack of attitude modification [21, 23].

Practice

In terms of practice, the majority of the participants ranked as 'weak'. Moreover, no significant relation was observed between knowledge and practice; e.g., whether the knowledge increased or decreased, the practice did not change. Also, in similar studies, no relation between knowledge and practice was noted; however, there was significant relation between attitude and practice, which shows importance of factors improving personnel's attitude to improve their practice [24, 25]. Therefore, the best way to improvement in practice is change in attitude.

As seen in the results, even medical and nursing students presented weak practice, despite recently passing appropriate courses about blood-borne diseases and pre-exposure prophylaxis. If people would constrain themselves to practice standard precaution proceedings, they would naturally have better practice, and there would be serious prevention of diseases transmission. It must always be reminded that not all infections are recognized, and precaution measures must not be performed only in special cases, in whom an infection is recognized, but all patients must be seen as the source of infection [15].

Limitations

Although this study was unusual due to cooperation of 1,912 members of two big educational hospitals, low re-

sponse rate of the specialists and professors employed in these two hospitals decreased this group's sample size. Another limitation was due to the use of the questionnaire, which may differ from results of a direct interview or observation of actual behaviors of individuals.

Conclusions

Low level of knowledge in all job categories indicated that participating in training courses did not provide a desired efficiency. Therefore, paying attention to the main role of mentorship held by professors and residents is of great importance. Secondly, exertion of overseen rules and principles of the hospital personnel practice would be crucial due to their vital role in the infection transfer cycle. Reinforcement of supervision on practice and execution of punishment and encouraging rules to prevent infection prevalence among personnel and patients are necessary, and those responsible for infection control must consider this matter.

Conflict of interest

The authors declare no conflict of interest.

References

1. Pirozzolo JJ, LeMay DC. Blood-borne infections. Clinics in Sports Medicine 2007; 26: 425-431.
2. Rossouw TM, van Rooyen M, Louw JM, Richter KL. Blood-borne infections in healthcare workers in South Africa. South Afr Med J 2014; 104: 732-735.
3. Prüss-Üstün A, Rapiti E, Hutin YJ. Sharps injuries: global burden of disease from sharps injuries to health-care workers. Geneva; 2003.
4. Centers for Disease Control and Prevention. Bloodborne infectious diseases: HIV/AIDS, hepatitis B, hepatitis C. 2010. Available at: http://www cdc gov/niosh/topics/bbp/.
5. Ciorlia LA, Zanetta DM. Hepatitis B in healthcare workers: prevalence, vaccination and relation to occupational factors. Braz J Infect Dis 2005; 9: 384-389.
6. Yenesew MA, Fekadu GA. Occupational exposure to blood and body fluids among health care professionals in Bahir Dar town, Northwest Ethiopia. Saf Health Work 2014; 5: 17-22.
7. Hanafi M, Mohamed A, Kassem M, Shawki M. Needlestick injuries among health care workers of University of Alexandria Hospitals. East Mediterr Health J 2011; 17: 26-35.
8. Wicker S, Jung J, Allwinn R, Gottschalk R, Rabenau HF. Prevalence and prevention of needlestick injuries among health care workers in a German university hospital. Int Arch Occup Environ Health 2008; 81: 347-354.
9. Adib-Hajbaghery M, Lotfi MS. Behavior of healthcare workers after injuries from sharp instruments. Trauma Monthly 2013; 18: 75.
10. Askarian M, Malekmakan L. The prevalence of needle stick injuries in medical, dental, nursing and midwifery students at the university teaching hospitals of Shiraz, Iran. Indian J Med Sci 2006; 60: 227-232.
11. Mobasherizadeh S, Ebneshahidi S, Mohammadi NA, Abazari F. Intervention study of needle stick injury in Iran. Saudi Med J 2005; 26: 1225-1227.
12. Board S. Risks to health care workers in developing countries. N Engl J Med 2001; 345: 538-541.
13. U.S. Public Health Service. Updated US Public Health Service Guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis. MMWR Recomm Rep 2001; 50(RR-11): 1-52.
14. Pittet D, Allegranzi B, Storr J. The WHO Clean Care is Safer Care programme: field-testing to enhance sustainability and spread of hand hygiene improvements. J Infect Public Health 2008; 1: 4-10.
15. World Health Organization. Practical guidelines for infection control in health care facilities. Manila: WHO Regional Office for the Western Pacific; 2004.
16. Kang J, Cho J, Kim Y, et al. Hospital nurses' knowledge and compliance on multidrug-resistant organism infection control guideline. J Korean Acad Nurs 2009; 39: 186-197.
17. Janjua NZ, Razaq M, Chandir S, Rozi S, Mahmood B. Poor knowledge – predictor of nonadherence to universal precautions for blood borne pathogens at first level care facilities in Pakistan. BMC Infect Dis 2007; 7: 81.
18. Hentgen V, Jaureguiberry S, Ramiliarisoa A, Andrianantoandro V, Belec M. Knowledge, attitude and practices of health personnel with regard to HIV/AIDS in Tamatave (Madagascar). Bull Soc Pathol Exot 2002; 95: 103-108 [Article in French].
19. Gurubacharya D, Mathura K, Karki D. Knowledge, attitude and practices among health care workers on needle-stick injuries. Kathmandu Univ Med J (KUMJ) 2003; 1: 91-94.
20. Alam M. Knowledge, attitude and practices among health care workers on needle-stick injuries. Ann Saudi Med 2002; 22: 396-399.
21. Zaidi MA, Griffiths R, Beshyah SA, Myers J, Zaidi MA. Blood and body fluid exposure related knowledge, attitude and practices of hospital based health care providers in United Arab Emirates. Saf Health Work 2012; 3: 209-215.
22. Fazio RH, Chen JM, McDonel EC, Sherman SJ. Attitude accessibility, attitude-behavior consistency, and the strength of the object-evaluation association. J Exp Soc Psychol 1982; 18: 339-357.
23. Aisien A, Shobowale M. Health care workers' knowledge on HIV and AIDS: universal precautions and attitude towards PLWHA in Benin-City, Nigeria. Nigerian J Clin Pract 2005; 8: 74-82.
24. Zhang M, Wang H, Miao J, Du X, Li T, Wu Z. Occupational exposure to blood and body fluids among health care workers in a general hospital, China. Am J Industrial Med 2009; 52: 89-98.
25. Mehta A, Rodrigues C, Ghag S, Bavi P, Shenai S, Dastur F. Needlestick injuries in a tertiary care centre in Mumbai, India. J Hosp Infect 2005; 60: 368-373.