Occupational Health Problems among Cambodian Dentists: A Cross-Section Study

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Article

Occupational Health Problems among Cambodian Dentists: A Cross-Section Study

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Abstract: A cross-sectional study was organised to investigate the range, prevalence, and associated factors for occupational health problems related to dental practice among Cambodian dentists; Participants underwent a face-to-face interview to explore dentists work-related health problems; 106 Cambodian dentists participated in this study, 68.9% were male. Ages ranged from 29 to 71 years, averaging 36.1 years, with the majority (77.4%) in the 29-40 age group. They had 5 to 18 years of practice experience, and worked an average of 52.2 hours per week. Commonly reported health issues included back pain (88.7%), headaches (81.1%), shoulder pain (78.3%), arm/hand pain (57.5%), and eye problems (48.1%). 38.7% of participants felt stressed and 19.8% depressed. Some reported suicidal thoughts and taking medication for depression. Despite these challenges, 91.5% enjoyed practicing dentistry; Findings highlight the need for interventions and strategies to address the physical and mental well-being of Cambodian dentists. By addressing these issues, steps can be taken to enhance the working conditions and professional satisfaction of dental professionals, ultimately benefiting both the practitioners and their patients

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1. Introduction

Occupational health concerns persist across various professions. Despite numerous technological advancements in last few decades [1], dental practitioners continue to encounter multiple occupational health issues. Notwithstanding the implementation of standards and regulations aimed at minimizing health hazards in dentistry, dentists remain susceptible to occupational health problems. These issues encompass a wide range of physical, biological, chemical, radiological, and psychosocial hazards associated with dental practice [2–4]. Dental practitioners are also exposed to factors such as excessive noise, vibration, ergonomic stress, as well as occasional instances of workplace and other sources of psychological stress [3,4].

Moreover, dentists often work longer hours in comparison to the standard working week, as highlighted in previous research [1]. This extended workload has been linked to higher rates of depression and even suicide within the dental profession [5,6]. Instances of substance abuse have also been reported among some dentists, with substances dependence. While the majority of dentists report moderate alcohol and/or drug usage [7], it is important note that patterns of alcohol consumption vary significantly among dentists in different countries, mirroring the variations observed in other societal groups [8].

The practice of dentistry, as well as dental training, involves numerous risk factors that necessitate the dental team's ability to identify and mitigate them to safeguard their own well-being. It is worth noting that individual characteristics can moderate the impact of exposure to these hazards [9]. Nevertheless, research provides evidence that the stresses associated with clinical practice commence during dental education, where the learning environment can be more challenging, and hostile compared to other healthcare programs [10–12].

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Fortunately, the negative impacts of stress can be mitigated by a strong personal sense of coherence, exercises and traing, and seeking support from family and friends. Additionally, programs designed to enhance personal confidence can contribute to stress reduction. Furthermore, even dental students can derive benefits from social support networks and vocational orientation programs offered by dental faculties and local professional organizations, as these resources have the potential to alleviate stress [13,14].

Many studies have been conducted regarding the health problems of dentists around the world [15–19], however, in Cambodia no such study has been conducted. Anecdotal reports indicate that Cambodian dentists do suffer from a range of health problems, and many dentists have been affected by various illnesses. Some appear to have died prematurely. This study was organised to initiate this understanding by investigating the range, prevalence, and distribution, by selected socio-demographic characteristics, work characteristics, and psychosocial factors occupational health problems of Cambodian dentists.

The responsibility for occupational health problems and in acquiring the necessary knowledge to prevent or identify these problems usually falls on the dentist him/herself and the dental team. Despite the critical importance of this knowledge, there is often a lack of structured or formal education provided within the profession. Consequently, dentists and their teams must take proactive steps to seek out relevant information, training, and resources to safeguard their health and well-being in the workplace.

Having prior information on the knowledge, attitude, practice, and beliefs (KAPB) of dentists, strategies at different levels (e.g., dental schools, dental organizations, workplaces, etc.) can be developed to improve awareness, attitudes, and practices would be useful in developing strategies at different levels (e.g., dental schools, dental organizations, workplaces, etc.) to reduce occupational health problems and enhance the well-being of oral healthcare professionals.

2. Materials and Methods

In the context of occupational health dentistry, a questionnaire-based cross-sectional survey of Cambodian practising dentists was organised to assess occupational health among dentists. The conceptual framework adopted in the present study was the knowledge, attitudes, practices, and beliefs (KAPB) approach [20,21]. The KAPB model is widely used in different fields, including occupational health [22,23], to understand and address behaviour change and health promotion.

Using the KAPB model in the study of occupational health may facilitate understanding and allows insights into the factors that influence occupational health behaviours and can be used to guide the development and implementation of interventions that aim to improve workplace health and safety [21].

The appropriate sample size was calculated according to the formula for population-based surveys [24]. Sample calculations indicated that, assuming that 70% of the dental practitioners have experienced occupational health-related problems [17], a sample size of 100 participants yield a confidence level of 0.05 with an estimated effect size between 61% and 79% of dentists have occupational health-related issues.

Following ethics approval from the University of Puthisastra Research Committee (ID: N31123UP). A convenience sample of dentists practicing in Phnom Penh, Siem Reap, Kampong Cham, or Kompong Som with at least 5 years of clinical experience, were invited to participate in this study. Traditional Dentists, dentists with less than 5 years of experience, and retired dental practitioners were excluded from this study.

Three research assistants visited each dentist or spoke to them online. Once the purpose of the study was explained to the dentist, they were invited to provide written consent as for online interviews only verbal consent was obtained. Consenting dentists underwent a face-to-face or online structured interview with a trained research assistant to explore the work-related health problems that they had experienced during their professional practice, as well as risk factors associated with them. Data were collected between March 2022 to November 2023.

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The KAPB model was taken into consideration when developing the data collection instrument. The instrument was developed in English based on previous studies [25]. The instrument was then translated into Khmer and back translated from Khmer to English to ensure the meaning of the questions was correct [26]. A pilot study was carried out to ensure that the questions were easy to understand and could be answered with ease.

Data collection included four sections:

1) sociodemographic (i.e., age and sex) and work background information: the location of practice; years of practice; and hours a week practicing dentistry. This section also included a question asking to self-assess their health status as; "Poor"; "Fair "; "Good"; and "Excellent".

2) Type and severity of eleven occupational health conditions, common to dentistry, they may be experiencing, including: back pain; headaches; and pain in the shoulders; arms; hands; legs and/or feet; skin problem; eye problem; hearing problem; and neurological problems. These conditions were coded as "Never"; "Sometimes"; and "Often". Participants were also asked whether they have any transmissible viral infection (e.g., Hep B, Hep C or HIV). This section also asked about mental health conditions (i.e., stress and depression). A health conditions score was created by adding positive responses (i.e., Sometimes and Often) across the list of occupational health conditions.

3) Beliefs about occupational health problems in dental practice. This section included eleven items. The reliability and validity of this occupational health belief scale was reviewed. The construct validity of the scale was assessed through a confirmatory factor analysis of the instrument's 11 items using the maximum-likelihood estimation method with oblique rotation. The analysis indicated that the factor structure of the instrument had two dimensions; one related to the physical health beliefs, and another related to the mental health beliefs (e.g., stress, depression, level of enjoyment when practicing dentistry). Cronbach's alpha was used to determine the internal consistency. The reliability of the scale was found to be 0.84. In order to quantify responses, an overall occupational health beliefs index was created by adding the responses across the physical health beliefs items.

4) Participants were also asked whether they believed that occupational health problems in dentistry could be prevented, or not. They were also asked whether they have had a needlestick injury or not. A positive answer was followed up whether they, as well as the patient, had a blood test.

Additionally, participants were asked whether they have learned: the correct position when treating patients; how to reduce stress in dentistry. Participants were presented with a diagram with four positions of the operator doing restorative dentistry, and three positions for the patient.

The statistical analysis provides basic descriptive information on the distribution of the socio-demographic, and work-related variables. To investigate the patterns of responses for Occupational Health scales, Analysis of Variance (ANOVA) were employed. A significant ANOVA was followed by post-hoc comparisons using Tukey's HSD tests. To test if any combination of the various socio-demographic and work-related variables (e.g., age, sex, location, and year of practice), provided a multivariate explanation of the health conditions scores, a linear regression model was fitted using a stepwise selection method. When a probability value was 0.05 or smaller, the finding was considered to be statistically significant. Data manipulation and analyses were conducted using SPSS PC (Version 25.0).

3. Results

A convenience sample of 106 dentists from Phnom Penh (n=41; 38.7%) Kampong Som provinces (n=26; 24.5%); Siem Reap (n=23; 21.7%); and Kampong Cham (n=16; 15.1%). The majority of participants in the study were male (n=73; 68.9%). Age ranged from 29 to 71 years, with a mean age of 36.1 (s.d. 8.3) years. The majority (77.4%) was in the 29-40 years age group.

Years of practice ranged from 5 to 18 years, with a mean age of 7.6 (s.d. 3.0) years. The majority (71.7%) was in the 5 to 9 years of experience. Participants reported working an average of 52.2 (s.d. 12.9) hours per week, with 31.1% working 56 hours a week and another 24.5% working more than 56 hours a week. Table 1 shows the socio-demographic work characteristics. Regarding self-reported health status, 60.4% classified their health as 'Good' or 'Excellent'.

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Table 1. Sociodemographic and work characteristics of participating Cambodian dentists.

Variables		
Mean age (years)	36.1 (s.d. 8.3)	
	categories	**N %** [1]
Sex	Male	73(68.9%)
	Female	33 (31.1%)
Age group	29-40	22 (20.7%)
	41-50	78 (73.7%)
	50 and more	6 (5.6%)
Year of practicing dentistry	5 to 10 years	89 (84.0%)
	More than 10 years	17 (16.0%)
Place of practice	Phnom Penh	41 (38.7%)
	Kampong Som	26 (24.5%)
	Siem Reap	23 (21.7%)
	Kampong Cham	16 (15.1%)
Working hours (weekly)	Less than 56	47 (44.3%)
	56-70	53 (50.0%)
	More than 70	6 (5.7%)
How would you describe your current health?	Poor/Fair	42 (39.6%)
	Fair/Good	64 (60.4%)

[1] n=106.

The majority of the participants indicated that they 'Often' or 'Sometimes' experienced: back problems (88.7%); headaches (81.1%); pain in their shoulder (78.3%); and over half have pain in their arms and/or hands (57.5%), while almost half of the participants reported (48.1%) eyes problems. About one-third of the participants reported either skin problems (30.2%) or legs or feet pain (34.0%). Another 18.8% reported 'Often' or 'Sometimes' hearing problems (See Table 2).

Table 2. Occupational health problems reported by Cambodian dentists.

Statement	**Never N (%)**	**Sometimes N (%)**	**Often N (%)**
I have pain in my back	12 (11.3%)	74 (69.8%)	20 (18.8%)
I have pain in my shoulder(s)	23 (21.7%)	69 (65.1%)	14 (13.2%)
I have pain in my arms and/or hands	45 (42.4%)	54 (50.9%)	7 (6.6%)
I have pain in legs and/or feet	70 (66.0%)	33 (31.1%)	3 (2.8%)
I have a skin problem	74 (69.8%)	31 (29.2%)	1 (0.9%)
I have an eye problem	55 (51.9%)	45 (42.4%)	6 (5.6%)
I have a hearing problem	86 (81.1%)	19 (17.9%)	1 (0.9%)
I have headaches	20 (18.8%)	75 (70.7%)	11 (10.4%)

Additionally, 4.7% answered testing positive for blood-borne viruses (i.e., Hep B, Hep C, and HIV). Half of the participants (n=53) have had needle stick or sharp instrument injury. Of them, about half (n=28: 52.8%) reported that their patients and themselves did the blood tests.

Regarding mental health, slightly more than one-third of the participants (38.7%) agreed that they often feel stress when practicing dentistry, and approximately one-fifth (19.8%) said that they often feel depressed and have consulted a doctor or counsellor about the depression they have from practicing dentistry (21.7%). Two dentists reported that they considered committing suicide in the past from work stress and another two reported that they were taken medicines to cope with depression. On the other hand, most participants agreed that they enjoyed practicing dentistry (91.5%).

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In terms of prevention and management of mental health issues, about half of the participants (54.7%) said that they had been taught about how to manage or reduce their stress. Similarly, about half of dentists (50.9%) believed that health problems in dentists could be prevented.

Overall, participants nominated as an average 6.0 (s.d. 2.3; range 1-11) health problems. There were no significant associations by age, sex, or location. However, there was a statistical significant difference by hours of work (p=0.015), which showed a non-linear association with the number of health conditions where those in the middle range 50 – 70 hours a week reported less health conditions (5.5; s.d. 2.4) than those in the low (6.3; s.d. 2.1) and higher (8.0; s.d. 1.7) ends. More specifically, regarding musculoskeletal disorders (i.e., back pain, shoulders, legs/feet, or arms/hands) participants nominated as an average 2.6 (s.d. 1.1; range 0-4) problems. However, the number of musculo-skeletal conditions was not related to age, hours of work, sex, or time of practice.

In terms of beliefs, the majority of the participants 'Agreed' or 'Strongly agreed' that practicing dentistry can cause musculo-skeletal problems (89.6%); and eye problems (82.1%). Almost half of the participants agreed that practicing dentistry can cause mental health problems (47.2%). Approximately one-quarter of the dentist agreed that practicing dentistry could cause hearing problems, neurological problems, and hypertension. Additionally, more than half of participants (52.8%) agreed that practicing dentistry could cause other (not listed) occupational health problems. On the other hand, about half of participants (49.1%) believed that the dentists' occupational health problems could be prevented (See Table 3).

Table 3. Beliefs about occupational health problems in dental practice by Cambodian dentists.

Statement	Agree N (%)	Disagree N (%)	Do not know N (%)
Practicing dentistry can cause musculoskeletal problems	95 (89.6%)	11 (10.4%)	0 (0.00%)
Practicing dentistry can cause skin problems	42 (38.7%)	50 (47.1%)	14 (13.2%)
Practicing dentistry can cause eye problems	87 (82.1%)	13 (12.2%)	6 (5.6%)
Practicing dentistry can cause hearing problems	25 (23.6%)	67 (63.2%)	14 (13.2%)
Practicing dentistry can cause neurological problems	26 (24.5%)	59 (55.6%)	21 (19.8%)
Practicing dentistry can cause mental health problems	50 (47.1%)	37 (34.9%)	19 (17.9%)
Practicing dentistry can cause high blood pressure	25 (23.6%)	54 (50.9%)	27 (25.5%)
Practicing dentistry can cause diabetes	11 (10.3%)	75 (70.7%)	20 (18.8%)
Practicing dentistry can cause other health problems	56 (52.8%)	21 (19.8%)	29 (27.3%)
I enjoy practicing dentistry	97 (91.5%)	3 (2.8%)	6 (5.6%)
Dentists have more health problems than other occupations	30 (28.3%)	45 (42.4%)	31 (29.2%)
I often feel stressed when practicing dentistry	41 (38.8%)	57 (53.7%)	8 (7.5%)
I often feel depressed	21 (19.8%)	72 (67.9%)	13 (12.3%)
Because of work stress and/or depression I have consulted my doctor and/or had counselling	23 (21.7%)	65 (61.3%)	18 (17.0%)
I take medicines to help me cope with my stress and/or depression	2 (1.9%)	96 (90.6%)	8 (7.5%)
Because of work stress and/or depression I have considered committing suicide in the past	2 (1.9%)	103 (97.2%)	1 (0.9%)

When asked about the dentist and the patient positions during treatment, the majority (89.6%) reported being taught the correct positioning of dentist and patient during treatment. However, 66.0% of participants responded that when treating patients, they sit with their thigh parallel to the floor. When asked about dentist-to-patient positions, 71.7% preferred working in a "10-11 o'clock" position followed by 17.0% sitting at a "12 o'clock" position. With regards to patient positioning, 66.0% of the dentists put their patients in a semi-supine position while 29.2% put them in the fully supine position. Five dentists treated their patients sitting up right.

To test whether any of the SES, KAPB, and work experience variables produced an explanation on the number of self-reported occupational health conditions, particularly musculoskeletal disorders,

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linear regression analyses were conducted. However, none of the IVs showed evidence of a significant association with the dependent variables ($p > 0.05$) in this study.

4. Discussion

The study identified musculoskeletal disorders, in particular, back problems; shoulder pain; arm/hand pain, as the most common occupational health condition reported by dentists followed by stress. Participants also reported experiencing various additional occupational health problems, including headaches, and eye problems. Risks such as noise, and chemical contamination were not reported. Many dentists reported feeling stress or depression from practicing dentistry, and a few even considered suicide. However, most dentists still reported enjoying their practice.

The relatively high prevalence of stress and depression among participants underscores the importance of addressing mental health concerns in the Cambodian dental profession. It is concerning, however, the number of dentists who reported using medication for their mental health issues. This further emphasizes the need to prioritize work-life balance and promote well-being among dentists [27]. About half of the participants reported being taught how to manage or reduce stress. Still, most of these findings serve as a call to action for the dental community to address mental health challenges and implement support systems for dentists in Cambodia.

Overall, these findings align with previous research conducted elsewhere, which also reported a high prevalence of musculoskeletal disorders among dentists [15–19]. In the same manner, studies report experiences of high levels of work-related stress, and work-life imbalances [28]. Reported factors contributing to musculoskeletal disorders include workload, faulty ergonomics, incorrect techniques during patient treatment, and long working hours. In this study, many participants attributed musculoskeletal disorders to improper sitting positions and long work hours. However, in the present results, reported risk factors (e.g., age or sex) were not associated with the number of musculoskeletal disorders or any health conditions experienced. However, dentists who worked 50-60 hours per week reported fewer health conditions compared to those who worked fewer or more hours.

Additionally, the study explored the beliefs of dentists regarding the impact of dentistry on their health. It was found that most participants acknowledged the potential for dentistry to cause back problems and eye problems. Furthermore, a significant proportion of dentists agreed that practicing dentistry can lead to mental health problems. This highlights the recognition of the occupational hazards within the profession and the need for preventive measures and support systems.

Effective preventive measures included massage treatments, physical activities, ergonomic equipment, proper working positions, and efficient workflow organization [15,29]. The study investigated the positioning of dentists and patients during treatment. The majority of participants reported sitting with their thighs parallel to the floor and working in the 10-11 o'clock dentist-patient position. Ergonomically this position is most recommended. Still, a few dentists provided treatment while standing, which is not recommended according to the World Dental Federation ergonomic guideline.[15] Nonetheless, about one third of participants reported positioning patients in positions (e.g., semi-supine), which is not considered optimal position for the dentist according to the World Dental Federation.[15] Working in the correct position can help to avoid musculoskeletal disorders and should be learned and emphasized during the training of dental students.

Additionally, dentists should be aware of the risks of hepatitis B, hepatitis C, HIV in dental settings, and in taking necessary precautions. In the present study, half of participants reported having experienced needle stick or sharp instrument injuries. However, only a minority of participants reported that they and their patients underwent blood tests.

Although this study provides valuable insights into occupational health issues among Cambodian dentists, it is not without limitations. The most obvious limitation was the cross-sectional nature of this study, which precludes a strong conclusion about causal relationships between occupational factors and health outcomes. Another limitation is the self-report nature of the data, which may introduce response bias. Participants may have underreported or overreported their occupational health conditions or mental health problems due to social desirability bias.

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Furthermore, the study relied on participants' beliefs about the impact of dentistry on their health, which may not necessarily reflect objective measurements or clinical diagnoses.

Still, while this information is useful, it only provides an initial approximation of the true occupational health conditions profile. Findings reflect those conditions among dentists recruited from four locations in Cambodia, therefore generalization of the study results might be limited. Future research should consider larger, more representative samples and longitudinal designs to gain deeper insights into the occupational health and safety concerns faced by oral health professionals in Cambodia. Further exploration of occupational health, by geographic location, and for dentists with longer work experience is needed. Most of the participants were under 50 years of age. Health problems are generally more prevalent in the older age groups. It also appears that some important factors contributing to the development of occupational health conditions were not included in the present study, as none of the variables in the current study were significantly associated with occupational health problems in Cambodian dentists.

Future research should also aim to further investigate the underlying causes of the reported occupational health problems and explore potential interventions that could improve the occupational health and safety of oral health professionals in Cambodia. Further research and interventions in this area can contribute to the development of policies and guidelines that promote a safe and healthy working environment for dental practitioners.

Despite these limitations, the study findings provide valuable insights into the occupational health-related challenges faced by Cambodian dentists. Data were collected using instruments that showed good construct validity and reliability, and present results do not differ greatly from other reports in the literature on occupational health-related challenges faced by dentists.

These findings highlight the importance of addressing the physical and mental well-being of oral health professionals in Cambodia to ensure their continued productivity and job satisfaction. Findings emphasize the importance of dentists to stay updated on new equipment, materials, and techniques that could impact their occupational health, as well as the need to use ergonomic equipment (i.e., saddle seats, loupes, and microscopes) [30] that can help dentists improve their working position and reduce the risk of musculoskeletal disorders [15]. Cambodian dentists should also be equipped with knowledge and resources for effectively managing and seeking support for their mental health conditions and stress.

This self-directed approach about prevention and early identification of occupational health concerns underscores the need for greater emphasis on occupational health education within dental curricula and ongoing professional development programs. The provision of this information should start during undergraduate training and be integrated into continuing professional development programs. Continuing education plays a crucial role in enhancing dentists' awareness and providing practical strategies to prevent occupational hazards and work-related health issues. Additionally, dental schools should implement comprehensive monitoring systems to safeguard the well-being of their students [13]. It is imperative that information regarding occupational health problems among dentists be incorporated into the undergraduate dental curriculum of all dental schools. Further research is recommended to assess the content of dental school curricula and identify interventions that can promote health and safety in the dental workplace.

5. Conclusions

This section is not mandatory but can be added to the manuscript if the discussion is unusually long or complex.

This study sheds light into the occupational health and safety concerns experienced by Cambodian dentists. It contributes significantly to the existing knowledge gap in this field within the country, emphasizing the substantial prevalence of physical and psychological health issues among Cambodian dentists. These findings underscore the urgent need for interventions and support systems to address these concerns and prioritize the well-being of dentists in Cambodia. The outcomes of this study can serve as a foundation for the development and implementation of health and safety policies and interventions aimed at tackling these issues effectively in the future. By

gaining a deeper understanding of the knowledge, attitudes, practices, and beliefs of dentists, it becomes possible to mitigate occupational health problems through the implementation of preventive measures, targeted education and training programs, and the identification of barriers or challenges to safety protocols. Addressing these attitudes through awareness campaigns or interventions can promote a safer work environment. Furthermore, evaluating the actual practices of dentists in relation to occupational health measures can identify areas for improvement and inform the implementation of interventions that enhance compliance with safety guidelines.

Author Contributions: For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization, R.M. and R.H.; methodology, R.M. and R.H.; formal analysis, R.M.; investigation, R.H. , M.S., K.H., S.H.;.; data curation, R.H. , M.S., K.H., S.H.; writing—original draft preparation, R.M. and R.H.; writing—review and editing, R.M.; supervision, R.H.; project administration, R.H. All authors have read and agreed to the published version of the manuscript.

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