# Awareness Of Basic Protocols Followed In Routine Dentistry: A Hospital Based Survey In Dental Institution Of Central Gujarat

**Dr. Manjiri Joshi*, Dr. Mansi Tailor**, Dr. Alpana Nair *****

* Reader. Dept of Oral Medicine and Radiology, Manubhai Patel Dental College and ORI, Vadodara, Gujarat, **Senior Lecturer. Dept of Oral Medicine and Radiology, Manubhai Patel Dental College and ORI, Vadodara, Gujarat, ***Dentist. Vadodara, Gujarat.

**Abstracts:** Background and Aim: Modern dentistry has been cited as one of the least hazardous of all the occupations, still many risks challenge the status of this occupation. Most of these risks are caused by failure of an individual to adapt to the working environment and establishing appropriate preventive procedures .Every Dental practitioner should have knowledge about professional hazards they encounter everyday like musculoskeletal problems, mercury exposure, accidental needle prick, eye splash and radiation exposure. The present study was conducted to assess knowledge about awareness of basic protocols amongst faculties and students in Dental Institution of Central Gujarat. This study was conducted to assess the knowledge regarding the universal protocols and the level of awareness of occupational hazards amongst the faculty and students of Dental Institution in Central Gujarat. Methodology: The data was obtained using a self-administered questionnaire categorized in three sections from a total of 213 subjects including faculty, postgraduate students, interns and undergraduate students of Dental Institution in Central Gujarat. Results**:** The present study showed that maximum numbers of undergraduate (48.78%)and post graduate students (62.5%) were working in strained posture while 62.2% of undergraduates were suffering from chronic backache. 67.97% of study subjects were not using any of the radiation protection measures. Majority of the study subjects were lacking in proper mercury and fixer solution disposal protocol. Conclusion: This study shows that although there appears to be a high level of awareness of exposure to occupational hazards, increased awareness must be created about the dangers of chronic mercury poisoning, radiation exposure and the importance of practicing universal protocols and use of proper posture during routine dental practice. [Joshi M et al NJIRM 2015; 6(3):74-79]

**Key Words**: Amalgam, radiation, needle prick, awareness, biomedical waste.

**Author for correspondence:** Dr. Manjiri Joshi, Reader. Dept of Oral Medicine and Radiology. Manubhai Patel Dental College and ORI, Munjmahuda, Vadodara, Gujarat. PIN: 390011. Email: maitri.joshi2@gmail.com

**Introduction:** Occupational Hazard refers to a risk or danger as a consequence of the nature of a job. The history of occupational hazard can be traced back to the 18th century when Bernadino Ramazzini, who is referred to as the Father of Occupational Medicine, recognized the role of occupation in the dynamics of health and diseases.[1] Although modern dentistry has been cited as one of the least hazardous of all the occupations, many risks still challenge the status of this occupation.[2] Studies have shown that dentists report more frequent and worse health problems that other high risk medical professionals.[3] Most of these risks are caused by failure of an individual to adapt to the working environment and establishing appropriate preventive procedures.

Potential sources for occupational hazards to dentists include:

1. Working for long periods of time in physiologically improper positions
2. Percutaneous exposure incidents during close contact with patient's saliva and blood, facilitating the transmission of blood borne pathogens.
3. Exposure to infectious diseases including bio - aerosols, radiation, etc.
4. Exposure to various types of chemicals those are hazardous including mercury, silica, latex etc which act by local action, inhalation or ingestion.

The present study was aimed to assess the knowledge regarding the universal protocols and increase the level of awareness of occupational hazards amongst the faculty and students of Dental Institution in Central Gujarat.

**Material and Methods:** A questionnaire based survey was conducted among a total of 213 subjects including four groups as:

Group1: Faculty, Group 2: Postgraduate students, Group 3: Interns and Group 4: Undergraduate students of Dental Institution in Central Gujarat.

It included questions on awareness about occupational hazards, safety measures practiced, knowledge regarding the disposal of biomedical waste used frequently in the dental profession and the experience of occupational hazards while in practice. Study objectives were explained and a fully informed verbal consent was taken from them. The questions in the survey form were divided into three broad categories for better understanding and the categories are as Physical and ergonomic hazards, Biologic Hazards and Chemical Hazards.

Statistical analysis : Data was stored in MS-Excel spread sheet. Percentage prevalence was obtained from the data for interpretation of results.

**Results:** Results of the study can be categorized into three parts as Physical and ergonomic hazards, Biologic hazards and Chemical hazards.

Physical and ergonomic hazards : In this category of questionnaire, 99.06% subjects out of total study population were aware of using gloves for every new patient, 86.85% were aware of immediate protocols in case of accidental needle pricks. These results were indicative of the awareness of physical injuries and the protocols. Out of total study population 38.5% were working in strained position, 58.69% were not working in strained position and 2.82% did not know about it. In spite of it, 38.5% of total subjects were suffering from chronic backache. Out of these, maximum number of subjects falls in undergraduate group (62.2%). Again this result favours proper training of undergraduates when they start with their clinical postings. Out of total study population, 3.29% were suffering with vertigo, 1.49% with carpal tunnel syndrome and 1.88% were suffering from cervical spondylitis which accounts for very less number of subjects as compared to chronic backache.

Biologic Hazards : Out of total study subjects, 85.37% were using protective eye wear while performing on a patient. 94.84% of the subjects were aware of treating patients with communicable diseases. But 61.97% subjects in study population were not using lead aprons and TLD badges in routine practice suggesting lack of awareness of radiation hazards.

Chemical Hazards : Out of total study population, 63.85% subjects were using dust free alginate which indicates awareness of respiratory disorders arising from alginate. 92.49% were aware of proper channel of biomedical waste disposal, 36.62% subjects were disposing mercury waste into dustbin, 28.88% were not aware of proper disposal, 2.82% were disposing mercury waste in wash basins and only 35.68% were aware of proper mercury disposal waste and disposed it in fixer solution. 21.6% of study subjects disposed off x-ray solution into drain, 45.07% were not aware of proper disposal and only 33.33% were aware of offsite and onsite treatment and disposal of fixer solution. These results states that although study subjects were aware of biomedical waste disposal, they were lacking knowledge about disposal of chemical waste like mercury and fixer solution.

**Discussion:** Physical and ergonomic hazards: One of the most common types of physical injury includes Percutaneous Exposure Incidents (PEI) which includes needle stick and other sharp injuries as well as cutaneous exposure to blood and serum following glove tear etc. From the results, it is very clear that a majority of the subjects chose to wear gloves while treating patients (99.06%) and most of them were also sure about the measures to be undertaken in the case of accidental needle prick (86.85%). A previous study carried out among the dental surgeons of Indian navy revealed that almost 80% respondents always wore gloves for every new patient, [4] which was in accordance with the present study. Needle stick injuries and cuts from sharp objects and instruments (percutaneous injuries) have been reported in 1-15% of surgical procedures, mostly associated with suturing.[5] Any accident should be treated equally, regardless of the characteristics of the patient or the accident site. A careful evaluation is necessary to determine the need for post-exposure chemoprophylaxis.[6]

Besides this, the posture of the dentist while at work with the bent back and twisted neck, abducted arm and repetitive movements of the hand causes stress on the spine and limbs. It ultimately affects the musculoskeletal system which manifests as pain within the shoulder and the upper extremities.[7] This can be categorized as ergonomic hazards affecting the dentists. In the present study 58.69% of the total subjects

reported that they used to work in a strained position for a very long period of time with the highest number of subjects being from the undergraduate category. This can be attributed to the inadequate knowledge among the dental students regarding maintenance of proper posture while at work. In the present study 38.5% of total subjects were suffering from chronic backache. Out of these maximum of 62.2% were undergraduate students. Low-back discomfort has been associated with dental work in numerous studies like in a Greek study 46% prevalence, [8] and in an Australian study as much as 53.7 %.[9,10] These results were in accordance with the result of our studies. Good posture correlated negatively with back pain and dentists who sat 80 percent to 100 percent of the day reported more frequent lower-back pain, than those that do not sit as often.[11] Four-handed dentistry is ergonomically the most favourable way to provide dental services since it minimizes undesirable movements of the operating team and expedites the progress of most dental procedures.[12] Available research supports the idea that ergonomic hazards can be managed or alleviated effectively using a multifaceted approach that includes preventive education, postural and positioning strategies, proper selection and use of ergonomic equipment and frequent breaks with stretching and postural strengthening techniques. This represents a paradigm shift for daily dental practice.[13]

Biologic Hazards: The biologic hazards are constituted by infectious agents of human origin and include bacteria, virus and fungi. Transmissible diseases currently of greatest concern to the dentist include HIV, HBV, HCV and Mycobacterium Tuberculosis. A dentist can become infected either directly or indirectly i.e. by PEI through a cut or wound, needle stick injury as discussed before or by aerosol splatters and organic dust particles. Our results showed that most of the subjects used eye wears during their routine dental treatment (85.37%) as well as were also aware of the protocols to be followed while diagnosing and treating the patients with communicable studies (94.84%). This result differed from the result of a study carried out in Lithuania in 2007 according to which the dentist's knowledge regarding infectious diseases that can be acquired or transmitted in the dental surgery and the vaccinations recommended are quite poor: only 44.1 and 32.4 percent correctly indicated all infections that can be acquired or transmitted during their activity.[14] In a study done by Watt, HIV was believed to be very similar to eye injury and mercurial poisoning in terms of rate of concern amongst dental personnel team and they are at risk of exposure to Hepatitis B virus (HBV), HIV infection, and other types of communicable infections.[15] Since it is now known that the persons carrying the blood-borne pathogens may not have been identified in all the conditions, it follows that the procedures routinely adopted for all the patients must be adequate to prevent cross infection.[16] Dental personnel are exposed to both the ionizing and non-ionizing types of radiation. Ionizing radiation is a well established risk factor for cancer.[17] The results of the study showed that only a very meagre amount of the total population reported the use of Lead aprons and TLD Badges for monitoring the radiation exposure. A study conducted among the Canadian dentists reported that occupational doses of ionizing radiations have markedly decreased since 1950s.[18] Direct radiation injury has been virtually eliminated by improvements in radiologic equipment and methods and radioprotection measures.[19] However, the potential effects of whole body radiation remains a concern with the secondary radiation scattered from the bones of the patient's head now representing the greatest source of radiation received by the dentist.[20, 21] Radiographs are an integral part of the clinical assessment. As such it is important that good radiation practice be employed to protect the patient as well as the dental staff. Dental staff should take steps to protect themselves during the exposure by standing behind the protective barriers, use of monitoring badges and regular equipment checks.[22] Our study showed that 62.97% of total subjects were not using lead apron and TLD badges seeking an attention towards awareness of ionizing radiation.

Chemical Hazards: Dentists are exposed to various types of chemicals that are hazardous in their routine dental practice. These include the agents like mercury, silica, beryllium and powdered natural rubber. These chemicals act by local action, inhalation and ingestion.

**Table 1: Physical and ergonomic hazards**

| GROUPS | TOTAL NO | Q.1 Use of gloves for every new patient | | Q.2 Awareness of protocols in case of an accidental needle prick | | Q.3 Do you work in a strained position for a long period | | | Q.4 Do you suffer from any of the following due to your posture | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | YES | NO | YES | NO | YES | NO | DON'T KNOW | CHRONIC BACKACHE | CERVICAL SPONDYLITIS | CARPEL TUNNEL SYNDROME | VERTIGO | NONE OF THE ABOVE |
| Group 1 | 29 | 28 (96.55) | 1 (3.45) | 23 (79.31) | 6 (20.69) | 5 (17.24) | 23 (79.31) | 1 (3.45) | 5 (17.24) | 1 (3.45) | 1 (3.45) | 1 (3.45) | 21 (72.41) |
| Group 2 | 16 | 16 (100) | 0 (0) | 15 (93.75) | 1 (6.25) | 10 (62.5) | 6 (37.5) | 0 (0) | 2 (12.5) | 0 (0) | 1 (6.25) | 0 (0) | 13 81.25) |
| Group 3 | 86 | 85 (98.84) | 1 (1.16) | 77 (89.53) | 9 (10.47) | 27 (31.4) | 55 (63.95) | 4 (4.65) | 24 (27.91) | 1 (1.16) | 1 (1.16) | 3 (3.49) | 57 (66.28) |
| Group 4 | 82 | 82 (100) | 0 (0) | 70 (85.37) | 12 (14.63) | 40 (48.78) | 41 (50) | 1 (1.22) | 51 (62.2) | 2 (2.44) | 0 (0) | 3 (3.66) | 26 (31.7) |
| TOTAL | 213 | 211 (99.06) | 2 (0.94) | 185 (86.85) | 28 (13.15) | 82 (38.5) | 125 (58.69) | 6 (2.82) | 82 (38.5) | 4 (1.88) | 3 (1.4) | 7 (3.29) | 117 (54.93) |

**Table 2: Biologic hazards**

| GROUPS | TOTAL NUMBER | Q.5 Do you use protective eyewear while working on a patient | | Q.6 Protocols while treating & treating patient with communicable disease | | Q.7 Do you use a lead apron for operator and patient | | Q.8 Do you use a TLD badge to monitor radiation exposure | |
|---|---|---|---|---|---|---|---|---|---|
| | | YES | NO | YES | NO | YES | NO | YES | NO |
| Group 1 | 29 | 16 (55.17) | 13 (44.83) | 29 (100) | 0 (0) | 12 (41.38) | 17 (58.62) | 8 (27.59) | 21 (72.41) |
| Group 2 | 16 | 4 (25) | 12 (75) | 15 (93.75) | 1 (6.25) | 4 (26) | 12 (75) | 4 (25) | 12 (75) |
| Group 3 | 86 | 77 (89.53) | 9 (10.47) | 84 (97.67) | 2 (2.33) | 22 (25.58) | 64 (74.42) | 27 (31.4) | 59 (68.6) |
| Group 4 | 82 | 81 (98.78) | 1 (1.22) | 74 (90.24) | 8 (9.76) | 43 (52.44) | 39 (47.56) | 42 (51.22) | 40 (48.78) |
| TOTAL | 213 | 178(85.37) | 25 (16.43) | 202 (94.84) | 11 (5.16) | 81 (38.03) | 132 (61.97) | 81 (38.03) | 132 (61.97) |

**Table 3: Chemical Hazards**

| Groups | Total number | Q.9 Do you use dust – free alginate | | Q.10 Awareness of protocols of disposing Medical/Dental waste | | Q.11 How do you dispose mercury waste | | | | Q.12 How do you dispose off used x-ray fixer solution | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Yes | No | Yes | No | Fixer Solution | Dustbin | Wash basin | None of the above | Flush in the drain | Taken off the site for treatment and disposed | Use a silver recovery system on site | None of The Above |
| Group 1 | 29 | 17 (58.62) | 12 (41.38) | 27 (93.1) | 2 (6.9) | 13 (44.83) | 6 (43.75) | 2 (6.89) | 8 (27.59) | 8 (27.59) | 4 (13.79) | 4 (13.79) | 13 (44.83) |
| Group 2 | 16 | 14 (87.5) | 2 (12.5) | 14 (87.5) | 2 (12.5) | 7 (43.75) | 4 (25) | 0 (0) | 5 (31.25) | 2 (12.5) | 7 (43.75) | 0 (0) | 7 (43.75) |
| Group 3 | 86 | 48 (55.81) | 38 (44.19) | 83 (96.51) | 3 (3.49) | 53 (61.63) | 18 (20.93) | 1 (1.16) | 14 (16.28) | 16 (18.6) | 16 (18.6) | 10 (11.63) | 44 (51.17) |
| Group 4 | 82 | 57 (69.51) | 25 (30.49) | 73 (89.02) | 9 (10.98) | 3 (3.66) | 50 60.98) | 3 (3.66) | 26 (31.7) | 20 (24.4) | 26 (31.7) | 4 (4.88) | 32 (39.02) |
| TOTAL | 213 | 136 (63.85) | 77 (36.15) | 197 (92.49) | 16 (7.51) | 76 (35.68) | 78 (36.62) | 6 (2.82) | 53 (24.88) | 46 (21.6) | 53 ( 24.88) | 18 (8.45) | 96 (45.07) |

(For all the three tables: Values in parenthesis are in percentage, Group 1- faculties, Group 2- postgraduates, Group 3- Interns, Group 4- Undergraduates)

Inhalation of dust containing free silica or silicon dioxide can lead to silicosis. It has been widely seen that most of the dentist are allergic to the latex content of the gloves. Most dangerous of these agents is mercury.[23] The dangers of chronic exposure to mercury are well documented.[24] The greatest exposure to mercury comes from the inhalation of the mercury vapours which represent an important source of exposure.[25] The maximum level of exposure to be considered safe is 50 microgram/cc of air.[26, 27] The active component in mercurial vapour has a particular affinity for the brain tissue.[4] It has been proved that high mercury vapour high dose exposure can lead to biological and neurological insults.[28] Our study showed that the subjects lacked proper knowledge regarding the disposal of mercury waste and fixer solution (68.32% and 45.07% respectively), whereas the subjects in a recent study in India showed that the subjects followed good mercury hygiene. At the same time, another study stated that while concerns regarding its systemic toxicity have reduced with decreasing urinary mercury levels detected in dentists over recent years, continuing attention to mercury hygiene, particularly amalgam storage, handling and disposal is essential. It was advised that excess material be stored within radiographic fixer solution in a closed container.[29] Sealed amalgam capsules use with lower mercury level, water irrigation and high suction, good ventilation and proper collection, and discarding of amalgam have substantially diminished the mercury dangers.[30]

Similarly, used X-ray fixer is a hazardous waste because of its high silver content (the regulatory level is 5 mg/l silver), used fixer typically contains 3,000 to 8,000 mg/l of silver). As such, it cannot be severed or disposed of as common solid waste. There are three common ways of dealing with used fixer:

1. Dispose of it off-site as a hazardous waste,
2. Pay someone that operates a silver recovery unit to take your fixer, or
3. Use a silver recovery unit on-site.

**Conclusion:** As this study shows, many occupational health problems remain in modern dentistry. Although there appears to be a high level of awareness of exposure to occupational hazards, the practical steps to prevent them need to be reinforced. First of all, students must be aware of the health risks in dentist's job, especially when talking about musculoskeletal disorders it might be assumed that knowledge in ergonomics may be of some use. Maintenance of proper posture by the clinician during routine dental practice must be stressed upon. Secondly, all sorts of protection must be used during treatment in order to prevent infectious diseases and other injuries. Increased awareness must be created about the dangers of chronic mercury poisoning, radiation exposure, etc. Thus, sufficient knowledge and adequate information regarding occupational hazards and its prevention will contribute in providing quality care to patients without any doubt.

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