

Original Article

Association of oral parafunctional habits with anxiety and big five personality traits in the Karachi Population.

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Abstract

Background: Oral parafunctional habits such as nail biting, teeth grinding, and lip biting are often linked to stress, anxiety, and specific personality traits with potential physical and psychological health impacts. While these habits are common, research on their association with anxiety and personality traits in young adults, particularly in Karachi, is limited. This study aims to explore the prevalence of oral parafunctional habits and their relationship with anxiety and Big Five personality traits in the young adult population of Karachi.

Methodology: This observational, cross-sectional study used convenience sampling to collect data from dental institutes and non-medical populations in Karachi. Participants completed an online and paper-based questionnaire that included demographic details, the Hamilton Anxiety Rating Scale (HAM-A) to assess anxiety levels, a section on oral parafunctional habits, and the Ten-Item Personality Inventory (TIPI) to measure personality traits. Data analysis was performed using Pearson's Chi-Square and Binary Logistic Regression.

Results: A total of 360 participants (266 females and 94 males) were included in the study. Lip biting was most common among unemployed females aged 18-25 (78%). A significant association was found between female gender, occupation, and oral parafunctional habits ($p = 0.022$). Mild anxiety was linked to oral parafunctional habits, and nail biting was associated with the agreeableness personality trait ($p = 0.011$).

Conclusion: Oral parafunctional habits are highly prevalent among young adults in Karachi, with significant association of these habits with anxiety, and certain personality traits. Unemployed females, particularly those aged 18-25, showed a higher prevalence, highlighting the importance of addressing these habits in this population.

Keywords

Oral Parafunctional Habits, Personality Traits, Anxiety, Bruxism, Psychological Stress



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Introduction

The term habit refers to repetitive psychological behaviors, whether consciously or unconsciously performed, as part of daily routines¹. Oral parafunctional habits (OPH) encompass abnormal functions of the stomatognathic system, which include bruxism, lip biting, nail biting, and thumb thrusting². These habits are frequently linked to anxiety, depression, emotional distress, and personality traits. Bruxism, one of the most common oral parafunctional habits, is characterized by nonfunctional contact between the mandibular and maxillary teeth due to repetitive contractions of the masseter and temporalis muscles, leading to tooth grinding^{3,4}.

A study by Vlăduțu et al., conducted in Craiova, Romania, among young students aged 21–41 years at the Faculty of Dental Medicine, University of Medicine and Pharmacy, highlighted a high prevalence of bruxism⁵, particularly awake bruxism, and its strong association with stress and anxiety. Another prevalent oral parafunctional habit, nail biting (onychophagia), is often observed in young adults, typically as a response to boredom or emotional states^{6,7}, such as stress or anxiety. Similarly, thumb sucking, a non-nutritive sucking habit, is common among children, with a global prevalence ranging from 34% to 90%. This habit generally decreases with age⁸.

Additionally, a significant association between cheek biting and depression was found in a case-control study conducted at Ameen Medical and Dental Center, Karachi, among adults aged 16–65 years⁹. The impact of stress on health outcomes is also influenced by personality, which plays a crucial role in how individuals respond to stress. Personality traits, such as those outlined in the Big Five Personality Model, reflect individual patterns of thoughts, feelings, and behaviors. The Big Five model includes extraversion, openness, conscientiousness, agreeableness, and neuroticism. Extraversion is characterized by sociability, expressiveness, and ease in forming relationships, while agreeableness refers to traits like cooperativeness and compassion^{10–14}.

Neuroticism is linked to emotional instability, such as anxiety, irritability, and nervousness.

A study at the Faculty of Dentistry, Universitas Trisakti, Indonesia, found a relationship between oral parafunctional habits and neuroticism, particularly in young adults aged 18–24 years, in response to psychological distress, depression, and anxiety¹⁵. Other personality traits such as conscientiousness (self-discipline and goal achievement) and openness (creativity and ingenuity) were also explored in relation to these habits^{16,17}.

However, there is a gap in research examining the association between oral parafunctional habits, anxiety, and the Big Five personality factors in Pakistan. The aim of this study is to assess the prevalence of oral parafunctional habits in Karachi and investigate their association with anxiety and personality traits. This study, specifically aims to explore how stress influences the development of certain habits during periods of anxiety and how these habits, in turn, impact personality characteristics.

Methodology

Study Design

This was a multi-centered, cross-sectional, observational study conducted to assess the association between anxiety, personality traits, and oral parafunctional habits among adults. The study aimed to explore the prevalence and relationships between anxiety levels and these habits, focusing on individuals between the ages of 18 and 40, a group prone to significant emotional and environmental stressors. Given the nature of the research, a cross-sectional design was deemed most appropriate for identifying associations at a specific point in time, providing a snapshot of the targeted population.

Ethics

Ethical approval for the study was obtained from the Ethics Committee of Bahria University Health Sciences Campus Karachi (BUHSC) on April 22, 2022. Prior to participation, all individuals provided informed consent, ensuring that they understood

the purpose of the study, the voluntary nature of their participation, and their right to confidentiality. The study adhered to ethical guidelines in research, ensuring participants' privacy and well-being were safeguarded throughout the data collection process.

Setting

The study was conducted at several educational institutions in Karachi, Pakistan, including Bahria University Health Sciences Campus Karachi (BUHSC), Dr. Ishrat-ul-Ibad Institute of Oral Health Sciences (DUHS), Fatima Jinnah Dental College (FJDC), and non-medical students from Bahria University Karachi Campus. These institutions were selected due to their diverse student populations, including individuals from both medical and non-medical backgrounds, allowing for a comprehensive analysis of oral parafunctional habits, anxiety, and personality traits across different educational sectors.

Participants

The study included male and female participants between the ages of 18 and 40. This age group was chosen as individuals in this range are often subject to various environmental and emotional stressors that can lead to anxiety, depression, and altered personality traits, which may impact their day-to-day living. Participants were selected using convenience sampling, with both electronic and physical dissemination of the survey to ensure a broad sample across different educational institutions. The study specifically focused on dental students and non-medical students to explore potential differences in habits and traits within these populations. Participants with no formal education, those younger than 18, and individuals over 40 were excluded.

Variables

- Anxiety levels (measured using the Hamilton Anxiety Rating Scale)¹⁸
- Personality traits (measured using the Ten-Item Personality Inventory [TIPI])³
- Oral parafunctional habits (e.g., nail biting, teeth grinding, lip biting, cheek biting, object biting)

Data Sources/Measurement

Data collection was performed through a questionnaire designed using Google Forms, which was distributed electronically via WhatsApp, email, and in hard copy formats. The questionnaire consisted of four sections:

- **Demographic Information:** Age, gender, occupation, education level, marital status, and institution.
- **Oral Parafunctional Habits:** Questions about common habits such as nail biting, teeth grinding, lip biting, cheek biting, and object biting.
- **Anxiety Levels:** Anxiety was assessed using the Hamilton Anxiety Rating Scale (HAM-A), a validated 14-item clinician-based questionnaire. Scores from 0 to 4 were assigned for each item, with the total score ranging from 0 to 56, categorizing anxiety from mild to severe.
- **Personality Traits:** The Ten-Item Personality Inventory (TIPI) was used to assess the Big Five personality traits: extraversion, agreeableness, conscientiousness, emotional stability, and openness. Responses were recorded on a 1-7 scale, and scores were analyzed to categorize participants' personality traits.

Bias

The primary method of data collection involved convenience sampling, which introduces the potential for selection bias. While this method was necessary due to logistical constraints and the need for broad participation from a diverse sample, it may limit the generalizability of the findings to the broader population. Additionally, there may have been response bias, as participants self-reported their habits and anxiety levels, which could have influenced the accuracy of the data. Despite these limitations, this sampling technique was the most feasible given the study's design.

Study Size

The sample size for the study was calculated using OpenEpi software version 3. A total of 360 participants were deemed sufficient, calculated with a 95% confidence interval and a 5% margin of error. This sample size was considered adequate to

achieve reliable and valid results for the intended analysis.

Statistical Methods

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics, including frequencies and percentages, were used to summarize the demographic data, prevalence of oral parafunctional habits, and anxiety levels. Pearson's Chi-Square test was used to assess the association between categorical variables, such as anxiety levels and oral parafunctional habits. Binary Logistic Regression was employed to explore the relationship between personality traits and anxiety. A p-value less than 0.05 was considered significant.

Results

Participants

The study included a total of 360 participants, consisting of 266 females (73.9%) and 94 males (26.1%). The age distribution showed that 274 participants (76.1%) were aged 18-25 years, followed by 66 participants (18.3%) in the 25-35 age range, and 20 participants (5.6%) aged 35-40 years. Employment status revealed that 274 participants (76.1%) were unemployed, while 86 participants (23.9%) were employed. Educational background was diverse, with 182 participants (50.6%) having completed secondary school, 134 participants (37.2%) being university graduates, and 44 participants (12.2%) holding postgraduate qualifications. Marital status data showed that 297 participants (82.5%) were single, 59 participants (16.4%) were married, and 4 participants (1.1%) were either divorced or separated. Additionally, a significant number of participants, 160 (44.4%), reported no oral parafunctional habits (OPH), which set the foundation for further analysis of OPH patterns in relation to other variables.

Descriptive Data

Descriptive analysis of the oral parafunctional habits (OPH) revealed a variety of behaviors, with the most common being lip biting (22.8%), followed by nail biting (14.4%) and teeth grinding (11.7%). A smaller portion of the sample engaged in cheek biting (5.0%), and object biting (1.7%). Lip

biting was the most prevalent OPH, significantly more common among unemployed participants (71 participants, or 86.6%) compared to employed participants (p-value = 0.022). This habit was also noted more frequently in females and younger participants (18-25 years). The data on anxiety levels, as measured by the Hamilton Anxiety Scale, revealed that 63.33% of participants (n=228) had mild anxiety, 28.3% (n=102) had moderate anxiety, and 8.3% (n=30) had severe anxiety. This distribution provided an opportunity to explore the link between anxiety levels and the prevalence of OPH.

Outcome Data

The outcome of interest was the prevalence of oral parafunctional habits and their potential association with anxiety levels, personality traits, marital status, employment status, and education. The study revealed that participants exhibiting higher anxiety levels were more likely to engage in OPH. Specifically, teeth grinding and nail biting were notably associated with moderate and severe anxiety levels (p-values ranging from 0.002 to 0.020). Furthermore, participants with higher levels of extraversion, agreeableness, and openness to experience were more likely to report engaging in nail biting (34.6%, p-value=0.000), indicating a strong connection between these personality traits and specific OPH behaviors. Marital status was another key factor, with married and divorced participants reporting higher rates of nail biting and teeth grinding, with a 43.7 times higher prevalence of nail biting among married participants and a 60.0 times higher prevalence among divorced participants compared to singles.

Main Results

- **Oral Parafunctional Habits:** The most commonly reported OPHs were lip biting, followed by nail biting and teeth grinding. Significant associations were found between anxiety levels and the prevalence of these habits. For example, participants with moderate to severe anxiety were more likely to report nail biting (p-value=0.002) and teeth grinding (p-value=0.020), suggesting a potential link

between psychological distress and oral behaviors.

- **Anxiety and OPH:** Anxiety was a significant predictor for engaging in OPH, with nail biting and teeth grinding more prevalent in participants with higher anxiety levels. The results show that anxiety-related symptoms such as difficulty concentrating, increased heartbeat, and dry mouth were commonly reported by individuals with these OPHs. This finding supports the hypothesis that stress and emotional distress could influence the manifestation of oral parafunctional behaviors.
- **Personality Traits:** The study found that individuals with higher scores in extraversion, agreeableness, and openness to experience were more likely to engage in nail biting. Participants with a higher extraversion score were 34.6% more likely to engage in nail biting (p -value=0.000), which underscores the

influence of personality characteristics on oral habits.

- **Marital Status and Employment Status:** Marital status was found to significantly correlate with OPH. Married and divorced participants exhibited a higher tendency to engage in nail biting and teeth grinding. Moreover, unemployed individuals were more likely to engage in lip biting (p -value=0.022), suggesting that occupation and personal stressors may contribute to the development of such habits.
- **Age and OPH:** Age appeared to be a factor in the type of OPH reported, with younger participants (18-25 years) showing higher rates of lip biting, while participants aged 25-35 years were more likely to report teeth grinding. These age-related trends highlight the potential role of developmental and psychosocial factors in the occurrence of OPH.

Table 1: Demographic Details.

Variables	N (%)
Gender	Female
	266 (73.9)
	Male
	94 (26.1)
Age	18-25 Years (Young adults)
	274 (76.1)
	25-35 Years (Early Adults)
	66 (18.3)
	35-40 Years (Middle-aged)
	20 (5.6)
Occupation	Employed
	86 (23.9)
	Unemployed
	274 (76.1)
Oral Parafunctional Habits	Lip Biting
	82 (22.8)
	Grinding of Teeth
	42 (11.7)
	Nail Biting
	52 (14.4)
	Cheek Biting
	18 (5.0)
	Object Biting
	6 (1.7)
	No OPH
	160 (44.4)
Marital Status	Single
	297 (82.5)
	Married
	59 (16.4)
	Divorced/Separated
	4 (1.1)
Education	Secondary
	182 (50.6)
	Graduate
	134 (37.2)
	Postgraduate
	44 (12.2)

Table 2: Prevalence and factors significantly associated with oral parafunctional habits.

Variables		Nail Biting	Grinding	Lip Biting	Cheek Biting	Object Biting	None	p-value
Gender	Males	19(36.5)	10(23.8)	18(22.0)	6(33.0)	2(33.3)	39(24.3)	0.456
	Females	33(63.5)	32(76.2)	64(78.0)	12(66.7)	4(66.6)	121(75.6)	
Age	18-25 Years	38(73.1)	27(64.3)	72(87.8)	16(88.9)	6(100.0)	115(71.9)	0.233
	25-30 Years	4(7.7)	6(14.3)	4(4.9)	1(5.6)	-	22(13.8)	
	30-35 Years	6(11.5)	5(11.9)	5(6.1)	1(5.6)	-	12(7.5)	
	35-40 Years	4(7.6)	4(9.5)	1(1.2)	-	-	11(6.8)	
Occupation	Employed	12(23.1)	14(33.3)	11(13.4)	2(11.1)	-	47(29.4)	0.022*
	Unemployed	40(76.9)	28(66.7)	71(86.6)	16(88.9)	6(100.0)	113(70.6)	
Education	Secondary	29(55.8)	16(38.1)	54(65.9)	11(61.1)	3(50.0)	69(43.1)	0.370
	Graduate	15(28.8)	20(47.6)	24(29.3)	6(33.3)	3(50.0)	66(41.3)	
	Postgraduates	8(15.3)	6(14.2)	4(4.8)	1(5.5)	-	25(15.6)	

Values are given as n(%).

*p<0.05 is considered statistically significant

Table 3: Association of anxiety with oral parafunctional habits.

Variables		Nail Biting	Grinding	Lip Biting	Cheek Biting	Object Biting	None	p-Value
Difficulty in concentration, attentiveness, and poor memory	No	9(17.3)	11(36.2)	7(8.5)	-	-	38(23.8)	0.020*
	Mild	19(36.5)	7(16.7)	30(36.6)	8 (44.4)	1(16.7)	60(37.5)	
	Moderate	16(30.8)	18(42.9)	26(31.7)	5(27.8)	3(50.0)	35(21.9)	
	Severe	5(9.6)	3(7.1)	10(12.2)	2(11.1)	2(33.3)	20(12.5)	
Fast heartbeat, fainting, and palpitations	No	27(51.9)	16(38.1)	36(43.9)	7 (38.9)	2(33.3)	91(56.9)	0.008*
	Mild	8(15.4)	12(28.6)	24(29.3)	4 (22.2)	3(50.0)	44(27.5)	
	Moderate	9(17.3)	11(26.2)	11(13.4)	7 (38.9)	1(16.7)	18(11.3)	
	Severe	8(15.4)	1(2.4)	9(11.0)	-	-	6 (3.8)	
	Very Severe	-	2(4.8)	2(2.4)	-	-	1(0.6)	
Dry mouth, tendency to sweat, dizziness, and headache	No	21(40.4)	14(33.3)	27(32.9)	9(50.0)	-	83(51.9)	0.002*
	Mild	21(40.4)	17(40.5)	30(36.6)	4(22.2)	2(33.3)	57(35.6)	
	Moderate	10(19.2)	9(21.4)	21(25.6)	2(11.1)	4(66.7)	15(9.4)	
	Severe	-	-	3(3.7)	2 (11.1)	-	3(1.9)	
	Very Severe	-	2(4.8)	1(1.2)	1(5.6)	-	2(1.3)	

Values are given as n(%).

*p<0.05 is considered statistically significant

Table 4: Oral parafunctional habits and personality factors.

Variables		Nail Biting	Grinding	Lip Biting	Cheek biting	Object Biting	None	p-value
Extraversion								
I see myself as confident, outgoing, & enthusiastic	DS	3(5.8)	1(2.4)	2(2.4)	3(16.7)	2(33.3)	10(6.3)	0.000*
	DM	3(5.8)	-	9(11.0)	-	-	4(2.5)	
	DL	1(1.9)	1(2.4)	14(17.1)	1(5.6)	-	18(11.3)	
	NAND	4(7.7)	7(16.7)	12(14.6)	4(22.2)	-	16(10.0)	
	AL	8(15.4)	12(28.6)	9(11.0)	3(16.7)	1(16.7)	34(21.3)	
	AM	15(28.8)	12(28.6)	29(35.4)	4(22.2)	2(33.3)	53(33.1)	
	AS	18(34.6)	9(21.4)	7(8.5)	3(16.7)	1(16.7)	25(15.6)	
Agreeableness								
I see myself as sympathetic & warm	DS	3(5.8)	1(2.4)	1(1.2)	-	-	9(5.6)	0.011*
	DM	1(1.9)	-	6(7.3)	-	1(16.7)	5(3.1)	
	DL	1(1.9)	1(2.4)	6(7.3)	-	-	9(5.6)	
	NAND	10(19.2)	4(9.5)	7(8.5)	3(16.7)	1(16.7)	11(6.9)	
	AL	10(19.2)	10(23.8)	23(28.0)	4(22.2)	1(16.7)	29(18.1)	
	AM	9(17.3)	19(45.2)	24(29.3)	1(5.6)	-	50(31.3)	
	AS	18(34.6)	7(16.7)	15(18.3)	10(55.6)	3(50.0)	47(29.4)	
Openness to experience								
I see myself as open to new experiences, complex	DS	5(9.6)	1(2.4)	4(4.9)	2(11.1)	-	7(4.4)	0.058*
	DM	-	1(2.4)	1(1.2)	-	1(16.7)	5(3.1)	
	DL	4(7.7)	1(2.4)	10(12.2)	2(11.1)	-	11(6.9)	
	NAND	-	4(9.5)	14(17.1)	1(5.6)	-	28(17.5)	
	AL	21(40.4)	15(35.7)	25(30.5)	5(27.8)	3(50.0)	38(23.8)	
	AM	9(17.3)	10(23.8)	20(24.4)	3(16.7)	2(33.3)	37(23.1)	
	AS	13(25.0)	10(23.8)	8(9.8)	5(27.8)	-	34(21.3)	

DS: Disagree Strongly, DM: Disagree Moderately, DL: Disagree a little, NAND: Neither agree nor disagree, AL: Agree a little, AM: Agree Moderately, AS: Agree Strongly.

Table 5: Logistic Regression Analysis.

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Gender of participant (1)	0.220	0.342	0.416	1	0.519	1.247
Age of participant			2.264	3	0.520	
Age of participant (1)	-0.606	1.458	0.173	1	0.677	0.545
Age of participant (2)	-0.705	1.323	0.284	1	0.594	0.494
Age of participant (3)	-1.605	1.333	1.451	1	0.228	0.201
Occupation of participant (1)	-0.149	0.598	0.062	1	0.803	0.862
Education of participant			3.907	2	0.142	
Education of participant (1)	-1.292	0.836	2.392	1	0.122	0.275

Education of participant (2)	-0.722	0.784	0.848	1	0.357	0.486
Institute of participant			3.171	4	0.530	
Institute of participant (1)	-0.689	0.503	1.875	1	0.171	0.502
Institute of participant (2)	-1.149	1.037	1.227	1	0.268	0.317
Institute of participant (3)	0.375	1.307	0.082	1	0.774	1.455
Institute of participant (4)	0.641	1.248	0.264	1	0.608	1.899
Marital status			1.218	2	0.544	
Marital status (1)	-20.035	40193.279	0.000	1	1.000	0.000
Marital status (2)	-19.261	40193.279	0.000	1	1.000	0.000

Discussion

The prevalence of oral parafunctional habits (OPH) has been extensively discussed in the literature, with contemporary studies supporting a high prevalence rate²¹, which aligns with the findings of this study. Numerous factors contribute to the development of OPH, including depression, anxiety, neurological disorders, personality disorders, and other psychological conditions. Personality traits, in particular, significantly influence an individual's ability to manage emotional and mental stress, as well as anxiety and depression¹⁰.

In this study, the most common OPH was lip biting, observed in 22.8% (82 participants) of the population, followed by nail biting at 14.4% (52 participants). Object biting, however, was the least prevalent at 1.7% (6 participants). A similar study in Poland reported differing results, with object/gum chewing and bruxism being the most prevalent OPH in the adult Polish population²². Additionally, a Brazilian study conducted on high school students found nail biting to be the most common OPH among adolescents²³.

A significant association was observed between lip biting (the most prevalent OPH) and the unemployed population, with 86.6% (71 participants) of unemployed individuals reporting this habit. This finding, with a significant p-value of 0.02, suggests that unemployment may be a contributing factor to OPH. Moreover, lip biting was most commonly found in females (73.9%) aged 18–25 years. These results are consistent with a study conducted in Saudi Arabia, which reported

a higher prevalence of OPH in the unemployed population³.

The relationship between anxiety and OPH severity was also evident in the findings of this study. Participants with higher anxiety levels were significantly more likely to engage in OPH. A study conducted by Alkan et al.²⁴ on the psychological status of a population in relation to OPH found similar associations, particularly among children and adolescents exposed to stressful events, which led to higher anxiety and an increased incidence of OPH^{25,26}.

Our findings also support the general trend that females are more susceptible to OPH, which aligns with previous studies^{27,28}. However, a study conducted by Alamoudi et al. on Saudi population found no significant link between OPH and the psychological state of participants, which contrasts with the results of this study²⁹.

The impact of personality on OPH is significant, as demonstrated by Gabriela et al., who highlighted that personality traits play a key role in how individuals respond to the stressful events³⁰. The findings in revealed that the highest percentage of individuals who strongly agreed that nail biting was the most prevalent OPH (34.6%) fell under the personality traits of extraversion and agreeableness. Nail biting was also strongly associated with neuroticism (25%) and openness to experience (25%), while 21.2% of individuals with a conscientious personality trait strongly disagreed with the prevalence of nail biting. These results suggest a clear link between OPH and specific personality traits, particularly those associated with

psychological disorders, including anxiety, depression, and other neurotic conditions³¹.

The cross-sectional design of this study limits the ability to draw causal conclusions, making it difficult to establish the directionality of the relationships between OPH, anxiety, and personality traits. Additionally, the relatively small sample size may reduce the statistical power and limit the generalizability of the findings to the wider Karachi population. To enhance the robustness and applicability of the results, a multi-center study with a larger, more diverse sample from various regions of Pakistan would be beneficial for more comprehensive insights and better generalization.

Conclusion

Our study, based on a self-reported questionnaire, indicates a high prevalence of OPH in the adult population of Karachi, with a significant association to mild anxiety levels and various personality traits. The most common parafunctional habits were found among individuals with conscientiousness and neuroticism. Notably, single females aged 18-40 years, particularly those who are unemployed or financially distressed, exhibited a higher prevalence of OPH compared to other demographic groups.

Conflicts of Interest

The author(s) have no conflicts of interest.

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