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Original Article

# Blood and Body Fluid Exposure Related Knowledge, Attitude and Practices of Hospital Based Health Care Providers in United Arab Emirates

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**Objectives:** Knowledge, attitudes, and practices of healthcare providers related to occupational exposure to bloodborne pathogens were assessed in a tertiary-care hospital in Middle East.
**Methods:** A cross-sectional study was undertaken using a self-administered questionnaire based on 3 paired (infectivity known vs. not known-suspected) case studies. Only 17 out of 230 respondents had an exposure in the 12 months prior to the survey and of these, only 2 had complied fully with the hospital's exposure reporting policy.
**Results:** In the paired case studies, the theoretical responses of participating health professionals showed a greater preference for initiating self-directed treatment with antivirals or immunisation rather than complying with the hospital protocol, when the patient was known to be infected. The differences in practice when exposed to a patient with suspected blood pathogens compared to patient known to be infected was statistically significant ($p < 0.001$) in all 3 paired cases. Failure to test an infected patient's blood meant that an adequate risk assessment and appropriate secondary prevention could not be performed, and reflected the unwillingness to report the occupational exposure.
**Conclusion:** Therefore, the study demonstrated that healthcare providers opted to treat themselves when exposed to patient with infectious disease, rather than comply with the hospital reporting and assessment protocol.

**Key Words:** Blood and body fluid exposure, Knowledge, Attitude and practices

## Introduction

Blood and body fluid exposure has been a known occupational hazard since 1978, when it was first documented that a healthcare provider had acquired an infectious disease due to an occupational exposure to infected blood [1]. The World Health Organization reported that while 90% of infections among healthcare providers are attributed to occupational exposure in the developing world, 90% of the reporting of occupational exposure to blood and body fluid is from the developed world [2,3]. Failure to report an exposure increases the likelihood of consequential infection.

Most of the developing countries do not have a formal blood and body fluid exposure reporting system, due to which exposures go unreported and inadequately treated [4]. Prevention of infection following occupational exposure to a healthcare provider is based on the principles of disease prevention, which can be categorized as primary, secondary, or tertiary. Primary prevention includes safe techniques, needle-free sys-

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tems, safe equipment, staff training on safe clinical procedures, and health risk awareness education of blood and body fluid exposures. Secondary prevention includes exposure reporting, immediate post exposure risk assessment based on characteristics of the source patient, the affected staff member and the nature of the incident itself, which will direct subsequent treatment, follow-up, and surveillance. Tertiary prevention includes counseling for exposed individuals, appropriate safe work advice, and rehabilitation. Reporting is therefore of immense importance because, if this crucial step is not taken secondary and tertiary interventions cannot be implemented. One of the most important aspects of reporting is that the source patient's blood can be tested as part of the risk assessment. Even if the infection of the patient is known, retesting at the time of the incident indicates the patient's infectivity, through a polymerase chain reaction test for human immunodeficiency virus (HIV) and hepatitis C, and the hepatitis B envelop antigen (HbeAg) and hepatitis B surface antigen (HbsAg).

According to recently published studies, 5-65% of all needlestick injuries are unreported [5-7]. There is limited research data published on blood and body fluid exposures from the Middle East and United Arab Emirates (UAE) [8,9].

Consistency between health information and knowledge, and knowledge and practice, is the cornerstone for the success of any health promotion or disease prevention program. To measure the effectiveness of a specific blood and body fluid exposure program, many researchers have performed cross-sectional studies to assess the knowledge, attitudes, and practices (KAP) of healthcare providers, which have been successful in identifying the quality and effectiveness of the exposure program. A recently conducted detailed search of the literature was not able to show a single study on blood and body fluid exposure related KAP of hospital based health workers in the UAE [8,9]. Our study was designed to explore KAP of healthcare providers by evaluation of how they might respond to different scenarios that they come across while providing care to patients.

## Materials and Methods

In July 2008, healthcare providers visiting the hospital's occupational health and safety (OHS) clinic were requested to complete an anonymous questionnaire on the first visit only; this convenience sampling method was considered to be representative of the staff complement of the hospital. The hospital had more than 4,500 staff members trained in 40 different countries, introducing differences in culture and religion as they affect KAP. The mean age of participants was 33 year-old (range 20-55). Males were 30% (70 employees) and females were 70% (160). Filipinos were 46% (105 employees), followed by Indians (19%, 43), Arabs (9%, 21) and other nationalities (26%, 61). They were 133 nurses (58%), 19 physicians (8%), 11 laboratory staff (5%) and 67 other healthcare providers (29%) (Table 1). A total of 230 questionnaires were completed with a response rate of 82%.

A simple questionnaire was designed to assess the KAP of healthcare providers in terms of:

- Knowledge – This was assessed by questions related to the hospital's policy and protocol for blood and body fluid exposure including options of investigation, treatment, immunization, and management.
- Attitude – The paired case studies examined the difference in attitudes when a healthcare provider was exposed to a patient known to have hepatitis B, C, or HIV versus an unknown patient.
- Practices – These were assessed by asking if they had reported an exposure, their immunization status, antibody titre, and responses to scenarios in which case management was assessed.

Three disease scenarios (involving hepatitis B, hepatitis C, and HIV) were presented to the participants in paired case studies with a number of options from which to select what action they would take. The first case study had a question regarding exposure to blood of a patient, who was *suspected* of having hepatitis B, which was followed by a question regarding exposure to a patient who was *known* to have hepatitis B. The sec-

**Table 1.** Demographics of study subjects

| | | Number | Percentage |
|---|---|---|---|
| Gender | Male | 70 | 30.4 |
| | Female | 160 | 69.6 |
| Nationality | Philippines | 105 | 45.7 |
| | India | 43 | 18.7 |
| | Arab countries | 21 | 9.1 |
| | Other countries | 61 | 26.5 |
| Occupation | Nurses | 133 | 57.8 |
| | Physician | 19 | 8.3 |
| | Lab staff | 11 | 4.8 |
| | Other healthcare provider | 67 | 29.1 |
| | Total | 230 | 100.0 |

ond and third paired case studies had similar questions related to suspected and known cases of hepatitis C and HIV, respectively. Descriptive statistics were generated using SPSS version 18 (SPSS Inc., Chicago, IL, USA). The research proposal was approved by the Research and Ethics Committee of the hospital. Informed consent was obtained from the participants.

## Results

### First paired case: hepatitis B

The participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected hepatitis B. The most common attitude at 55.7% was to have the patient and healthcare provider both undergo a blood test, the number that answered that the patient only should undergo a blood test was 14.3%. The rate of request for a blood test and taking the hepatitis B vaccine and immunoglobulin was 13%, immunoglobulin only was 4.8%, hepatitis B vaccine was 4.3%, and the response of no action should be done was 3%. The responses were different to what they would do if they were exposed to blood or body fluid of a patient with known hepatitis B. The most common action was a blood test for patient and health care workers at 34.8%, followed by taking immunoglobulin as of 22.6%. The rate of taking hepatitis B vaccine was 16.1%, requesting a blood test and taking immunoglobulin and hepatitis B vaccine was 13.0%; no action was the option proposed by 2.6%. The attitude of participants was statistically different when they would be exposed to a suspected

**Table 2.** Attitude at the situation of having been exposed to blood or body fluid to suspected or known hepatitis B

| | Suspected hepatitis B | | Known hepatitis B | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Blood test, engerix B, and immunoglobulin | 30 | 13.0 | 30 | 13.0 |
| Take immunoglobulin | 11 | 4.8 | 52 | 22.6 |
| Take hepatitis B vaccine | 10 | 4.3 | 57 | 16.1 |
| Blood test for patient and healthcare providers | 128 | 55.7 | 80 | 34.8 |
| Blood test for patient only | 33 | 14.3 | 17 | 7.4 |
| No action | 7 | 3 | 6 | 2.6 |
| No response | 11 | 4.8 | 8 | 3.5 |
| Total | 230 | 100.0 | 230 | 100.0 |

F-value = 19.5, p-value < 0.001.

**Table 3.** Attitude at the situation to be exposed to blood or body fluid to suspected or known hepatitis C

| | Suspected hepatitis C | | Known hepatitis C | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Blood test and immunoglobulin | 5 | 2.2 | 24 | 10.4 |
| Take immunoglobulin | 19 | 8.3 | 24 | 10.4 |
| Take antiviral | 11 | 4.8 | 76 | 33.0 |
| Blood test for patient and healthcare providers | 139 | 60.4 | 73 | 31.7 |
| Blood test for patient only | 41 | 17.8 | 18 | 7.8 |
| No action | 7 | 3.0 | 5 | 2.2 |
| No response | 8 | 3.5 | 10 | 4.3 |
| Total | 230 | 100.0 | 230 | 100.0 |

F-value = 18.5, p-value < 0.001.

versus confirmed hepatitis B ($p < 0.001$) as shown in Table 2.

## Second paired case: hepatitis C

In the second paired case, the participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected hepatitis C. The most common attitude at 60.4% was a blood test for the patient and healthcare provider, followed by a blood test for patient only as of 17.8%, taking immunoglobulin was 8.3%, taking antiviral 4.8%, blood test and immunoglobulin 2.2%, and no action was 3.0%. The responses were different to what they would do if they were exposed to blood or body fluid of patient with known hepatitis C. The most common action of the healthcare providers was to take antiviral 33.0%, followed by a blood test for the patient and healthcare providers 31.7%. The rate of request for blood test and immunoglobulin was 10.4%, taking immunoglobulin only was of 10.4%, blood test for patient only was 7.8% and no action was selected by 2.2%. The attitude of participants was statistically different when exposed to between suspected versus patient with known hepatitis C ($p < 0.001$) as demonstrated in Table 3.

## Third paired case: HIV

After which the participants were asked to select what they would do if they were exposed to blood or body fluid of patient with suspected HIV. The most common attitude was a blood test for the patient and healthcare provider with a response rate of 52.2%, followed by blood test for the patient only of 18.3%. The rate of requesting a blood test and taking post exposure prophylaxis was 12.2%, initiating post exposure prophylaxis without blood test was 11.7%, taking immunoglobulin only was 0.9%, and no action should be done was 1.3%. The respondents had different responses to what they would do if they were exposed to blood or body fluid of a patient know to be infected with HIV. The majority of the respondents 35.7% opted to initiate post exposure treatment without any blood work, followed by 35.7% to perform blood test for patient and health care workers. The rate of request to perform a blood test for both and to start post-exposure prophylaxis was only 10.9%, performing a blood test for patients only was 6.5%, taking immunoglobulin was 4.3%, and no action was 1.3%. The attitude of participants was statistically different when exposed to between suspected versus patient with known HIV ($p < 0.001$) as detailed in Table 4.

## Other questions

The majority of the respondents (186; 80%) stated that they were immunized for hepatitis B, but only 91 (40%) had their titres checked after immunization to establish that their immunization had been effective, as recommended by hospital policy. Most of the respondents (209; 90%) reported they were aware of a hospital policy to report a blood or body fluid exposure. Only 17 out of 230 respondents had the blood and body fluid exposures in the last 12 months and of these only 2 reported the exposure to both their manager and OHS clinic as required by the hospital policy, whereas 8 respondents reported the exposure to only one of them. The group of 17 healthcare providers who reported having an exposure was further examined for profession and reporting pattern; it composed of 11 nurses, 3 physicians, one laboratory staff member, and 2 healthcare

**Table 4.** Attitude at the situation to be exposed to blood and body fluid to suspected or known HIV

| | Suspected HIV | | Known HIV | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| Blood test for both and post exposure prophylaxis | 28 | 12.2 | 25 | 10.9 |
| Take immunoglobulin | 2 | 0.9 | 10 | 4.3 |
| Initiate post-exposure prophylaxis | 27 | 11.7 | 82 | 35.7 |
| Blood test for patient and healthcare providers | 120 | 52.2 | 82 | 35.7 |
| Blood test for patient only | 42 | 18.3 | 15 | 6.5 |
| No action | 3 | 1.3 | 3 | 1.3 |
| No response | 8 | 3.5 | 13 | 5.7 |
| Total | 230 | 100.0 | 230 | 100.0 |

HIV: human immunodeficiency virus.
F-value = 21.8, p-value < 0.001.

**Table 5.** Practice of the study subjects after exposure to patients with diseases

| | Exposure to blood or body fluid | | | Report to manager and OHS Clinic | | |
|---|---|---|---|---|---|---|
| | Participants | Exposed | | Both | Either | Not reported |
| | | Number | Percentage | | | |
| Nurse | 133 | 11 | 8.3 | 2 | 7 | 2 |
| Physician | 19 | 3 | 15.8 | 0 | 1 | 2 |
| Laboratory staff | 11 | 1 | 9.1 | 0 | 0 | 1 |
| Other healthcare provider | 67 | 2 | 3.0 | 0 | 0 | 2 |
| | 230 | 17 | 7.4 | 2 | 8 | 7 |

OHS: occupational health and safety.

providers categorized as 'other'. When analysed in terms of which professional group reported or decided not to report an exposure, the breakdown showed that 7 out of 11 nurses and 1 out of 3 physicians reported the exposure as shown in Table 5.

The exposure to blood and body fluid of patient was confirmed by 7.4% (17 cases) of the respondents. The most frequent professional group exposed were the nurses 8.3% (11 among 133), followed by physicians 15.8% (3 among 19) and the laboratory staff 9.1% (1 among 11). However, among 17 healthcare providers who were exposed, only 11.8% (2 cases) reported the exposures to both their manager and the OHS clinic. The report to either of them was 47.0% (8 cases). No report to either of them was 41.2% (7 cases) as shown in Table 5.

## Discussion

The study was conducted in a hospital with healthcare providers that had been trained in many different countries; hence before developing a training and awareness campaign for a comprehensive blood and body fluid exposure program, it was essential to assess the determinants of compliance with blood and body fluid exposure protocol in this multinational group of healthcare providers. The hospital had recently implemented a corporate policy that mandated reporting of occupational exposure to blood or body fluids and had developed a post exposure management protocol.

### Knowledge

The majority of the health professionals were well aware of the different treatment options after an exposure. For example, few healthcare providers selected the option of taking immunoglobulin's in case of exposure to hepatitis C, as there is no passive or active immunity enhancement available for this pathogen. In contrast to our finding, Jankovic et al. [10] found that 25% of health care providers incorrectly believed that there was a vaccine for hepatitis C. Similar findings were reported in studies which showed that 30-61% of the health professionals were not aware that hepatitis C was transmitted after a blood or body fluid exposure [11,12].

In the case study of exposure to HIV, less than 5% opted for immunoglobulin's which are not available. These findings concur with those of Efetie and Salami [13] who found that both the doctors and nurses had good knowledge related to universal precautions: 97% and 92% respectively. On the contrary, Alam [11] reported that 21% healthcare providers did not consider HIV/acquired immune deficiency syndrome (AIDS) to be transmissible after an exposure. While, Slater et al. [14] reported that most of the health professional perceived HIV to be the most likely transmitted disease by needlestick injury followed by hepatitis C and hepatitis B. This demonstrated that knowledge of health professionals varied from study to study; health professionals in the hospital were more knowledgeable than some of their colleagues in other studies. The majority of the healthcare providers were aware of the hospital's policy for notification of a blood or body fluid exposure in response to recent awareness sessions. However, the concordance of knowledge with attitudes and practices was disappointingly low.

### Attitudes

An attitude is a hypothetical construct that represents an individual's like or dislike for something. Generally attitudes are the result of either direct experiential or observational learning from the environment. An attitude based upon direct experience appears to be more likely than one based upon indirect experience to have an impact on behavior [15]. Attitudes can be modified by persuasion, awareness, knowledge, and similar strategies. Our study found that healthcare providers knew the importance of blood tests for themselves and the source

patient, but when exposed to a patient known to have hepatitis B, C, or HIV the majority would skip testing and initiate treatment without formal risk assessment. They may have thought that the risk was so serious that testing was unlikely to add value; in addition, there was a reluctance to test as this would require reporting of the incident, the importance of which was under-estimated. Similar attitudes were reported by Aisien and Shobowale [16] in Nigeria, and Mungherera et al. [17] in Uganda. Future education and awareness training should focus on an understanding of the effectiveness of the hospital's protocols. Moghimi et al. [18] reported that that surgeons' with proper knowledge of risk of seroconversion had safer practices. Reda et al. [19] asserted the positive effect of work experience on reducing the frequency of needlestick injuries. These studies supported the fact that experiential or observational learning could positively influence attitudes.

### Practices

Hospital staff had a detailed knowledge of potential treatment options, but their responses to the scenarios were based on personal opinion rather than evidence or protocols and there was little consensus. This demonstrated that a standard protocol for post exposure management was required to avoid confusion and improve follow-up. Our findings were in concordance with those of Zhang et al. [20] in China and Mehta et al. [21] in India. The gap between knowledge and practice was indicated by 7 out of 17 healthcare providers who had an exposure in the last 12 months did not report the incident although 90% of them were aware that it should be reported. This finding is in agreement with the literature which showed that there is a pattern of low reporting [22]. Studies in different parts of the world found the number of needlestick injuries to vary from 17 to 30 per 100 beds [23-25]. The low blood and body fluid exposure reporting demonstrated in our study is consistent with similar studies of needlestick injury reporting published by Gurubacharya et al. [12] in Nepal: 21%; Alam [11] in Saudi Arabia: 7%; McGeer et al. [7] in Canada: 5%, and Zafar et al. [26] in Pakistan: 53%. These results demonstrate the need for more targeted education and that awareness is required for improving compliance. It is possible that nurses (64%) regard testing and risk assessment more seriously, as they reported the exposures more often than physicians, a finding in concordance with the results of Zafar et al. [26] and McCormick and Maki [1]. This finding needs to be studied further to understand why other professional groups did not report exposures. The majority of the healthcare providers did not have their post-immunization status checked, which is the recommended best practice [27,28]. The results are in agreement to the studies which reported that 60-80% of respondents had been immunized, but only 10-14% had their antibodies checked [11,18,20].

The limitations of this study were that while convenience sampling was used to ensure a good response rate, we were not able to verify the information provided by the healthcare providers because the information was collected anonymously.

The study showed that there was considerable under-reporting of occupational exposures and a statistically significant difference in the healthcare providers' responses to the hypothetical situation, when they knew that the source was positive for HIV, hepatitis B, or C in which healthcare providers opted to treat themselves rather than follow the hospital's post-exposure protocol.

## Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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