

## ORIGINAL RESEARCH

# Accidental Occupational Exposures among Dental Healthcare Workers in Asir Region, Saudi Arabia

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## ABSTRACT

**Aims and objectives:** This study aims to assess the prevalence of accidental occupational injuries among dental healthcare workers in Asir region, Saudi Arabia, and thus the risk involved.

**Materials and methods:** Self-administered questionnaires were distributed among dental specialists, general dental practitioners, dental interns, hygienists and dental assistants working in dental college (College of Dentistry, King Khalid University, Abha, KSA). Dentists working in private clinics and government hospitals in Asir Province, Saudi Arabia, were also included in this study.

**Results:** Of the total 300 questionnaires, 190 were returned with a response rate of 63.3%. Of the respondents, 138 (72.63%) were males and the rest 52 (27.3%) were females. The response rate in this study was 63.3%. The total number of occupational injuries among DHCWs was 138 (72.5%) with a density rate of 0.72 per 100 persons per year which is significantly high. In the present study, a higher incidence of injuries occurred in the dental operatory and most of them being from needlestick injuries, i.e. 78 (56.2%).

**Conclusion:** (1) Accidental occupational exposure incidence rate among DHCWs in Asir region, Saudi Arabia, is high as compared to other studies, (2) the majority of the injuries occurred in the dental operatory. Most of these injuries were caused by syringe needles and involved the finger or thumb.

**Keywords:** Accidental, Occupational, Health care, Exposure.

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## INTRODUCTION

Occurrence of occupational injuries in the dental setting is of utmost concern to the healthcare professionals in general and dental professionals in particular. Dentists are at risk of both contracting diseases from their patients and infecting patients with pathogenic organisms carried by them or transmitted from other patients.<sup>1</sup> In dentistry, sharp injuries are more likely to occur due to the small operating field, the frequent patient movement and variety of sharp dental instruments used in everyday practice.<sup>2,3</sup> In addition, instruments frequently used in the dental practice generate spatter, mists and aerosols which could carry potentially pathogenic infectious materials.<sup>4</sup>

Needlestick injuries are associated with a number of blood-borne infections and common among dental healthcare professionals.<sup>5</sup> The injuries are mainly related with

cleaning instruments, recapping needles and administering local anesthesia. Previous studies among general dentists and dental students and faculty, during the past two decades, have found that up to one-third of reported injuries were associated with syringe needles.<sup>6</sup> Percutaneous injuries are one of the major risk factors in the transmission of hepatitis C (HCV), hepatitis B (HBV) and human immunodeficiency virus (HIV).<sup>7</sup> HCV is a leading cause of chronic hepatitis and cirrhosis and, to date, there is no protective vaccine against HCV. Hepatitis B is a hazardous disease with severe consequences. It has been found that the incidence of hepatitis B among DHCWs after needlestick injuries is 20%. In Saudi Arabia, hepatitis B prevalence is about 10% among the entire population, and the prevalence of hepatitis C is around 2 to 6% depending on the geographic location.<sup>8</sup>

Other forms of exposure which are common among DHCWs are injuries with bur, explorer, endodontic file and orthodontic wire. In Saudi Arabia, data regarding occupational exposures are limited. One such similar study has been conducted in Riyadh and the results published. The aim of this study was to assess and evaluate the occurrence of occupational exposure among healthcare workers in the dental setting in Asir province which is a region in southern part of Saudi Arabia and compare the results with similar studies conducted elsewhere.

## MATERIALS AND METHODS

This is a retrospective study conducted among dental healthcare workers in Asir province, Saudi Arabia. Self-administered questionnaires were distributed among dental specialists, general dental practitioners, dental interns, hygienists and dental assistants working in dental college (College of Dentistry, King Khalid University, Abha, KSA). Dentists working in private clinics and government hospitals in Asir province, Saudi Arabia, were also included in this study. Informed consent was obtained at the time of distribution of questionnaires. Due clearance from the ethical committee was obtained during before the start of research.

A total of 43 dental centers were involved in the study. These dental centers were subdivided as (1) Universities and specialist dental centers,<sup>8</sup> (2) Primary health care centers, (3) Private dental centers.

Of the total 300 questionnaires distributed, 190 responded back.

The questionnaire included the following:

1. Demographic information (age, gender, marital status, type of work, specialty)
2. History of occupational exposure including:
  - a. Number of occupational injuries
  - b. Type of occupational injury experienced
  - c. Type of the procedure performed, when the exposure occurred
  - d. Place where the exposure occurred
  - e. Instrument that caused the occupational exposure
3. Adherence to infection control procedures.

The feedback received through questionnaires was entered into Excel spreadsheet and the statistical analysis done through statistical package for social sciences (SPSS, Windows version 16.0).

## RESULTS

### Demographic Background

Of the total 300 questionnaires, 190 were returned with a response rate of 63.3%. The rest were either unfilled or incomplete. As shown in Table 1, 138 (72.63%) were males and the rest 52 (27.3%) were females. One hundred and twenty (63.15%) of the respondents were married and 70 (36.31%) unmarried.

Sixty, eight (35.7%) of the DHCWs were working in the government sector, 15 (7.8%) were students and 107 (56.3%) were involved in academic training. Sixty-one (32.1%) of the respondents were dental specialists, 67 (35.2%) were students and the rest 62 (32.6%) were either dental hygienists or dental technicians as displayed in Table 1.

### Incidence of Occupational Injuries

Table 2 shows that only 52 (27.3%) DHCWs had never experienced occupational injury. Sixty-three (33.1%) of them had reported one occupational injury and 75 (39.4%) had experienced more than two injuries. One hundred and

<i>Incidence</i>		<i>N (%)</i>
Number	No injury	52 (27.3)
	One injury	63 (33.1)
	Two or more injuries	75 (39.4)
Gender	Male	130 (94.2)
	Female	8 (5.8)

thirty (94.2%) males had experienced occupational injuries and eight (5.8%) were females having experienced occupational injuries.

### Use of Protective Equipments

Of the 138 respondents who had experienced injury, 39 (28.2%) were not wearing any protective equipment including gloves, 91 (65.9%) of them were wearing gloves, 17 (12.31%) of them wearing goggles, 36 (26%) were wearing gowns, 38 (27.5%) were wearing face masks as shown in Table 3.

### Occupational Injuries and Type of Clinical Procedure

Table 4 reveals the type of occupational injury. The most common type of occupational injury occurred in the dental operatory (60.9%) and injecting local anesthesia was the most common type of injury (20.3%) followed by drilling with a handpiece (19.1%).

<i>Type of protection</i>	<i>N (%)*</i>
No protection	39 (28.2)
Gloves	91 (65.9)
Goggles	17 (12.31)
Gowns	36 (26)
Face mask	38 (27.5)

\*Number includes personal wearing more than one type of protection

**Table 1: Demographic characteristics of all participants (N = 190)**

<i>Demographic characteristics</i>	<i>N (%)</i>
<i>Gender</i>	
Male	138 (72.63)
Female	52 (27.3)
<i>Marital status</i>	
Single	120 (63.15)
Married	70 (36.31)
<i>Type of work</i>	
Government	68 (35.7)
Private	15 (7.8)
Academic	107 (56.3)
<i>Practice speciality</i>	
Specialist	61 (32.1)
Student	67 (35.2)
Dental assistant/hygienist	62 (32.6)

**Table 4: Type of occupational injury**

<i>Clinical procedure</i>	<i>N (%)</i>
During dental procedure	60.9
Injecting local anesthesia	20.3
Drilling with handpiece	19.1
Removing bur	8
Scaling	6
Manipulating orthodontic wire	12
Performing endodontic treatment	10
Suturing	9.5
Placing amalgam	10
Filling	4
After dental procedure	39.1
Recapping needles	43.2
Disposing sharps	22
Cleaning up instruments	35.5

A total of 104 (39.1%) injuries occurred after the dental procedures were performed and recapping the needle was the most common activity associated with this exposure category followed by cleaning of instruments (43.2% and 35.5% respectively).

## DISCUSSION

Occupational exposure to bloodborne pathogens is a well-recognized hazard to healthcare workers.<sup>9</sup> Percutaneous injuries among healthcare workers pose the greatest risk of infection. Dentists are in danger of both contracting diseases from their patients and infecting patients with pathogenic organisms carried by them or transmitted from other patients.<sup>1</sup> Hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are the principal blood-borne pathogens of concern to dental staff.<sup>10</sup> With the advent of AIDS in 1981, a higher level of importance has been elucidated to the disease's routes of transmission. Hepatitis B had earlier been identified as a blood-borne infection with potentially very serious consequences, and by the mid 1970s, it was known to be at a much higher prevalence in dentists than in general population.<sup>11</sup>

This study aims to assess the prevalence of accidental occupational injuries among dental healthcare workers in Asir region, Saudi Arabia, and thus the risk involved. The response rate in this study was 63.3%. Similar study conducted by Al-Hussyeen AA<sup>8</sup> et al (2007) had a response rate of 41.9% which is significantly low than the response rate in the present study.

The total number of occupational injuries among DHCWs was 138 (72.5%) with a density rate of 0.72 per 100 persons per year which is significantly high. The density rate was 0.6 per 100 persons per year in a study conducted by Al-Hussyeen AA<sup>8</sup> et al in 2007. Males had experienced a significantly higher number of occupational injuries 130 (94.2%) than eight females (5.8%) which is contrary to the results of Al-Hussyeen AA<sup>8</sup> et al, wherein the injury rate was higher among females.

In the present study, a higher incidence of injuries occurred in the dental operatory and most of them being from needle stick injuries, i.e. 78 (56.2%). Much has been written in the literature on needlestick injuries and the methods to avoid them. A low incidence of needlestick injuries was reported by Drelich EV<sup>12</sup> in a survey conducted by him among 144 practicing dentists in Broome County, NY, February 1996. He substantiated his findings of lower injury rate by stating that his study/survey included only experienced dentists and not dental students and interns, and the traits of the study population would have an influence on the results. Shah SM<sup>5</sup> et al in their study involving 4,695

DHCWs in Washington State stated that local anesthetic syringe and recapping were the two most important causes of needlestick injuries in dentists and dental hygienists. Khader Y<sup>13</sup> et al conducted a cross-sectional study in Northern Jordan which included 170 general dental practitioners and reported a 66.5% incidence of needlestick injuries. The frequency of needlestick injuries in our study (56.2%) is almost same as that of a similar study conducted by Paul T<sup>14</sup> among DHCWs at the Armed Forces Hospital, Riyadh, Saudi Arabia.

The first documented case of HIV seroconversion following a needlestick occurred in 1984<sup>10</sup> Smith AJ<sup>10</sup> et al, suggested practical policies for needlestick injuries in general dental practice. First aid management of sharp injuries include assessment of the injury (how deep is the injury, device contamination with blood), washing with water followed by assessing the risk factors for the patient and then following appropriately. Anil S<sup>9</sup> et al in their review on transmission and postexposure management of blood borne virus infections in dental practice also suggested a similar protocol for management of needlestick injuries. According to them, the recommendations for hepatitis prophylaxis following needlestick injuries depend on the following factors: (1) The workers's hepatitis B vaccination state, (2) level of antibody response in the worker, (3) whether the hepatitis B status of the source is known or unknown.

Recapping of needle can account for 25 to 30% of all needlestick injuries.<sup>9</sup> In our study, 43.2% of the injuries were due to needle recapping among the injuries that occurred after the dental procedures were performed. Safe recapping procedures, safer needle device and needle guard are few of the precautions suggested in the literature.<sup>9</sup>

Majority of the injuries occurred on the hand (finger or thumb) (129, 93.4%) and, in nine (6.5%) of them, either the eye or mouth was affected. Of the 138 respondents who had experienced injury, 39 (28.2%) were not wearing any protective equipment including gloves. This is a significantly higher percentage for not adhering to the standard norms of using protective barriers.

Standard precautions are infection control measures that reduce the risk of transmission of blood-borne pathogens through exposure to the blood or body fluids of patients and healthcare providers. The application of standard precautions requires that all blood and other body fluids should be regarded as potentially infectious and appropriate protective action taken.

This is a retrospective study, based on self-recalled information regarding occupational exposures, so that reliability of the information collected is dependent on the

accuracy of the individual's memory. Regardless of this limitation, this study provides information on the accidental occupational exposure incidence rate among DHCWs in Asir Region, Saudi Arabia.

## CONCLUSION

1. Accidental occupational exposure incidence rate among DHCWs in Asir region, Saudi Arabia is high as compared to other studies.
2. The majority of the injuries occurred in the dental operatory. Most of these injuries were caused by syringe needles and involved the finger or thumb.
3. There is a need to do further prospective studies and to increase the emphasis on the reporting system.

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