Influencing Factors of Diabetic Patients of on Oral Health-Related Quality of Life: A Scoping Review

Xiaomin Xian [1], *Yanping Zhang [1], *Guifen Fu [2], Ziqiang Li [1], Jingfeng Chen [1], Miao Wang [3], Qiuping Zheng [1]

1. Department of Geriatric Endocrinology and Metabolism, Guangxi Academy of Medical Sciences and the People's Hospital of Guangxi Zhuang Autonomous Region, Nanning, China
2. Department of Nursing, Guangxi Academy of Medical Sciences and the People's Hospital of Guangxi Zhuang Autonomous Region, Nanning, China
3. Otolaryngology Head and Neck Department, Guangxi Academy of Medical Sciences and the People's Hospital of Guangxi Zhuang Autonomous Region, Nanning, China

*Corresponding Authors: Emails: 2584026044@qq.com, 3475271841@qq.com

Abstract

Background: The oral health-related quality of life in diabetic patients is regarded as a significant factor for assessing their dental health. This study aimed to examine the current research state, frequently utilized research instruments, and factors impacting the oral health quality of life in individuals with diabetes.

Methods: Our review was conducted according to the PRISMA extended guidelines for scoping review. We conducted a literature review on the oral health and quality of life of diabetic patients using PubMed, Embase, and additional databases. This research proposal has been formally submitted to the Open Science Framework.

Results: Out of 3827 materials, merely 17 publications satisfied the review requirements for our study. The search period extended from the inception of the library until Feb 5, 2024. The research encompassed seven countries, including China, the United States, and Iran, utilizing the Oral Health Evaluation Index for the Elderly and the Oral Health Impact Scale as prevalent assessment instruments. The quality of life connected to oral health was predominantly low among diabetic patients, influenced by socio-demographic characteristics, oral health status, biochemical indicators, psychosocial elements, lifestyle choices, and oral-related factors.

Conclusion: The oral health-related quality of life among diabetic patients is typically diminished. Oral health care professionals must devise strategies to promptly identify, assess, and manage the factors influencing the oral health-related quality of life in diabetic patients, while incorporating necessary preventive measures and screenings to enhance oral disease prevention in routine evaluations.

Keywords: Diabetes; Oral health-related quality of life; Determinants; Scoping review; Evaluation instrument

Introduction

Data from the League of Nations indicate that diabetes has emerged as one of the most critical and rapidly escalating chronic diseases, with a global prevalence of around 537 million individuals and a significant increase in both prevalence and incidence worldwide (1). The worldwide social and economic burden of diabetes is steadily escalating and is linked to diminished nutritional

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quality, decreased physical activity, and heightened sedentary behavior (2,3). Chronic high blood glucose levels in diabetic patients result in diabetic foot, neuropathy, retinopathy, and many microvascular and macrovascular consequences, including diabetic nephropathy, heart disease, peripheral artery disease, and cerebrovascular disease (4). Hyperglycemia results in numerous oral problems, such as dental caries, xerostomia (5), periodontitis (6), oral candidiasis (7), tooth loss (8), and taste issues (9). Related studies have shown that some diabetic patients experience salivary gland dysfunction, leading to reduced salivation, closely associated with the onset of dry mouth symptoms (10).

As the modern medical paradigm evolves, the quality of patient survival is increasingly prioritized, and the oral health-related quality of life of diabetic patients has emerged as a global public health concern. Oral diseases in diabetic patients considerably diminish their comfort and adversely impact the stable regulation of blood glucose, while diabetes-related oral conditions greatly impair the quality of oral health in these individuals (11, 12). Oral health-related quality of life refers to an individual's subjective perception of their oral health, encompassing three dimensions: functional health, mental health, and social functioning domains (13). Oral health-related quality of life is profoundly influenced by oral health status, mostly manifested through oral discomfort, speech impairments, and taste dysfunction, which impact an individual's physical functioning, mental health, and social dimensions (14). Since the early 1990s, researchers have created instruments to evaluate oral health-related quality of life, including the Oral Health Impact Profile (OHIP) (15) and the Geriatric Health Assessment Index (GOHAI) (16).

Previous literature identified that factors influencing the oral health-related quality of life in diabetic patients include dry mouth, dental caries, gingivitis, periodontal disease, oral burning, taste disorders, and poor wound healing (17). Despite the abundance of studies about oral health-related quality of life in diabetes both domestically and internationally, there is a deficiency in systematic generalization of the factors influencing oral health-related quality of life in diabetic patients. This scoping review aimed to compile and summarize findings from national and international research regarding factors affecting oral health-related quality of life and assessment instruments for individuals with diabetes. A scoping review is a thorough method for summarizing information via study design, data extraction, and generalization, with the objective of guiding future research.

This study was conducted based on the standards for scoping reviews outlined in the PRISMA extended guidelines (18). It provides a comprehensive and systematic summary and analysis of relevant research on the factors affecting the oral health-related quality of life in diabetic patients, offering a reference for healthcare professionals in developing nursing intervention strategies.

Materials and Methods

Inclusion criteria

1) The study population comprised diabetic patients aged ≥18 yr.

2) The study examined oral health-related quality of life and its associated factors.

3) The included study types were cross-sectional, longitudinal, cohort, and case-control studies.

4) The literature was published in Chinese or English.

Exclusion criteria

1) Studies of inferior quality, redundantly published, or inconsistent with the research topic.

2) Literature not authored in Chinese or English.

3) Studies lacking accessible full text.

4) Literature types including experimental studies, substantive studies, reviews, systematic reviews, dissertations, or conference abstracts.

Data sources

Upon establishing the research question, we conducted a search across 12 databases, encompass-

ing Chinese databases such as CNKI, Wanfang Data, and VIP Chinese Science and Technology Journal Database, in addition to English databases including PubMed, Embase, EBSCO, Proquest, Scopus, Science Direct, Web of Science, and Cochrane Library.

Search strategy

The investigation concentrated on research pertaining to determinants affecting oral health-related quality of life in diabetic individuals, done from the inception of the relevant databases until Feb 5, 2024. The specifics of the advanced search for this phrase were as follows: Type 1 Diabetes Mellitus; Type 2 Diabetes Mellitus; Oral Health Related Quality of Life; Oral Health Behavior; Oral Health-Related Quality of Life; OHRQoL; Risk Factor; Predicted Factor; Correlated Factor; Predicted Factor; Influential Factor; Factor. The search approach for the English database, exemplified by PubMed, is illustrated in Table 1. This research is registered on the Open Science Framework (https://doi.org/10.17605/OSF.IO/J6AQH).

Table 1: PubMed Database Search Strategy

Search	Query
#8	#3 AND #6 AND #7
#7	"Oral Health Related Quality of Life" OR "oral health behavior" OR "oral health-related quality of life" OR "OHRQoL" OR "OHRQL"
#6	#4 OR #5
#5	"Risk factor"[Title/Abstract] OR "perdicted factor"[Title/Abstract] OR "correlated factor"[Title/Abstract] OR "predicted factor"[Title/Abstract] OR "influen* factor"[Title/Abstract] OR "factor"[Title/Abstract]
#4	"Risk Factors"[Mesh]
#3	#1 OR #2
#2	"diabetic patient"[Title/Abstract] OR "Diabetes Mellitus"[Title/Abstract] OR "diabetes mellitus type2"[Title/Abstract] OR "diabetes mellitus, type 1"[Title/Abstract] OR "type 2 diabetes"[Title/Abstract] OR "type 2 diabetes mellitus"[Title/Abstract] OR "type 2 diabetic"[Title/Abstract] OR "type II diabetic"[Title/Abstract] OR "type II diabetes"[Title/Abstract] OR "typeII diabetes mellitus"[Title/Abstract] OR "T1DM"[Title/Abstract] OR "T2DM"[Title/Abstract]
#1	Diabetes Mellitus[Mesh]

Literature screening and exclusion

The preliminary systematic search yielded 3827 articles. All acquired studies were loaded into NoteExpress software, resulting in 2668 papers after the elimination of duplicates. Subsequently, two researchers conducted a secondary screening utilizing the titles and abstracts of the articles. Following the application of the inclusion criteria, 39 articles were retained. In the event of any disagreement between the two researchers during the analysis, a third researcher was consulted. Upon reading the complete content of the 39 articles, 17 pieces were ultimately included. The literature screening procedure is illustrated in Fig. 1.
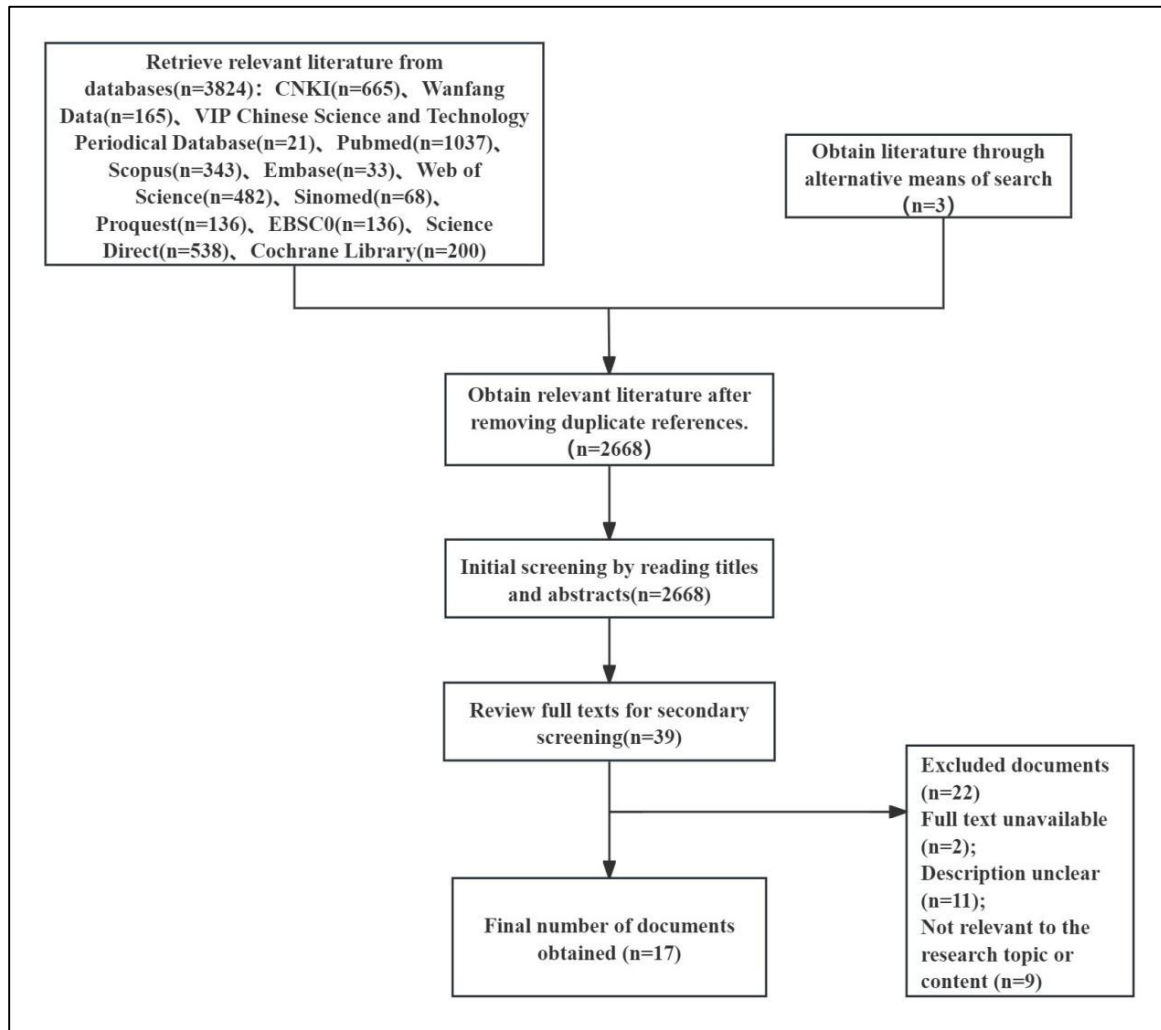
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┌─────────────────────────────────────┐
│ Retrieve relevant literature from    │
│ databases(n=3824): CNKI(n=665)、     │        ┌──────────────────────────┐
│ Wanfang Data(n=165)、VIP Chinese     │        │ Obtain literature through │
│ Science and Technology Periodical    │        │ alternative means of      │
│ Database(n=21)、Pubmed(n=1037)、      │        │ search (n=3)              │
│ Scopus(n=343)、Embase(n=33)、Web of   │        └──────────────────────────┘
│ Science(n=482)、Sinomed(n=68)、       │
│ Proquest(n=136)、EBSC0(n=136)、       │
│ Science Direct(n=538)、Cochrane       │
│ Library(n=200)                       │
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Fig. 1: Flowchart of Literature Screening

(Flowchart boxes:)
- Retrieve relevant literature from databases(n=3824): CNKI(n=665)、Wanfang Data(n=165)、VIP Chinese Science and Technology Periodical Database(n=21)、Pubmed(n=1037)、Scopus(n=343)、Embase(n=33)、Web of Science(n=482)、Sinomed(n=68)、Proquest(n=136)、EBSC0(n=136)、Science Direct(n=538)、Cochrane Library(n=200)
- Obtain literature through alternative means of search (n=3)
- Obtain relevant literature after removing duplicate references. (n=2668)
- Initial screening by reading titles and abstracts(n=2668)
- Review full texts for secondary screening(n=39)
- Excluded documents (n=22) Full text unavailable (n=2); Description unclear (n=11); Not relevant to the research topic or content (n=9)
- Final number of documents obtained (n=17)

Quality assessment

The Agency for Healthcare Research and Quality Checklist and the Critical Appraisal Skills Programme Checklists both consist of 11 items, and each item is scored based on whether it meets the standards with "Yes," "No," or "Unclear." If 3 or fewer items meet the criteria, the study is considered of low quality; if 4 to 7 items meet the criteria, the study is rated as medium quality; and if 8 to 11 items meet the criteria, the study is considered of high quality (19). The AHRQ checklist is primarily used to assess cross-sectional studies in this research, while the CASP checklist is used to evaluate case-control studies. To ensure the fairness and accuracy of the evaluation, the two researchers independently assess each article and score each item according to the AHRQ and CASP standards. If there are any discrepancies between the evaluators, they will discuss and reach a consensus. During the screening process, any papers rated as low quality will be excluded to ensure that the studies included in the review are credible and scientifically rigorous. Therefore, all studies included in this review have been rigorously screened and are of medium or high quality (Table 2).

Table 2: Quality evaluation of literature included in the study

Author,	Score for literature quality evaluation	Literature Quality Evaluation Tools
Lin et al (20)	6	AHRQ
Ma et al (21)	4	AHRQ
Zheng et al (22)	6	AHRQ
Wen et al (23)	6	AHRQ
Wang et al (24)	6	AHRQ
Ding et al (25)	6	AHRQ
Jia et al (26)	8	CASP
Duan et al (27)	7	AHRQ
Liu et al (28)	6	AHRQ
Lu et al (29)	8	AHRQ
Chen et al (30)	6	AHRQ
Giang et al (31)	5	AHRQ
Tabesh et al (32)	7 分	AHRQ
Azogui-Lévy et al (33)	6	AHRQ
Sousa et al (34)	7	AHRQ
Thirunavukkarasu et al(35)	7	AHRQ
Sadeghi et al (36)	4	AHRQ
Annotation：AHRQ: The Agency for Healthcare Research and Quality Checklist; CASP:The Critical Appraisal Skills Program Checklists		

Data analysis

To ensure the accuracy and consistency of data extraction, this study established detailed data extraction criteria. Two researchers independently performed data extraction and communicated regularly to discuss and resolve any potential discrepancies until consensus was reached. The data extraction included: author, publication year, study location, sample size, study design type, measurement tools used, oral health-related quality of life scores, and influencing factors.

Results

Basic characteristics of the included literature

Our investigation comprised 17 papers, consisting of one case-control study and 16 cross-sectional studies. The studies were done in the following nations and regions: China, the United States Iran, Brazil, Saudi Arabia, and France. The studies were published between 2003 and 2023. The majority of the investigations concentrated on middle-aged and elderly individuals with diabetes. Refer to Table 3 for fundamental details regarding particular literature.

Table 3: Characteristics of the 17 diabetic patients included in the oral health-related quality of life literature

Author	Assessment Tools	Ohrqol Level	Ohrqol Score	Influencing Factors
Lin et al (20) China	GOHAI	Low ohrqol (n=157); High ohrqol (n=147)	-	Age, Income level, educational level, duration of diabetes, tooth loss, frequency of dental visits, use toothpicks or floss daily, vertical brush for teeth, frequency of dental visits
Ma et al (21) China	GOHAI	Moderate-to-low level	42.86±5.71	Duration of diabetes, educational level, income level, dietary restrictions, frequency of brush, frequency of dental visits, vertical brush for teeth
Zheng et al (22) China	GOHAI	Moderate-to-low level	34.93±2.11	Age, residence, smoking, duration of diabetes, glycosylated hemoglobin, complications of diabetes, periodontitis, tooth loss, frequency of brush, brushing time
Wen et al （23） China	GOHAI, GSEOH	Low ohrqol (n=205); High ohrqol (n=203)；	-	Age, marital status, educational level, glycosylated hemoglobin, tooth loss, duration of diabetes, income level, medical insurance, living with children, oral self-efficacy
Wang et al (24) China	OHIP-14	Lower level	18.63±9.43	Age, gender, educational level, income level, smoking, duration of diabetes, glycosylated hemoglobin
Ding et al (25) China	GOHAI	Lower level	34.18±3.28	Economic income, educational level, duration of disease, frequency of dental visits, frequency of brush
Jia et al (26) China	GOHAI	Lower level	33.4±2.04	Frequency of brush, use toothpicks or floss daily, vertical brush for teeth, use of soft-bristled toothbrushes, replacing toothbrush every 2-3 months, frequency of dental visits
Duan et al (27) China	GOHAI	Moderate-to-low level	34.23_+3.74	Duration of diabetes, educational level, income level, use toothpicks or floss daily, frequency of brush, frequency of dental visits
Liu et al (28) China	GOHAI	Lower level	34.17±3.78	Duration of disease, educational level, frequency of brush, economic income, use toothpicks or floss daily, vertical brush for teeth, frequency of dental visits
Lu et al (29) China	OHIP-14	Lower level	13.29±6.62	Educational level, occupation, duration of disease, glycosylated hemoglobin
Chen et al (30_ China	OHIP-7	Lower level	-	Residence, educational level,

Table 3: Continued…

Giang et al (31) America	OHIP-NHANES	Lower level	-	Glycosylated hemoglobin, obesity, dental caries, periodontitis, economic income, gender, medical insurance, educational level, frequency of dental visits
Tabesh et al (32) Iran	Xi、OHIP-14	Lower level	13.76±8.41	Dry mouth, age, fasting blood sugar, glycosylated hemoglobin, duration of disease, denture wearing
Azogui-Lévy et al (33) France	GOHAI	Low ohrqol（n=69） High ohrqol（n=212）	-	Dry mouth, denture wearing
Sousa et al (34) Brazil	OHIP-14	Low ohrqol（n=160） High ohrqol（n=142）	-	Tooth loss, bleeding after probing, dental mobility, denture need, dry mouth, periodontitis
Thirunavukkarasu et (35) Saudi Arabia	OHIP-14、DASS-21	Low ohrqol（n=357） High ohrqol（n=320）	-	Age, duration of disease, occupation, educational level, frequency of dental visits, depression, anxiety, stress
Sadeghi et al (36) Iran	OHIP-20	Low ohrqol（n=45） High ohrqol（n=155）	-	Age, duration of disease, educational level, frequency of dental visits, frequency of brush, oral health knowledge, attitude, and practice

Current status of research regarding oral health-related quality of life in individuals with diabetes

Our study comprised 17 studies, 11 of which particularly detailed the impact of oral health-related quality of life in diabetic patients at low to moderate levels (21, 22, 27) and at lower levels (24-26, 28-32) (Table 3).

Present condition and future outlook of oral health-related quality of life evaluation instruments for individuals with diabetes

Among the 17 literature sources analyzed in this investigation, the most frequently utilized evaluation techniques were the Geriatric Oral Health Evaluation Index and the Oral Health Impact Profile-14. The threshold for the GOHAI was established at 35 points, with scores ≥35 classified as indicative of a high quality of life, while scores <35 were classified as indicative of a bad quality of life (20, 23). Azogui Levy et al. (33) established a threshold of 50 points based on the average GOHAI score, categorizing scores below 50 as indicative of poor oral health-related quality of life and scores over 50 as reflecting moderate to high levels. Thirunavukkarasuet al. (35) de-

termined the OHIP-14 cut-off values using a formula with a maximum total score of 54 and a minimum score of 6, establishing 30 as the cutoff, where scores ≥30 indicate poor outcomes and scores <30 indicate positive outcomes. The inconsistency of critical value delineation criteria across various studies may introduce bias in the assessment of OHRQoL levels in diabetes patients, thereby influencing the outcomes of these measurements.

Socio-demographic factors
Age

Numerous studies have demonstrated (20, 22-24, 32, 35, 36) that the oral health-related quality of life in diabetic patients diminishes with age, indicating that as patients grow older, their OHRQoL levels decline. The activity of alkaline phosphatase, regeneration ability, and osteogenic function of periodontal cells in diabetic patients progressively diminish with age, resulting in deteriorating oral health and a subsequent deterioration in oral health-related quality of life (37). Conversely, a study reached an opposing outcome, indicating no significant correlation be-

tween age and oral health-related quality of life (21).

Gender

Two research investigated the correlation between oral health-related quality of life and gender among diabetic patients, although the findings were incongruous (24, 31). Female diabetic patients exhibited poorer OHRQoL levels compared to their male counterparts (24, 31), while Sadeghi et al. (36) found no significant correlation between gender and OHRQoL scores. This disparity may be attributed to factors such as cultural background and the features of the study population.

Duration of Diabetes

The duration of diabetes adversely affects the Oral Health-Related Quality of Life in diabetic patients (20-25, 27-29, 32, 35, 36). There exists a negative correlation between disease duration and OHRQoL, primarily because prolonged diabetes results in sustained high glucose levels in the oral cavity, diminishing the mouth's self-cleaning capacity, which can exacerbate periodontal disease and consequently reduce OHRQoL (27, 38). Conversely, a study indicated no substantial correlation between disease duration and diminished OHRQoL (33).

Educational level

Diabetes individuals possessing elevated educational attainment exhibit enhanced oral health-related quality of life (20, 21, 23-25, 27-31, 35, 36). Nonetheless, the influence of cultural disparities must also be considered when examining the impact of educational attainment on OHRQoL in diabetes patients (14).

Economic income

Various research has reached divergent findings concerning the impact of economic income on oral health-related quality of life in diabetic individuals. Certain studies indicate that poor income does not significantly impact OHRQoL in diabetes individuals (22, 29, 33-35). Additional research indicates that individuals with greater eco-

nomic resources exhibit superior oral health-related quality of life (20, 21, 23-25, 27, 28, 31). Diabetic individuals with substantial economic resources may possess access to high-quality oral health services and the financial means for prolonged dental treatment and consistent oral health maintenance practices. A systematic study and meta-analysis demonstrated a correlation between low socioeconomic level and diminished oral health-related quality of life (39).

Residence

The oral health-related quality of life was typically inferior in rural diabetic patients compared to their urban counterparts, with rural patients reporting more severe oral health issues, a difference that was statistically significant (22,30).

Medical insurance

Diabetes patients enrolled in urban employee medical insurance exhibited superior oral health-related quality of life compared to those utilizing urban resident medical insurance (23). In comparison to others, the scope and capability of urban residents' medical insurance are restricted, potentially resulting in individuals being more likely to passively address oral health issues. Another study (31) similarly shown that diabetic individuals possessing private dental insurance exhibited markedly elevated OHRQoL levels.

Living with children and marital status with spouse

OHRQoL was found to be better in diabetic patients living with children and with a spouse in their marital status (23). Diabetic patients in traditional families with good marital status and living with children tend to be more knowledgeable about oral health and more cooperative during treatment. Spouses and children supervise, motivate, and help them better utilize the resources of oral health services.

Occupation

Diabetic individuals employed in healthcare professions or institutions typically exhibited superior oral health-related quality of life (29, 35). This

may result from their robust capacity to acquire information and resources pertaining to the disease and oral health via many channels (e.g., Internet, textbooks, and lectures).

Dry mouth

Dry mouth adversely affects the oral health-related quality of life in diabetic patients, with increased severity correlating to diminished quality of life (32-34). Xerostomia impairs patients' abilities to swallow, chew, and articulate, thus compromising their dietary practices and nutritional health, while also causing speech difficulties and pain with dentures. Moreover, xerostomia can lead to taste alterations, dental caries, oral discomfort, and dysphagia, all of which may further diminish patients' quality of life (40,41).

Dental caries

Research indicates a substantial correlation between dental caries and the quality of life connected to oral health (31). The occurrence of dental caries in diabetes individuals may correlate with diminished salivary gland function and elevated glucose levels in both blood and saliva. Elevated carbohydrate levels in saliva foster an environment conducive to the proliferation of yeast, Streptococcus mutans, and Lactobacillus in the oral cavity, thereby heightening the risk of dental caries (17,42) . These results align with findings of that demonstrated a significant correlation between dental caries and quality of life in diabetic patients (43).

Periodontitis

Periodontitis significantly diminishes oral health-related quality of life in diabetic patients. The underlying cause may be attributed to diabetes impairing neutrophil function, which diminishes their capabilities in sterilization, phagocytosis, adhesion, and chemotaxis, thereby facilitating the invasion of anaerobic bacteria and their toxins, leading to infections. Consequently, immunological control diminishes, facilitating more bacterial proliferation in the oral cavity, which ultimately results in periodontitis (44). A meta-analysis report states that diabetes increases the likelihood of developing periodontitis by 86% (45).

Tooth loss

Multiple studies demonstrate a negative link between tooth loss and patients' Oral Health-Related Quality of Life; specifically, an increase in tooth loss is associated with a deterioration in OHRQoL (20, 22, 23, 34). Tooth loss in diabetes individuals negatively affects their digestive system and reduces mastication, resulting in food impaction in the oral cavity, which further undermines their nutritional and functional status (20). Edentulism not only hinders mastication, leading to inadequate nutritional consumption, but also adversely impacts patients' facial aesthetics, potentially undermining their self-esteem, social interactions, and psychological health, consequently reducing their oral health-related quality of life (34).

Denture wearing

Tabesh et al. (32) administered the OHIP-14 questionnaire to evaluate oral health-related quality of life among 200 diabetes patients in Iran, revealing that 45% of these patients' utilized dentures, which significantly impacted their OHRQoL negatively. This may result from patients with dentures opting for softer foods over harsh ones to acclimatise to the dentures, hence impacting their Oral Health-Related Quality of Life, aligning with Azogui's findings (33).

Denture requirements, bleeding after probing, and dental mobility have been identified as significant factors affecting the oral health-related quality of life in diabetic patients. Patients who do not acquire a denture promptly may encounter challenges such as impaired chewing and eating, thereby impacting nutritional intake and general health (31). Bleeding after probing and dental mobility are characteristic indicators of periodontal disease, reflecting the extent of oral inflammation and impairment of tooth-supporting structures, which can adversely impact the patient's daily activities, including eating, communication, social interactions, and self-esteem (31).

Biochemical indicators

Diabetes individuals with inadequately managed glycated hemoglobin (22-24, 29, 31, 32) and fasting blood glucose (32) experience a diminished quality of life regarding dental health. Poor glycemic control in these patients may diminish the oral cavity's defense mechanisms, heightening the risk of infection, disrupting the balance of oral flora, and increasing the prevalence of pathogenic bacteria in periodontal disease. This initiates the synthesis of inflammatory cytokines by immune cells, thereby harming immunological tissues and resulting in an imbalance within the body's immune system, potentially culminating in severe periodontal disease. Consequently, periodontal disease diminishes patients' quality of life regarding dental health (46)

Depression, anxiety and stress

Depression, anxiety, and stress exhibited a negative correlation with oral health-related quality of life in diabetic patients (35). These patients, suffering from oral conditions such as periodontitis and dental caries, experienced symptoms including erythema, edema, and hemorrhage of the gums, tooth loss, and unpleasant taste. Such oral manifestations adversely impacted the patients' self-image, resulting in diminished confidence in social interactions, thereby exacerbating anxiety and depression and ultimately reducing overall quality of life. Stress may significantly influence the onset and advancement of diabetes associated with Periodontitis, particularly in those with compromised immunological function. Prolonged psychological or physical stress modifies the immune response and diminishes defenses against infections. This alteration in immune function renders patients more vulnerable to periodontal pathogenic bacteria, exacerbating periodontal inflammation and consequently speeding the course of periodontitis (47).

Oral self-efficacy

Oral self-efficacy significantly impacts oral health-related quality of life, and diabetes patients exhibiting strong oral self-efficacy typically have superior OHRQoL (23). Oral self-efficacy may motivate diabetes patients to engage in oral health behaviors; higher self-efficacy correlates with increased concern for oral cleanliness and health care needs, hence enhancing behavioral motivation.

Oral hygiene habits

Frequency of brushing (20-22, 25-28, 36), brushing time (22), vertical brush for teeth (20, 21, 26, 28), frequency of dental visits (20, 21, 25-28, 31, 35, 36), using toothpicks or floss daily (20, 26-28), using of soft-bristled toothbrushes (26), and replacing toothbrush every 2-3 months (26) as influencing factors for OHRQoL in diabetic patients. Good oral health care behaviours are important factors in the oral health quality of life of diabetic patients, and maintaining good oral hygiene habits, such as regular brushing and flossing, can effectively remove plaque, stubborn soft tartar, and residues from daily diets, preventing bacterial growth and reproduction in the oral cavity (20). At the same time, such good habits can also reduce the problem of bleeding gums, which is common among diabetic patients, and effectively reduce the loss of periodontal tissue attachment, helping to maintain a healthy and stable oral environment.

Oral Health Knowledge

A study conducted by Sadeghi et al. (36) identified a substantial direct correlation between oral health awareness and oral health-related quality of life. Older diabetic individuals possessing comprehensive oral health knowledge generally experience a superior overall oral health quality of life. This discovery underscores the significance of oral health education for diabetic individuals, particularly among the senior population. Diabetic people are predisposed to dental issues including gingivitis and periodontal disease due to compromised immune function; however, possessing adequate oral healthcare knowledge can significantly mitigate these concerns.

Smoking

Diabetes individuals who smoke have inferior oral health-related quality of life compared to

non-smokers (22, 24). Smoking is a significant risk factor for oral cancer and periodontal disease. The chemical constituents in tobacco alter the oxygen levels in periodontal tissues, facilitate the proliferation of periodontal pathogens, and diminish the oral mucosa's defense against external stimuli, resulting in deteriorated oral health and ultimately impacting the quality of life for diabetic patients (48).

Dietary restrictions

Dietary limitation significantly influences OHRQoL levels in diabetic patients, who must meticulously regulate their dietary types and consumption to sustain stable blood glucose levels due to the nature of their condition (21). This dietary limitation entails not only reducing the consumption of sugary foods but also limiting some items that are harmful to oral health. This prolonged dietary regulation, while beneficial for diabetes management, has adversely impacted patients' daily eating experiences, resulting in a diminished quality of life.

Limitations

Despite utilizing various databases for literature retrieval, the majority of studies incorporated in this research concentrated on elderly people with diabetes, perhaps constraining the breadth of the conclusions. The study exclusively included literature in Chinese and English, perhaps leading to incomplete literature retrieval.

Conclusion

The oral health-related quality of life in diabetic patients is generally low. Clinicians should incorporate oral health into the comprehensive management of diabetes, improving patients' oral health-related quality of life through regular check-ups, multidisciplinary collaboration, and personalized health education.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

Conflict of interest

The authors declare that there is no conflict of interests.

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