ORIGINAL ARTICLE

Community Assessment of Prevalence and Associated Factors of Tobacco Chewing in an Underprivileged Area of Karachi: A Cross-Sectional Survey

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Abstract

Background: According to the World Health Organization, a substantial proportion of the Pakistani population chews some form of smokeless tobacco. Most smokeless tobacco products are made from tobacco leaves, so they have many of the same harmful chemical substances as cigars and cigarettes.

Objective: To assess the prevalence and associated factors of tobacco chewing among residents of an underprivileged area of Karachi.

Methods: A cross-sectional study was conducted from February, 2023 to November, 2024 at Baqai Institute of Health Sciences, Baqai Medical University, Karachi. The data were collected using a study questionnaire from 601 individuals residing in Kathore, UC 3, Gadap, Karachi. SPSS version 20 was used for data analysis.

Results: The mean age of participants was 33.11±9.56 years, and a majority of them were male (58.2%). About two-thirds of respondents were tobacco chewers (63.9%). Furthermore, age ≥35 years (aOR=3.86, 95% CI: 2.52-5.92, p<0.001), male gender (aOR=2.55, 95% CI: 1.52-4.29, p<0.001), education level (illiterate aOR=6.71, 95% CI: 2.87-15.71, p<0.001 and able to read and write/primary aOR=4.53, 95% CI: 2.11-9.72, p<0.001), unemployed (aOR=2.95, 95% CI: 1.38-6.27, p=0.005) and monthly household income Up to 20000 rupees (aOR=1.67, 95% CI: 1.09-2.55, p=0.018) were all significantly associated with tobacco chewing practice.

Conclusion: A majority of participants were tobacco chewers. Moreover, many participant characteristics were significantly associated with tobacco chewing. It is therefore imperative to spread awareness regarding the harmful effects of chewing tobacco, especially among the population that is older, male, less educated, and unemployed.

Keywords: *Prevalence, risk factors, tobacco, smokeless, community.*

INTRODUCTION

The term chewing tobacco refers to the consumption of unburned tobacco in the form of chewing. Consumers chew tobacco in their mouths and spit out the juice that accumulates [1]. Tobacco comes in the form of loose leaf, plug, or twist piece taken from a pouch and placed between the cheek and gums [2]. Common forms of chewable tobacco include paan (betel quid with tobacco), naswar, and gutka. Tobacco usage is among the major causes of morbidity and mortality worldwide. Globally, nearly 1.3 billion people are tobacco users, and 80% of them belong to low- and middle-income countries. Tobacco use is linked to 8 million deaths every year [3].

Tobacco is the most common cause of oral cancers, including cancers of the mouth, tongue, cheeks, and gums. According to the National Institute of Health, tobacco use can also cause many types of cancer, including carcinoma of the lung, Larynx, esophagus, throat, bladder, and liver, as well as Acute Myeloid Leukemia [4]. According to the American Cancer Society, most smokeless tobacco products are made from tobacco leaves, so they have many of the same harmful chemical substances as cigars and cigarettes [5].

The Global Youth Tobacco Survey recorded that the majority of school-going children between the age group of 13 to 15 years are currently using or have tried tobacco [6]. It is a common habit in developing countries due to a lack of education, the predominance of lower socio-economic status, and poverty. According to the World Health Organization, a substantial proportion of the Pakistani population chews some form of smokeless tobacco [3]. According to a local study, males and urban residents were more likely to be tobacco chewers [7]. A recent study from India reported pan mixed with tobacco and naswar to be the 2 commonest types of smokeless tobacco products used [8].

Tobacco chewing is common in rural areas of Pakistan mainly because of lack of education and awareness about its side effects. Moreover, a recent local study found a serious gap between participants' awareness of the harmful effects of smokeless tobacco use and their attempts to stop it [9]. In many suburbs of Karachi,

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where socioeconomically deprived people live, chewing tobacco is a common practice that results in the suffering of the local population due to its serious consequences on oral and general health. Research aimed at exploring locally specific risk factors in the population to address this important public health issue effectively is therefore essential. To the best of the investigator's knowledge, recent local literature on this topic is limited at best [10-13]. This study was therefore conducted to assess the prevalence and associated factors of tobacco chewing among residents of an underprivileged area of Karachi. The results of this study are expected to add to the limited local evidence base and aid in devising informed prevention strategies suitable in our societal context.

MATERIALS AND METHODS

A cross-sectional study was conducted from February, 2023 to November, 2024 at Kathore, Union Council 3, Gadap, Karachi. Gadap Town spreads over 1,200 square kilometers and is the most backward and least developed area of Karachi [14]. Baqai Institute of Health Sciences granted ethical approval for the study (Reference # FHM 31-2023). Individuals aged 18 years or above of either gender residing in Kathore, UC 3, Gadap, Karachi were included, whereas those who refused to provide verbal informed consent were excluded from the study.

Setting the percentage frequency of the study outcome at 50% for the most conservative estimate, the confidence level at 95%, and the precision at 4%, the required sample size was calculated to be 600 respondents using the OpenEpi calculator [15]. The study participants were selected using a non-probability convenience sampling technique.

After obtaining their verbal consent, the principal investigator collected data through a one-to-one interview using the study questionnaire. The study questionnaire was specifically designed for the study and had been checked for content validity by two public health experts. A face-to-face approach was used for this purpose. Relevance ratings for the items were determined, and based on these ratings, the item-level content validity index (I-CVI) was calculated by dividing the number of experts who agreed by the total number of experts. Only those items were retained in the questionnaire whose I-CVI value was equal to 1.

The questionnaire consisted of two sections: section A contained six questions about the socio-demographic characteristics of the respondents, including age, gender, education level, employment status, monthly household income, and type of family, while section B contained twelve questions to assess the prevalence and details of tobacco chewing practices. These included whether family members or friends offered chewable tobacco, frequency of use, urge to chew more after first use, type and duration of chewable tobacco consumed, place tobacco was bought from, place and means of buying tobacco, desire to chew tobacco early morning, if felt relaxed after chewing it, and if ever sought help or advice to quit. Participants were divided into tobacco chewers and non-chewers based on history of tobacco chewing, and those who responded yes to the question 'Do you chew tobacco in any form?' were considered tobacco chewers.

Data were analyzed using SPSS version 20. Categorical variables were reported using frequencies and percentages, while continuous variables were reported using mean and standard deviation. Binary logistic regression was applied to compute univariate odds ratios with 95% confidence intervals. Variables with $p<0.25$, as well as other important variables regardless of $p<0.25$ in univariate analysis, were used to build a multivariable regression model to estimate adjusted odds ratios with 95% confidence intervals, controlling for potential confounders such as gender, education level, and monthly household income. To address multicollinearity and ensure a stable model, the variance inflation factor for all predictors was calculated and found to be between 1 and 2, indicating low correlation and considered perfectly acceptable. As the study aimed to test a specific theory, variables were selected for the model using the enter method for simultaneous entry. A two-tailed p-value of ≤0.05 was considered statistically significant.

RESULTS

A total of 605 eligible individuals were approached, of whom only 4 refused, yielding a response rate of 99.3% for the study. Because of scrutiny during the interview, none of the variables had any missing data. Data of 601 participants were therefore analyzed for the study (**Fig. 1**).

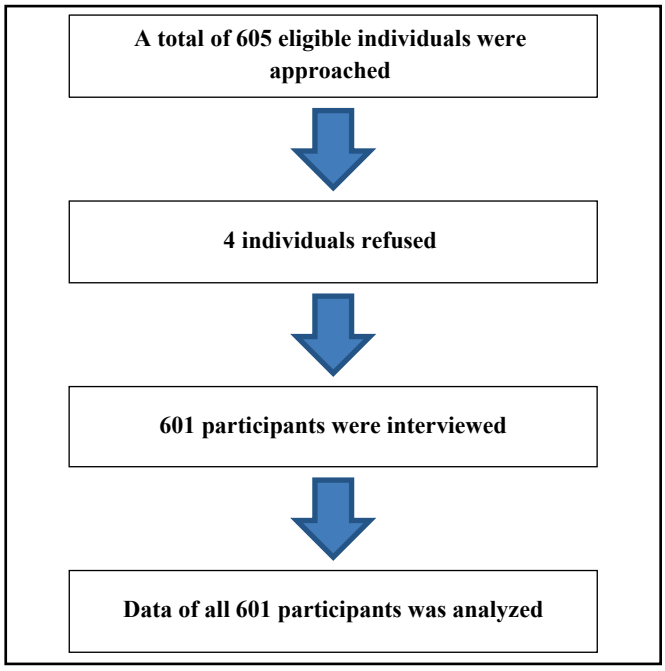


Fig. (1): Flow diagram depicting patients enrolment into the study.

Table 1: Summary of participants' profile (n=601).

Participant Profile	Frequency (%)/Mean ± Standard Deviation
Age (Years)	33.11±9.56
Age Group	
Less than 35 years old	163(42.4)
35 years old or more	221(57.6)
Gender	
Male	350(58.2)
Female	251(41.8)
Education level	
Illiterate	116(19.3)
Able to read and write/Primary	140(23.3)
Secondary	162(27.0)
Intermediate	131(21.8)
Graduate or above	52(8.7)
Employment status	
Employee / Self employed	317(52.7)
Unemployed	64(10.6)
Student /House wife	220(36.6)
Monthly household income (Rupees)	
Up to 20000	243(40.4)
21000 to 50000	358(59.6)
Type of family	
Nuclear	201(33.4)
Joint	400(66.6)

The mean age of participants was 33.11±9.56 years; a majority belonged to the less than 35 years age group (53.1%) and were male (58.2%). Around one-fifth were illiterate (19.3%), whereas a little over a quarter had secondary education (27.0%). A majority of them had a monthly household income of more than 20,000 rupees (59.6%) and lived in a joint family system (66.6%) (**Table 1**).

Worryingly, the study results revealed that around two-thirds of respondents (63.9%) were tobacco chewers (**Fig. 2**).

Moreover, assessment of their tobacco chewing practice showed that a majority were offered chewable tobacco by their family members or friends (57.4%). Around two fifth of them chewed tobacco more than twice a day (42.9%) and were addicted to gutka (39.4%). Furthermore, a majority easily got chewed tobacco when they wanted (61.6%) and desired chewing tobacco after taking it for the first time (58.4%). Encouragingly, though, a majority of them sought help or advice to stop chewing tobacco (58.9%) (**Table 2**).

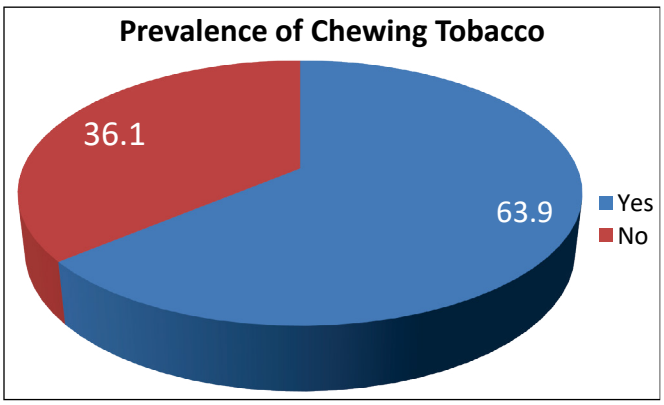


Fig. (2): Prevalence of chewing tobacco.

Table 2: Details of tobacco chewing practice (n=384).

Tobacco Chewing Practice	Frequency (%)
Have your family members or friends offered you chewable tobacco in any form?	
Yes	345(89.8)
No	39(10.2)
How many times a day do you chew tobacco?	
Less often once a day	12(3.1)
Once a day	28(7.3)
Twice a day	86(22.4)
More than twice a day	258(42.9)
Do you feel more urge to chew tobacco after taking it first time?	
Yes	365(95.1)
No	19(4.9)
Which type of tobacco do you chew?	
Pan	96(25.0)
Gutka	237(61.7)
Naswar	31(8.1)
Or any other form	20(5.2)
During last month how many days did you chew tobacco in any form?	
1 to 2 days	112(29.2)
3 to 5 days	19 (4.9)
6 to 10 days	52(13.5)
More than 10 days	201(52.3)
From where do you buy tobacco?	
From village shop	352(91.7)
At Gas Station	11(2.9)
From Drug Station	7(1.8)
From Grocery Station	14(3.6)
Is it easy for you to get tobacco when you want?	
Yes	370(96.4)
No	14(3.6)
How do you get tobacco for yourself?	
I buy it myself	278(72.4)
Someone else buys it for me	93(24.2)
Someone else give it to me	13(3.4)
Do you ever have desire of chewing tobacco early in the morning?	
Yes	351(91.4)
No	33(8.6)
Do you feel relaxed after chewing tobacco?	
Yes	376(97.9)
No	8(2.1)
Did you ever seek help or advice to stop chewing tobacco?	
Yes	354(92.2)
No	30(7.8)

Multivariable analysis of association between participants' characteristics and their tobacco chewing practice showed that age (35 years old or more aOR=3.86, 95% CI: 2.52-5.92, p<0.001), gender (male aOR=2.55, 95% CI: 1.52-4.29, p<0.001), education level (illiterate aOR=6.71, 95% CI: 2.87-15.71, p<0.001

Table 3: Multivariable analysis of association between participant characteristics and their tobacco chewing practice (n=601).

Participants' Characteristics	cOR	95% CI		p-value	aOR	95% CI		p-value
		Lower	Upper			Lower	Upper	
Age Group								
Less than 35 years old	Reference				Reference			
35 years old or above	4.57	3.15	6.62	*<0.001	3.86	2.52	5.92	*<0.001
Gender								
Male	2.78	1.97	3.92	*<0.001	2.55	1.52	4.29	*<0.001
Female	Reference				Reference			
Education Level								
Illiterate	6.75	3.16	14.4	*<0.001	6.71	2.87	15.71	*<0.001
Able to read and write/Primary/ Religious education	3.36	1.72	6.56	*<0.001	4.53	2.11	9.72	*<0.001
Secondary	1.22	0.65	2.28	0.530	1.79	0.87	3.68	0.109
Intermediate	1.13	0.59	2.15	0.708	1.74	0.84	3.60	0.136
Graduate or above	Reference				Reference			
Employment Status								
Employed/Self employed	3.15	2.19	4.54	*<0.001	1.72	0.99	2.97	0.051
Unemployed	4.13	2.15	7.90	*<0.001	2.95	1.38	6.27	*0.005
Student/House wife	Reference				Reference			
Monthly Household Income (Rupees)								
Up to 20000	1.47	1.04	2.07	*0.028	1.67	1.09	2.55	*0.018
21000 to 50000	Reference				Reference			
Type of Family								
Nuclear	1.24	0.86	1.77	0.237	1.03	0.67	1.58	0.867
Joint	Reference				Reference			

cOR=Crude Odds Ratio, aOR = Adjusted Odds Ratio, CI=Confidence Interval, *Significant at p<0.05

and able to read and write/primary aOR=4.53, 95% CI: 2.11-9.72, p<0.001), employment status (unemployed aOR=2.95, 95% CI: 1.38-6.27, p=0.005) and monthly household income (Up to 20000 rupees aOR=1.67, 95% CI: 1.09-2.55, p=0.018) were all significantly associated with tobacco chewing practice (**Table 3**).

DISCUSSION

The study found that around two-third of participants were tobacco chewers. Moreover, many participant characteristics, such as age, gender, education level, employment status, and monthly household income, were significant predictors of their tobacco-chewing practice.

The study found that 63.9% of respondents were tobacco chewers. This coincides with the findings reported from studies by Niaz *et al.* in 2017 and Ayedi *et al.* in 2023 [1, 16]. This may be because smokeless tobacco products such as gutka and naswar are cheap, affordable, and easily available. Moreover, the culture of using these products is common in our society and is passed down from generation to generation. Having said that, it should be kept in mind that the high prevalence of tobacco chewing found in this study may be a resultresult of sampling bias or of the definition of chewing used in this study, and thus requires careful interpretation.

The high proportion of tobacco offered by friends or family members, reported in 89.8% of cases, also speaks volumes about the power of social influence in initiating and maintaining such habits. Hasan *et al.* in 2020 found that peer pressure presented as the main reason for initiation of tobacco use among teens and youth [17]. To reduce the use of chewable tobacco in our society, awareness and counseling of not only users but their close acquaintances is also needed. This can only be achieved through mass media campaigns targeting the high-risk population of our society.

A little less than half of the respondents reported using tobacco more than twice a day, a finding possibly indicative of their strong dependence on chewable tobacco. In fact, Jennings C in 2020 found that the more frequently a person chews tobacco, the more it exponentially increases one's chances of committing to full-blown nicotine dependence [18]. Vijayakarthikeyan *et al.* in 2025 reported that psychological nicotine dependence is associated with being male and using tobacco for 10 or more years [19]. These risk factors are easy to identify and can help direct targeted counseling efforts towards such individuals.

A reported desire to chew tobacco after the first experience by 95.1% of respondents suggests rapid onset dependence as well as use for coping with life stressors. This quick addiction to nicotine is very troubling, as this suggests why users face difficulty in giving up their tobacco use. The ultimate aim of public health is to focus on primary prevention. Preventing the first use of these products is therefore paramount to limit the spread of tobacco chewing and its many unwanted health consequences in our society.

This study shows a comparatively low prevalence of naswar consumption, at only 8.1%, which closely parallels the rate reported by Ahmad *et al.* in 2020 in Khyber Pakhtunkhwa Province, Pakistan, where about 10% of respondents reported using naswar regularly [20]. Naswar is popularly consumed in many areas of this province due to a strong cultural preference for this chewable tobacco product. Opportunities need to be identified within the local healthcare system, in line with regional traditions, to counsel the resident population to stop, or at least decrease, the use of this chewable tobacco product.

The remaining 5.2% of respondents reported using other products, including chewing tobacco, consistent with Gentzke's 2022 findings documenting experimentation with non-traditional or hybrid forms of smokeless tobacco products, often combined with locally available substances, on plantations in India [21]. These niche forms are less commercialized but can also have serious health side effects because their composition may be largely unregulated. Strict vigilance and the implementation of relevant laws and regulations are the recommended solutions to combat this menace.

Notably, 92.2% of chewers reported taking assistance or seeking advice to quit this habit. Hossain *et al.* in 2016 found that about 45% of tobacco chewers made a quitting attempt at least once [22]. This was a welcome finding showing potential for quitting among tobacco chewers if proper counseling is provided to them. It also potentially indicates that there are increased health concerns about smokeless tobacco among users and a realization of the need to intervene or help them quit. In addition, this high proportion of individuals seeking assistance may also be a result of tobacco cessation campaigns and programs conducted in our local communities. These programs have helped increase awareness of, and access to, quit support services and centers in our population.

The discovery that 97.9% of subjects experienced relaxation from chewing tobacco also points to an important and known reason for using tobacco, in helping people cope with life stresses and anxiety. Similarly, in this study reported by Kosendiak *et al.* in 2021, smokers revealed that they use tobacco as a coping strategy for dealing with stress and anxiety, strengthening their psychological addiction [23]. This finding, though not unexpected, is very troubling as it indicates the extent to which our population is suffering from stress and anxiety in their daily routines.

Interestingly, our results indicate that respondents' age was significantly associated with their habit of chewing tobacco, with older respondents more likely to chew tobacco than younger ones. This might be linked to changes in people's habits over time, to a higher cumulative exposure when chewing tobacco products were more common and more easily available in the past, or to both. Unfortunately, many new forms and means of using tobacco, such as e-cigarettes and vapes, are now both available and preferred by our younger generation.

As expected, the study results showed a gender predilection for tobacco use, where males had significantly higher odds of being tobacco chewers than females. Dhanapriyanka *et al.* in 2022 also found that 90.8% of tobacco chewers were male [24]. Likewise, Vijayakarthikeyan *et al.* in 2025 reported psychological nicotine dependence to be associated with being male [19]. As a matter of social acceptance and public norms, smokeless tobacco use is mostly a male habit in many countries and cultures of South Asia, as is smoking.

Education level also emerged as an important associated factor, with illiterate individuals and those who were able to read and write or had primary education having significantly higher odds of chewing tobacco as compared to those who were graduates. This is likely due to greater unawareness of its potential harms among people with lower levels of education. On the other hand, those with higher education are more likely to be aware of potential health risks and less inclined to adopt this habit. A pooled analysis of data from 12 lower-middle-income countries also found that higher education significantly reduces tobacco consumption [25].

Employment status was also significantly associated with chewing tobacco, where those who were unemployed had significantly higher odds of chewing tobacco as compared to those who were student/housewife. This was similar to the finding reported by Fielding-Singh *et al.* in 2020, in which they stated that unemployment can often lead to anxiety and tobacco use because unemployed individuals have more idle time on their hands [26]. Moreover, chewing tobacco could also be a coping mechanism to deal with the stress of being unemployed.

The results further showed that people with lower monthly household income had significantly higher odds of chewing tobacco. This is an interesting finding and may be a result of the lower cost and easy access to smokeless tobacco products in our society. Moreover, a lower income may be coupled with a lower level of education, which is a potential risk factor for this habit. A recently published systematic review also reported low monthly income to be a significant influencer of tobacco use [27].

As a community-based survey with a moderate sample size, the study provides a comprehensive picture of the prevalence of tobacco chewing among adults in a low-income, semi-urban area of Karachi. However, this study has certain limitations. Using a non-probability sampling method due to resource constraints can introduce selection bias. Moreover, taking a sample from a single geographic area can reduce the generalizability of the study's results. Furthermore, participants were only asked whether they chewed tobacco and its type;

however, use of other forms of smokeless tobacco, such as snuff, was not recorded.

CONCLUSION

A majority of participants were tobacco chewers. Moreover, many participant characteristics were significantly associated with tobacco chewing. It is therefore imperative to spread awareness regarding the harmful effects of chewing tobacco, especially among the population that is older, male, less educated, and unemployed. This awareness can be provided through mass media or by conducting public awareness campaigns and community sessions. Our primary healthcare centers can also play a crucial role in this regard. The first contact with visitors should be used by healthcare staff to impart necessary awareness and sensitize our local population about the harmful effects of chewing tobacco, particularly in high-risk areas.

ETHICS APPROVAL

The authors adhered to the institutional ethical standards for human experiments and the Declaration of Helsinki in study procedures, including obtaining verbal informed consent from all participants. Baqai Institute of Health Sciences granted ethical approval for the study (Reference # FHM 31-2023).

CONSENT FOR PUBLICATION

Before data collection, verbal informed consent was obtained from each study participant.

AVAILABILITY OF DATA

Data cannot be shared publicly because it is intellectual property of Baqai Institute of Health Sciences. Data are available from the Baqai Institute of Health Sciences (contact *via* manager.mph@baqai.edu.pk).

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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None.

AUTHORS' CONTRIBUTION

SRB : Study concept, design, and data collection, manuscript drafting

SMZHN : Data analysis, interpretation, and manuscript drafting.

AKK : Data analysis and critical review and revision of the initial draft.

SIAJ : Critical review and revision of the initial draft.

All authors have read and approved the manuscript.

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