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Original Research

Examining the inter-relationship between psychological wellbeing, socioeconomic status, and oral hygiene self-care practices in the general population of Chennai city, India. An explorative analysis using the DASS - 21 short scale and OHI-S index

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ABSTRACT:

Background: Oral hygiene practices are influenced by a multitude of factors, including psychological health and socioeconomic status (SES). With increasing evidence linking mental well-being to health behaviours, understanding this relationship in diverse populations has become vital. **Objective:** This study aimed to explore the interrelationship between psychological well-being, SES, and oral hygiene self-care practices among adults in Chennai, Tamil Nadu, using the Depression Anxiety Stress Scale-21 (DASS-21) and the Oral Hygiene Index-Simplified (OHI-S). **Methods:** A cross-sectional study was conducted among 270 adult outpatients selected through stratified random sampling from two urban primary health centres. Data on psychological status (DASS-21), oral hygiene behaviours, SES (Modified Kuppuswamy Scale, 2023), and clinical oral health status (OHI-S) were collected via interviews and clinical examinations. Statistical analysis included descriptive and inferential methods, with a significance level set at $p<0.05$. **Results:** A substantial proportion exhibited moderate to severe psychological distress, with 66.7% showing moderate to extremely severe anxiety. Oral hygiene behaviours were suboptimal; only 37.8% brushed twice daily, and 62.2% never flossed. OHI-S scores revealed that 73.3% had fair, and 15.6% had poor oral hygiene. Statistically significant associations were observed between higher levels of psychological distress and poorer oral hygiene ($p<0.001$). SES was also significantly linked to both psychological well-being and oral hygiene status.

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INTRODUCTION

Oral hygiene is a fundamental aspect of overall health, significantly impacting both physical well-being and quality of life. Poor oral hygiene has been associated with various systemic health conditions, including cardiovascular diseases, diabetes, and respiratory infections [1]. Despite its recognized importance, oral hygiene practices vary widely across different populations, influenced by psychological, social, and economic determinants.

Recent research has increasingly focused on the role of psychological well-being in shaping health behaviours, including oral hygiene practices. Mental health conditions such as depression, anxiety, and stress can negatively impact an individual's motivation and ability to maintain regular oral hygiene routines [2]. The Depression Anxiety Stress Scale-21 (DASS-21) is a well-established tool for assessing psychological well-being, offering insights into how mental health status may influence self-care behaviours, including oral hygiene [2].

Health is a multifactorial concept influenced by genetic predisposition, lifestyle choices, environmental conditions, and socioeconomic status (SES). Importantly, health outcomes cannot be examined in isolation from their social context, as socioeconomic and environmental factors play a significant role, often paralleling the effects of medical interventions. Among the indicators of oral and dental health, dental caries remains a major concern, influenced by multiple factors [3].

Similarly, SES is a crucial determinant of health behaviours, encompassing variables such as income, education, and occupation, all of which shape an individual's access to healthcare, health literacy, and engagement in preventive health measures. Individuals with lower SES often face barriers to accessing dental care, possess lower health literacy, and experience heightened stress levels, all of which may lead to inadequate oral hygiene practices and poorer oral health outcomes. Chennai, Tamil Nadu, with its diverse population exhibiting a broad range of SES and mental health conditions, provides an ideal setting to explore these interrelationships.

Chronic stress has been implicated in the progressive development of oral diseases through two primary mechanisms. First, stress may lead individuals to adopt maladaptive coping strategies such as tobacco and alcohol use, poor dietary choices, and physical inactivity, all of which contribute to oral disease. Second, prolonged stress exposure results in increased allostatic load, which can disrupt physiological systems essential for maintaining homeostasis, thereby accelerating disease processes. Optimal oral health is essential for overall well-being, as the mouth is often regarded as a reflection of systemic health. Oral diseases continue to pose a significant public health challenge worldwide, with dental caries affecting approximately 90% of individuals, particularly in Asian and Latin American countries [4]. Contributing factors include psychological attitudes, lack of awareness regarding oral health, and high consumption of refined carbohydrates.

Individuals with mental illnesses are disproportionately affected by poor oral health compared to the general population. While the bidirectional relationship between oral and mental health remains underexplored, some studies have identified correlations between poor oral health and common psychological disorders, including depression, generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, post-traumatic stress disorder, and phobias. A systematic review demonstrated a significant association between mental health disorders and increased rates of dental decay and tooth loss [6]. Individuals with psychological conditions exhibited higher numbers of decayed, missing, and filled tooth surfaces compared to control groups. Furthermore, research has linked conditions such as chronic periodontitis and tooth erosion with severe mental illness and eating disorders [7].

This study aims to investigate the interrelationship between psychological well-being, SES, and oral hygiene practices using the DASS-21 scale to assess mental health status and the Oral Hygiene Index-Simplified (OHI-S) to evaluate oral hygiene behaviours. By analysing these factors within Chennai's general population, this research seeks to provide a comprehensive understanding of the determinants influencing oral hygiene behaviours. The findings may contribute to the development of targeted public health interventions designed to improve oral hygiene and overall well-being in populations vulnerable to poor oral health outcomes.

MATERIALS AND METHODS

A cross-sectional study was conducted among outpatients at primary health center bajanai kovil UPHC & sakthi nagar UPHC at Ramapuram ,Chennai, India, over six months to examine the correlation between psychological well-being, socioeconomic status, and oral hygiene self-care practices [8]. A randomly selected sample of 270 participants aged above 18 years was included in the study.A stratified random sampling technique was used to select 270 participants aged above 18 years [9]. Inclusion criteria comprised individuals from various socioeconomic backgrounds, while exclusion criteria encompassed individuals with diagnosed psychological illnesses or hereditary periodontal conditions affecting oral hygiene.

Data collection was conducted with the assistance of trained dentists who were provided with knowledge about the Depression, Anxiety, and Stress Scale-21 (DASS-21) and the modified Kuppuswamy scale (2023). A structured case record proforma was used to capture demographic details, socioeconomic status, oral hygiene practices, and psychological well-being. Informed consent was obtained from all participants before data collection. The case record proforma included the following components:

Data collection included a structured case record proforma that captured demographic details, socioeconomic status, oral hygiene practices, and psychological well-being. Informed consent was obtained from all participants before data collection. The case record proforma included the following components:

- Socioeconomic Status Assessment: SES was evaluated using the modified Kuppuswamy scale (2023), which categorizes individuals based on education, occupation, and income. The classification ranged from Upper Class (26-29) to Lower Class (<5), providing a structured framework for understanding economic disparities.
- Oral Hygiene Practices Assessment: Participants provided self-reported data on their oral hygiene behaviors, including brushing frequency (twice a

day, once a day, or less), flossing habits (daily, weekly, or never), mouthwash usage, and dental visit frequency.

- Psychological Well-being Assessment: The Depression, Anxiety, and Stress Scale-21 (DASS-21) was used to evaluate psychological well-being. The scale includes 21 items categorized into depression, anxiety, and stress subscales, each rated on a 4-point Likert scale.
- Clinical Examination: The Oral Hygiene Index-Simplified (OHI-S) was used for objective assessment. The Debris Index and Calculus Index were recorded based on six tooth surfaces using a mouth mirror and Shepherd's Hook Explorer (No. 23). Interpretation of OHI-S was carried out using standardized scoring criteria.

This comprehensive data collection approach ensured an accurate evaluation of the interplay between psychological well-being, socioeconomic status, and oral hygiene self-care practices.

Data were collected through structured in-person interviews and clinical examinations to ensure a comprehensive assessment of study variables [10]. Psychological well-being was assessed using the 21-item Depression, Anxiety, and Stress Scale (DASS-21), a validated tool measuring depression, anxiety, and stress over the past week [2]. This scale comprises 21 items divided into three subscales, each rated on a 4-point Likert scale, ranging from "Never" to "Almost Always" [3]. The summed scores for each subscale categorize severity as normal, mild, moderate, severe, or extremely severe [11]. The study employed the Tamil version of the Depression Anxiety Stress Scales-21 (DASS-21) as validated by Venkatesh (2022) for assessing psychological distress. The scale was translated and validated through a rigorous process involving linguistic validation, expert reviews, and testing for reliability and construct validity. [12].

Oral health status was objectively assessed through clinical examination, where the Debris Score (DS), Calculus Score (CS), and overall Oral Hygiene Index-Simplified (OHI-S) scores were recorded [13]. The examination utilized a single mouth mirror and a Shepherd's Hook Explorer (No. 23), assessing six tooth surfaces classified within three debris criteria.

Socioeconomic status was evaluated using the Kuppuswamy scale, a widely recognized tool categorizing individuals based on education, occupation, and income levels [5]. This scale assigns scores to each component[14]

Additional demographic details such as age, gender, education, and income were collected to provide further insights into oral hygiene self-care practices [15]. This multi-faceted approach ensured a robust understanding of the interplay between psychological well-being, socioeconomic status, and oral hygiene self-care practice

Descriptive statistics will be expressed in frequency and percentage. To analyse the data. Inferential statistics will be performed using chi square test for qualitative variable. To analyse the data SPSS (IBM SPSS Statistics for Windows, Version 26.0, Armonk, NY: IBM Corp. Released 2019) is used. Significance level is fixed as 5% ($\alpha = 0.05$). P-value <0.05 is considered to be statistically significant.

RESULTS

A total of 270 participants were included in the study. The demographic and socioeconomic characteristics are presented in Table 1. The majority (66.7%) had a graduate or postgraduate education, while only 6.7% were illiterate. The most common occupation was that of a technician (46.7%), followed by professionals (26.7%). Based on the modified Kuppuswamy scale (2023), the majority of participants (68.9%) belonged to the upper-middle socioeconomic class, while only 2.2% were in the upper-lower class.

Table 1: Demographic and Socioeconomic Characteristics of Participants

Characteristic	Category	Frequency (n)	Percentage (%)
Education of Head of Family	Illiterate	18	6.7
	High School	24	8.9
	Post High School/Diploma	30	11.1
	Graduate/Postgraduate	180	66.7
	Profession/Honour	18	6.7
Occupation of Head of Family	Skilled Worker	36	13.3
	Clerk	24	8.9
	Technician	126	46.7
	Professional	72	26.7
	Senior Official	12	4.4
Socioeconomic Class (Modified Kuppuswamy Scale 2023)	Upper	42	15.6
	Upper Middle	186	68.9
	Lower Middle	36	13.3
	Upper Lower	6	2.2

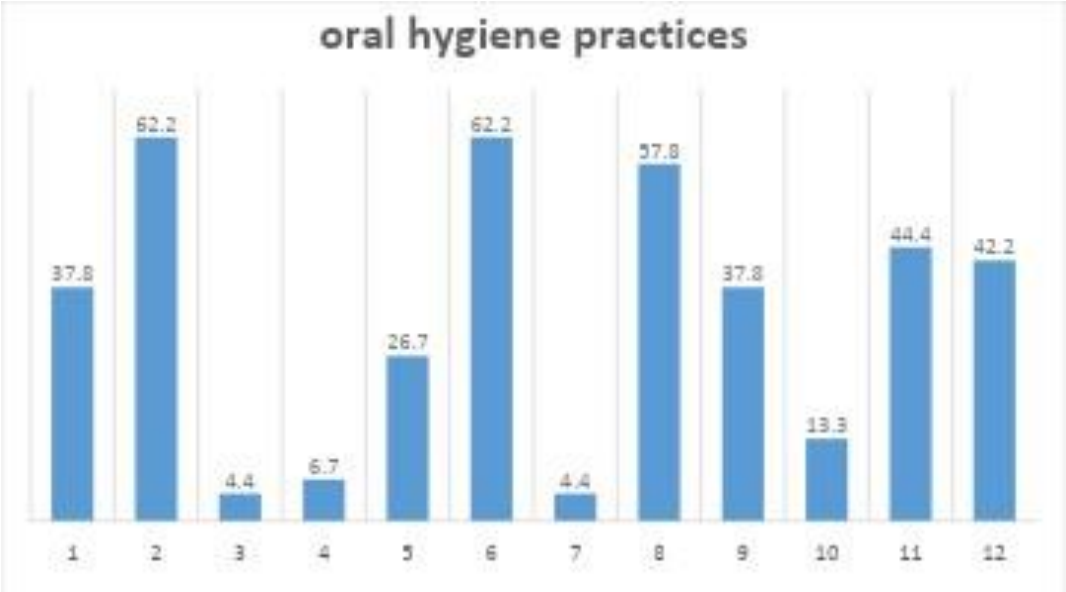
Oral Hygiene Practices

Oral hygiene practices varied among participants (Table 2) and (Graph2). While 37.8% reported brushing their teeth twice daily, a significant proportion (62.2%) brushed only once a day. Flossing habits were poor, with 62.2% never flossing, and only 4.4% reported daily flossing. Mouthwash usage was reported as occasional by 57.8% of participants, and 42.2% had never visited a dentist.

Table 2: Oral Hygiene Practices of Participants

Question	Response	Frequency (n)	Percentage (%)
Brushing Frequency	Twice a day	102	37.8
	Once a day	168	62.2
Flossing Frequency	Daily	12	4.4
	Several times a week	18	6.7
	Once a week	72	26.7
	Never	168	62.2
Mouthwash Usage	Daily	12	4.4
	Occasionally	156	57.8
	No	102	37.8
Frequency of Dental Visits	Once in 6 months	36	13.3
	Once in a year	120	44.4
	Never	114	42.2

Table 2 presents the oral hygiene practices among the study participants.

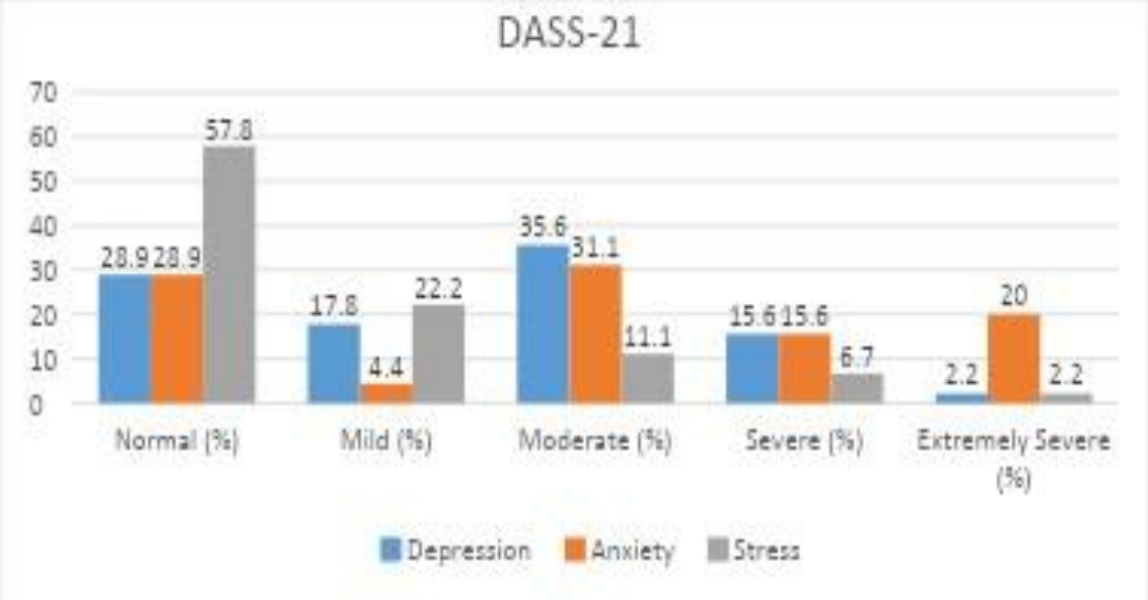


Psychological Well-being (DASS-21 Scores)

The DASS-21 scale was used to assess psychological well-being (Table 3) and (Graph 3). Moderate to extremely severe depression was reported in 53.4% of participants, while 66.7% had moderate to extremely severe anxiety. Stress levels were lower in comparison, with only 20% experiencing severe or extremely severe stress.

Table 3: Psychological Well-being (DASS-21 Scores)

	Normal (%)	Mild (%)	Moderate (%)	Severe (%)	Extremely Severe (%)
Depression	28.9	17.8	35.6	15.6	2.2
Anxiety	28.9	4.4	31.1	15.6	20.0
Stress	57.8	22.2	11.1	6.7	2.2

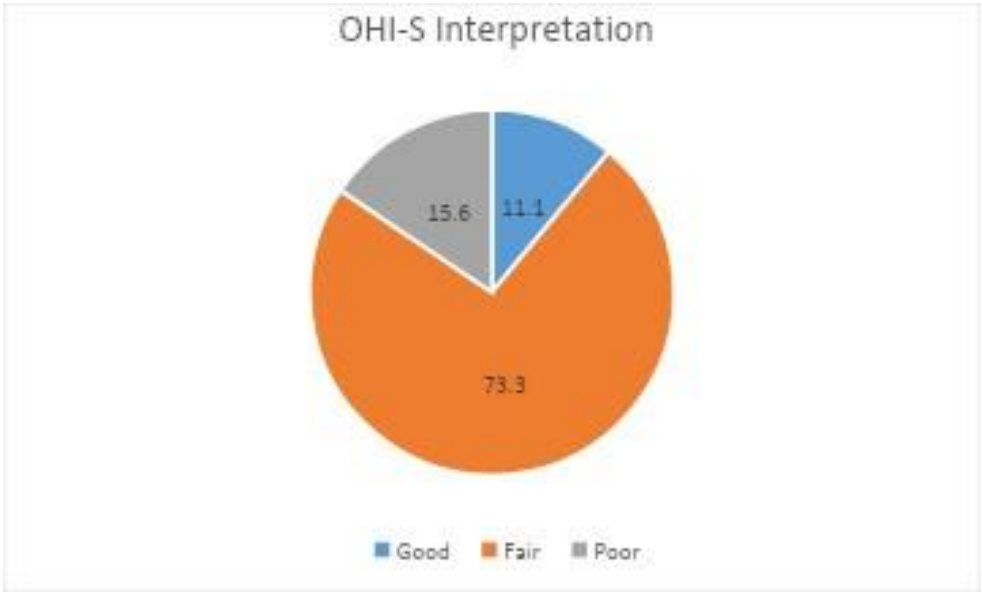


Oral Health Index-Simplified (OHI-S) Scores

The OHI-S index was used to evaluate oral health status (Table 4) and (Graph 4). The majority (73.3%) had fair oral hygiene, while 15.6% had poor oral hygiene, and only 11.1% had good oral hygiene. The mean OHI-S score was 2.22 ± 0.80.

Table 4: OHI-S Scores Interpretation

OHI-S Interpretation	Frequency (n)	Percentage (%)
Good	30	11.1
Fair	198	73.3
Poor	42	15.6



Interrelationship Between Psychological Well-being and Oral Hygiene Practices

The association between psychological well-being (Depression, Anxiety, Stress) and oral hygiene status (OHI-S scores: Good, Fair, Poor) was analysed using statistical tests. The results, presented in Table 6, show a significant correlation ($p < 0.001$) between psychological distress and oral health status.

Depression and Oral Hygiene (OHI-S Scores)

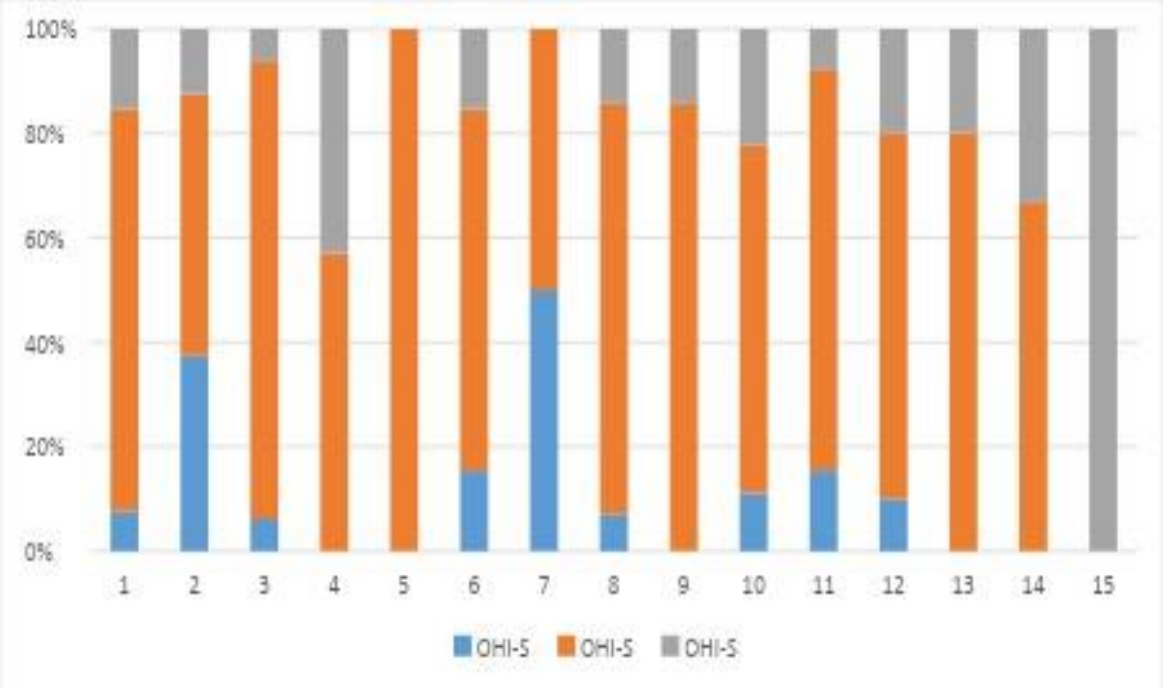
Participants with higher depression levels had significantly poorer oral hygiene compared to those with normal or mild depression ($p < 0.001$). Among those with severe depression, 42.9% had poor oral hygiene, while none had good oral hygiene. In contrast, normal and mild depression groups had higher percentages of participants with good or fair oral hygiene.

Anxiety and Oral Hygiene (OHI-S Scores)
A similar trend was observed for anxiety levels. Among participants with extremely severe anxiety, 22.2% had poor oral hygiene, whereas only 11.5% of those with normal anxiety had poor oral hygiene. The relationship was statistically significant ($p < 0.001$).

Stress and Oral Hygiene (OHI-S Scores)
Participants with higher stress levels had worse oral health outcomes. Among those with extremely severe stress, 100% had poor oral hygiene, while none had good or fair oral hygiene. Conversely, those with normal stress levels had the highest proportion of individuals with good oral hygiene. The results were statistically significant ($p < 0.001$).

Table 6: Association Between Psychological Well-being and Oral Hygiene Index (OHI-S Scores)

Groups		OHI-S			Total	P value
		GOOD	FAIR	POOR		
Depression	Normal	6	60	12	78	<0.001**
	Mild	18	24	6	48	
	Moderate	6	84	6	96	
	Severe	0	24	18	42	
	Extremely Severe	0	6	0	6	
Anxiety	Normal	12	54	12	78	<0.001**
	Mild	6	6	0	12	
	Moderate	6	66	12	84	
	Severe	0	36	6	42	
	Extremely Severe	6	36	12	54	
Stress	Normal	24	120	12	156	<0.001**
	Mild	6	42	12	60	
	Moderate	0	24	6	30	
	Severe	0	12	6	18	
	Extremely Severe	0	0	6	6	



Interrelationship Between Psychological Well-being and Socioeconomic Status (SES)
The association between psychological well-being (Depression, Anxiety, Stress) and socioeconomic status (SES) based on the Modified Kuppuswamy Scale 2023 was analysed. The results, presented in Table 7and Graph 7, indicate a statistically significant correlation ($p < 0.001$) between SES and psychological distress.

Depression and Socioeconomic Status
Participants from lower-middle and upper-lower SES groups had higher levels of depression. Among those with moderate depression, 12 participants (12.5%) were from the lower-middle class, whereas none were

from the upper SES group. Similarly, individuals with severe depression were more frequently observed in lower SES groups, whereas none of the participants from the upper SES group had extremely severe depression.

Anxiety and Socioeconomic Status

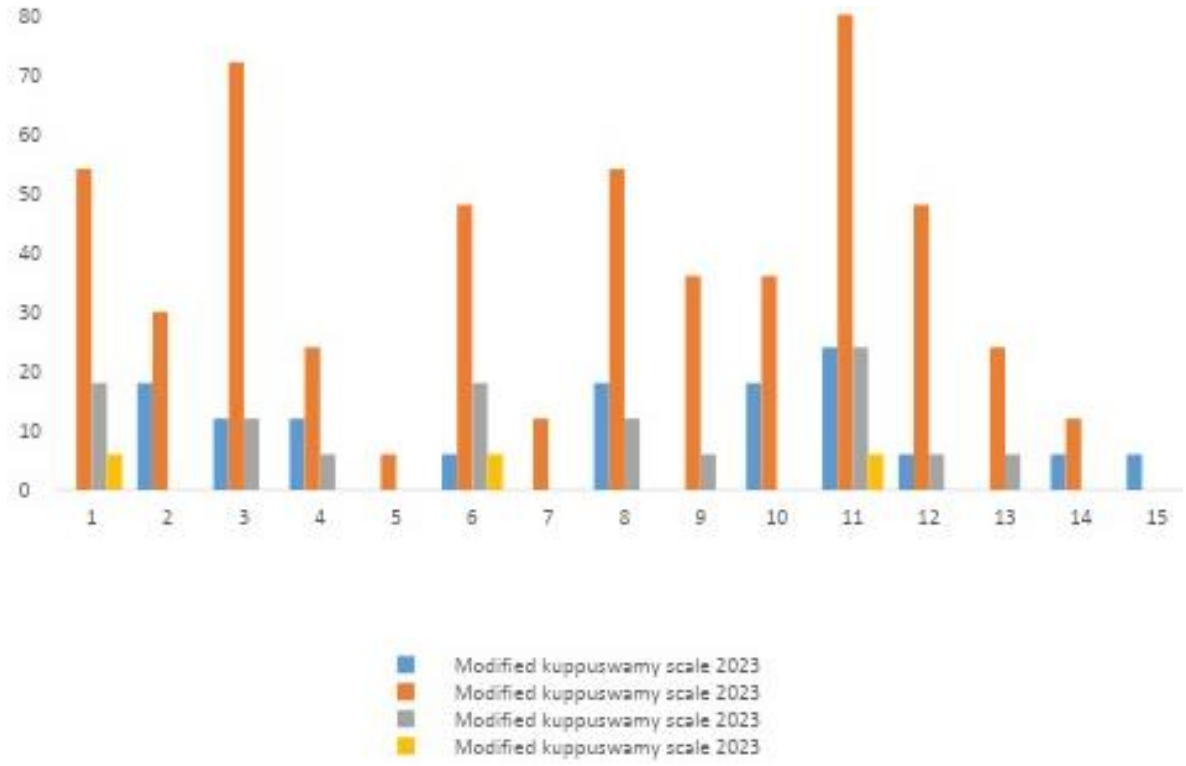
A strong association was found between anxiety levels and SES. Among those with extremely severe anxiety, 18 participants belonged to the upper SES group, and 36 were from the upper-middle class, while none were from the lower-middle or upper-lower classes ($p < 0.001$). This suggests that while severe anxiety is present across SES groups, higher SES groups reported higher rates of extremely severe anxiety.

Stress and Socioeconomic Status

Participants with higher stress levels were more likely to belong to lower SES groups. Among those with extremely severe stress, 6 participants were from the upper SES group, whereas none were from the lower-middle or upper-lower classes ($p < 0.001$). These findings suggest that stress may be more prevalent in higher SES groups, whereas lower SES groups experience higher levels of depression.

Table 7: Association Between Psychological Well-being and Socioeconomic Status (SES)

Groups		Modified kuppuswamy scale 2023				P value
		Upper	Upper Middle	Lower Middle	Upper Lower	
Depression	Normal	0	54	18	6	<0.001**
	Mild	18	30	0	0	
	Moderate	12	72	12	0	
	Severe	12	24	6	0	
	Extremely Severe	0	6	0	0	
Anxiety	Normal	6	48	18	6	<0.001**
	Mild	0	12	0	0	
	Moderate	18	54	12	0	
	Severe	0	36	6	0	
	Extremely Severe	18	36	0	0	
Stress	Normal	24	102	24	6	<0.001**
	Mild	6	48	6	0	
	Moderate	0	24	6	0	
	Severe	6	12	0	0	
	Extremely Severe	6	0	0	0	



DISCUSSION

The findings of this study highlight a significant interrelationship between psychological well-being, socioeconomic status (SES), and oral hygiene practices. The results indicate that higher levels of psychological distress (depression, anxiety, and stress) are associated with poorer oral hygiene behaviours, including lower brushing frequency, reduced flossing, and infrequent dental visits. Additionally, socioeconomic status plays a crucial role, influencing both mental health and oral hygiene outcomes.

Psychological Well-being and Oral Hygiene Practices

The study found a strong negative correlation between psychological distress and oral hygiene behaviours. Participants with higher depression, anxiety, and stress levels were significantly less likely to brush twice daily, floss, or visit a dentist regularly ($p < 0.001$).The results indicate that people dealing with psychological issues often tend to engage less in self-care practices.

The DASS-21 scale showed that participants with moderate to severe depression and anxiety had significantly higher Oral Hygiene Index-Simplified (OHI-S) scores, indicating poorer oral health. This finding reinforces the idea that a person's mental well-being can influence how consistently they follow oral hygiene routines, as emotional distress might result in reduced attention to personal care.

In addition, individuals experiencing high levels of stress tended to have the poorest oral hygiene scores, indicating a link between prolonged stress and deteriorating oral health. This may be due to stress-related habits like consuming more sugary foods, tobacco use, and neglecting daily oral care.

Socioeconomic Status and Psychological Well-being

The study also found a clear link between socioeconomic status and mental health, with those from lower economic backgrounds experiencing higher levels of depression. Factors such as financial hardship, lack of healthcare access, and social pressures may play a role in increasing emotional distress

Interestingly, individuals from higher socioeconomic backgrounds showed elevated levels of anxiety and stress, which could be linked to demanding jobs and greater societal expectations. Despite this, they maintained better oral hygiene and had lower oral hygiene index scores, possibly due to better access to dental services and greater awareness of health practices.

Comparison with Previous Research

The bidirectional relationship between oral health and mental health has been well-documented in previous studies. A meta-analysis demonstrated that individuals with common psychological disorders have higher rates of dental decay, missing teeth, and periodontal disease. Similarly, the current study found that psychological distress correlates with increased OHI-S scores, emphasizing the need for mental health interventions in dental care settings. [6]

A systematic review by Khokhar et al. (2011) [5] also highlighted the importance of providing oral health education to individuals with psychological disorders, as improving health literacy and accessibility to dental care can significantly reduce the burden of oral disease. The current study further supports this, showing that individuals from lower SES backgrounds, who may lack health literacy, are at higher risk for both poor mental health and poor oral hygiene.

Public Health Implications

The results of this study suggest a need for integrated oral health and mental health programs, particularly for individuals in lower SES groups who are at greater risk for both psychological distress and poor oral health outcomes. Some potential interventions include:

1. Mental Health Screening in Dental Clinics Implementing routine psychological screening (DASS-21) for dental patients at high risk.
2. Oral Health Education for Individuals with Psychological Disorders of Developing targeted programs to improve oral health literacy among individuals with depression, anxiety, and stress.
3. Community-Based Interventions of Providing accessible dental care and psychological counselling in lower-income communities.
4. Stress Management in Oral Health Promotion Encouraging stress-reduction techniques such as mindfulness, exercise, and dietary modifications to prevent stress-induced oral health neglect.

CONCLUSION

This study demonstrates a significant association between psychological well-being, socioeconomic status, and oral hygiene practices. Higher depression, anxiety, and stress levels were linked to poor oral hygiene behaviours and increased OHI-S scores. Socioeconomic status played a moderating role, with individuals from lower SES groups exhibiting higher depression and worse oral health, while higher SES groups had greater anxiety but maintained better oral hygiene.

These findings highlight the need for an interdisciplinary approach to oral health, integrating mental health screening and intervention into routine dental care and underscore the importance of an integrated approach to public health dentistry, where mental health, education, and financial accessibility are prioritized to enhance oral health outcomes in diverse populations【4,10,18】.Targeted public health policies focusing on oral health education, mental health awareness, and accessible dental services are

crucial to improving both psychological and oral health outcomes.

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