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Assessment of knowledge, attitude and practices of teaching staff regarding occupational hazards and safety measures among MDS teaching staffs of dental colleges in India

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Abstract---Background: The teaching institution acts as a major place for gaining knowledge with respect to such hazards and incorporation of prevention is the only cure is the onus of the trainers. Hence the current study was carried out with the aim of understanding the extent of knowledge of teaching staff related to occupational hazards and also the institutional environmental facilities that are conducive to the routine of safety and standards for the same accord. Materials and methods: An online survey was conducted among teaching dental staff members across India. A total of 223 participated in the survey.

The data was analyzed using Epi info software (CDC, USA) and Chi square test was performed for inferential statistics. Results: There was lesser proportion of participants who reported in affirmative regarding the questions asked to them. All the three aspects of the study-knowledge, attitude and practices were significantly lower among the staff; most answers were incorrect than the standard expected answers. Conclusion: There is less knowledge with regards to the latest and standard norms among many dental practitioners which can be a challenge when it comes to teaching the upcoming generation. There is an urgent need to change the practice norms and also upgrade information with safety rules.

Keywords---assessment knowledge, attitude, practices, occupational hazards, safety measures.

Introduction

The father of Occupational medicine is Bernadino Ramazzinni. wrote in his book titled, "De Morbis Artificum Diatribe" (1713) regarding his observations of systemically studied occupational diseases. He highlighted that there are 3 major principals related to occupational hazards-

1. Fixed working posture
2. A continuous repetitive motion
3. Psychological stress

Thus he inadvertently established the role play of occupation in the concepts of health and diseases. ¹ Occupational hazards concerns with the result of either nature or the working conditions of a specific job. Dentists carry out a number of procedures ranging from extraction of teeth to scaling and root planning, which results in the manifestation of ailments which is profession specific and end up with innumerable complexities.¹ Dentistry as a specialty comes with a Midas touch of varied work related hazards like- tedious concentration and prolonged working hours, sedentary workstyle, anxiety, microbial aerosol exposure, chemical exposures in the clinic and laboratory, burn- out phenomenon, musculoskeletal disorders and many others. ^{1,2} The hazards in dental practice can be classified into 5 major categories as follows- ^{2, 3}

Serial number	Hazard nature	Effect example
1.	Physical	Noise from dental equipment's can render a person deaf, Percutaneous exposures can lead to transmission of deadly diseases, lack of illumination can lead to slow blindness, radiation exposure can have long lasting effects
2.	Chemical	Chemical injury may happen via amalgam mercury, barium, gloves, formaldehyde, hypochlorite, fixer and developer solutions in the radiology sections.
3.	Biological	Sharps like surgical blade, needles and burs can transmit HIV, Hepatitis B, TB apart from other array of microorganisms.

		Aerosols from the scaling or surgical procedures are potentially infectious up to 48 hours.
4.	Musculoskeletal	Fatigue, back pain, sciatica, tendon inflammation and curvature to the back are common complaints.
5.	Psychological	Stress and professional burn outs are much prevalent

It is expected that a clinician upgrades his/her knowledge with regards to universal precautions and the set- up of the clinic is along the lines of sufficient lightening, ventilation, engineering tactics and well-armed with appropriate measures^{1,2,4} for not just a good service to the patients but also a safe service environment for both the dentist as well as the patients. This starts as a routine training and grilling at the undergraduate level itself. Unlike other specialties, the dental training involves 5 year tenure in India, wherein the II BDS is dedicated to learning pre-clinical skills wherein a student imitates the dental procedures and skills on extracted teeth as well as on phantom heads to get a gist of the expected competency levels. As soon as a student enters the III BDS level, they are weary of the fact that they are considered to be a part of the manpower system providing assistance as well as treatment under direct observations to the patients reporting to the clinics from time to time. An array of ignorance can bounce back during the actual real world scenario of the student if the norms of sterilization and universal precautions are missed. Also since the profession is skill based, a lack of theoretical knowledge can set the quality assurance of the services back by many folds. Even though the topic of occupational hazard is taught as a small topic, not many are sensitized to the same in their 5 years tenure leading to a bizarre picture of adulterated practices. The student learns as much as the teacher teaches and insists. Unfortunately if the student has no exposure in the clinical postings to handling special cases and its aftermath; the anticipated aspect of “will know it” or “will gather data from the internet” sets precedence to actual learning. As the system becomes more demanding with every passing day and time spared is less, the idea of building competency to turn a student as a life- long learner for the sake of seeking more right information for a better clinical practice falls solely on the shoulder of the teachers. Hence it is imperative to unearth the built in knowledge and skills among the staff members so that they set an actual example by practice, which the student eventually models and incorporates it as a part of his/her daily system routine. In order to be a productive professional one must be healthy. High production demands in combination with stressful working conditions will affect health. One thing should keep in mind that every technology, no matter how beneficial, can exert a negative impact on some members of the population. The reality of public health will always involve balancing maximum benefit and minimum harm to the public health and well-being. Immunization against various infectious diseases like HIV, HBV etc. is very essential for every Dental Health Care Worker. Regarding ergonomics, it is very essential to maintain an adequate work posture and that the instruments and furniture that the dentist is working with, have adequate working characteristics to prevent MSDs from developing. Dentists should control their working hours, pace of work, be aware of occupational hazards and observe their mental health. Strategies for improving mental health and reducing the effects of occupational hazards should be developed and implemented in order to secure the well- being of dentists. Serious infectious due to percutaneous

exposure incidents (PEI) can be avoided by use of appropriate barrier techniques and high level sterilization. Dental personnel should be familiar with the major signs and symptoms of allergic reactions, including anaphylaxis in the case that an allergic emergency should arise during a consultation. Various continuing dental education programs should be organized so that dental professionals can gain knowledge about various newer methods and developments.^{3,5-9} Literature reports of all forms of dental hazards experienced by the practitioner throughout the career.^{3-5,9-11} The teaching institution acts as a major place for gaining knowledge with respect to such hazards and incorporation of prevention is the only cure is the onus of the trainers. Hence the current study was carried out with the aim of understanding the extent of knowledge of teaching staff related to occupational hazards and also the institutional environmental facilities that are conducive to the routine of safety and standards for the same accord.

Aim

To determine the knowledge, attitude and practices related to occupational hazards in dental practices among teachers in the dental institutions across India and to assess the safety measures provided by the organization to reduce the same.

Methodology

Ethical clearance was obtained from MCE Society, Pune before the start of the study. An online pre tested questionnaire was sent across different dental colleges to all the staff members to participate in the study. The study was cross sectional in nature. A total of 250 members were approached for the study of which 223 gave completely filled in questionnaires which were included in the final analysis. The questionnaire comprised of 3 parts- Knowledge, attitude and practices according to the standard norms of occupational safety and health hazards. The questions were pre tested and validated on 50 staff members before the final study. The study was completed from December 2020 to March 2021.

Results

The questionnaire was given to 250 teachers of which 223 complete forms were received back across the 4 dental teaching colleges in the city. Of the 223 teachers; 200 (89.7%) were MDS degree holders while 23 (10.3%) were BDS. There were 132 (59.2%) females and 91 (40.8%) males who participated in the study. There was lesser proportion of participants who reported in affirmative regarding the questions asked to them (Table 01).

Serial number	Questions	Correct		Incorrect		Chi square	P value
		N	%	N	%		
1.	Can you name any one law pertaining to occupational health hazard in India?	20	9.0	203	91	300	0.005*
2.	How many articles are enshrined in the constitution for workplace protection in India	00	0.0	223	100	-----	-----

3.	Can you name any one area covered by the Indian Association of Occupational Health (IAOH)	00	0.0	223	100	-----	-----
4.	Have you achieved any training related to occupational health safety	24	10.8	199	89.2	23.4	0.006*
5.	Have you been briefed about your rights as an employee in relation to the organization and occupation related or work related hazards	00	0.0	223	100	-----	-----
6.	Can you name at-least 2 places where you can obtain information related to occupational safety and health hazards in India	00	0.0	223	100	-----	-----
7.	How many Occupational Safety and Health Administration (OSHA) standards are applicable to dental hospital set up	54	24.2	169	75.8	45.67	0.0001*
8.	Can you name the Dental Council of India (DCI) law or declaration regarding Occupational Safety for dentists	00	0.0	223	100	-----	-----
9.	How many categories can one classify occupational health hazard in dental set up and what are they	168	75.3	55	24.7	54.3	0.000*
10.	Can you enlist any 4 early signs of any hazard related to dental practice	223	100	00	0.0	-----	-----
11.	Have you educated your non-teaching staff (clerks,attenders and back office) about their rights and safety	00	0.0	223	100	-----	-----

Table 01: Distribution of the study participants based upon the answers provided to the knowledge based questions as against the standard expected answer(s).

Serial number	Questions	Correct		Incorrect		Chi square	P value
		N	%	N	%		
1.	Have you ever participated or organized workshops related to Ergonomics	10	4.5	21	95.5	300	0.0001*
2.	Have you ever participated or organized workshops related to radiation protection norms and safe disposal of chemicals used in x ray processing	23	10.3	20	89.7	304.56	0.0001*
3.	Do you take regular breaks from dental work for rejuvenation or reconciliation	22	100	00	0.0	-----	-----
4.	Have you maintained any record of musculoskeletal related disorders (including simple neck stiffness or back ache) that you have faced since you started your practice	00	0.0	22	100	-----	-----

5.	Should there be a policy for getting students and staffs vaccinated with HB and tetanus before they start working	22 3	100	00	0.0	-----	-----
6.	Do you have any permission/ policy for breaks in between for workers through the day during the college hours	22 3	100	00	0.0	-----	-----
7.	Name any 4 practices that you practice to avoid musculoskeletal issues in day to day practice	22 3	100	00	0.0	-----	-----

Table 02: Distribution of the study population based upon the answers to attitude based questions as against the standard expected answer(s)

Serial number	Questions	Correct		Incorrect		Chi square	P value
		N	%	N	%		
1.	Name any 4 practices that you practice to avoid musculoskeletal issues in day to day practice	22 3	100	00	0.0	-----	-----
2.	What is the ideal position of the operator while shooting an IOPA	15 6	70. 0	67	30. 0	25.9	0.000*
3.	Do you feel that it is tedious to use lead shields and thyroid collars every time while shooting an X ray and hence avoid it sometimes	20 0	89. 7	23	10. 3	300	0.005*
4.	Do you undergo fire safety drills regularly in the department	00	0.0	22 3	100	-----	-----
5.	Do you feel that it is tedious to use eye protector or loops while performing procedures on patients	17 3	77. 6	50	22. 4	57.68	0.0001*
6.	Have you trained the non-teaching staffs in the past 1 year to 3 months regarding infection control and possible health hazards	00	0.0	22 3	100	-----	-----
7.	Do you have air purifiers in closed chambers in the department to avoid aerosol infections	00	0.0	22 3	100	-----	-----
8.	Do you have a system to frequently take samples for microbiological testing from different places in department for evaluating infection presence	00	0.0	22 3	100	-----	-----
9.	Are the waste carriers labelled and marked for biohazards	22 3	100	00	0.0	-----	-----
10.	Is there a system in place to overcome methacrylate aerosol in the department	00	0.0	22 3	100	-----	-----
11.	Do all the department staff get a physical fitness certificate annually	00	0.0	22 3	100	-----	-----
12.	Do you use diagnostic gloves for	22	100	00	0.0	-----	-----

	carrying out procedures in your department	3					
13.	Is there a system for vaccination in the department for all working staff members	22 3	100	00	0.0	-----	-----
14.	Do you have a procedure for incident reporting- spillage, needle stick injury	00	0.0	22 3	100	-----	-----
15.	What chemicals are used to clean the pipes related to water and suction tubing	13 4	60. 1	89	39. 9	23.9	0.005*

Table 03: Distribution of the study population based upon the answers to practice based questions as against standard expected answers

The observations related to the institutions overall was found (Table 04).

Serial number	Observation (status quo)
1.	No policy of incident reporting
2.	No fire drills
3.	No training of non- teaching staff
4.	No fumigation and deep cleaning of the central storage rooms
5.	No Use of plastic drapes for OPD patients
6.	Scrubs worn at places outside the treatment areas like canteen and in public transportation
7.	No separate signboards explaining the law governing the occupational safety in India
8.	No policy for ill treatment or any psychological harassment for staffs
9.	No display of harassment/ flow chart displaying complaint registration or training or documents to the staff, especially the non- teaching staffs for their rights and duties
10.	No provision for annual health check-ups, especially related to bone, since musculoskeletal issues are common in dentistry
11.	For simple extraction, diagnostic gloves were used across the clinic as well as peripheral centers and the camp sites as well, with an increased risk- due to the porosity of the gloves as well as needle stick cases and injury due to burs and sharp probes at a high risk

Table 04: Lacunae in terms of organizational structure and function at the different institutions as reported by the staffs.

Table 05 shows the department wise lacunae prevalent across the institutions with regards to occupational health hazards which the staffs commonly have encountered in teaching practices and training of the students.

Serial number	Name of the department	Lacunae observed
1.	Prosthodontics	1. No knowledge regarding disposing the dental casts

		<ol style="list-style-type: none"> 2. No chemical treatment of impression materials after making impressions and before pouring 3. No air purifiers especially in Implant sections to prevent aerosols 4. No specific policy for asthma or any other form of respiratory disorders.
2.	Orthodontics	<ol style="list-style-type: none"> 1. No sterilization of the wires and brackets used in patients 2. No head caps used during treatment
3.	Oral Medicine	<ol style="list-style-type: none"> 1. No gloves used while initial assessment of all patients 2. No special storage and dispensing for biopsy specimens 3. Drained the developer and fixer into the sewage directly
4.	Periodontology	<ol style="list-style-type: none"> 1. No chemical treatment of impression materials after making impressions and before pouring 2. No air purifiers especially in Implant sections to prevent aerosols 3. No scrubs for periodontal surgery 4. No laser used for all patients, only certain cases. Laser has been recommendation for low occupational hazard
5.	Oral Surgery	<ol style="list-style-type: none"> 1. Diagnostic gloves for extraction 2. No fumigation of the department and minor OT at regular intervals 3. Extracted teeth stored in disposable plastic glasses and thrown Off. Not treatment before dispensing
6.	Oral Radiology	<ol style="list-style-type: none"> 1. No signage of x ray hazards at any place 2. No special training of staffs with regards to the same 3. No knowledge or system in place for the disposal of the X-rayfilms. Not shredded. Directly thrown in the bin
7.	Oral pathology	<ol style="list-style-type: none"> 1. No protocol for biopsy specimen disposal 2. Diagnostic gloves used for venipuncture and other procedures 3. No documented policy for changing formalin for models displayed in the departments 4. Formalin and chemicals/ dyes are thrown into the drain directly

Discussion

Most of the injuries reported by dentists are usually of musculoskeletal in nature.¹² The stiffness of neck and bending of posture to enhance work efficacy can result into a lot of potential permanent risk changes.¹³ With multiple

treatment options, different chemicals being used and also constant contact with blood and oral tissues; the dental staff is always at a greater risk of nosocomial infections.¹⁴ According to a study; needle stick injury itself is contributing to as high as 15% of all the surgical procedures related injuries.¹⁵ The aerosols and other particulate matter cause eye injuries and are a proven source of respiratory tract infections among health care workers; owing to the aerosols in the dental clinics.^{17, 18} The study is the first of its kind to look at the overall perspective of the teaching institutes from the quality improvement and assessment criteria. In a set up like India, with increasing costs of dental treatments and the intervention nature, it may be both time consuming and ostentatiously costly and luxurious for the operator as well as the patient. And since this is not been into practice, the major lack in such organizational management has been prevalent and dovetail with ignorance in teaching and passing on the buck to the next set of dental practitioners. The fairly large amount of unprecedented fortunate stroke of serendipity has helped escape any major damage with long lasting effects in most of the places. Even though cases of needle stick injury, bur injury, and saliva or blood splash may be there, there has been no recording or protocol existing for the same to be reported and documented. While the focus has been grossly on sending the patient back after a quick treatment that's sought, the parameter of potential hazards or its impact has taken a back foot. The exact prevalence of any of the known occupational hazard is also missing across India, unlike the west. The obsolete picture presented by the current study urges for an alarmistic approach towards an important and neglected parameter for improvement of safety and work productivity in a healthy environment.

Limitations

The study cannot be extrapolated across major teaching dental institutions in India. Also the same may not hold true with corporate hospitals with a dental unit that have already procured ratings and maintaining standards for continual efforts.

Conclusion

1. There is a need for more and immediate actions like awareness programs, policy development and implementation and quality assurance with respect to occupational hazards.
2. Specific department tailored training and monitoring is the need of the hour.
3. National data on incident reporting is essential to serve as a baseline for postintervention comparison.
4. The role of Dental Council of India is greater from the administrative and regulatory point of view in order to ensure more effective participation.

Conflict of Interest- None

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