Review

Nutrition, Oral Health, and Occupational Well-Being in Dental Professionals: Challenges and Strategies for Health Promotion

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Review

Nutrition, Oral Health, and Occupational Well-Being in Dental Professionals: Challenges and Strategies for Health Promotion

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Abstract

Background: Nutrition plays a pivotal role in sustaining both general and oral health; however, dental professionals often neglect their own dietary habits due to demanding clinical schedules, occupational stress, and limited access to workplace health promotion initiatives. These factors contribute to irregular eating patterns, increased consumption of ultra-processed foods, and poor hydration, ultimately affecting their oral and systemic well-being. **Methods:** A comprehensive literature review was conducted to explore the associations between dietary behaviors, work-related stress, and oral health outcomes among dental professionals. The databases PubMed, Scopus, and Cochrane Library were searched using MeSH terms and keywords such as Dentists, Oral Health, Diet, Nutrition Education, Work Environment, and Well-Being. Studies published in English between 2010 and 2024 were included. Screening, quality assessment, and data extraction were performed according to predefined inclusion criteria, and the results were narratively synthesized. **Results:** Twenty-one studies met the inclusion criteria. Evidence indicates that occupational demands, time constraints, and high stress levels promote unhealthy dietary behaviors among dentists. These behaviors are associated with higher risks of dental caries, periodontal disease, fatigue, and burnout. Conversely, structured wellness interventions, nutritional education during dental training, and supportive work environments were found to enhance both oral hygiene and systemic health, including improvements in BMI, metabolic status, and psychological well-being. **Conclusions:** Integrating nutrition literacy and lifestyle medicine principles into dental curricula and workplace policies can significantly improve the health and performance of dental professionals. Future interventional and longitudinal studies should focus on evaluating evidence-based strategies that promote sustainable dietary behaviors and resilience in dental teams.

Keywords: dental professionals; oral health; nutrition; dietary habits; occupational stress; lifestyle medicine; health promotion; well-being; resilience; work environment

1. Introduction

Nutrition plays a pivotal role in maintaining physical and mental health, influencing not only individual well-being but also professional performance across healthcare disciplines [1]. Healthcare professionals, including dentists, play a crucial role in promoting public health by delivering both preventive and therapeutic services [2]. Their responsibilities extend beyond clinical care to encompass patient education, particularly in encouraging healthier lifestyle choices [3–5]. However, despite their expertise in health promotion, many healthcare professionals struggle to maintain optimal dietary habits due to the demands of their work environments [6]. Factors such as long working hours, high stress levels, and irregular schedules frequently disrupt eating patterns,

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contributing to unhealthy food choices, missed meals, and inadequate nutrient intake [1,7]. Among dentists, these challenges are further enriched by the limited availability of nutritious food options during clinical hours, resulting in increased reliance on quick, processed meals [6,8].

Unhealthy eating patterns among healthcare professionals are associated with obesity, cardiovascular disease, type 2 diabetes, and impaired cognitive performance, undermining both clinician well-being and patient safety [3,9–11]. These findings highlight the need for systemic interventions to support nutrition and well-being [10,12]. Especially for dentists, diet is extremely relevant since it directly influences oral health outcomes [13]. Nutritional deficiencies are linked to caries and periodontal disease, undermining clinical performance and professional credibility [13,14]. Yet few dentists provide dietary counseling during everyday dental practice [16], underlining the need for closer collaboration with dietitians [15,16].

Barriers to healthy eating include limited nutrition education, low confidence in knowledge, and unsupportive work environments [17–21]. Stress and demanding schedules often lead to emotional eating of nutrient-poor foods, contributing to burnout and dissatisfaction, particularly among dentists [8,22,23]. Shift work further disrupts circadian rhythms and dietary quality, with night shifts associated with unhealthy patterns and increased metabolic risk [3,7,9,24,25]. Policies ensuring regular breaks and healthy food access are essential [7,22].

Cultural and social expectations also shape dietary behaviors, sometimes conflicting with modern guidelines and discouraging professionals from seeking support [15,25,26]. Expanding nutrition education in medical and dental curricula, alongside continuing training and workplace-based initiatives, can promote healthier practices [13,15,16,27]. Combined with policy-level reforms, such strategies can create sustainable improvements in health and performance [23,27].

This review identifies key gaps regarding dentists' dietary habits, particularly the impact of occupational stress and the lack of longitudinal evidence on long-term outcomes [14]. Addressing these gaps is vital to developing targeted interventions that enhance both dentists' well-being and patient care.

This review critically examines the connection between nutrition, oral health, and occupational well-being among dental professionals. It explores how workplace stressors shape dietary behaviors, influencing both clinical performance and oral health outcomes, and identifies strategies such as educational, institutional, and policy-level that promote sustainable nutrition practices and professional resilience. The central research question guiding this review is: "How do dietary habits, shaped by occupational conditions, affect the oral health and overall well-being of dentists, and what interventions can address these challenges?"

2. Materials and Methods

The methodology of this review was based on an extensive literature search conducted in PubMed, Scopus, and the Cochrane Library, focusing on quantitative studies investigating the effects of occupational factors, including the COVID-19 pandemic, on the nutrition, health, and working conditions of dental professionals [28]. Data extraction and quality assessment in the selected studies were performed according to standardized protocols, notably the Newcastle-Ottawa Scale for non-randomized studies and statistical analysis using SPSS (IBM, 2022) [29]. The entire process followed the PRISMA 2020 guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure transparency and reproducibility (https://www.prisma-statement.org/prisma-2020-flow-diagram).

Clear inclusion and exclusion criteria were defined before data collection. Eligible studies were those published between 2015 and 2024, written in English, and addressing the relationship between nutrition, oral health, and occupational well-being among healthcare professionals, with a particular emphasis on dentists [28,29]. This timeframe was selected to encompass both early methodological developments and the growing recognition of nutrition as a determinant of oral and systemic health over the past decade. The search was finalized in 2025, thereby capturing the most recent available evidence. Further, only primary quantitative research (e.g., cross-sectional and case-control studies)

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was included to ensure methodological consistency. Systematic reviews, qualitative studies, editorials, and papers lacking original data were excluded to prevent overlap and maintain epidemiological rigor [28]. Studies were also excluded if they did not focus on healthcare professionals or failed to examine nutrition and oral health as primary outcomes.

The certainty of evidence was assessed using the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) approach, recognized as the gold standard for evaluating evidence quality in systematic reviews (https://gdt.gradepro.org/app/handbook/handbook.html). The GRADE framework enabled a structured assessment of each study's risk of bias, consistency of findings, directness of evidence, precision of estimates, and potential publication bias. Evidence was categorized into four levels: High, Moderate, Low, or Very Low, reflecting the degree of confidence that future research may alter current conclusions. Two reviewers independently applied the GRADE criteria, and any discrepancies were resolved through consensus discussion to ensure accuracy and transparency [29].

2.1. Flowchart and Study Selection Process

The review process involved a comprehensive evaluation of the methodological patterns of the selected studies to confirm their adherence to high scientific standards, thereby strengthening the reliability and validity of the results [28]. During screening, studies were excluded based on the following criteria: (1) irrelevant population (non-dental professionals or unrelated occupational groups); (2) intervention mismatch (absence of dietary, nutritional, or workplace-based components); (3) inadequate outcomes (lack of data on health resilience, well-being, performance, or nutritional behaviors); (4) study type (non-original research or unavailable full text); and (5) duplicate record [30].

The following flowchart illustrates the systematic process of identifying, screening, and selecting studies for inclusion in a review. It outlines each stage, from the initial identification of records from databases and registers to the final inclusion of eligible studies. Key steps include the removal of duplicates, screening for relevance, retrieval of full-text reports, and the assessment of eligibility based on predefined criteria. This flowchart provides a clear and transparent overview of the methodology, ensuring the reproducibility and reliability of the study selection process. In the final selection phase, 72 studies were excluded after a thorough review, resulting in 21 studies being included in the systematic review (Figure 1). This quantitative breakdown underlines the systematic approach taken in the selection process, ensuring the inclusion of high-quality and relevant evidence.

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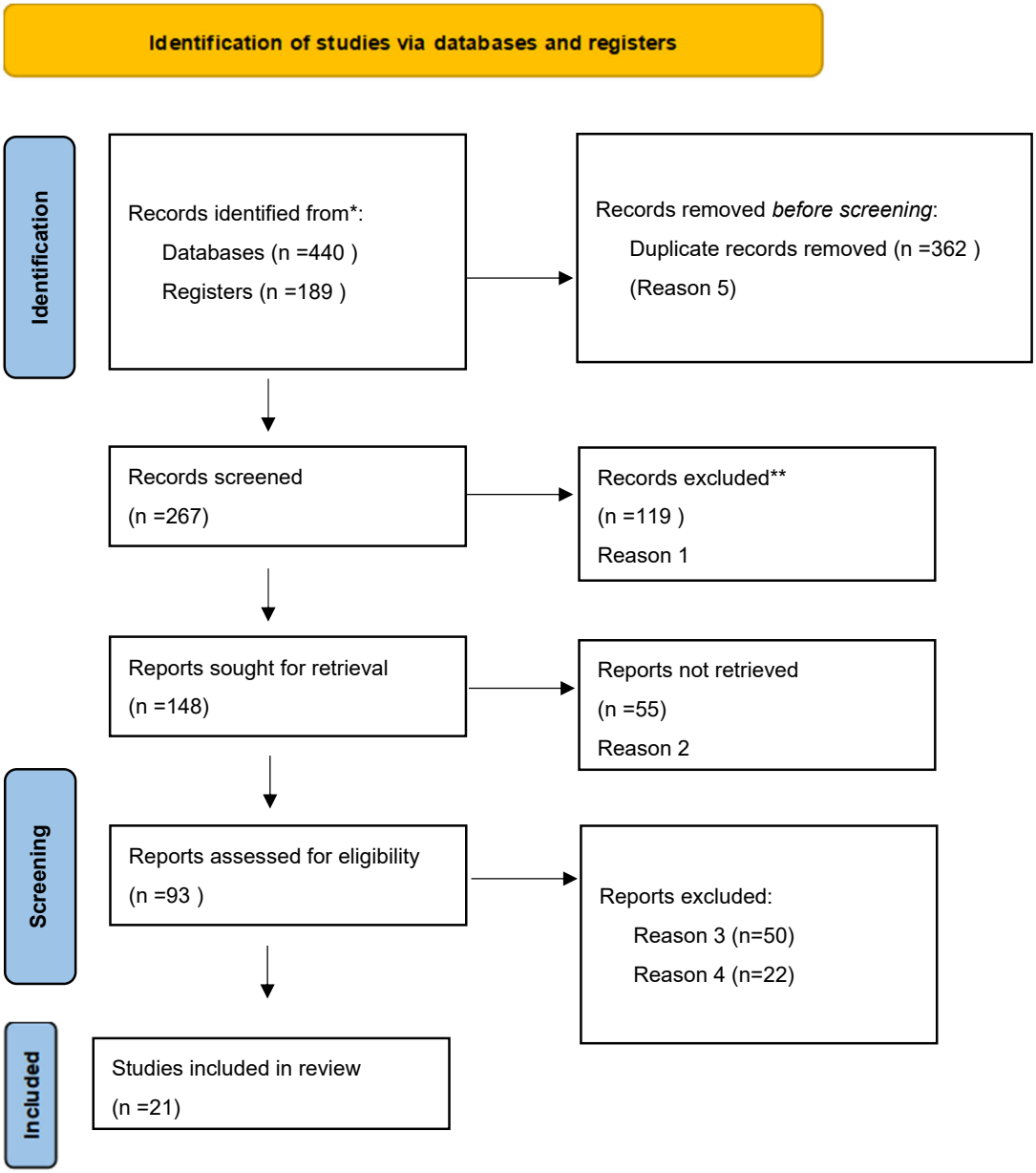

Figure 1. PRISMA Flowchart for the results of the search strategies.

3. Results

The use of proportional analysis, namely the comparison of topic-specific publications with the total number of publications per year on the theme, provides a more accurate perspective, avoiding the distortion created by examining absolute numbers alone.

The relevant graph clearly shows that, proportionally, 2021 marks the peak year of research output on diet and oral health among dentists, a trend closely linked to the unique dynamics of the COVID-19 pandemic period. Similarly, 2024 records a high proportion, confirming that the topic remains timely and continues to attract scientific interest. This proportional approach, therefore, enhances the validity of the conclusions, as it reflects not only the frequency but also the relative weight of publications within the broader research landscape.

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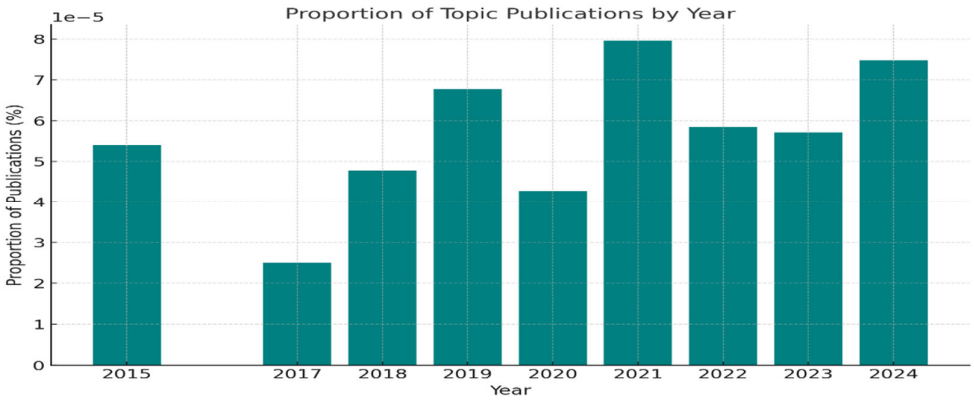

Figure 2. Proportional distribution of publications on diet and oral health among dentists in relation to total annual scientific output (2015-2024).

Table 1. In Table 1, we present the analysis of the articles selected for our systematic review.

Authors	Type of study-Single/multi-center	Population	Exposure	Comparators	Funding and Conflict	statistical significance	Limitations	Ethics approval	Sample calculation	Confounders	Outcomes
1.Tantimahanon et al., (2024), [8].	Cross-sectional (multi-center)	Dental professionals (UG, PG, DT; n=842)	Dietary behaviors	Knowledge, attitude, alcohol consumption	No conflicts mentioned; funded by Mahidol University	Significant correlation ($P < 0.001$ for all groups)	Self-reported survey may lead to response bias. Age range primarily under 30, limiting generalizability.	Approved by Mahidol University IRB (MU-DT/PY-IRB 2023/004.1701)	Calculated using the formula for a finite population (CI 95%, margin error 6%)	Stress, socioeconomic factors, and living environment	Attitude was the strongest determinant. Alcohol consumption is negatively associated with healthy behaviors.
2. Crespo-Escobar et al. (2024)[15]	Cross-sectional, multi-center	CeD patients (n=2,437); HCPs (n=346); Relatives (n=1,294)	Knowledge and adherence to GFD	Knowledge gaps in GFD; adherence in CeD	Not disclosed	Significant differences in knowledge sources and quality of GFD	Self-report bias; focus on Spain; overrepresentation of association members; limited dietitian availability in	Approved by the Ethics Committee of UPV/EHU	Sampling via the snowball method, with no formal sample calculation.	Sociodemographic data, professional role, and patient association membership	Knowledge gaps in GFD adherence among CeD patients and HCPs; limited time in consultations; reliance on unreliable

						information provision ($p < 0.05$)	public healthcare; cultural specificity of findings.				sources (e.g., Internet).
3.Hobby et al. (2024)[19].	Cross-sectional qualitative design	22 health professionals (including dietitians)	Perceptions of how personal diet influences self-efficacy in providing nutrition care	Not applicable	Not reported	Not applicable	Small sample size; findings may not be generalizable due to recruitment through media channels; self-reported data may introduce bias	Approved	Not applicable	Social environment, personal experiences	Health professionals perceive that personal dietary habits strongly influence their self-efficacy in providing nutritional care. Strategies supporting healthier diets may enhance care quality.
4.Znyk & Kaleta (2024)[31].	Cross-sectional study	161 doctors and 331 nurses in Poland	Eating habits and diet quality during shifts	General population; different work conditions	Not reported	Univariate logistic regression showed significant	Self-reported data may introduce recall bias; cross-sectional design; no questions about income;	Approved	Not applicable	Work experience, number of patients, BMI, smoking	Unhealthy eating habits affected 25.8% of healthcare workers, linked to smoking, work experience, and patient load. Nurses exhibited

						determinants of diet ($p < 0.05$)	small sample size; conducted during COVID-19 pandemic, potentially affecting habits.				a higher prevalence of unhealthy habits.
5.Chen et al. (2023) [32]	Cross-sectional study	In-service physicians in mainland China	Eating habits (e.g., eating out, eating irregular meals, eating too fast)	Physicians with healthier eating habits	Not reported	Significant associations between unhealthy eating habits and suboptimal health/ disease occurrence ($p < 0.05$)	Convenience sampling: self-reported data may introduce recall bias; cross-sectional design limits causal inference.	Approved	Not applicable	Sociodemographic characteristics, BMI classification	High prevalence of unhealthy eating habits is linked to increased rates of suboptimal health, obesity, and metabolic diseases among physicians. Eating too fast and eating out were common.

6.Utter et al. (2023)[12]	Cross-sectional study, single center (large healthcare organization in South-East Queensland, Australia)	501 healthcare workers (varied roles)	Dietary behaviors (overall diet quality, fruit/vegetable intake, family shared meals)	Different levels of dietary indicators (e.g., high vs low diet quality)	Not specified	Significant inverse relationship: healthier diet associated with lower burnout (adjusted for covariates)	Cross-sectional design (no causality); self-reported data; single site; no sample size calculation reported	Not explicitly stated (likely approved by institutional ethics board)	Not reported	Age, gender, role, employment level	Burnout levels; dietary behavior indicators
7.Sert & Kendirkiran (2023) [23]	Cross-sectional descriptive study	255 nurses working in Istanbul	Emotional eating behavior, burnout levels, and their effect on job performance	Nurses with different experience levels and job satisfaction levels	Not reported	Significant positive relationship between burnout, emotional eating,	Small sample size; single hospital study may not generalize findings; self-reported scales may introduce bias	Approved	Not detailed	Work environment factors, job satisfaction, and intensive care exposure	Burnout and emotional eating behavior negatively affect job performance. Recommendations include stress management training, psychiatric support, and organizational changes to

						and job performance					improve nurses' emotional and physical well-being.
8.Gilbert et al. (2023) [7]	Observational (multi-wave)	University and medical center staff (n=1,994 wave 1; 1,426 wave 2; 1,363 wave 3)	Physical activity and diet during COVID-19	Mental well-being, depression, anxiety, stress	Not specified	Maintained or increased physical activity and a healthy diet were significantly associated with reduced risk of worse mental health outcomes (ORs	Self-reported data, potential recall bias, no pre-pandemic data, and generalizability limited to one employer.	Approved by Washington University IRB	No specific sample calculation described; participation across three waves	Clinical role, age, gender, race, income, ethnicity	Maintaining/increasing PA and diet correlated with better mental health outcomes (e.g., reduced anxiety, stress).

						0.44–0.76).					
9.Bouillon-Minois et al. (2022),[25]	Prospective observational	184 emergency HCWs	Night shifts on food and water intake	Day shifts as baseline	Not stated	Calorie intake decreased by 206 kcal (p=0.049) and water consumption by 243 mL (p=0.010).	Small sample size, limited to emergency HCWs; self-reported food intake data; no long-term follow-up	Yes	Not reported	Time of day, shift duration	Night shifts reduced caloric intake by 14.7%, water consumption by 16.7%, carbohydrates by 8.7%, proteins by 17.6%, and lipids by 18.7%; increased periods without eating or drinking.
10.Wolska et al. (2022)[33]	Cross-sectional study	445 healthcare workers	Shift work and dietary patterns	Daily work	Not reported	Significant differences in dietary patterns and fat intake among shift	Regional sample; self-reported dietary data using FFQ; cross-sectional design limits causal relationships	Approved	Not applicable	Mealtime consistency, Polish-aMED® score, dietary fat intake	Shift workers showed 2x higher adherence to 'Meat/fats/alcohol/fish' pattern; lower adherence to 'Pro-healthy' dietary patterns and consistency

						workers ($p < 0.05$)					in mealtime; higher fat intake.
11.Mehrotra et al. (2021)[34]	Cross-sectional survey	473 HCWs (doctors, nurses, pharmacists, interns, technicians)	Oral health knowledge, attitudes, and practices	Comparison across HCW categories	Not stated	Significant differences in oral health knowledge among HCW categories ($P < 0.05$)	Self-reported data; limited sample size; cross-sectional design	Yes	Not applicable	Demographics, profession, gender	Positive attitude towards professional dental care across all HCWs; significant variation in knowledge and practices based on profession.
12.Mota et al. (2021, Brazil)[35]	Cross-sectional study	710 Brazilian HCWs (predominantly women, aged 30-40, mostly physicians)	Impact of COVID-19 on eating habits, physical activity, and sleep	General population data for comparison	Not stated	Significant changes in sleep, diet, and physical activity patterns	Self-reported data; potential recall bias; limited generalizability to HCWs outside Brazil	Yes	Not reported	Gender, age, professional role	Sleep-related complaints (66%); increase in carbohydrate and alcohol intake (24.5% and 27%, respectively); reduced physical activity (81.8%); self-medication

						among HCWs					for insomnia (60.3%).
13Lieffers et al., (2021),[16]	Scoping Review	Oral health professionals and dietitians in high-income countries	Nutrition care practices for oral health conditions	Nutrition care practices for oral health conditions	No conflicts reported, various funding sources	Not applicable	Limited data on dietitians; lack of detail on care provided; language restrictions (English only)	Not applicable	Not applicable	Not applicable	Identified gaps in the literature; recommendations for future research on collaboration and practices
14.Portero de la Cruz et al. (2020))[36]	Cross-sectional study	171 emergency nurses	Burnout, perceived stress, diet, job satisfaction	Not applicable	No conflict of interest	Lack of physical exercise, gender, and years worked were significant predict	Single region; potential reporting bias due to self-reported measures; cross-sectional design limits causal inference	Approved	Not applicable	Gender, years of experience, coping strategies, anxiety	Prevalence of high burnout: 8.19%. Moderate perceived stress and job satisfaction; frequent social dysfunction and somatic symptoms; problem-focused coping is commonly used.

						ors of burnout					
15.Schneider et al. (2019)[3]	cross-sectional data	18,820 participants (471 nurses, 433 healthcare professionals, 813 care workers, 17,103 non-healthcare workers)	Health-related behaviours: smoking, alcohol, physical activity, fruit/vegetable intake	General working population in Scotland	Not reported	Significant differences found in smoking, physical activity, and fruit/vegetable intake; no significant differences in	Small sample size for certain subgroups (e.g., nurses); self-reported behaviours may introduce bias	Not reported	Not reported	Age, occupation group	Nurses reported better health-related behaviours (except alcohol consumption) compared to the general population. Other healthcare professionals exhibited the best behaviours overall.

						alcohol consumption					
16.Almotebet al. (2019)[38]	Cross-sectional study	431 HCWs (doctors, nurses, pharmacists, technicians)	Oral hygiene status, practices, and knowledge	Comparison of doctors vs. others	Not stated	Significant differences in oral hygiene practices among HCWs ($P < 0.05$)	Limited to one hospital; cross-sectional design; lack of WHO oral hygiene pro forma	Yes (PSAU/CDS/430400428/2016)	Based on the formula	Age, gender, profession	Fair oral hygiene status observed; doctors demonstrated better interdental aid usage; need for improved oral health education and integration into medical training.
17. Van Horn et al 2019[39]	Expert workshop–based position/report; synthesizes existing education initiatives; multi-institutional/disciplinary representation	Medical students, residents, fellows, attending physicians, and other clinicians in the U.S. (and collaborators	Nutrition education frameworks, competency-based curriculum, interprofessional coordination	Pre-workshop baseline of medical nutrition training vs. proposed compete	Supported by NIH (NHLBI, Office of Dietary Supplements, Office of Disease Prevention) and American	Not applicable (informal consensus report; no primary data testing)	Not empirical; consensus may reflect workshop attendees' views; lacks direct outcome data; U.S.-centric; potential bias from funding stakeholders	Not required for workshop synthesis	Not applicable	Not applicable (conceptual framework rather than an experimental design)	Recommendations/frameworks: competency-based nutrition education, national coordination center, interprofessional collaboration models,

		internationally)		ncy-based updates; integrated models vs. traditional curricula	Society for Nutrition;						accreditation integration
18. Touger-Decker et al (2019) [40]	Practice guideline/position paper (single committee-authored; not empirical research)	Dietitians, nutritionists, and oral health professionals—recommendation target; broader public indirectly	Integration of nutrition and oral health—screening, education, referrals, medical nutrition therapy	Best-practice integrated nutrition–oral health services vs. non-integrated or standard care	Endorsed and published by Academy of Nutrition and Dietetics/Elsevier; no industry funding or conflicts disclosed	Not applicable (consensus guideline; no original data or statistical testing)	Position based on existing literature and expert consensus; may be influenced by publication bias; not a systematic review	Not required (non-research guideline development)	Not applicable	Not applicable (guideline synthesis, not primary research)	Recommendations for joint nutrition–oral health care practices, education, interprofessional collaboration, and research integration
19.Ab-Murat et al., (2018)[41]	Cross-sectional survey	Malaysian dentists (81% response rate)	Mental well-being assessed through	Not disclosed	- Positive mental well-being higher in those >40	~2.5 (as of publication year)	Limited to Malaysian dentists - Self-reported data may	Approved, details not specified	Sample size not explicitly	Age, marital status, parental status	- 61.7% reported positive mental well-being

			self-administered questionnaire using a conceptual framework		years, married, and with children (P < 0.05)		introduce bias - No detailed funding disclosure - Lacks longitudinal analysis		calculated		
20.Ahmad et al. (2015)[43]	Cross-sectional	Healthcare professionals (N = 1,190; doctors, nurses, dentists in Punjab, Pakistan)	Dietary habits, exercise, and mental well-being	Comparison with recommended guidelines (USDA, AHA, WEMWBS)	Not disclosed	Significant associations for diet, exercise, and mental well-being factors (p < 0.05)	Convenience sampling, limited to Punjab, Pakistan; self-reported BMI; no occupational stress scale; reliance on non-local guidelines (USDA); underrepresentation of dentists	Approved by CMH Lahore Medical and Dental College Ethical Review Committee	Sample size based on effect sizes; no priori power calculation.	Sociodemographic factors, income, profession, and occupational stressors	HCPs in Pakistan have poor adherence to dietary, exercise, and mental well-being guidelines, impacting both personal and professional outcomes.

21.Waqas al., (2015) [44]	Cross-sectional	Healthcare professionals (N = 1,319; doctors, nurses, dentists, pharmacists, physiotherapists in Punjab, Pakistan)	Diet, exercise, mental well-being, chronic illnesses, and occupational stressors	Comparison with global and USDA dietary standards, AHA exercise guidelines, WEMWBS mental well-being scores	Not disclosed	Identified significant predictors of mental well-being ($p < 0.05$)	Convenience sampling, restricted to Punjab, no validated occupational stress scale; BMI based on self-reported data; limited generalizability to Pakistan.	Ethical approval obtained, but WEMWBS not translated into Urdu	Not calculated; convenience sampling used with 87.35% response rate	Sociodemographic factors, household income, and career satisfaction	HCPs in Punjab exhibit suboptimal dietary and exercise habits, moderate mental well-being, and high occupational stress levels affecting both personal and professional health.

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3.1. Type of Study and Study Design

The majority of studies included in this review are observational, with cross-sectional surveys being the most prevalent design. Cross-sectional approaches, as seen in studies by Ahmad et al. (2015), Waqas et al. (2015), Bouillon-Minois et al. (2022), and Tantimahanon et al. (2024), are commonly used to capture a snapshot of dietary habits, mental well-being, or the effects of work patterns (e.g., shift work) among healthcare professionals at a single point in time [8,25,43,44]. This design is efficient for identifying associations across large populations but does not establish causal relationships. However, they depend on the quality and consistency of primary studies, which may introduce bias. In addition to these, some position papers and expert reports (e.g., Van Horn et al. (2019); Touger-Decker et al. (2019)) offer frameworks and recommendations for advancing nutrition education and interprofessional collaboration [39,40]. Though not empirical studies, these publications contribute valuable guidance for curriculum development and policy reform. Overall, the dominance of cross-sectional and observational designs across the reviewed articles reports on a strong descriptive focus in this research field, providing important insight into current practices and gaps, while highlighting the need for more longitudinal and intervention-based studies to better inform evidence-based strategies.

3.2. Population and Sample Size

The studies included in this review examined a diverse range of healthcare professionals across various countries and settings, including doctors, nurses, dentists, dietitians, and allied health workers. This diversity provides insight into how professional roles, work environments, and cultural contexts influence dietary habits, physical activity, mental health, and occupational stress. To be more specific, sample sizes varied considerably across studies. Larger studies, such as Waqas et al. (2015) (1,190 participants), Mota et al. (2021) (710 healthcare workers), and Tantimahanon et al. (2024) (842 dental profession-als), offered stronger findings and increased generalizability [8,35,44]. In contrast, smaller studies like Hobby et al. (2024) (22 participants) and Bouillon-Minois et al. (2022) (184 emergency healthcare workers) had limited statistical power and generalizability [19,25]. Also, many studies reported gender imbalances. For example, Mota et al. (2021) noted that 80.8% of participants were female, a common trend in healthcare workforce studies. Such imbalances may affect interpretations of gender-related health behaviors [35]. Further, sampling methods also varied, with many studies relying on convenience sampling and self-reported data, which introduce potential selection and response biases [7,34,35]. More structured sampling approaches were used in studies like Tantimahanon et al. (2024) (multi-center survey) and Crespo-Escobar et al. (2024) (diverse participant pool), improving representativeness [8,15]. In addition, cultural and regional differences further affect generalizability across studies. For example, findings from studies conducted in Asia, Europe, and North America reflect varying healthcare systems and dietary practices [7,14,25,39]. In summary, while the reviewed studies encompass a broad range of healthcare populations and settings, the variability in sample sizes, gender distribution, and sampling methods must be considered when interpreting the results and their applicability to different contexts.

3.3. Data Collection Methods

The studies in this review employed a variety of data collection methods, primarily determined by study design and population characteristics. Most cross-sectional and observational studies relied on self-administered surveys or questionnaires to gather data on dietary habits, physical activity, mental well-being, and occupational stressors [7,12,14,35]. These instruments were often distributed electronically (e.g., via online platforms) or through healthcare institutions, allowing efficient access to large, geo-graphically dispersed populations of healthcare workers.

The primary strength of survey-based data collection is its cost-effectiveness and ability to capture a broad range of behaviors and self-reported outcomes. However, these methods also carry limitations, notably recall bias, social desirability bias, and limited accuracy in reporting dietary or

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activity patterns [15,19,35]. Variability in question wording and participant interpretation can further impact data reliability [43,44]. Further, qualitative approaches, including interviews and focus groups, were used in studies like Hobby et al. (2024), which explored healthcare professionals' perceptions of how personal diet influences nutrition care provision [19]. These methods provide rich, detailed insights into attitudes and behaviors but are limited by small sample sizes and potential researcher bias during data collection and interpretation. A smaller number of studies used direct observational methods. For example, Bouillon-Minois et al. (2022) employed a prospective observational design to record the actual food and water intake of healthcare workers during shift work [25]. This method offers more objective data on behaviors, reducing reliance on self-report, but can still be influenced by observer effects (e.g., Hawthorne effect). Finally, systematic reviews and secondary data analyses integrated findings from multiple primary studies to provide broader evidence on diet, nutrition, and oral health [13,14]. While such methods enhance statistical power and contribute to evidence synthesis, they are constrained by the quality and heterogeneity of the included studies [15]. In conclusion, while most studies in this review relied on surveys for feasibility and reach, the use of diverse data collection methods, both quantitative and qualitative, provided complementary insights into healthcare professionals' health behaviors and outcomes.

3.4. Statistical Methodology, Analyses, and Recommendations

The studies reviewed employed a range of statistical methods suited to their observational and cross-sectional designs. Descriptive statistics, means, standard deviations, and percentages were commonly used to summarize demographic characteristics and self-reported behaviors [14,35,43]. These provided a general overview of dietary habits, physical activity, and mental well-being among healthcare professionals but do not permit causal inferences [15,16]. Also, inferential statistics were used in many studies to explore relationships between variables. Chi-square tests and t-tests were commonly employed to assess associations between categorical variables or to compare outcomes across groups [14,44]. Regression analyses (both univariate and multivariate) were frequently used to control potential confounders and to identify predictors of behaviors such as dietary patterns and burnout [7,19]. For example, Tantimahanon et al. (2024) used correlation analyses to demonstrate significant relationships between nutrition knowledge and healthier eating behaviors [8]. However, the predominance of cross-sectional designs limits the ability to establish causality or temporal relationships between variables. Many studies, including those by Mota et al. (2021), Gilbert et al. (2023), and Souza et al. (2019), emphasized the need for longitudinal research to better understand how dietary behaviors and health outcomes evolve [7,35,37]. Also, sample size limitations were noted in several studies, which may have reduced statistical power and the ability to detect smaller effects [14,44]. Additionally, the widespread reliance on self-reported data introduced potential biases such as recall error and social desirability [19,35].

To address these limitations, several authors recommend the use of objective measures (e.g., biomarkers, direct observation) to supplement self-reports [7], as well as the inclusion of more diverse and representative populations [15,44]. Furthermore, Bouillon-Minois et al. (2022) stress the importance of designing targeted interventions that consider the specific constraints of healthcare settings, such as shift work, time pressures, and access to healthy food options [14]. Conclusively, while the statistical methods employed were appropriate for descriptive and associative purposes, there remains a clear need for stronger longitudinal and intervention-based studies to advance this field.

3.5. Limitations Reported

The studies included in this review, although valuable, present several notable methodological limitations that must be considered when interpreting their findings. A key concern is their predominant reliance on observational and cross-sectional designs, which inherently restricts the ability to establish causal relationships. In particular, many studies relied on self-reported data, a practice prone to recall bias and social desirability bias, often resulting in underreporting of adverse

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behaviors and overreporting of favorable ones [7,34,35]. Sampling issues further weaken the robustness of the evidence, as several investigations employed non-random or convenience sampling methods, such as those reported by Ahmad et al. (2015) and Mota et al. (2021), thereby limiting the generalizability of results beyond the specific study populations [35,43].

Additionally, the absence of formal power calculations and stratified sampling in many studies reduces statistical precision, making it difficult to detect subtle effects or to adequately represent the diversity of healthcare professionals [14,44]. The cross-sectional nature of most included studies also constrains the interpretation of directionality in observed associations, for example, whether dietary behaviors influence mental well-being or vice versa [14,35].

3.6. Comparative and Cross-Cultural Analysis

A cross-cultural comparison of healthcare professionals' health behaviors reveals both shared challenges and regional differences shaped by cultural and socioeconomic contexts. Across all regions, work-related stress, long hours, and irregular shifts negatively affect dietary habits, physical activity, and mental well-being [7,44]. Studies from Western countries such as the US and UK emphasize barriers like long working hours, limited access to healthy food, and workplace stress, which contribute to poor dietary choices and mental health outcomes [7,42]. In contrast, research from Pakistan and Saudi Arabia highlights the influence of socioeconomic factors, traditional dietary practices, and limited preventive health infrastructure, with healthcare professionals reporting poorer diet quality and greater mental health challenges [38,44]. Further, in Brazil and Thailand, the COVID-19 pandemic significantly impacted healthcare workers' behaviors, leading to increased stress, higher intake of carbohydrates and alcohol, and changes in physical activity as coping mechanisms [8,35]. To add more, a key distinction between higher-income and lower-income countries is in the availability of structured workplace wellness programs. In high-income settings, there is greater emphasis on preventive health promotion, though barriers such as stress and time constraints remain [42]. In lower-income countries, limited healthcare resources often result in greater focus on treatment rather than prevention [38,44]. In sum, while healthcare professionals worldwide face similar occupational stressors affecting health behaviors, cultural norms, economic resources, and healthcare infrastructure shape both the risks and opportunities for intervention. These findings underline the importance of locally tailored strategies that consider regional contexts to promote sustainable health improvements among healthcare workers [7,35].

3.7. Overall Implications

The findings from this review highlight significant challenges in maintaining healthy lifestyles among healthcare professionals across diverse settings. Long working hours, high job stress, irregular shifts, and emotional exhaustion contribute to poor dietary habits, insufficient physical activity, and increased mental health risks, ultimately affecting both healthcare workers' well-being and the quality of patient care [7,38,44]. There is a clear need for structured, workplace-based interventions that address both physical and mental health. Creating supportive environments, through access to healthy food, opportunities for physical activity, and comprehensive mental health resources, is essential for reducing burnout and promoting healthier behaviors [8,15]. Effective programs should integrate exercise facilities, nutritious cafeteria options, and accessible psychological support services [19,42]. Further, wellness initiatives such as mindfulness programs, flexible work schedules, and stigma-free mental health resources can enhance occupational health outcomes [23]. At the policy level, institutional and governmental reforms are needed to prioritize preventive health strategies, shifting from reactive care to a proactive approach [8]. This includes establishing national guidelines for workplace wellness and incentivizing healthy behaviors [14]. To add more on this, tailored, culturally sensitive interventions are also necessary. In low- and middle-income countries, barriers such as limited resources and socioeconomic constraints require targeted solutions, such as subsidized healthy foods, community-based education, and mHealth (mobile health) tools to extend reach and impact [13,35,43]. Additionally, gender roles, religious practices, and community norms

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must be considered when designing interventions [12,38]. We should finally mention that the COVID-19 pandemic has exaggerated these challenges, with healthcare workers reporting worsened dietary habits, reduced physical activity, and heightened stress during this period [35]. This underlines the urgent need for long-term policies that enhance the healthcare workforce's resilience and safeguard their health. Conclusively, protecting the well-being of healthcare professionals is vital to maintaining an effective healthcare system. Sustainable, multi-level interventions addressing both short- and long-term needs are essential to promote the health, performance, and resilience of this critical workforce [7,8].

4. Discussion

Healthcare professionals, particularly dentists, occupy a unique position in promoting both general and oral health through clinical practice and patient education [46]. However, their own dietary habits and lifestyle behaviors are often influenced by occupational stressors, irregular work schedules, and high demands, which may undermine their ability to serve as effective role models and contribute to suboptimal personal health outcomes [47]. Given the growing body of evidence linking diet, nutrition, and lifestyle factors to both systemic and oral diseases, including chronic conditions and dental pathologies, addressing these gaps within dental education and practice is increasingly vital. This review seeks to integrate insights from the current literature and international guidelines to propose actionable pathways for improving nutrition-related knowledge, daily practices, competencies, and interprofessional collaboration within the dental field.

4.1. Current Gaps in Nutrition Education for Dentists

A consistent gap across the reviewed literature is the limited nutrition and oral health education provided to dental professionals. Despite WHO and FAO guidelines on sugar reduction and healthy diets [48,49], as well as UK policy recommendations supporting dietary counseling in dental care [50], most undergraduate and postgraduate curricula still lack structured competencies in this area [39,40]. As a result, many dentists report low confidence and insufficient preparation to provide nutrition advice, a problem further influenced by personal dietary habits, workplace stress, and irregular schedules that also contribute to poor nutrition among dental professionals themselves [8,19,35,38,43].

Interprofessional collaboration with dietitians is also limited, despite evidence that such cooperation improves patient outcomes [15,16]. Reviews indicate that dentists rarely integrate dietary counseling into routine care, even though diet is a well-established determinant of caries and periodontal disease [13,14,45,51,52]. Furthermore, nutrition-related knowledge varies widely among healthcare workers, with dentists not consistently outperforming peers in other fields [34,38,53]. The absence of national or institutional mandates reinforces this gap, as competency-based frameworks remain inconsistently applied across dental programs [39,40]. Without systematic reforms and policy-driven integration of nutrition competencies, dentists will remain underprepared to deliver effective nutrition guidance within oral healthcare [52,54].

4.2. Proposed Competency-Based Curriculum

Reforming dental education to integrate structured, competency-based nutrition training is widely recognized as essential. Although diet is a critical factor in preventing and managing oral diseases, many dental programs still provide only limited and inconsistent coverage of nutrition [52,54]. Establishing formal nutrition competencies would ensure that graduates are prepared to assess dietary behaviors, deliver effective counseling, and collaborate with nutrition professionals in clinical care [55]. Current curricula often lack experiential learning, underscoring the need for practical training in nutrition screening tools, case-based learning on diet-related oral conditions, and simulated patient encounters that build communication and counseling skills [45,54].

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Interprofessional education is equally important, as evidence shows that collaboration between dentists and dietitians improves patient outcomes [16,51]. Programs should therefore include joint modules, interdisciplinary rotations, and shared workshops to foster teamwork and patient-centered care [51,54,56]. Alongside technical skills, education must also address psychosocial and behavioral dimensions, since personal dietary habits influence healthcare professionals' motivation and confidence in providing advice [1,19,57]. Enhancing self-awareness and self-efficacy among dental students would strengthen their role-modeling capacity and professional identity [58]. Finally, coordinated action at national and international levels is needed to ensure consistency across institutions. Consensus statements advocate nutrition competency frameworks and accreditation standards, making nutritional education a core element of dental training rather than an optional component [39,55]. Implementing such reforms, combining clear learning outcomes, experiential training, interprofessional collaboration, and standardized curricula, would equip dentists to play a more effective role in promoting nutrition for oral and systemic health, both in clinical practice and in public health advocacy [39,51–55].

4.3. Interprofessional Coordination and Collaboration

Strengthening interprofessional collaboration between dentists, dietitians, physicians, and other healthcare professionals is consistently highlighted in the literature as essential for patient-centered care that integrates nutrition and oral health [39,40,51]. Studies emphasize that isolated efforts by individual practitioners are inadequate to meet patients' complex nutritional needs, supporting the adoption of interprofessional education (IPE) frameworks that foster shared competencies and a common language for collaborative practice [39,59]. Institutional reforms, including national coordination centers, joint curricula, and interprofessional clinical experiences, are also recommended to sustain such collaboration [39,55].

Evidence further indicates that bridging silos between dietetics and dentistry requires deliberate action through collaborative care models that position dentists to work closely with dietitians in nutrition screening, counseling, and referral [40,51]. Yet fragmented systems and the absence of clear referral pathways continue to hinder integration [19,51,61]. Beyond curricular reform, embedding nutrition into standard dental workflows, encouraging shared case management, and supporting cross-disciplinary professional development are critical steps toward building a collaborative culture [45,62]. Promising models, such as the interprofessional training described by Noorullah et al. (2025), where dental, dietetic, and medical students engage in joint clinical sessions and seminars, have shown improved communication, role understanding, and teamwork with measurable benefits for patient care [59]. Expanding such models across dental education requires coordinated action by institutions and professional bodies to integrate interprofessional learning, establish structured referral protocols, and design environments that reward team-based approaches to nutrition and oral health promotion [19,39,40,59].

4.4. Institutional and Policy Recommendations

Embedding nutrition into dental education and clinical care requires coordinated action at both institutional and policy levels. Closing current gaps in training will depend on accrediting bodies, licensing authorities, and professional organizations mandating the inclusion of nutrition competencies in accreditation and licensure standards [39,40,63,64]. Dental graduates should be required to demonstrate competence in dietary assessment, patient counseling, interprofessional collaboration, and referral, while these skills should also form part of continuing professional certification and education [39,40]. Expanding interdisciplinary CPD programs involving dietitians, dentists, and other healthcare providers can strengthen knowledge, foster collaboration, and promote a more integrated approach to patient care [19,65,66].

Beyond education, institutional support is needed to integrate nutrition into daily clinical practice through standardized screening protocols, referral pathways, and patient education tools [45,46,67,68]. The workplace environment also plays a critical role, such as lack of nutritious food,

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insufficient meal breaks, and high stress undermine clinicians' ability to act as role models [19,69]. Policies that provide healthy food options, ensure protected mealtimes, and promote staff wellness can improve both provider and patient outcomes [39,40,70]. Sustainable change will ultimately require alignment across education, regulation, and institutional culture, embedding nutrition competencies into accreditation, expanding interdisciplinary learning, and fostering clinical and organizational environments that support nutrition-informed care [19,39,40,70–72].

4.5. Role of National Coordination Centers

Achieving sustainable integration of nutrition education in healthcare, including dentistry, requires national-level leadership. Fragmented institutional initiatives are insufficient to drive systemic change [19,73]. The establishment of national coordination centers has been proposed to align curricula, define shared competencies, and promote inter-professional collaboration [39,40]. Acting as central hubs, such centers could bring together academic institutions, accrediting bodies, and professional organizations to ensure nutrition competencies are embedded in education, licensure, and clinical practice [40]. They would also reduce disparities between programs by supporting faculty development, resource sharing, and best-practice dissemination [19]. Without national or regional leadership, variability in educational quality and practice standards will persist, limiting progress toward making nutrition counseling a routine component of dental care [51,52]. Coordinated policy action is therefore essential to embed nutrition as a standardized element of healthcare training across all levels [19,39,40,74].

4.6. Enhancing Dentists' Own Oral Health Through Integrated Nutrition Education and Practice

Implementing reforms such as competency-based curricula, interprofessional collaboration, institutional policies, and national coordination can enhance both patient care and the oral and overall health of dentists themselves [75]. Research shows that dental professionals often face stress, irregular schedules, poor dietary habits, and limited access to nutritious food, all of which increase risks of caries, periodontal disease, and other oral conditions [8,19,39,40,74–77]. Integrating nutrition education into dental training can help future practitioners understand how their own dietary choices affect health, while practical learning, reflective practice, and wellness-oriented curricula encourage healthier habits and sustained self-care [8,39,45,51,58,78]. Furthermore, supportive workplace policies, such as access to nutritious meals, protected breaks, and wellness initiatives, further enable dentists to maintain balanced diets and oral hygiene during demanding schedules [39,45,79]. Improved nutrition contributes to reduced inflammation, a healthier oral microbiome, and stronger immune function, thereby lowering the risk of periodontal disease and related conditions [80]. Promoting a professional culture that values self-care and nutrition also empowers dentists to act as authentic role models, strengthening professional identity, job satisfaction, and long-term career sustainability [53,78,81,82]. Collectively, these strategies provide a pathway to improve dentists' oral health, build resilience to occupational stress, and reinforce their role as advocates of preventive oral healthcare [83].

4.7. Integrating Food Science and Oral Health for a Sustainable Nutrition Framework

Recent advances in food technology and nutritional science provide new opportunities for improving both population and professional health [84]. The integration of food science into dental education and practice can enhance understanding of how food composition, processing, and formulation influence oral and systemic outcomes [80]. Ultra-processed foods, for example, have been strongly associated with increased risk of caries, metabolic disorders, and inflammation, cardiometabolic disorders, common mental disorders, and mortality outcomes [85–88]. But are UPFs so unhealthy? [89].

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Conversely, the development of functional foods enriched with bioactive compounds, such as polyphenols, probiotics, and omega-3 fatty acids, has shown promise in modulating the oral microbiome, reducing oxidative stress, and supporting periodontal health [90].

For dental professionals, collaboration with food scientists enables evidence-based dietary recommendations that go beyond simple sugar reduction, emphasizing food quality, processing methods, and sustainability[91]. Incorporating insights from food technology can also guide public health messaging on balanced, minimally processed diets that protect oral health while reducing environmental impact [92]. Such interdisciplinary cooperation supports the global agenda of sustainable health promotion, aligning dentistry with the United Nations Sustainable Development Goals (SDGs 2, 3, and 12). [93].

Finally, future research should explore the interface between food innovation and oral health, examining how reformulated foods, alternative sweeteners, and novel plant-based products affect the oral ecosystem and professional dietary practices[94]. Embedding these topics into both dental and food science curricula would foster mutual understanding, joint research, and the development of nutrition strategies that benefit patients, professionals, and planetary health alike [95].

4.8. Strengths and Limitations of the Present Study

This review highlights the often-overlooked link between nutrition and the oral health of healthcare professionals [19,96]. Evidence from different regions and professional groups shows that personal dietary behaviors influence both practitioner well-being and clinical practice [7,8]. Nevertheless, important limitations must be acknowledged. Many studies relied on self-reported data, which is prone to recall and reporting bias [44], while the predominance of cross-sectional designs restricts causal inference [21]. Small sample sizes in several studies further limit the generalizability of results [97], and inconsistent control of socioeconomic, workplace, and policy-related factors may have affected outcomes [98]. Future research should therefore adopt longitudinal and interventional designs to assess how systemic workplace strategies influence dietary behaviors and oral health in healthcare professionals over time [99,100]. Such approaches are essential to foster healthier habits, reduce oral disease risk, and improve both well-being and professional performance in the healthcare workforce [98].

4.9. Future Research Directions

Future research should prioritize longitudinal studies to clarify the causal links between nutrition, mental well-being, oral health, and job performance among healthcare professionals [7,101]. Randomized controlled trials are needed to evaluate the effectiveness of targeted dietary interventions, such as increasing intake of omega-3 fatty acids, fruits, and vegetables, on reducing stress, improving physical health, and managing common conditions like obesity and hypertension [102,103]. Given the well-established impact of shift work on diet quality, research should also examine workplace strategies such as healthier food options during night shifts and tailored counseling for reducing these effects [25,104]. Additionally, studies should explore how organizational culture and policies influence dietary behaviors, particularly through access to healthy meals, nutrition counseling, and support for physical activity [7]. Understanding the role of socioeconomic and cultural factors is equally important for designing interventions that reflect the diverse realities of healthcare settings across regions [22,44]. Finally, further investigation is needed into how integrating nutrition education into dental and medical curricula can enhance both personal and patient care outcomes, helping to close current gaps in the complex relationship between diet, mental health, and oral health in healthcare professionals [104,105].

5. Conclusions

Integrating nutrition into dental education and practice appears important for supporting the oral and overall health of dental professionals. Evidence suggests that poor dietary habits, often

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shaped by demanding work conditions, may contribute to stress, burnout, and increased oral disease risk. While current findings highlight these associations, further systemic changes in education, institutional policies, and workplace environments could be considered to better support healthier behaviors. Future research should employ long-term designs to more clearly evaluate the impact of cultural, organizational, and professional factors on dentists' well-being, oral health, and clinical practice.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/doi/s1, Figure S1: title; Table S1: title; Video S1: title.

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, M.A. and T.V.; methodology, M.A. T.K. and T.V.; software, M.A. and T.K.; validation, M.A., T.K. and T.V.; formal analysis, M.A. and T.K.; investigation, M.A. and T.K.; resources, M.A. and T.V.; data curation, M.A., T.K. and T.V.; writing—original draft preparation, M.A., T.K. and T.V.; writing—review and editing, M.A., T.K. and T.V.; visualization, M.A. and T.V.; supervision, M.A.; project administration, M.A.; funding acquisition, M.A. and T.V. All authors have read and agreed to the published version of the manuscript." Please turn to the CRediT taxonomy for the term explanation. Authorship must be limited to those who have contributed substantially to the work reported.

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