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Original Research Article

Occupational skin dermatosis among dental lab technicians in Khartoum state, 2023-2024

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ABSTRACT

Background: Occupational skin dermatosis is of a significant concern among dental lab technicians due to their exposure to chemicals and materials used in dental prosthetics. These exposures can lead to various skin conditions, impacting the health and productivity of the workforce. To determine the prevalence, clinical features and associated factors of occupational skin dermatosis among dental lab technicians in Khartoum State from 2023 to 2024.
Methods: A descriptive, observational, cross-sectional study was conducted among 171 dental lab technicians in Khartoum State. Data collection involved a structured questionnaire, including demographic information, clinical features of skin conditions and use of protective equipment. Analysis was performed using SPSS Version 26, with descriptive and inferential statistics applied to identify significant associations.
Results: Of the 171 participants, 85.4% reported work-related skin symptoms, with dry skin being the most prevalent symptom (100%). Contact with denture material, particularly methyl methacrylate (MMA), was implicated in all reported cases. The use of protective equipment was low, with only 34.2% of participants using gloves or masks regularly. The prevalence of symptoms was significantly associated with the use of MMA and inadequate protective measures.
Conclusions: The study underscores a high prevalence of occupational skin dermatosis among dental lab technicians in Khartoum State, highlighting the need for improved occupational health practices. Implementing training programs on the proper use of protective equipment and regular monitoring of skin health are recommended to mitigate these risks.

Keywords: Occupational skin dermatosis, Denture material, Methyl methacrylate

INTRODUCTION

Because of frequent contact with various allergens and irritants, occupational skin illnesses are a serious health issue for dental laboratory workers. Especially the often-used component in denture construction, methyl methacrylate (MMA), has been related to a high frequency of contact dermatitis.[1-3] Apart from other resin-based compounds like 2-hydroxyethyl methacrylate (HEMA) and ethylene glycol dimethacrylate (EGDMA), prolonged exposure to MMA has been associated with allergic and irritating contact dermatitis, therefore causing substantial discomfort and damage in affected people.[4,5] Furthermore, aggravating dermatologic symptoms and raising the risk of occupational skin diseases are caused by extended skin contact with metal

alloys, porcelain powder and disinfectants used in dentistry laboratories.[6,7] With technicians sometimes handling products that compromise skin health, the dental laboratory setting offers particular occupational dangers.[3-5]

According to studies, allergic and irritating contact dermatitis is the most often diagnosed condition among occupational skin disorders and dental professionals claim that it is present between 20% and 70%. Furthermore, insufficient protective precautions contribute to the high frequency of occupational skin diseases in this field, including irregular glove use and the absence of suitable ventilation systems.[10,11]

Notwithstanding these hazards, nothing is known about the frequency of occupational skin disorders in the Sudanese population. Previous research has shown how much personal protective equipment (PPE) helps to reduce occupational skin dermatoses frequency. Studies reveal, in the meantime, that PPE use is still low; many technicians habitually overlook the use of gloves, masks or protective gear.[12,13] This disrespect for preventative activities highlights the need for increased occupational health education and stricter rules to shield workers from unfavorable exposures.[14]

Developing good preventive plans and enhancing dental lab workers' general health and safety depend on awareness of these hazards. Work-related dermatoses can be greatly lessened by following occupational safety procedures, increasing PPE availability and boosting knowledge of occupational skin dangers. Moreover, early identification and treatment are crucial to avoid chronic skin diseases that could compromise dental technicians' quality of life and work performance.[15,16]

With an eye on the influence of hazardous materials and the efficacy of present preventive measures, this study seeks to investigate the frequency and features of occupational skin dermatosis among dental lab workers in Khartoum State. By spotting important risk factors and assessing the protective action of PPE, this study aims to help create focused treatments that improve occupational dermatological health in this susceptible sector.

METHODS

Study design

A cross-sectional descriptive study was conducted in Khartoum Dermatology and Venereology Teaching Hospital among dental lab technicians in Khartoum State from January 2023 to May 2024.

Study population

The study included 171 dental lab technicians practicing in Khartoum State, representing a diverse range of experience levels and work environments.

Inclusion criteria

Dental technicians currently practicing in Khartoum State. Technicians with at least one year of work experience in a dental lab.

Exclusion criteria

Technicians who declined to participate or did not provide informed consent.

Data collection

Data was collected using a structured, self-administered questionnaire. The questionnaire included sections on demographic information, history of skin conditions, current symptoms, exposure to dental materials and the use of personal protective equipment.

Statistical analysis

Data was analyzed using SPSS Version 26. Descriptive statistics were used to summarize demographic characteristics and the prevalence of skin conditions. Inferential statistics, including chi-square tests and logistic regression, were employed to assess associations between exposure to dental materials, use of protective equipment and the occurrence of skin conditions.

RESULTS

Demographic characteristics

Of the 171 participants, the majority (39.8%) were aged between 35 and 39 years, with a gender distribution of 42.7% male and 57.3% female (Figure 1). Most participants had over three years of experience working in dental laboratories. Regarding working hours, 45.6% worked 6 hours, 43.3% worked 7 hours, 8.8% worked 8 hours and 2.3% worked 9 hours per day (Figure 2).

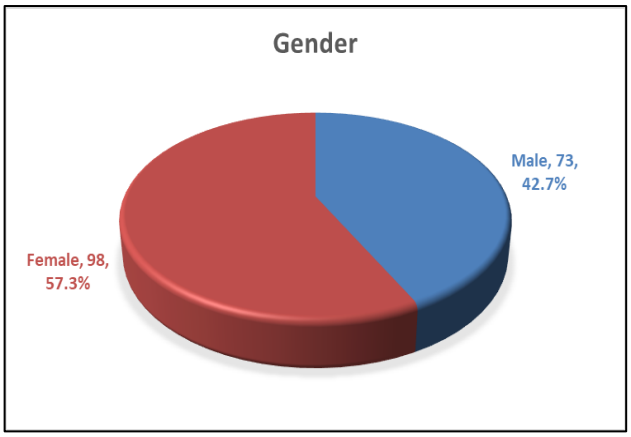

Figure 1: The distribution of the participants according to their gender in the study of occupational skin dermatosis among dental lab technicians in Khartoum State, 2023–2024 (n=171).

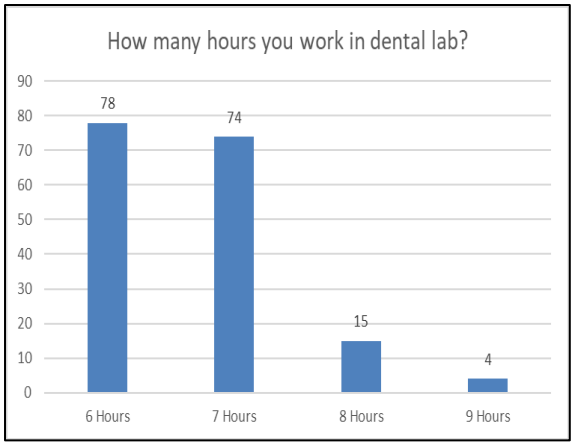

Figure 2: The distribution of work hours in the dental lab in the study of occupational skin dermatosis among dental lab technicians in Khartoum State, 2023–2024 (n=171).

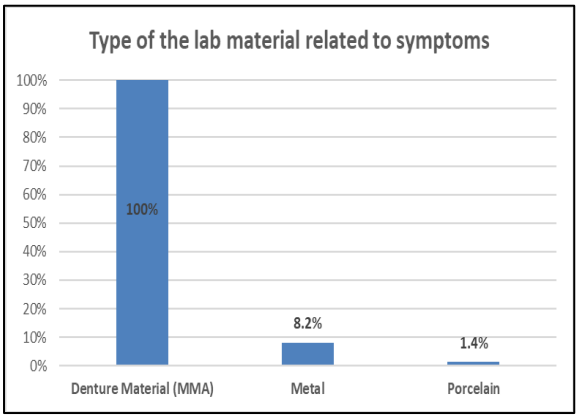

Figure 3: The distribution of type of lab material related to symptoms in the study of Occupational Skin Dermatosis among Dental Lab Technicians in Khartoum State, 2023–2024 (n=146).

Prevalence of skin symptoms

85.4% of participants reported experiencing work-related skin symptoms, with dry skin being the most common complaint (100%).

Other symptoms included itchy skin (56.2%), cracked skin (17.8%) and blistered skin (4.8%) (Table 1). The most prevalent lesion morphology was scaling (57.5%), followed by fissures (15.1%), erosions (3.4%) and vesicles (2.7%).

Associated factors

All participants with symptoms reported that their symptoms were related to contact with dental materials, particularly MMA, which was implicated in 100% of cases. Only 34.2% of participants reported using any form of protective equipment, with gloves being the most commonly used item (96%) (Figure 3).

Impact of protective equipment use

Participants who used protective equipment reported significantly fewer symptoms of dermatitis compared to those who did not (Table 2). For example, none of the participants using PPE reported cracked skin, while 27.1% of those not using PPE did ($p<0.001$).

Table 1: The distribution of the participants according to contact dermatitis signs and symptoms in the study of occupational skin dermatosis among dental lab technicians in Khartoum State, 2023–2024 (n=146).

	Frequency	%
Itchy skin	82	56.2
Blistered skin	7	4.8
Dry skin	146	100
Cracked skin	26	17.8
Swelling, burning or tenderness	0	0
Total	146	100

Table 2: the distribution of the participants according to whether protective equipment used (n=146 occupational skin dermatosis among dental lab technicians in Khartoum State, 2023-2024).

	Frequency	%
Yes	50	34.2
No	96	65.8
Total	146	100

DISCUSSION

This study underlined how occupational skin dermatosis affects work efficacy and quality of life. The clear connection between occupational exposures and dermatological issues is shown by 98.6% of affected people, who state improvement in their skin condition when not at work. Kanerva et al, performed thorough research demonstrating that dental technicians had a notable prevalence of occupational skin problems, ranging from 20% to 70%.[17]

Dry skin was the primary complaint, impacting all individuals (100%) with dermatological conditions. Additional prevalent complaints comprised pruritus (56.2%), fissured skin (17.8%) and vesiculation (4.8%). The predominant lesion form was scaling (57.5%), followed by fissures (15.1%), erosions (3.4%) and vesicles (2.7%).

While some participants also revealed lesions on the palms (26%), lesions primarily occurred on the fingers (98.6%). These results complement earlier studies on occupational skin diseases among dental workers. Rustemeyer et al, examined 55 dental technicians with potential occupational skin problems. They found that in cases of allergic contact dermatitis, 93% affected the fingertips, whereas in irritant contact dermatitis, 80%

included the dorsal of the fingers.[18] All symptomatic participants (85.4%) attributed their symptoms to exposure to specific items or substances on the job. Methyl methacrylate (MMA) was found to be the leading cause in 100% of cases. While Metal and porcelain were linked to 8.2% and 1.4%, respectively. These numbers highlight the occupational hazards related to dental laboratory work, particularly with regard to the general effect of MMA. As triggers for allergy responses in dentistry workers, Rustemeyer et al, 2 found plastic-associated allergens, including MMA, 2-hydroxyethyl methacrylate (2-HEMA) and ethylene glycol dimethacrylate (EGDMA). Among dental professionals, Katelaris et al, found a 33% prevalence of latex allergy 22% of them fit the criteria for glove dermatitis.[19]

This study underlined how occupational skin dermatosis affects work efficacy and quality of life. Most of the affected people (98.6%) state improvement in their skin condition when not at work, demonstrating the clear connection between occupational exposures and the dermatological issues.

Preventive measures

The use of personal protective equipment (PPE) has proved efficient in diminishing the occurrence of occupational skin dermatosis. However, only 34.2% of participants, meanwhile, claimed to have worn PPE. The results show that PPE greatly reduce the risk of severe skin conditions. While the lower prevalence of scaling and fissures further supports its efficacy, the absence of blasted and cracked skin among PPE users indicates its protective action. Users of PPE showed reduced erythema, desquamation and erosion, therefore highlighting its efficiency in reducing occupational skin damage. These results highlight the importance of using more personal protective equipment and further research to improve protective techniques and enhance occupational health for those working in dental labs.

CONCLUSION

The findings of this study underscore the need for enhanced occupational health interventions to protect dental lab technicians from skin disorders. Specific recommendations include the provision of adequate PPE, regular training on its use and the implementation of routine skin health monitoring programs.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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