

# Awareness and prevalence of dental students and dental practitioners towards occupational hazards in dentistry

**Dr. Ruksana Sheik,**

Graduate Student,

Saveetha Dental College & Hospital,

Saveetha Institute of Medical and Technical Sciences, Chennai

**Dr. Mimansa Bhoj**

Senior Lecturer,

Department of Oral and maxillofacial surgery,

Saveetha Dental College & Hospital,

Saveetha Institute of Medical and Technical Sciences, Chennai

## Abstract

**Aim** - To assess the knowledge of dental students and practitioners on different occupational hazards associated with dentistry

**Objective** - To assess and evaluate the type, prevalence and awareness towards the occupational hazards associated with dentistry.

**Background** - Dental professionals are susceptible to various types of occupational hazards. These include exposure to infectious agents, radiation, noise, percutaneous exposure accidentally, hazardous dental materials, musculoskeletal disorders (affecting back, neck and shoulders), psychological problems, respiratory disorders and eye injuries. These occupational hazards are a great challenge to the dental professionals and therefore need to be identified and reduced or eliminated.

**Material and Method** –A closed ended questionnaire containing 17 questions were given to 100 dental undergraduate students and 100 dental practitioners.

**Results**- The most common form of physical hazard was musculoskeletal problem, chemical hazard was latex glove allergy and the most common form of biological hazard was needle stick injury among both the students and practitioners. The students and practitioners have a good knowledge on the type and prevalence of different occupational hazards.

**Keywords:** occupational hazards, students, practitioners, dentists, prevalence

## Introduction

Occupational hazard is defined as a risk or danger as a consequence of the nature or working conditions of a particular job (1). The history of occupational hazards awareness can be traced back to the 18th century when Bernadino Ramazzini, who is known as the father of occupational medicine, recognized the role of occupation in dynamics of health and diseases (2)

Studies have shown that the dentists report more frequent and worse health problems than other high risk medical professionals (3). Dental professionals are exposed to different occupational hazards like stress, allergic reactions, higher noise levels, percutaneous exposure incidents(PEI), radiation, musculoskeletal disorders, legal hazards etc. (4-8) Apart from this, the dental environment is also associated with a considerable risk of exposure to the various microorganisms. Infectious agents can be present in blood or saliva, as a consequence of bacteremia or viremia associated with systemic infections.

Dental professionals and Dental Health Care Workers [DHCW] may be exposed to a variety of micro-organisms via blood or oral or respiratory secretions (9). These micro-organisms may include cytomegalovirus, hepatitis B virus, hepatitis C virus, herpes simplex virus types 1 and 2, HIV, mycobacterium tuberculosis and other viruses and bacteria, especially those which infect the upper respiratory tract (10) Microorganisms can pass into an organism, through a cut on the skin of the person's hand while performing a medical procedure, any dental procedure resulting in an accidental biting by the patient, or through a needle wound created while imparting anesthesia. (10)

Occupational health should focus at promoting the highest degree of physical, mental, and social well being of the workers in all the occupations; their protection from risks resulting from factors adverse to health. (11) Healthy practitioners are particularly essential for a successful dental practice and well-being of the patient (12) Studies across the world have shown that, dentists as compared to other medical professionals have reported more frequent and serious health problems. (13)

Assessment of the occupational hazard awareness and experience among dentist population would help in motivating and planning preventive strategies so as to increase the efficiency and productivity of these health care practitioners. Hence, our present study was focused in creating awareness of the different occupational occupational hazards experienced in addition to preventive measures undertaken by the students and dental practitioners.

## Materials and method

The study population consisted of 200 participants including 100 undergraduate dental students and 100 dental practitioners from Chennai. The data was obtained using a self-administrated questionnaire consisting of 17 questions that included questions on personal data, awareness of occupational hazards, safety measures practiced and the experience of occupational hazard while in practice.

The questionnaire was designed from previous relevant researches. The questions were framed to assess their basic knowledge, attitude, and practices towards the different occupational hazards in dental clinics. Data was collected and percentile analyses for knowledge, attitude and practice descriptive were computed and results obtained.

Results

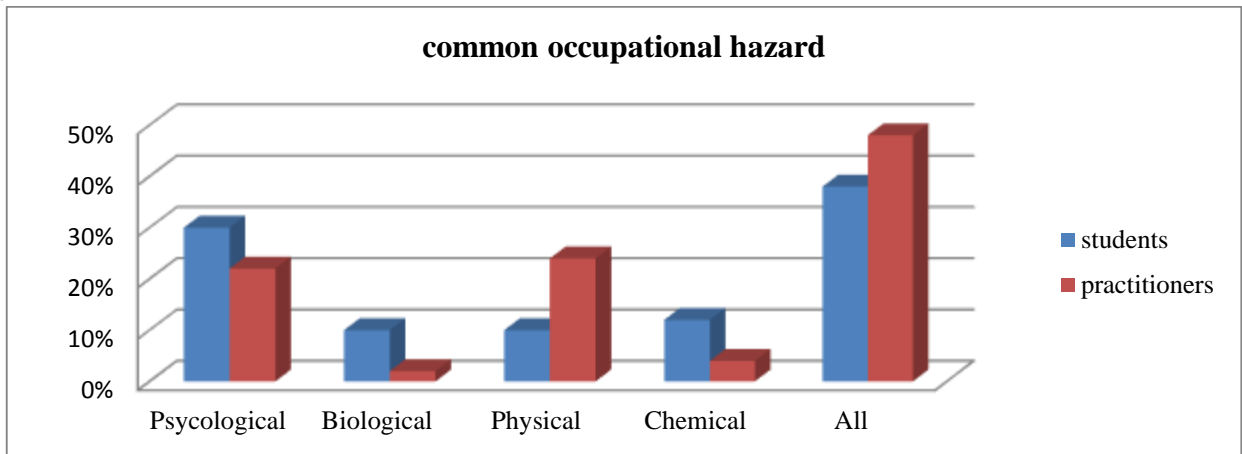


Fig 1: Common occupational hazard

In figure 1, 30% of students have reported that psychological hazard as the most common occupational hazard, 10% biological hazard, 10% physical hazard, 12% chemical hazard, and 38% of students have reported all of the above, whereas among practitioners, 22% psychological hazard, 2% biological hazard, 24% physical hazard, 4% chemical hazard, 48% all of the above.

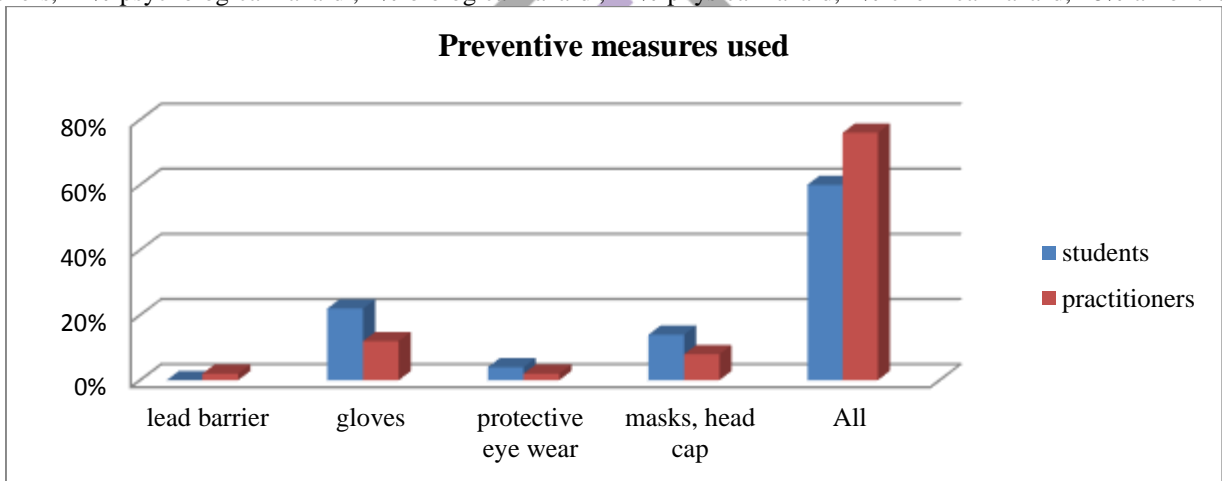


Fig 2 Preventive measures used

When asked about the different preventive measure used from the hazard in figure 2, 22% of the student used gloves, 4% protective eye wear, 14% masks and heap cap and 60% use all of them where as, 2% of the practitioners use let barriers, 12% gloves, 2% protective eye wear, 8% masks and head cap and 76% use all of them.

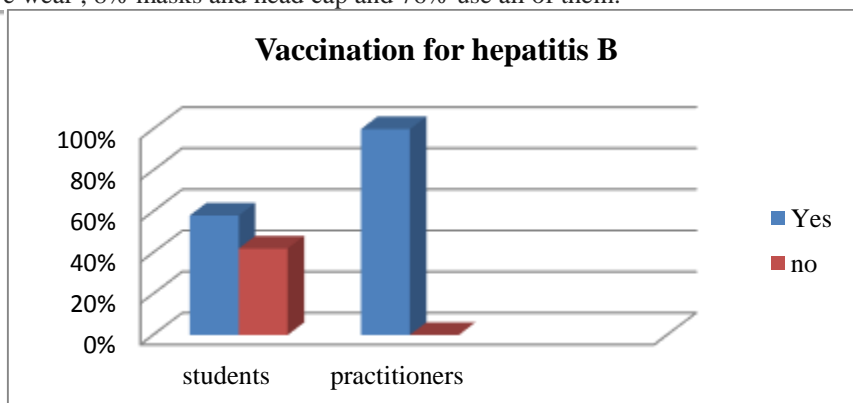


Fig 3: Vaccination for Hepatitis B

In figure 3, only 58% of the students reported to have been vaccinated for Hepatitis B, while 100% of practitioners reported to have been vaccinated for Hepatitis B.

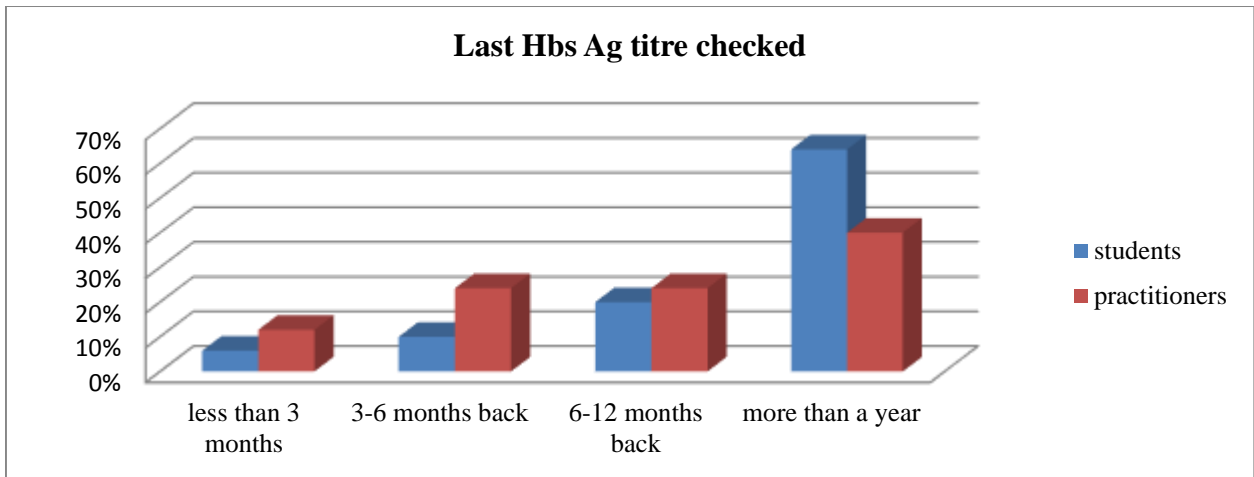


Fig 4: Last Hbs Ag titre checked

In figure 4, of the vaccinated students, 12% of the students have checked their Hbs Ag titre in last three months, 10% 3-6 months back, 20% 6-12 months back, 64% more than a year. Among the practitioners 12% have checked their titre value in the last 3 months, 24% 3-6 months back, 24% 6-12 months back and 40% more than a year.

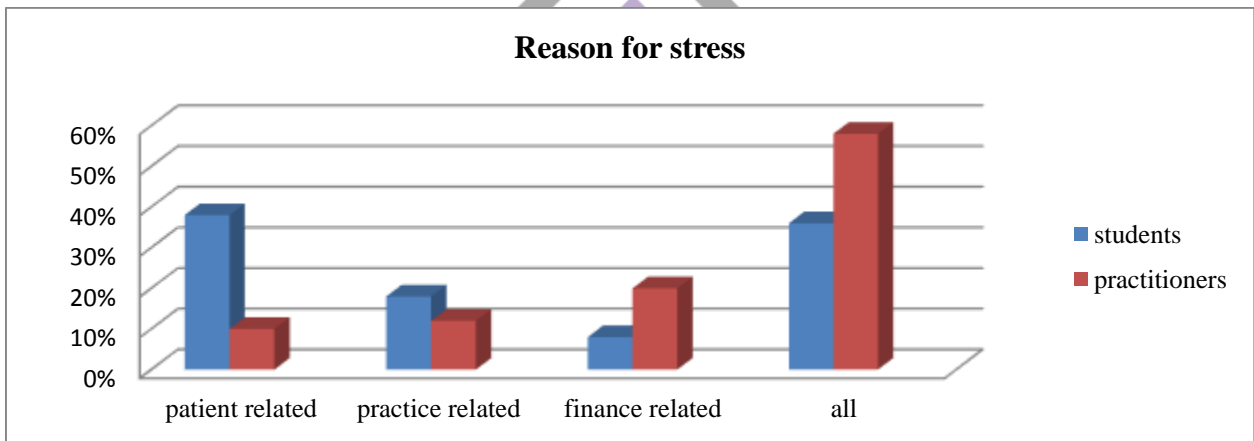


Fig 5: Reason for stress

In figure 5, the results shows that 38% of students stress ism patient related, 18% practice related, 8% finance related and 36% is due to all of the above reasons. 10% of the practitioners stress is due to patient related 12% practice related, 20% finance related and 58% is due to all of the above reasons.

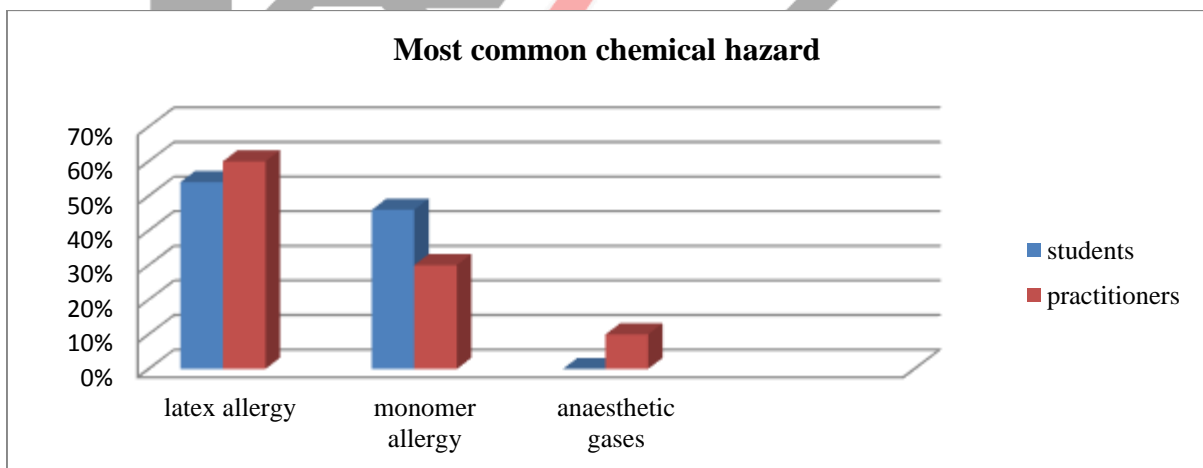


Fig 6: Most common chemical hazard

In figure 6, the most common form of chemical hazard among students and practitioners were evaluated. 54% of the students have opted for latex glove allergy and 46% monomer allergy. Among practitioners, 60% was due to latex glove, 30% monomer allergy and 10% anesthetic gases.

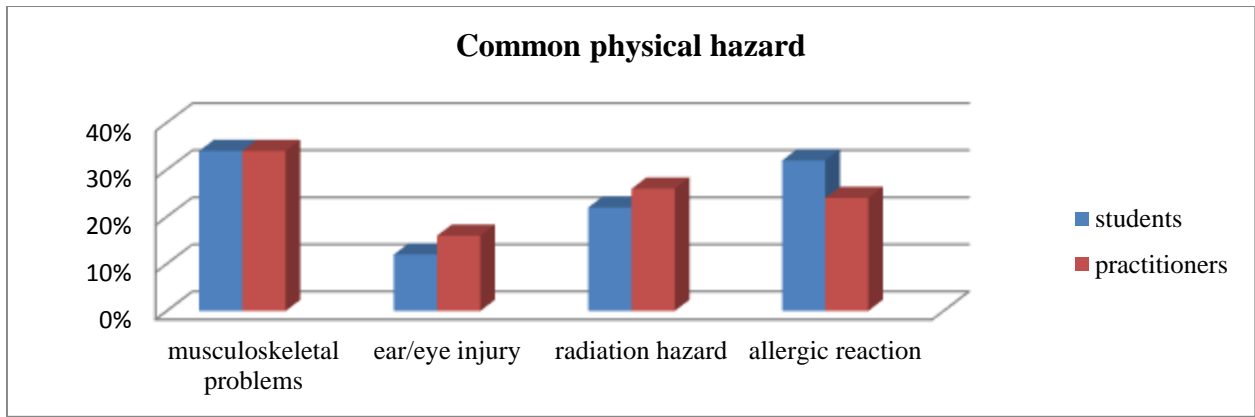


Fig 7: Common physical hazard

In figure 7, the most common form of physical hazard among students and practitioners were evaluated. 34% of students have revealed it is due to musculoskeletal problem, 12% eye/ear injury, 22% radiation hazard , 32% allergic reaction. 34% of practitioners have revealed it is due to musculoskeletal problem, 16% eye/ear injury, 26% radiation hazard , 24% allergic reaction.

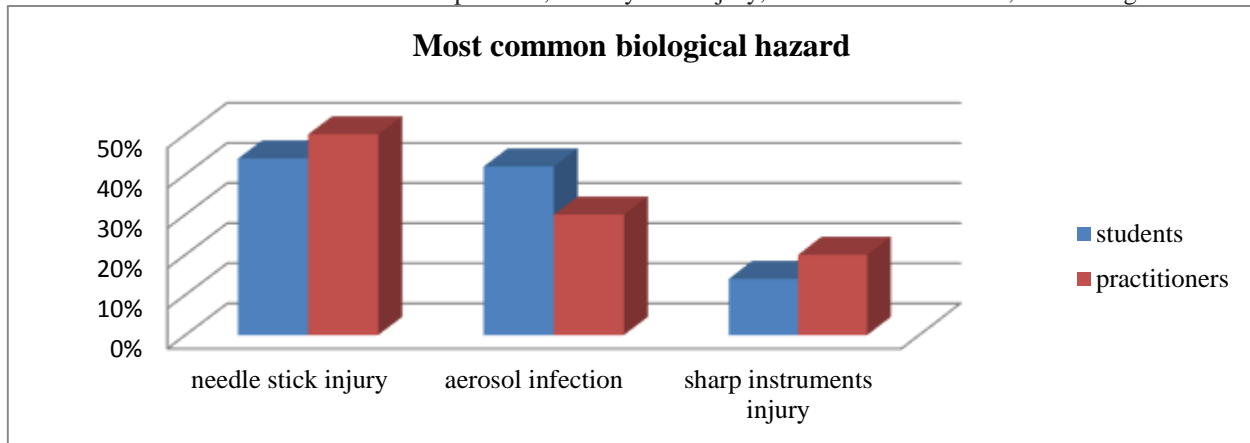


Fig 8: Most common biological hazard

In figure 8, the most common form of biological hazard among students and practitioners were evaluated. 44% of students have revealed that it is due to needle stick injury, 42% transmission of infection through aerosols, 14% injury by sharp instruments. 50% of practitioners have revealed that it is due to needle stick injury, 30% transmission of infection through aerosols, 20% injury by sharp instruments.

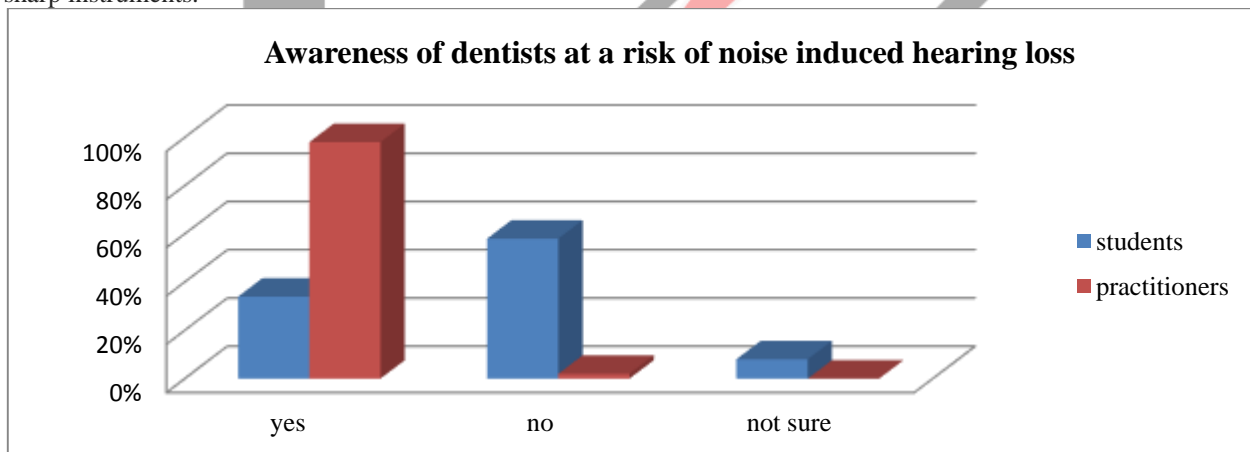


Fig 9: Awareness of dentists at a risk of noise induced hearing loss

In figure 9, 34% of students and 98% of practitioners were aware that dentist are a risk for noise induced hearing loss, 58% of the students and 2% of the practitioners were not aware and 8% of the student were not sure.

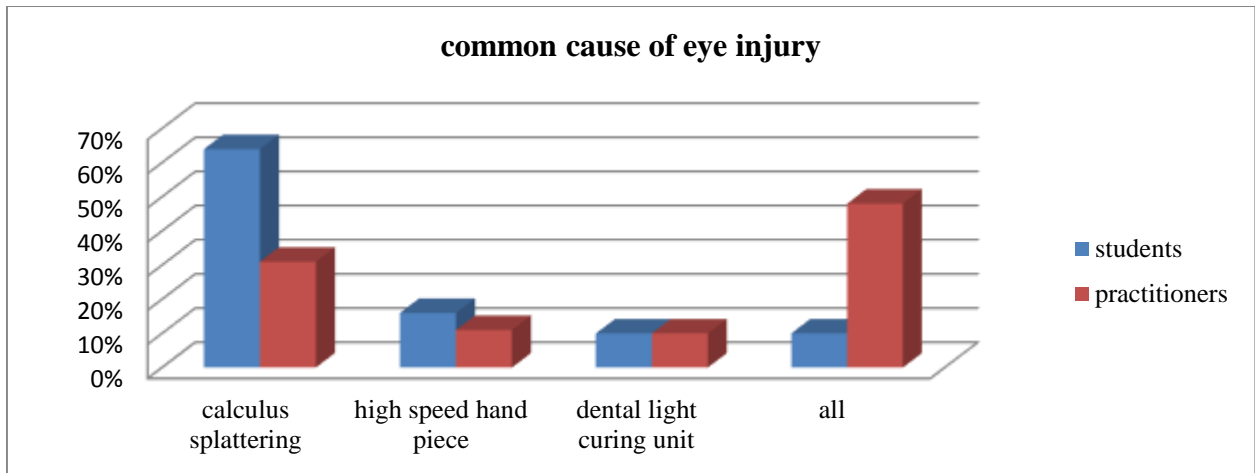


Fig 10: Common cause of eye injury

In figure 10, most common cause of eye injury was assessed. 64% of students revealed that it is due to the splattering of calculus during scaling procedure, 16% due to high speed hand piece, 10% dental light curing unit and 10% due to all of them. 31% of practitioners revealed that it is due to the splattering of calculus during scaling procedure, 11% due to high speed hand piece, 10% dental light curing unit and 48% due to all of them.

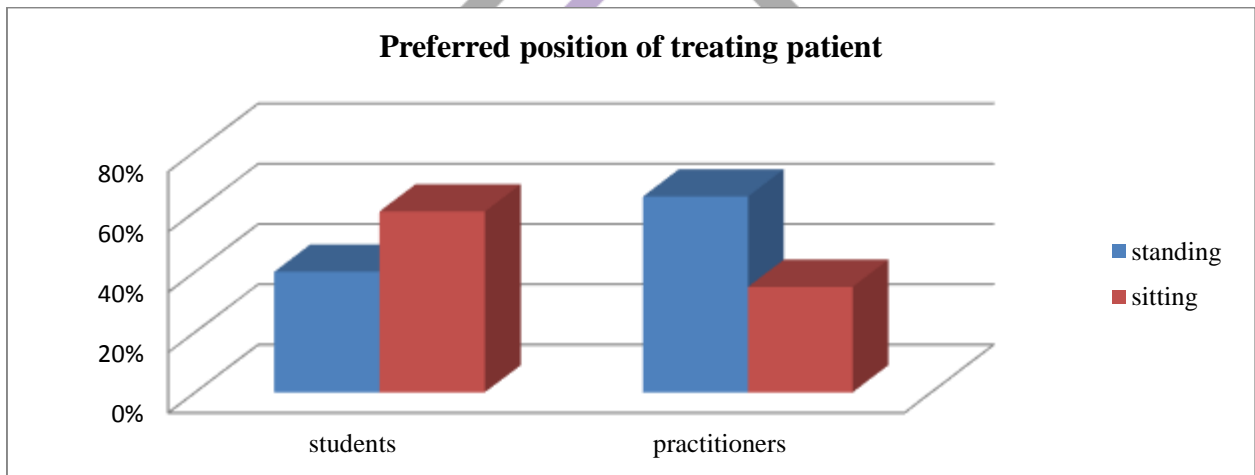


Fig 11: Preferred position of treating patient

In figure 11, when asked about the most preferred position of treating a patient, 40% of students and 65% of the practitioners prefer treating while standing, 60% of the students and 35% of the practitioners prefer treating a patient while sitting.

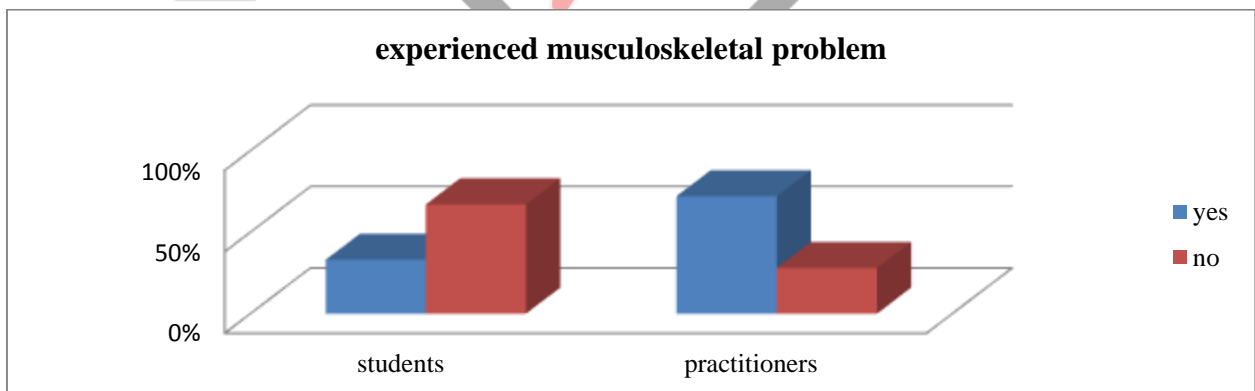


Fig 12: Experienced musculoskeletal problems

In figure 12, 33% of the students and 72% of the practitioners have suffered from musculoskeletal problems since their clinical practice or training associated with dentistry.

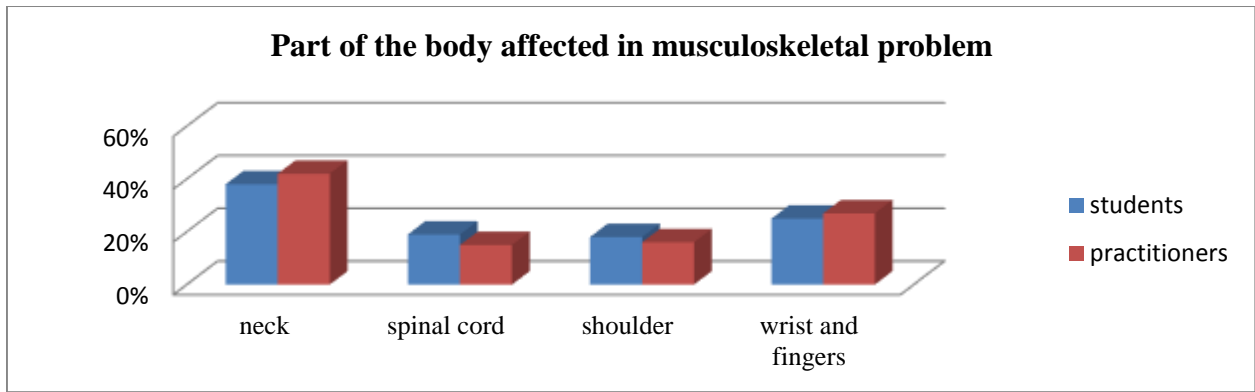


Fig 13: Part of the body affected in musculoskeletal problem

In figure 13, when asked about the part of the body affected during a musculoskeletal problem, 38% of students have revealed that neck is affected, 19% spinal cord, 18% shoulder, and 25% wrist and fingers. 42% of students have revealed that neck is affected, 15% spinal cord, 16% shoulder, and 27% wrist and fingers.

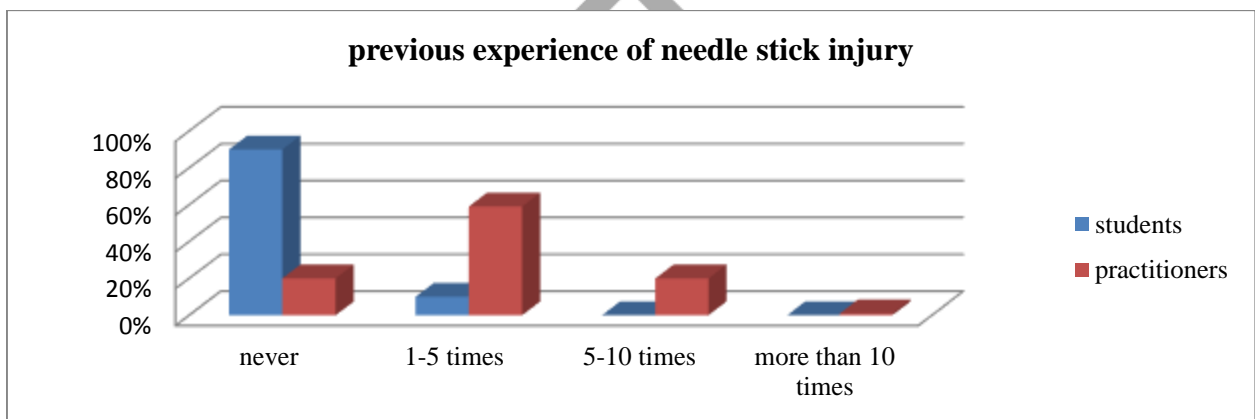


Fig 14: Previous experience of needle stick injury

In figure 14, 90% of the students and 20% of practitioners have never encountered a needle stick injury, 10% of students have encountered 1-5 times, 59% of practitioners reported to have a needle stick injury 1-5 times, 20% report 5-10 times and 1% more than 10 times.

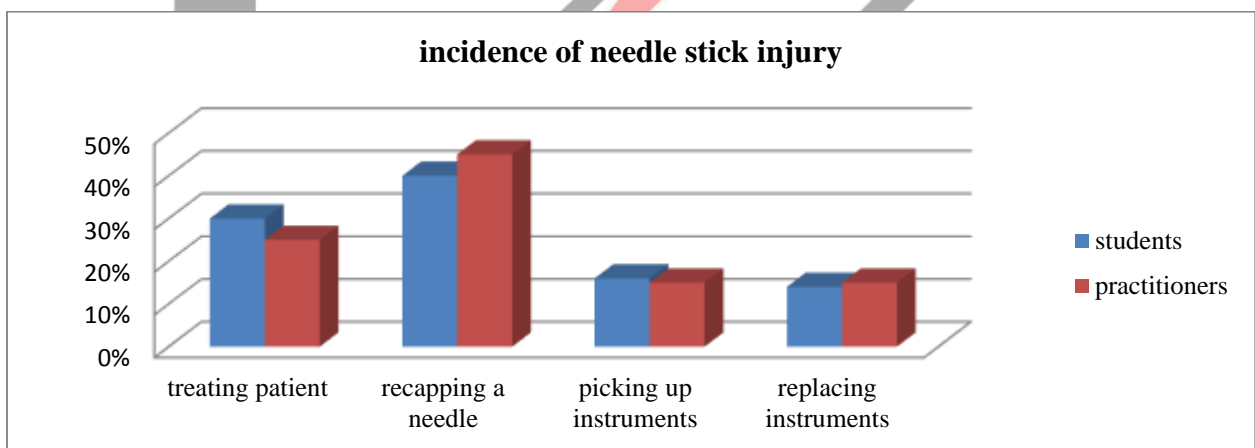


Fig 15: Incidence of needle stick injury

In figure 15, 30% of students revealed that they encounter a needle stick injury while treating patients, 40% recapping a needle, 16% picking up instruments, 14% replacing instruments. 25% of practitioners encounter a needle stick injury while treating patients, 45% recapping a needle, 15% picking up instruments, 15% replacing instruments.

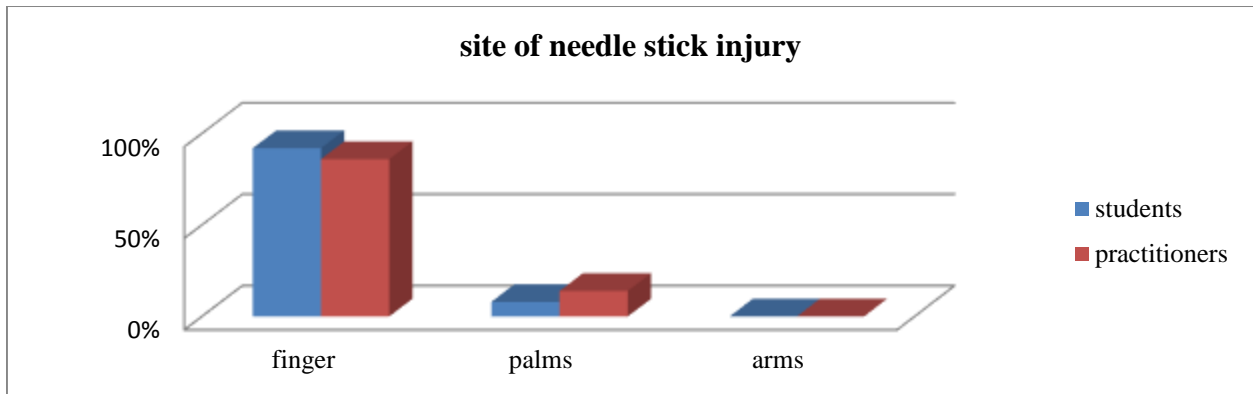


Fig 16: Site of needle stick injury

In figure 16, when asked about the most frequent site of needle stick injury among the students, finger was the most common site with 92%, 8% palm. Also among the practitioner finger was the most common site with 86% and palms with 14%.

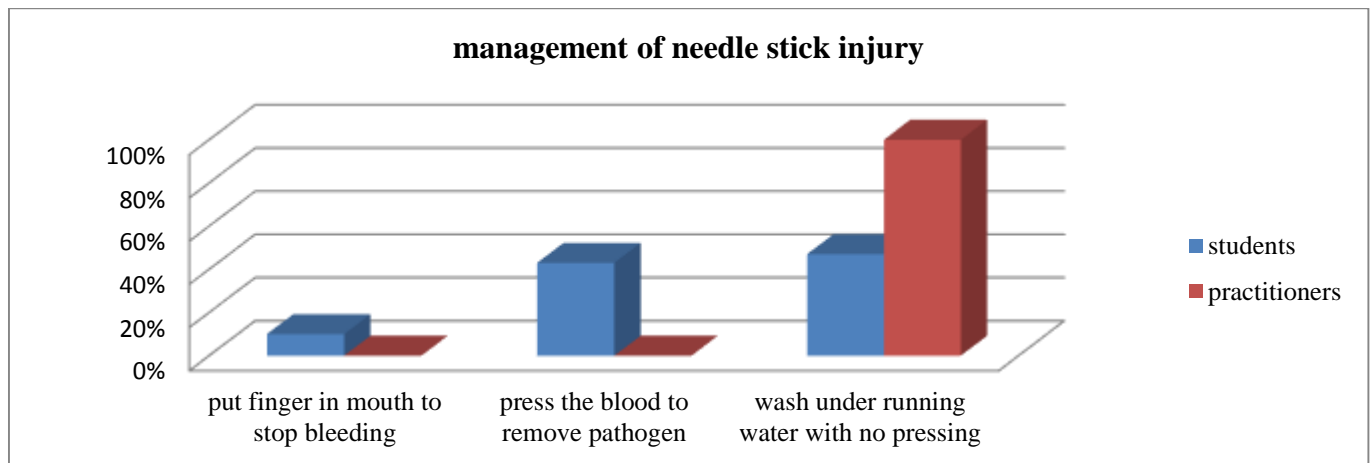


Fig 17: Management of needle stick injury

In figure 17, management of needle stick injury was also assessed. 100% of the practitioners and 47% of the students opted for washing under running water without no pressing till bleeding stopped.

Discussion

Despite numerous technical advances in recent years, many occupational health problems still persists in the modern dentistry [14]. The main source of these hazards is the work environment which can include physical, chemical, biological, mechanical and social aspects [4]

In our study 30% of students have reported that psychological hazard as the most common occupational hazard, 10% biological hazard, 10% physical hazard, 12% chemical hazard, and **38% of students have reported all of the above hazards, whereas among practitioners, 22% psychological hazard , 2% biological hazard , 24% physical hazard, 4% chemical hazard, 48% all the above hazards. In another study conducted by Reddy V et al, majority of dentists (92.4%) faced physical hazards followed by psychological hazards (78.7%), Biological (63.6%) and chemical hazards (13.6%). (15)**

In another study conducted by Puriene A et al, more than half of the Lithuanian dentists experienced work psychological complaints (16)and stress was identified as major hazard by all respondents in East Jerusalem in a study conducted by Al- Khatib et al (4).

In our study both students (60%) and practitioners (76%) use preventive measures like gloves, protective eye wear, masks, head cap. Concerning preventive measures, all of the dentists mentioned barrier techniques: wearing protective clothing was standard procedure for all the respondents by Al-Khatib et al. (4)

In a study conducted in Saudi Arabia only 2% – 4% of dental professionals never wore gloves when treating patients [17]. In Canada: in 1994 it was found that almost 91.8% of dentists in Ontario, always wore gloves, 74.8% always wore masks and 83.6% always wore eye protection [18]. A study conducted by Morris et al. showed that about 90% of dentists in Kuwait wore gloves, 75% wore masks and 52% wore eyeglasses [19]. In a New Zealand study, 42.0% of dentists wore gloves, 64.8% wore masks and 66.4% wore eye protection [20].

Dentists are at a high risk of infection by blood-borne pathogens, as they are continuously exposed to blood and saliva mixed with blood, and may even suffer needle punctures. (21)



58% of the students have been vaccinated for Hepatitis B, whereas 42% of the students have not been vaccinated. 100% of practitioners have been vaccinated for Hepatitis B. In a study conducted by Santhosh Kumar, only 68% of students have reported to have been vaccinated against HBV. (22)

In another study conducted by S Shaghaghian et al, (23) all the dentists had received Hepatitis B vaccination which is in accordance with our study where all the practitioners received Hepatitis B vaccination. In this study 64% of the students and 40% of the practitioners did not check their antibody titre value for more than a year. In another study conducted, only 60% (24) of Iranian medical specialists and 89% of African HCWs checked their post-vaccination antibody titers. (25)

The results show that 38% of students stress is due to patient related, 18% practice related, 8% finance related and 36% is due to all of the above reasons. 10% of the practitioners stress is due to patient related 12% practice related, 20% finance related and 58% is due to all of the above reasons. Patient-related stress, according to the respondents in a study conducted by Al-Khatib et al, was associated with dealing with patients who had a medical history of other conditions and the possibility of the patient deliberately or unintentionally concealing their health status and stress associated with dentist–dentist relations (4)

Many potential toxic materials which are used in dentistry pose health hazard if appropriate precautions are not used. In our present study majority of the students and practitioners faced latex glove allergy followed by monomer allergy. Our findings are in accordance with another study conducted by Reddy V et al, where the dentists faced glove and monomer allergy. (15)

34% of the students and practitioners in this study have reported that musculoskeletal problem is a great threat to the dentists. In another study conducted by Leggat PA et al, most of the dentists (87.2 per cent) reported having at least one musculoskeletal symptom in the past 12 months. (26) The most common site of musculoskeletal problem among the students and practitioners in our study was neck region.

In another study conducted by Leggat PA et al, the most prevalent musculoskeletal complaints among dentists during the previous 12 months were reported at the neck (57.5%), lower back (53.7%) and shoulder (53.3%). (26)

In another study conducted by Tarantola A et al, it was found that over 92% of the surveyed dentists experienced pain and disability of the musculoskeletal system, especially in the neck (47%) and lower back, i.e. the lumbar and sacral region of the spine (average of the two regions of the spine is 35.1%). Over 29% of the dentists experienced discomfort in their hands and fingers. They complained of paresthesia, pain or difficulty with movement. Another 23.3% of the dentists reported hip joint disorders, whereas 20% demonstrated problems in the thoracic region of spine (midback), and also in the shoulders (20.1%). The prevalence of disorders in wrists was found in 18.3% of the studied group. Pain in knees, feet or elbows was reported by 15–16% of respondents. (27) In a similar study conducted, for the Canadian orthodontists in Alberta, low back pain was the most prevalent of musculoskeletal disorders (59%), followed by neck (56%) and shoulder pain (47%) (28).

When a dentist is working, he/she assumes a strained posture both while standing and sitting close to the patient who remains in a sitting or a lying position. This can overstress negatively and affect the musculoskeletal system (29).

Majority of the students prefer to work in the sitting position in our study. In a study conducted by Anna Kierklo et al, it was found that the majority of the surveyed dentists work without an assistant (63.6%) in a sitting position (66.8%). (27)

72% of the practitioners in this study reported to have experienced a musculoskeletal problem whereas most of the students have not experienced any musculoskeletal problem. In another study conducted by Jyothi Tadakamadla et al, more than half (59.7%) of the respondents had musculoskeletal disorders. (30)

34% of the students and 98% of the practitioners are aware that dentists are at a high risk of noise induced hearing loss. This shows that the students are not aware of the harmful effects of the noise produced during the treatment procedures. The most common cause of eye injury during the procedures was as reported by the students and practitioners was splattering of calculus and debris during a scaling procedure. This indicates that the use of a protective eye wear is essential to protect the eyes.

The most common form of biological hazard reported by students and practitioners was needle stick injury followed by the transmission of infection through aerosols. This is in accordance with another study conducted by Reddy V et al, where needle/sharp instrument prick was common in biological hazard (59%).(15)

Majority of the students in our study did not encounter a needle stick injury whereas 59% of the practitioners had encountered needle stick injury 1- 5 times in the course of last 5 years. In another study conducted by Cheng HC et al, among the 434 participants, 100 (23.0%) reported that they had experienced more than one needle stick per week. (31) The most common site of needle stick injury among the students and practitioners was finger. This is in accordance with another study the most common site of injury reported to be associated with NSIs was the fingers at 90.8%. (31) In our study, among the students and practitioners, the most common needle stick injuries occur while recapping a needle. Whereas in another study conducted by Cheng HC et al, the most common needle stick injuries occur when treating patients (31%), recapping a needle (28%), and picking up instruments (25%). Replacing instruments (10%) and transmitting instruments (6%) also accounted for smaller proportions of needle stick injuries. (31)



## Conclusion

Our study revealed the awareness and prevalence of the different types of occupational hazards among the undergraduate students and practitioners. The most common type of chemical hazard was latex glove allergy, physical hazard was musculoskeletal problem, and the most common biological hazard was needle stick injury among both the students and practitioners. Our study showed that although there appears to be an awareness of exposure to the different occupational hazards, suitable practical steps and preventive measures need to be reinforced to protect the dentists from the different occupational hazards.

## References

1. Chopra SS, Pandey SS. Occupational hazards among dental surgeons. *Medical Journal Armed Forces India*. 2007 Jan 1; 63(1):23-5.
2. Fasunloro A, Owotade FJ. Occupational hazards among clinical dental staff. *J Contemp Dent Pract*. 2004 May 15;5(2):134-52.
3. Brooks SL, Rowe NH, Drach JC, Shipman C Jr, Young SK. Prevalence of herpes simplex virus disease in a professional population. *J Am Dent Assoc* 1981, 102: 31-4.
4. Al-Khatib IA, Ishtayeh M, Barghouty H, Akkawi B. Dentists' perceptions of occupational hazards and preventive measures in East Jerusalem. *East Mediterr Health J* 2006; 12: 153-60.
5. Myers HL, Myers LB. 'It's difficult being a dentist': stress and health in the general dental practitioner. *Br Dent J* 2004; 197: 8993.
6. Kaney S. Sources of stress for orthodontic practitioners. *Br J Orthod* 1999; 26: 75-6.
7. Shugars DA, DiMatteo MR, Hays RD, Cretin S, Johnson JD. Professional satisfaction among California general dentists. *J Dent Educ* 1990; 54: 661-9.
8. Logan HL, Muller PJ, Berst MR, Yeane DW. Contributors to dentists' job satisfaction and quality of life. *J Am Coll Dent* 1997; 64: 39-43.
9. Adebola FA, Owotade FJ. Occupational hazards among clinical dental staff. *J Contemp Dent Pract* 2004; 5: 134-52.
10. Jolanta Scymanska. Occupational hazards of dentistry. *Ann Agric Environ Med* 1999, 6, 13-9.
11. Park K. Nutrition and health. *Textbook of Preventive and Social Medicine*. 20th ed. Jabalpur: Banarsidas Bhanot. 2009:562-4.
12. Leggat PA, Chowanadisai S, Kedjarune U, Kukiattrakoon B, Yapong B. Health of dentists in southern Thailand. *International dental journal*. 2001 Oct 1;51(5):348-52
13. Brooks SL, Rowe NH, Drach JC, Shipman C, Young SK. Prevalence of herpes simplex virus disease in a professional population. *The Journal of the American Dental Association*. 1981 Jan 1;102(1):31-4.
14. Leggat PA, Kedjarune U, Smith DR. Occupational health problems in modern dentistry: a review. *Industrial health*. 2007;45(5):611-21.
15. Reddy V, Bennadi D, Satish G, Kura U. Occupational Hazards among Dentists: A Descriptive Study. *J Oral Hyg Health*. 2015 Sep 4;3(185):2332-0702.
16. Puriene A, Aleksejuniene J, Petrauskiene J, Balciuniene I, Janulyte V. Self-reported occupational health issues among Lithuanian dentists. *Ind Health* 2008;46:369-74.
17. Al-Rabeah A, Mohamed AG. Infection control in the private dental sector in Riyadh. *Annals of Saudi medicine*, 2002, 22(1-2):13-7.
18. McCarthy GM, MacDonald JK. The infection control practices of general dental practitioners. *Infection control and hospital epidemiology*, 1997;18(10):699-703.
19. Morris E et al. Infection control knowledge and practices in Kuwait: a survey on oral health care workers. *Saudi dental journal*, 1996, 8:19-26.

20. Treasure P, Treasure ET. Survey of infection control procedures in New Zealand dental practices. *International dental journal*, 1994, 44(4):342–8
21. Mutters NT, Hägele U, Hagenfeld D, Hellwig E, Frank U. Compliance with infection control practices in an university hospital dental clinic. *GMS Hyg Infect Control* 2014;9(3):Doc18.
22. MP SK. KNOWLEDGE, ATTITUDE, AND PRACTICES REGARDING INFECTION CONTROL AMONG UNDERGRADUATE DENTAL STUDENTS. *Asian J Pharm Clin Res.* 2016;9(1):220-4
23. Shaghaghian S, Pardis S, Mansoori Z. Knowledge, attitude and practice of dentists towards prophylaxis after exposure to blood and body fluids. *The international journal of occupational and environmental medicine.* 2014 Jul 12;5(3 July):379-146.
24. Kabir A, Tabatabaei SV, Khaleghi S, *et al.* Knowledge, attitudes and practice of Iranian medical specialists regarding hepatitis B and C. *Hepat Mon* 2010;**10**:176-82.
25. Tarantola A, Koumare A, Rachline A, *et al.* A descriptive, retrospective study of 567 accidental blood exposures in healthcare workers in three West African countries. *J Hosp Infect* 2005;**60**:276- 82.
26. Leggat PA, Smith DR. Musculoskeletal disorders self-reported by dentists in Queensland, Australia. *Australian dental journal.* 2006 Dec 1;51(4):324-7.
27. Anna Kierklo *et al.* WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG DENTISTS – A QUESTIONNAIRE SURVEY, *Ann Agric Environ Med* 2011, 18, 79–84)
28. Newell TM, Kumar S: Prevalence of musculoskeletal disorders among orthodontics in Alberta. *Int J Ind Ergon* 2004, 33, 99–107.
29. Szymanska J. Occupational hazards of dentistry. *Ann Agric Environ Med* 1999;6:13-9. )
30. Jyothi Tadakamadla *et al.* Occupational hazards and preventive practices among students and faculty at a private dental institution in India, *Stomatologija, Baltic Dental and Maxillofacial Journal*, 14:28-32, 2012
31. Cheng HC, Su CY, Yen AM, Huang CF. Factors affecting occupational exposure to needlestick and sharps injuries among dentists in Taiwan: a nationwide survey. *PloS one.* 2012 Apr 3;7(4):e34911.