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EVALUATION OF DENTAL TECHNICIANS AWARENESS OF HEALTH AND SAFETY RULE IN DENTAL LABORATORIES AT SOME CITIES IN LIBYA

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ABSTRACT
A variety of materials are used in dental laboratories for manufacturing crowns and bridges, chromium-cobalt frameworks, acrylic dentures, and other dental products. The use of these materials has caused respiratory diseases, dermatological problems and neurotoxicity between dental technicians. Adequate and efficient protection should be considered to prevent occupationally related diseases. This study was conducted in some cites at different parts of Libya to know how are the dental technicians awareness about laboratory safety. This study was included of eighty seven technicians that are working in public and private dental laboratories (11 and 26 laboratories respectively) in the following cities; Tripoli, Benghazi, Sabha, Misurata, Zliten, Alkhoms, Alzawia, Alejelat, Agdabia, Al-Bida, and El-Gubba. The questions were about type of laboratory, cleanness, working area, crowded, quality of air freshen, lighting, suction of dust, protection of gas tubes and electric cable, present of lab safety tools and uses of personal protection tools. The results showed that whose agree with the cleanness were 83.9% where 16.1% disagree, while the opinion of technicians whose agree with working area, crowded, quality of air freshen, lighting, protection of gas tubes and electric cable were 82.8, 42.5%, 69%, 72.4%, 89.7% and 79.3% respectively. While the percentage of disagree were 17.2%, 57.5%, 31%, 27.6%, 10.3% and 20.7% respectively. The laboratories safety tools (air suction, fire extinguisher, first aid box and emergency phone number) were present in the laboratories in percentage of 51.4%, 32.4 %, 37.8% and 27% respectively. While correspondingly not present in the percentage of 48.6%, 67.6%, 62.2% and 73%. Whereas the technicians used personal protection tools (Eyeglasses, rubber gloves, thermal isolated gloves, lab coat, face mask and earplug) their percentages were 55.2%, 63.2%, 24.1%, 86.2%, 83.9 and 6.9%). While whose not used the personal tools their percentage were 44.8%, 36.8, 75.9% 13.8% 16.1% and 93.1 respectively. It can be seen that, the technicians were awareness about personal safety, however they were less care about laboratories safety tools which are very important for their health and safety. The study strongly recommends the dental technicians to follow the safety rule in their dental laboratories.
Keywords: dental technicians, uses personal and laboratory safety tools

1. INTRODUCTION

A variety of materials are used in dental laboratories for manufacturing of different types of dental prosthesis such as crowns and bridges, chromium-cobalt frameworks, acrylic dentures, and other dental products. The uses of these materials have caused respiratory diseases, dermatological problems and neurotoxicity between dental technicians. Several cases of respiratory disorders have been reported among the members of this profession and epidemiological studies have shown a high prevalence of pneumoconiosis related to duration of exposure (Zadeh & Dufresne, 1998; Hu *et al.,* 2006; Choudat, 1994; Wittczak *et al.,* 2004). Since exposure is not limited to one substance, combined exposure to several contaminants may be responsible for the pneumoconiosis. Exposures to metals, waxes, resins and silica can cause irritation or allergic reactions, affecting either the skin or the respiratory tract. The risks of benign pneumoconiosis induced by hard metals are well documented. A prevalence of 15.4% after 20 or more years of exposure has been reported, whereas the prevalence in the general population is less than 1% (Choël *et al.,* 1999). Malignant pneumoconiosis is caused by dust from crystalline silica, asbestos or beryllium. Silicosis is the most common occupational disease among dental technicians, while for berylliosis the risk is not well documented. Isolated cases of systemic autoimmune diseases have been observed. Silica is known to provoke systemic scleroderma, but its role in prosthetics remains to be established (Nayebzadeh *et al.,* 1999; Kim et al., 2002; Dahmann *et al.,* 2008).

Dust amounts could be reduced in breathing air close to the emission source to levels lower than threshold limit values for various elements or compounds in dust produced through cutting, grinding, or polishing various dental materials such as chromium-cobalt, nickel, or gold alloys, porcelain, gypsum models, or denture base material (Brune & Beltesbrekke, 1980a). However, the local exhaust system did not enable a dust reduction from handling amalgam dies consistent with criteria of threshold limit values for mercury and silver. The measurements revealed the occurrence of a high proportion of respirable dust associated with these operations; consequently, the use of efficient ventilation systems is strictly necessary to ensure industrial safety with respect to air pollution in the working environment of dental laboratories. The efficiency of electrostatic filters installed in dental laboratories for general ventilation purposes was found to range from 37% to 73% based on weight reduction (Brune & Beltesbrekke, 1980a). Various ventilation systems with bag filters possessing a high efficiency based on weight reductions allowed small, respirable particles less than 5 μm to recirculate within the working environment. The efficiency of face masks for the reduction of inhaled dust revealed efficiencies for two commercial masks ranging from 70% to 95% based on weight reduction (Brune & Beltesbrekke, 1980b). However, such masks only partly retained the respirable dust. Since exposure is not limited to one substance, combined exposure to several contaminants may be responsible for the pneumoconiosis (Brune & Beltesbrekke, 1980c). The first steps in prevention are the identification, classification and evaluation of exposure and the effects of that exposure on the health of exposed workers. Reduction or elimination of exposure by collective or individual protective measures are the best modalities of prevention. Adequate and efficient protection should be considered for this profession to prevent occupationally related disorders

2. METHODOLOGY

This study was conducted in some cites at different parts of Libya to know the dental technicians awareness about laboratory safety. About 103 questionnaire were distributed to the technicians that are working in public and private dental laboratories (11 and 26 laboratories respectively) in the following cities; Tripoli, Benghazi, Sabha, Misurata, Zliten, Alkhoms, Alzawia, Alejelat, Agdabia, Al-Bida, and El-Gubba. The responded (feedback) were 87 Questionnaire from the total. The questions were about type of laboratory, cleanness, working area, crowded, quality of air freshen, lighting, suction of dust, protection of gas tubes and electric cable, present of lab safety tools such as air suction, fire extinguisher, first aid box and emergency phone number and uses of personal protection tools (Eyeglasses, rubber gloves, thermal isolated gloves, lab coat, face mask and earplug). The questions were collected and statically analyzed and expressed in percentage and plotted in excel graph.

3. RESULTS ANALYSIS

The results of Technician's opinion were shown in figure 1. The results showed that whose agree with the cleanness were 83.9% where 16.1% disagree, while whose agree with working area, crowded, quality of air freshen, lighting, protection of gas tubes and electric cable were 82.8%, 42.5%, 69%, 72.4%, 89.7% and 79.3% respectively. While the percentage of disagree were 17.2%, 57.5%, 31%, 27.6%, 10.3% and 20.7% respectively.

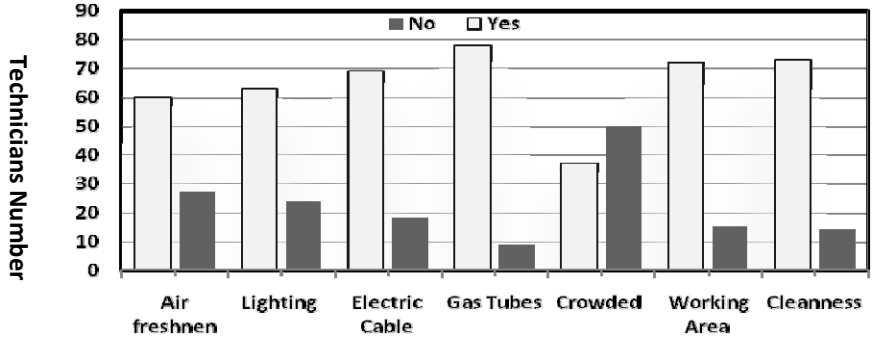

Figure 1: Dental technicians opinion regarding to laboratories facilities

The results of present of laboratories safety tools (air suction, fire extinguisher, first aid box and emergency phone number) were shown in figure 2. It can be seen that the present of safety tools in the laboratories were in percentage of 51.4%, 32.4 %, 37.8% and 27% respectively. While correspondingly not present in the percentage of 48.6%, 67.6%, 62.2% and 73%.

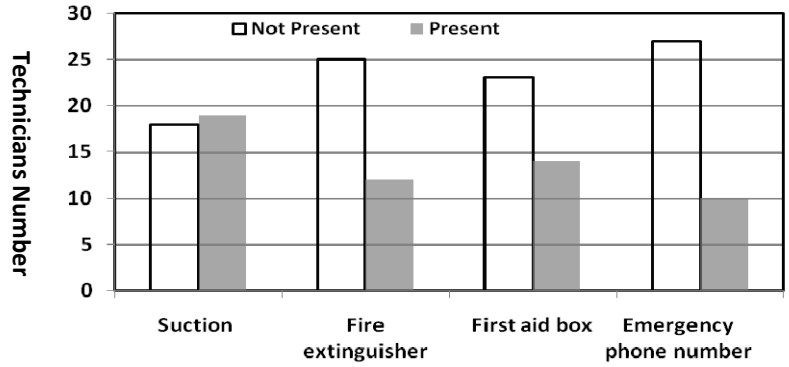

Figure 2: Present of laboratories safety tools

Figure 3: Shows the results of technicians whose were used personal protection tools (Eyeglasses, rubber gloves, thermal isolated gloves, lab coat, face mask and earplug) the results showed that the percentages of uses were 55.2%, 63.2%, 24.1%, 86.2%, 83.9 and 6.9% respectively . While whose not used the personal tools their percentage were 44.8%, 36.8, 75.9% 13.8% 16.1% and 93.1 respectively.

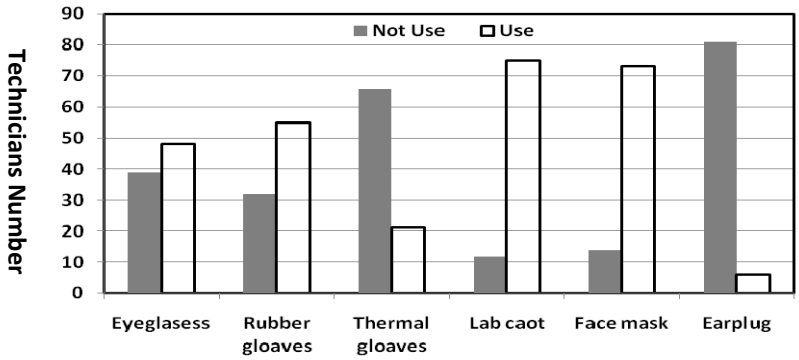

Figure 3: Uses of laboratories safety tools

4. DISCUSSION

It can be seen that the opinion of technicians was different who was agree and disagree with air fresh, crowded, lightning, protection of gas tubes and electric cable and their percentage were almost high for those agree, may this due to the most laboratories issued new. Even that, the technicians and the managers of the dental laboratories should be insure the safety in their laboratories due to the importance of these factors, which effect on the safety and comfortable of the dental technicians during their work. Where the present of laboratories safety tools (air suction, fire extinguisher, first aid box and emergency phone number) as shown in figure 2, were not present in may laboratories, may this due to the careless of the operators and the unawareness of users. In addition, some of them did not know how to deals with these tools, such as using of fire extinguisher. It highly recommended for the dental officer, technicians and laboratories managers to do training regally for first aid, and using of fire extinguisher. Regarding to using of personal safety tools (Eyeglasses, rubber gloves, thermal isolated gloves, lab coat, face mask and earplug). The results showed that most dental technicians care about wearing the lab coat and using of face mask (their percentage %, 86.2%, 83.9 respectively) while they were careless about using earplug (6.9%). This may due to that the dental technicians care about their cloths to keep cleans and not to smell undesirable odor or inhaled the dust. While they did not care about noise pollution, despite the fact that, this may has side effect in their health in future (Bahannan *et al.,* 1993).

5. CONCLUSION

It can concluded that, the awareness of dental technicians were high in laboratories facilities and in using lab coat and face masks. While less awareness for using some personal protection tools such as wearing of earplug during working with noise machines. While they were less awareness about present of first aid in their lab and were fewer of them know how to use fire extinguisher. It highly recommended that the dental officer, technicians and laboratories managers take care about all

personal protection tools and to do training regally for their staff how to deals with first aid, and using of fire extinguisher.

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