

OCCUPATIONAL HAZARDS IN DENTISTRY –Review

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Dentistry is considered by the practitioners and most of the public as being extremely hazardous.They are predisposed to a number of occupational hazards. These include exposure to infections,percutaneous exposure incidents, dental materials, radiation, and

noise, musculoskeletal disorders, psychological problems and dermatitis, respiratory disorder, and eye insults.

It is essential for the dentist to recognise these risk factors and protect against them. Among the various organs that are vulnerable in the dental situation are- The eyes, the ears, the respiratory system, the palm of the hand, and the back and the vertebrae. In addition, the dentist and the dental team must recognise the potential for Hepatitis (A, B, C, D, E), and for the acquired immune deficiency syndrome due to the HIV virus.

Infection :

Needles and other sharp objects, spatter, and aerosols can transmit viral infections such as life-threatening infections such as acquired immunodeficiency. The leading causes that should be concerned are syphilis and tuberculosis.[1]

Dental practitioners as other healthcare workers confront a identified risk of occupational exposure to blood-borne pathogens like the Human Immunodeficiency Virus (HIV), the hepatitis B virus (HBV), and the hepatitis C virus.[2]

Musculoskeletal:

During dentistry procedure, the dentist's posture is strained which induce stress injury on musculoskeletal system. This occurs in 37.7% of work time. Hand or wrist complaints among dentists and especially dental hygienists are highly prevalent. Hand or wrist complaints follow low back disorders.[3] Musculoskeletal pain may be induced by mechanical vibrations affecting the organism through the upper limbs and causing changes in the vascular, neural, and osteoarticular systems. These changes may produce an occupational disease called vibration syndrome.

Latex :

The aetiology of latex sensitivity is based on a reaction to the plant containing allergenic proteins in natural rubber. Referred to as Type I allergy to natural rubber latex protein, allergic reactions can be severe sometimes fatal.[4]

Radiation:

Dental personnel are exposed to both ionising and non ionising type of radiations. Ionising radiation is a well established risk factor for cancer. However, despite the fact that most dental offices and clinics have x-ray machines that are in frequent use the exposure of dental workers to ionising radiation and the associated potential cancer risk have been assessed in only a few studies.[5] Dental staff should stand behind protective barriers and also use radiation monitoring badges to protect themselves.

Non-Ionising radiation has become an important concern with the use of blue light and ultra-violet light to cure various dental materials. Exposure to the radiations emitted by these can cause damage to the various structures of the eye including the retina and the cornea. Use of safety glasses and appropriate shields can minimise or eliminate the radiations in this regard. [5] A study conducted among Canadian dentists reported that occupational doses of ionising radiation among dentists and dental workers have decreased markedly since the 1950s.

Auditory effect:

Hearing threshold reduces with frequencies of sound and dentist experience it gradually due to high speed dental air turbines frequency that reduces hearing capacity.

Dental machines like ultrasonics, amalgamator, scalers, high speed evacuation produce sounds at different frequencies.

The Biological Hazards:

The biological hazards are constituted by infectious agents of human origin and include viruses, bacteria and fungi. Transmissible diseases currently of greatest concern to the dental professional are HIV, HBV, HCV and Mycobacterium tuberculosis. A dentist can become infected either directly or indirectly, needle stick injury, aerosols of saliva. They are the main entry points of infection epidermis of hands, oral epithelium, nasal epithelium, epithelium of upper airways, bronchial tubes, alveoli and conjunctival epithelium. During many dental procedures, the use of a rubber dam will eliminate virtually all contamination arising from saliva or blood. [6]

The risk of HIV transmissions to healthcare workers approximately range from 0.2 to 0.3% for parenteral exposures and 0.1% or less for mucosal exposures. Despite reducing the risk for HBV transmission among healthcare workers by effective HBV vaccination programs, measuring of anti-HBs antibody response after HBV vaccination is essential for all vaccinated individuals with high-risk professionals. HCV transmission risk is 1.8% and is the most serious viral hepatitis infection because of its ability to produce chronic infection in as many as 85% of those infected. [6] The U.S. Public Health Service recommendations for HCV exposures implicate precise follow-up of the exposed practitioners and referral for appropriate therapy if an infection occurs.

Psychological Hazards:

Stress:

Dentists encounter numerous sources of professional stress, beginning in the dental clinic. Stress can be defined as the biological reaction to any adverse stimulus physical, mental or emotional that tends to disturb the organism's homeostasis. Dentists perceive dentistry as being more stressful than other occupations. Coping with difficult or uncooperative patients, over workload, constant drive for technical perfection, underuse

of skills, low self-esteem and challenging environment are important factors contributing to stress among dentist.

Source of stress:

Sources of Stress Many clinical situations produce stress to a dentist and these include, among others, procedures connected with anaesthetization of patients, overcoming of pain and fear, unanticipated emergency situations in which a patient's life is in danger, or procedures with hesitant prognosis. According to a study administration of anaesthesia to patient is seldom discussed and it forms a major source of stress in this profession. Unskillful planning of a treatment may be source of disappointment and pain associated with failure both to a doctor and a patient. [7] In many dentists an inseparable presence of stress situations may elicit painful thoughts, emotions or fears. It may also contribute to the development of such instantaneous reactions as increased tension, high blood pressure, fatigue, sleeplessness, touchiness and depression

Anxiety and Depression:

In panic disorder, feelings of extreme fear and dread strike unexpectedly and repeatedly for no apparent reason They are accompanied by intense physical symptoms like feeling sweaty, weak, faint, dizzy, flushed or chilled; having nausea, chest pain, smothering sensations, or a tingly or numb feeling in the hands.[8]

Major depression is an illness that involves the body, mood and thoughts. It affects the way people eat, sleep, feel about themselves and think about things.

Asthma Due to Acrylate Compounds:

Allergic respiratory problem due to dental materials is also an important occupational hazard. A previous study reported occupational asthma, conjunctival symptoms and allergic contact dermatitis among dental technicians exposed to acrylate compounds.[8] Another study was conducted on occupational asthma among dental technicians by determining time-weighted average and peak concentrations of methacrylate vapor and time-weighted average concentration of acrylic dust. It suggested that the use of a local exhaust ventilation system significantly reduced the peak concentration of methyl methacrylate vapor in the breathing zone of dental technicians. However, the local exhaust ventilation was not efficient in reducing the concentration of airborne acrylic dusts.

Hazard Due to Nitrous Oxide Gas

The National Institute for Occupational Safety and Health (NIOSH) in 1994 issued a warning to hundreds of thousands of medical, dental and professionals who work with nitrous oxide (N₂O). The Institute warns that even with preventive measures such as scavenging systems in place these workers may be at risk for serious health effects due

to their exposure . [9]N₂O commonly called as laughing gas, is an anesthetic agent used in operating rooms. Workers are exposed to N₂O while administering the anesthetic gas to patients. To protect workers from the health risks associated with N₂O, operating rooms are often equipped with scavenging systems that vent unused and exhaled gas away from the work area. Recent research shows that these systems can significantly reduce the risk of impaired fertility among female dental assistants exposed to N₂O.[10] Several human studies have shown that occupational exposure to N₂O, may cause reduced fertility, spontaneous abortions, and neurologic, renal, and liver disease as well as documented decreases in mental performance, audiovisual ability, and mental dexterity in susceptible individuals.

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