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RESEARCH ARTICLE

EXPLORING THE PREVALENCE AND CHARACTERISTICS OF SENSORY STIMULATION-INDUCED HEADACHES AMONG DENTAL PROFESSIONALS: A QUESTIONNAIRE-BASED STUDY

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ABSTRACT

Introduction: The dental profession nowadays is a highly demanding and stressful environment. Dental professionals encounter a great deal of stress in the form of academics and at work in clinics. Headaches are a major and common neurological problem and are the main reason for decreased work performance, absenteeism, and behavioral disturbances in dental professionals. Aim: In the current incidence of increasing stressful conditions in dental professionals, the present study was carried out with the aim of assessing the prevalence and characteristics of sensory stimulation-induced headaches in dental professionals in Pune, India. ***Materials and Methods:*** A cross-sectional survey was carried out among undergraduate and postgraduate dental students, as well as dental practitioners in Pune. Participants were requested to complete the questionnaire using an online Google Form platform and provide their ratings and responses based on personal experiences. Consequently, the collected data were subjected to comprehensive statistical analysis using Statistical Product and Service Solution (SPSS) version 22, and descriptive statistics were employed to compare and analyze the obtained results. ***Results:*** The headache was found to be prevalent in 88% of subjects included in the study. Over 40.8% of subjects experience throbbing pain. 66.4% of subjects experience fatigue, and 50% of them show mood changes like premonitory symptoms. The most triggering factor of the headache is odor, i.e., 81.6%. 67.6% experience difficulty in concentrating, and 31.2% experience nausea. About 40.4% of subjects are exposed to dental chair light for 2-4 hours of work. Over 16.4% of subjects have missed work in past years due to headaches. 76.4% of subjects alleviate headaches through sleeping. ***Conclusion:*** It can be concluded from the present study that the characteristics of sensory stimulation are a significant reason for headaches among dental professionals.

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INTRODUCTION

In the demanding and intricate landscape of healthcare, where precision, unwavering dedication, and an unyielding focus on patient care reign supreme, dental professionals find themselves navigating a distinctive set of occupational stressors . These challenges are multifaceted, extending from the relentless academic pressures and the weighty expectations of job performance to the profound physiological and psychological toll they bear . However, beneath the surface of this dynamic dental world lies a compelling phenomenon that warrants exploration - sensory stimulation-induced headaches. These headaches, ignited by an array of sensory stimuli encountered daily, represent a unique and often overlooked challenge within the demanding realm of dentistry. Within the heart of the dental clinic, an environment rich in sensory experiences unfurls, teeming with potential triggers for headaches. The radiant brilliance of chair lights, indispensable for precision during dental procedures, paradoxically The pungent odors emanating from dental materials, which are essential for various treatments, unwittingly challenge the physical and mental well-being of practitioners . The omnipresent hum of the compressor, an inseparable companion to the dental clinic, conceals hidden health implications beneath its constant drone . Even the extended working hours, a testament to their unwavering commitment to patient care, may inadvertently amplify the impact of these sensory triggers. As dental professionals wholeheartedly dedicate themselves to providing exemplary patient care, they unwittingly become susceptible to sensory overload, a phenomenon that has, for too long, lingered in the shadows of the profession. Sensory stimulation-induced headaches, while pervasive, have received limited attention despite their potential far-reaching repercussions on the well-being of these practitioners. It is against this backdrop that our study embarks on an ambitious journey to explore the prevalence and distinct characteristics of sensory stimulation-induced headaches among dental professionals.

This comprehensive questionnaire-based study is poised to navigate the intricate and oftentimes elusive landscape of sensory stimulation-induced headaches. Our mission is to delve deep into their unique attributes, quantifying their prevalence with precision and nuance, and uncovering the subtleties that have long eluded the spotlight of scientific inquiry. By dissecting the multifaceted interplay between sensory stimuli and health outcomes, our aspiration is to contribute not only to the well-being of dental professionals but also to the broader understanding of sensory-induced disorders within the healthcare domain. Our ultimate goal transcends mere academic inquiry. We aim to cultivate a work environment that not only empowers the delivery of exceptional patient care but also places the health and comfort of dental practitioners at its core . Recognizing that dental professionals wield a profound influence over the health and welfare of both their patients and themselves, we consider addressing the challenges posed by sensory stimulation-induced headaches not only an academic endeavor but also a moral imperative. It is essential for the creation of a healthier, more sustainable dental practice, benefiting all stakeholders involved. In the pursuit of this ambitious endeavor, we draw inspiration and insights from a rich tapestry of scholarly resources, each contributing a piece to the puzzle of sensory stimulation-induced headaches. Central to our undertaking is the seminal work presented in reference , which serves as our guiding light in navigating this complex terrain. This study holds the potential not only to advance our comprehension of sensory stimulation-induced headaches but also to lay the foundation for well-informed strategies aimed at enhancing the overall well-being of dental professionals.

Aim

In the current incidence of increasing stressful conditions in dental professionals, the present study was carried out with the aim of assessing the prevalence and characteristics of sensory stimulation-induced headaches in dental professionals in Pune, India.

MATERIALS AND METHODS

A cross-sectional survey was carried out among undergraduate and postgraduate dental students as well as dental practitioners in Pune for a research project titled "Exploring The Prevalence And Characteristics Of Sensory Stimulation Induced Headaches Among Dental Professionals: A Questionnaire-Based Study."

Questionnaire Validation and Reliability: The validation of the questionnaire involved the calculation of Mean Content Validity Ratio (CVR), resulting in a CVR score of 0.87, demonstrating its robust content validity. Reliability was assessed using Cronbach's alpha, which yielded a coefficient of 0.90, indicating strong internal consistency. The questionnaire comprised a total of 22 items.

Sample Size Determination: To establish the required sample size, the assumed population prevalence (P) of reported Sensory Stimulation Induced Headaches Among Dental Professionals was set at 20% (0.2). A confidence level (1-α) of 95% (0.95) was chosen, corresponding to a Z value of 1.96, with an absolute precision (d) set at 0.05. Based on these parameters, the minimum sample size (n) was calculated to be 246. To account for potential non-responses or data-related issues, the final sample size for this study was rounded up to 250 subjects.

Questionnaire Structure

The questionnaire utilized in this study was carefully designed to investigate various aspects of headaches experienced by dental professionals.

METHODOLOGY

After providing a detailed explanation of the study's objectives, the questionnaire was distributed to undergraduate and postgraduate dental students and dental practitioners in Pune. Participants were requested to complete the questionnaire using an online Google Forms platform and provide their ratings and responses based on their personal experiences. Subsequently, the collected data were subjected to comprehensive statistical analysis using SPSS version 22, and descriptive statistics were employed to compare and analyse the obtained results.

RESULTS AND ANALYSIS

88% of the respondents experienced headachesA total of 250 structured questionnaires were distributed to dental professionals. There were 30% males and 70% females in the study. (Table 1) Of all the respondents 72% were intern and undergraduates. 23% were practitioners and 5% were post graduate students. (Table 2)

Table 1.Gender Distribution

	Frequency (n)	Percentage (%)
MALE	75	30 %
FEMALE	175	70 %

Table 2. Designation

	Frequency(n)	Percentage (%)
Intern/UG	180	72%
PG	12	4.8%
Practitioner	58	23.2%

34% respondents experienced weekly headaches, 11% experienced it daily, 30% experienced it monthly while 26% experienced it rarely or never. (Table 3). In all these cases it was seen that 36% respondents experienced headaches in the evenings, while 34% experienced it in the afternoon, The rest experienced headaches in the morning or late night.(Table 4). For 41% of the respondents the headaches reached the maximum intensity within a few hours, and for 39% of the respondents it was variable. (Table 5). 60% respondents experienced moderate intensity headaches, 20% experienced mild headaches, and 18% experienced severe headaches. (Table 6)

Table 3. How often do you experience headache?

	Frequency (n)	Percentage (%)
Daily	28	11.2%
Weekly	84	33.6%
Monthly	74	29.6%
Rarely or never	64	25.6%

Table 4: When do your headaches typically occur?

	Frequency (n)	Percentage (%)
Morning	15	6%
Afternoon	85	34%
Evening	91	36.4%
Night	40	16%
No response	9	3.6%

Table 5: How quickly do your headaches reach their maximum intensity?

	Frequency (n)	Percentage (%)
Within a few minutes	45	18%
Within few hours	103	41.2%
Varies	98	39.2%
No response	4	1.6%

Table 6: How would you rate the intensity of your headaches?

	Frequency (n)	Percentage (%)
Mild	50	20%
Moderate	150	60%
Severe	45	18.5%
Incapacitating	5	2%

Headache occurring at both sides affected 68% of the respondents, 19% respondents experienced it on the right side and 13% respondents experienced it on the left side. (Table 7). The headache lasted for hours in 71% of the respondents while the headache was minimized within a few mins in 25%of the respondents.(Table 8)

Table 7. Where do you usually experience your headaches?

	Frequency (n)	Percentage (%)
Left Side	32	12.8%
Right Side	48	19.2%
Both Sides	170	68%

Table 8. How long do your headaches typically last?

	Frequency (n)	Percentage (%)
Few minutes	63	25.2%
Hours	177	70.8%
Days	10	4%

44% respondents noticed correlation between compressor sound and their headaches (Table 9). For 55% of the respondents the smell of sodium hypochlorite/monomer worsened their headache while for 16% respondents the smell was not an additional trigger. (Table 10). 74% respondents believed that dental chair light contributed in worsening their headache while 7% disagreed for the same. (Table 10). On the basis of the study statistical significant difference was noticed in the premonitory symptoms of the headaches. Fatigue was the most common premonitory symptom for 66% of the respondents followed by 46% respondents experiencing neck pain as the symptom where as the rest of the respondents experienced mood changes, personality changes, appetite changes were their premonitory symptoms. (Table 11). In relation to associated symptoms statistical significant difference was noted showing 68% of the respondents experienced difficulty in concentrating, 31% experienced nausea, 23% experienced vomiting, numbness and running nose, while others experienced symptoms like vertigo, numbness, tears. (Table 12)

Significant Statistical difference was seen in duration of exposure to a dental chair light. 40% spent 2-4hours on the chair while 20% spent 4-8 hours where as the rest has 1-2 hours exposure to the chair. On questioning how often did the respondent miss work due to headache 49% voted less often, 28% voted never, 16% voted often while 7% voted very often. (Table 14). It was seen in 74% of the respondents that the headache interfered with their daily activities and for 71% it affected their overall quality of life and job performance. (Table 10)
80% respondents were seeking medical advice for their headaches while 85% respondents are taking medical therapy/medication specifically for their headaches. (Table 9)

DISCUSSION

A total of 250 structured questionnaires were distributed among dental professionals from Pune, India. The data were gathered from undergraduates, postgraduates, and dentists, indicating that this population has more information about headaches than the general population, as surveyed by Elzer *et al*. in their study where 150 questionnaires were distributed. Our preliminary estimate of prevalence and characteristics of sensory stimulation-induced headaches was 88% of respondents experienced headaches. Numerous past studies by Barros *et al*., Amayo *et al*., Mitsikostas *et al*., and Deleu *et al*. have also demonstrated high prevalence of headaches, ranging from 39% to 96%. One such study was carried out with Norwegian students, showing that 69.4% of boys and 84.2% of girls have experienced headaches within the past year, as studied by JA Zwart *et al*. Another similar analysis surveyed Brazilian college students, and about 58% of students suffered headaches in a year, as studied by Silva Jr *et al*. Juni *et al*. found that the prevalence of headaches in paramedical students was 82.3% in males and 83.4% in females. We found no gender difference in the effect of headaches on working ability, which is unlike most studies reporting greater disabilities among females, as studied by Rasmussen *et al*. in their study showing that 88% of women suffer from tension-type headaches.

Table 9. Knowledge Domain

	Yes N(%)	No N(%)
Do you experience headaches?	219 (87.6%)	31 (12.4%)
Noticed any correlation b/w compressor sound and your headaches	110 (44%)	140 (56%)
Ever missed work due to headaches	137 (54.8%)	113 (45.2%)
Currently taking any medications/therapy specifically for your headaches	39 (15.6%)	211 (84.4%)
Sought professional help or medical advice for your headaches	51 (20.4%)	199 (79.6%)

Table 10. Attitude Domain

	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
Believe strong smells like sodium hypochlorite /monomer or other chemicals trigger/worsen your headache	39 (15.6%)	98 (39.2 %)	72 (28.8%)	33 (13.2%)	8 (3.2%)
Believe that your headaches interfere with your daily activities	53 (21.2%)	131 (52.4%)	46 (18.4%)	15 (6%)	3 (1.2%)
Believe that exposure to dental chair light causes or worsens your headaches	23 (9.2%)	99 (39.6%)	90 (36%)	26 (10.4%)	9 (3.6 %)
Headaches affect your overall quality of life and job performance	46 (18.4%)	132 (52.8%)	53 (21.2%)	10 (4%)	6 (2.4%)

Table 11. What are the premonitoring symptoms?

	Frequency (n)	Percentage (%)
Mood Changes	125	50%
Personality Changes	45	18%
Appetite Changes	62	24.8%
Neck Pain	114	45.6%
Fatigue	166	66.4%
None of the above	0	0%
	Chi square test value=6.031,p=0.025 (statistical significant difference)	

p<0.05-statistical significant difference

Table 12. Which associated symptoms do you experience?

	Frequency (n)	Percentage (%)
Nausea	78	31.2%
Vomiting	58	23.2%
Vertigo	30	12%
Numbness	56	22.4%
Tears	33	13.2%
Running nose	55	22%
Difficulty nose	35	14%
Difficulty concentrating	169	67.6%
None of the above	19	7.6%
	Chi square test value =5.098,p=0.038 (statistical significant difference)	

P<0.05-statistical significant difference

Table 13. How long is your exposure to a dental chair light on a typical workday

	Frequency (n)	Percentage (%)
0-1 hours	37	14.8%
1-2 hours	60	24%
2-4 hours	101	40.4%
4-8 hours	50	20%
>8 hours	2	0.8%
	Chi square test value=6.09,p=0.022 (statistical significant difference)	

P<0.05-statistical significant difference

Table 14. How often in the past year have you missed work due to headaches?

	Frequency (n)	Percentage (%)
Never	69	27.6%
Less Often	123	49.2%
Often	41	16.4%
Very Often	17	6.8%
	Chi square test value=7.912,p=0.014 (statistical significant difference)	

P<0.05-statistical significant difference

However, little is known about its prevalence characteristics, particularly in the dental profession. The smell of chemicals such as sodium hypochlorite and monomer; 55% of respondents believe that the smell of chemicals worsens headaches, as studied by Maya Lyapina *et al*. in their study, which shows that 81.2% of dental professionals are exposed to monomer. In this study, 56% of respondents show a correlation between compressor sound and headaches, as studied by Kuen Wai Ma *et al*. in their study, showing that dental professionals are surrounded by a noisy environment leading to headaches, fatigue, irritation, and tinnitus. In our study, 68% of respondents experience bilateral headaches, as studied by Nandha *et al*. 36.13% experience bilateral headaches. In our study, 74% of respondents believe that dental chair light worsens their headache, as Nandha *et al*. shows that 81.25% of major triggers of headaches by students were stress, irregular sleep, and bright light, also in concordance with Sweilleh *et al*., Vilela Braga PC *et al*., and Hashel *et al*., who considered stress, lack of sleep, sound as trigger factors of headaches. In our study, it is also found that 31% of respondents experienced nausea, and 23% of respondents vomiting, as studied by Nandha *et al*. 81.25% of students experience these symptoms with headaches. In the present work, 11.2% of cases experience daily headaches, 33.6% experience weekly headaches, 29.6% experience monthly headaches, and 25.6% never had experienced headaches, as with accordance with other studies; Vilela Braga PC *et al*. and Curry K *et al*. performed a questionnaire-based survey in undergraduate students, showing that approximately 50% of students experience headaches monthly, and 17% of students indicated headaches one or more times per week. 80% of respondents consulted medical advice for their headaches, and 85% of respondents took over-the-counter drugs for treating headaches, as studied by Nandha *et al*. 88.2% of students took over-the-counter drugs (non-prescription drugs). We have found out that 16% of respondents have missed work due to headaches more often, in concordance with the study by Amayo *et al*., where 22.5% of students have missed classes or work in the last one year as a result of headaches.The present study revealed that headaches were highly prevalent among dental professionals, and the majority of the participants did not seek medical attention and relied on analgesics to relieve their headaches. Headaches were more significantly aggravated due to bright light, compressor sound (noise environment), the smell of chemicals such as sodium hypochlorite and monomer, and work-related stress. Hence, the policymakers, academic officials, and concerned bodies should make an effort to design effective measures to curb this public health menace in this vulnerable population and thereby improve their quality of life.

CONCLUSION

Considering the limitations and strengths of the study, it can be concluded that trigger factors are the main reason for headaches among dentists and hence negatively affect their quality of life and character. Thus, it is essential to counsel people about its impacts and techniques of management.

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