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Assessing Awareness of the Oral-Systemic Health Connection: A Population-Based Cross-Sectional Study

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ABSTRACT

Objectives:
1. To evaluate the general population's knowledge of the association between oral health and systemic diseases such as diabetes, cardiovascular disease, and respiratory conditions.
2. To assess attitudes and behaviors related to oral hygiene and their perceived impact on overall health.

Materials and Methods:
An electronic version of the questionnaire using multiple-choice questions was developed using Google Forms for distribution through WhatsApp. The data were analyzed using SPSS version 29. The study population consisted of 200 random people who filled the google forms that were circulated. Inclusion criteria were all the people ranging from age 18 years and above who were willing to fill the form while exclusion criteria included those who were not willing to participate.

Results:
Most participants were female (54.5%), predominantly aged 18-29 years(71.5%). Additionally, there was a significant association between gender and the level of knowledge , with females exhibiting a higher level of knowledge compared to males.

Conclusion: Since 33.5% of the surveyed individuals showed a lack of knowledge about oral health, there is a need for improved awareness and educational programs about how oral health affects overall health in the population.

INTRODUCTION

Oral health is a key part of overall health. The connection between oral health and overall health is complex. Chronic oral diseases can harm overall health, and poor oral health is common in patients with other medical issues. Poor oral health is linked to various chronic diseases, including chronic liver conditions, especially in cases of non-alcoholic fatty liver [1,2]. People with liver disease often have poor oral health, which means they need careful dental care planning.

As liver disease progresses, it may lead to worse oral health. Inadequate oral health before a liver transplant is related to a higher risk of acute rejection after the transplant. Additionally, poor oral health is tied to higher ALT levels and lower albumin levels, which affects liver health after the transplant. Therefore, addressing oral and dental problems early in liver disease is important. This highlights the need to maintain good oral hygiene [3,4].

Another example is asthmatic patients, who often suffer from poor oral health due to frequent use of steroid inhalers [5]. These inhalers impact salivary flow rates, leading to dryness in the mouth. Poor oral health is linked to systemic inflammatory disorders like asthma, which increases cytokines such as IL-1β, IL-6, and TNF-α. Asthmatic patients may develop gingivitis due to a changed immune response and dehydration from mouth breathing [6]. Moreover, reports show that inhaled or topically applied corticosteroids in asthmatic patients can lead to oral candidiasis [7].

Furthermore, diabetes is linked to several oral diseases. These include periodontal disease, tooth loss, dry mouth, cavities, burning mouth syndrome, taste issues, salivary gland problems, and slow wound healing [8]. Oral health professionals tackle problems like periodontitis that can affect blood sugar control in diabetic patients [9]. Interestingly, patients with medical issues often do not have the knowledge needed to maintain good oral health. For instance, studies show that parents of diabetic children know less about diabetes and oral health than parents of healthy children.

Additionally, diabetic patients tend to have inadequate oral health knowledge, negative oral health attitudes, and fewer dental visits [10,11]. A recent study showed a high rate of gingival diseases and dental caries in pregnant women. On average, these women had seven decayed teeth, which could lead to dental problems in newborns through bacterial transmission [12]. Another study suggested that educational programs run by oral health professionals during and after pregnancy could improve the oral health and behaviors of pregnant and lactating mothers [13]. However, many pregnant women seem to lack awareness of the link between oral health and pregnancy [14,15].

Poor oral health, especially in patients with chronic kidney disease (CKD), can lead to serious health issues. CKD does not have clear oral signs, but periodontitis in these patients is associated with higher rates of illness and death due to various complications [16]. People with cardiovascular disease (CVD) often face oral health problems without realizing that there is a connection between periodontal disease and CVD [17]. They also may not know about possible oral side effects from heart medications, such as hyperplasia or gingival overgrowth caused by calcium channel blockers, which can increase the risk of tooth loss due to higher rates of gum disease [18].

As mentioned, oral health is an important aspect of overall health, particularly for medically vulnerable patients. However, knowledge about this connection seems to be lacking, even among these individuals. To our knowledge, no prior study has looked at awareness of the relationship between several chronic diseases, including diabetes, cardiovascular diseases, asthma, liver diseases, and pregnancy, and oral health among the population.

Thus, this study aimed to examine the knowledge and awareness of the general population regarding oral health and its connection to systemic diseases. It also sought to identify any differences in knowledge based on gender, age, and education level. This research will fill a gap in the existing literature by providing a strong reason to investigate this specific population, thereby improving understanding in this under-researched area.

MATERIALS AND METHODS

This cross-sectional study was designed to assess public knowledge and awareness about oral health and its association with systemic diseases and was approved by the Institutional Ethics Committee (Protocol Number 112/2025-2026).

We developed a structured, close-ended questionnaire with "Yes or No or Maybe" options and multiple-choice questions. The questionnaire had two parts: the first collected socio-demographic data, including age, sex, occupation, and education level. The second part measured knowledge and awareness about oral health with 14 close-ended "Yes or No or Maybe" and multiple-choice questions. We designed the questionnaire based on a careful review of relevant literature and validated it for content with an expert in the field [9-23].

An electronic version was created using Google Forms for distribution via social media platforms like WhatsApp. We included individuals aged 18 and older. The study sample consisted of 200 subjects. The inclusion criteria required participants to be adults aged 18 or older; those who showed no interest were excluded. Participants completed a self-administered questionnaire about oral health and its association with systemic diseases. We entered and coded the data in Excel, then analyzed it using SPSS, version 29.

RESULTS

A total of 200 subjects, agreed to participate in this study, most of which were female (109, 54.5%) and aged between 18 and 29 years (143, 71.5%) . Further analysis showed that most participants were undergraduates (102, 51%). Regarding their occupations, most participants were unemployed (76, 38%), while 61 (30.5%) worked in the private sector, 29 (14.5%) were self employed . Most participants (156, 90.7%) were healthy while 14 participants (7%) had diabetes .

Table 1. Sociodemographic characteristics of participants (N = 200).

Variable	Category	n (%)
Gender	Female	119 (59.5)
	Male	80 (40.0)
	Other	1 (0.5)
Education	Undergraduate	116 (58.0)
	Graduate	43 (21.5)
	Postgraduate	29 (14.5)
	Higher secondary	11 (5.5)
	Diploma	1 (0.5)
Occupation	Unemployed	83 (41.5)
	Private sector	60 (30.0)
	Self-employed	28 (14.0)
	Government employee	22 (11.0)
	Retired	7 (3.5)

Oral hygiene practices

Regarding regular oral hygiene practices, most participants (145; 45%) reported brushing their teeth twice a day, while 85 (25.5%) brushed their teeth once a day .

Knowledge regarding the association between the oral health and overall health

The majority of participants demonstrated a high level of awareness regarding the importance of maintaining oral health, with 79.5% acknowledging its significance. A considerable proportion (66.5%) recognized the link between oral health and chronic diseases, while 62.5% were aware of the connection between oral health and diabetes. Awareness of associations between oral health and specific systemic conditions varied: 58.0% acknowledged a link with pregnancy, 55.5% with heart disease, 51.0% with asthma, and 50.0% with liver disease. Notably, 70.5% of respondents understood the importance of disclosing their medical conditions to their dentist, and 77.0% were aware that systemic health conditions could influence dental treatment plans. Despite these findings, a notable proportion of participants remained unaware or uncertain about many of the specific associations between oral and systemic health, highlighting areas where public education and interdisciplinary communication could be improved.

2. Awareness of oral–systemic health connections (N = 200).

Awareness item	Yes n (%)	No n (%)	Maybe/Uncertain n (%)
Importance of maintaining oral health	159 (79.5)	38 (19.0)	3 (1.5)
Oral health linked with chronic disease	133 (66.5)	61 (30.5)	6 (3.0)
Diabetes and oral health	125 (62.5)	69 (34.5)	6 (3.0)
Pregnancy and oral health	116 (58.0)	77 (38.5)	7 (3.5)
Heart disease and oral health	111 (55.5)	82 (41.0)	7 (3.5)
Asthma and oral health	102 (51.0)	90 (45.0)	8 (4.0)
Liver disease and oral health	100 (50.0)	95 (47.5)	5 (2.5)
Disclosure of health conditions to dentist	141 (70.5)	53 (26.5)	6 (3.0)
Treatment plan may change due to systemic health	154 (77.0)	40 (20.0)	6 (3.0)

DISCUSSION

Oral health is an important part of overall health, and their relationship is complex. Many studies have found a link between oral health and general well-being. Research also shows a connection between dental health and the advancement of chronic diseases. Ongoing oral issues can negatively affect overall health and quality of life, while people with health

problems often show poor dental health. For example, there is a link between diabetes and several oral diseases, such as periodontal disease, tooth loss, dry mouth, cavities, burning mouth syndrome, taste and salivary gland issues, and slow healing of wounds. Therefore, it is important for people to understand the relationship between oral health problems and general health. Increased awareness can lead to better prevention and quicker interventions, which can improve both oral and overall health.

This study looked at the connection between different demographic factors and knowledge about the link between oral health and systemic health. In our group, female participants showed more knowledge about this connection than male participants. This was likely due to their tendency to actively seek health information and a greater interest in healthcare. These findings match earlier studies that found female participants generally have more awareness than males.

When looking at the relationship between education level and knowledge, individuals with college degrees showed more knowledge compared to those with other degrees, aligning with earlier research. Surprisingly, participants with postgraduate degrees showed lower knowledge levels, possibly because their field of study was not related to oral health. This is interesting because past studies have indicated that those with postgraduate degrees have higher levels of knowledge about oral health.

We also found a significant difference where participants who maintained good oral hygiene, specifically those who brushed their teeth twice a day, showed a lack of knowledge about oral health. This finding goes against a study from the United States, which found that those with better oral hygiene practices had greater knowledge about oral health. Participants with chronic diseases had a lower level of knowledge compared to healthy participants. Similar studies in Australia and Germany found that those with chronic diseases had limited knowledge regarding the links between heart issues, periodontal disease, and cardiovascular disease. Studies in India and Nigeria also showed poor knowledge about the oral effects of diabetes and the connection between diabetes and periodontal disease.

This study provided important insights into where participants get their oral health information. A large majority relied on social media platforms. This shows a change in how people consume information, with digital channels playing a bigger role in health knowledge. However, it is troubling that only a small number sought information directly from healthcare providers, such as dentists or primary care professionals.

The preference for social media as the main source of oral health information raises concerns about the quality, accuracy, and reliability of the information people are accessing. Consistent with other studies, social media stands out as a major source of oral health information. While these platforms are convenient and widely available, they often lack the expert advice that healthcare providers can give. Information from qualified professionals ensures accuracy and personalized recommendations that are essential for maintaining good oral health. Healthcare providers, especially dentists, have a key role in not only diagnosing and treating oral health issues but also in educating patients about prevention and promoting good oral hygiene.

Other studies have found that participants tend to rely on doctors as their main source of health information. Direct interaction with healthcare providers allows for thorough assessments, timely treatments, and the sharing of evidence-based information tailored to individual needs. This personalized approach improves health literacy and helps people make informed choices about their oral health.

RECOMMENDATIONS

Based on the survey results, it is advised to raise public awareness about the link between oral and systemic health through focused educational programs, especially on popular social media platforms, as this was the main information source for participants. Additionally, healthcare providers should be encouraged to discuss oral health during routine check-ups, especially for patients with chronic conditions, to close the knowledge gap seen in the study.

LIMITATIONS

More than half of the participants said they did not have enough knowledge about oral health. However, the study did not evaluate how effective specific educational interventions were. Future research could help improve understanding about raising awareness of oral health among different groups in general population. Another limitation is the relatively small sample size, gathered from just one location. Also, relying on self-reported data through questionnaires may lead to response bias. To make the findings stronger and more widely applicable, it is important to increase the sample size and collect data from various locations or cities.

CONCLUSION

Considering the limitations, this study's findings show a significant awareness about oral health, particularly among people with chronic conditions. This highlights the need for health education and a better understanding of the links between oral and general health. While social media provides a lot of information, there are still worries about its accuracy and reliability. By tackling these issues with focused educational efforts and ensuring access to trustworthy health information, people can make informed choices about their oral health. This approach can lead to an improvement in their overall well-being.

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