Factors influencing smokeless tobacco use among high school adolescents in Sindh Pakistan

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ABSTRACT:

Objective: To assess the use of smokeless tobacco among adolescents in high schools, and to determine the factors that contribute to the use of smokeless tobacco in this age group.

Methodology: This cross-sectional study was carried out between October and December 2022, involving 308 participants who were 9th and 10th-grade adolescents, aged 13 to 16 years, from four public high schools located in Taluka Qasim Abad, District Hyderabad. Data were collected using a pre-designed YRBSS (Youth Risk Behavior Surveillance Survey) questionnaire to examine smokeless tobacco (SLT) use. Data analysis utilized SPSS version 29, involving chi-square tests and binary logistic regression analyses to evaluate the likelihood of factors related to adolescent smokeless tobacco use.

Results: The study indicated that 23% of participants were actively using smokeless tobacco, with an average age of 15.42 (±SD 5.6). The logistic regression analysis demonstrated that male adolescents whose parents and friends use smokeless tobacco, who have limited health education and exposure in public environments, and who perceive comfort and appeal in using smokeless tobacco, were all significantly associated with an increased likelihood of smokeless tobacco use among adolescents.

Conclusion: There is an urgent requirement for focused interventions and public health initiatives to diminish the use of SLT and to tackle the social influences and perceptions associated with it.

Keywords: Tobacco, Smokeless, Adolescent, Health Impact Assessment.

Introduction: Smokeless tobacco has been widely used in South and Southeast Asia, typically consumed through chewing, sucking, or snuffing.[1] However, the rise of smoke-free policies and the global diversification of the tobacco market have contributed to a growing worldwide concern over the increasing use of smokeless tobacco products.[2, 3] In 2015, the global number of smokeless tobacco users stood at approximately 356 million, with 82% of these individuals in South and Southeast Asia.[1] Smokeless tobacco products contain over 30 harmful compounds associated with nicotine addiction,[4] Nicotine poisoning, oral diseases, adverse pregnancy outcomes, diabetes, cardiovascular diseases, and various cancers.[4-6] which contributes to the global burden of disease. Most tobacco users initiate smoking during adolescence, a period of heightened vulnerability to the harmful effects of tobacco products.[7] Adolescents are especially susceptible to nicotine addiction, making early exposure to tobacco a significant concern for long-term health and adverse effects on brain development.[7, 8] In addition, adolescents who have developed a dependency on nicotine are more inclined to experiment with other substances and engage in delinquent behavior.[9]

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Further, The Global Youth Tobacco Survey findings revealed a troubling increase in smokeless tobacco use among adolescents in South Asian countries, with a notably high prevalence in Pakistan ranging from 5.3% to 23% respectively.[10-13] In a prior study of male high school students in Sindh, Pakistan, it was found that smokeless tobacco use was more prevalent among those attending government schools, having less educated parents, family influence, and media exposure.[10] Despite that, the study has several limitations. First, excluding female students limits the generalizability of the findings to all adolescents. Second, the study was geographically limited to three areas in Karachi. Lastly, there was no biochemical validation to verify self-reported smokeless tobacco use, which could affect the accuracy of the data.[10]

Based on the review of the literature and considering the limitations of previous studies, it is evident that addressing smokeless tobacco use requires a comprehensive approach that considers both sexes and the unique cultural, social, and environmental factors influencing its prevalence. Efforts to reduce the prevalence of smokeless tobacco should encompass targeted interventions for adolescents and broader public health initiatives aimed at raising awareness of the health risks associated with these products.

Objective:

To assess the use of smokeless tobacco among adolescents in high schools, and to determine the factors that contribute to the use of smokeless tobacco in this age group.

Methodology:

This cross-sectional study was conducted from October to December 2021. The study population was selected from four public high schools in Taluka Qasim Abad, Hyderabad District. The rationale for choosing this population from Dis-

trict Hyderabad was based on a previous study conducted among college students, which found a smoking prevalence of 11.9% and an initiation age of less than 16 years in District Hyderabad.[14] In addition, smokeless tobacco refers to any tobacco product that is consumed without burning.[15] In our study, we considered Safina sachet, snuff gutka, and Tara chewing tobacco products as smokeless tobacco products for current users.[15]

The study included 308 respondents from the total enrollment of students in schools 1860 by calculating through the open EPI calculator with (95% CI), 5% error accepted,[16] Previous research found a 60.30% prevalence rate.[17]

Random sampling was utilized to determine the study population. The education office of the district first compiled an exhaustive list of public high schools located in Taluka Qasim Abad, District Hyderabad. Each school on this list was assigned a distinct identification number through a computer program. Subsequently, the program randomly chose four schools from the list to guarantee an unbiased and representative sample of the population.

Inclusion Criteria: Ninth–and tenth-grade male and female adolescents, aged 13 to 16, studying in four public high schools in Taluka Qasim Abad, District Hyderabad, Sindh, Pakistan. The decision to include only public schools is based on findings from previous studies.[10] Exclusion Criteria: adolescents from other classes, non-specified high schools in Taluka Qasim Abad, and those aged below 13 or above 16 are excluded.

Study data were collected through a predesigned Youth Risk Behavior Surveillance Survey (YRBSS) questionnaire.[18] For current smokeless tobacco use, the following questions were assessed: (1) Have you ever tried or experimented with smokeless tobacco products, such as snuff or chewing tobacco? (yes, no) (2) During the past 30 days, how many days did you use chewing tobacco, snuff, dip, snus, or dissolvable tobacco products such as Safina sachet, Gutka, and Tara chewing tobacco? (0, 1-2, 3-5, 6-9, 10-19, 20-29, and 30 days), and current smokeless tobacco use was classified if respondents answered that they had used it for at least one day during the past 30 days. Factors considered as independent variables encompassed gender, age, academic grade, parental education level, history of parental smoking, use of smokeless tobacco by parents, friends' smoking habits, exposure to tobacco products, receipt of health education regarding the risks of tobacco in class, perceived comfort in using smokeless tobacco during social events, and the perception of smokeless tobacco as more appealing. Prior to data collection, approval was obtained from the district education officer, the principals of the relevant public schools, and the parents or guardians of the adolescents. The questionnaire was administered in classrooms, allowing participants to respond in English, Urdu, or Sindhi.

Data analysis used SPSS version 29 for descriptive categorical variables using frequency and proportion, and continuous variables using mean and standard deviation. The Chi-Square test assessed the correlation between smokeless tobacco users and non-users. Additionally, binary logistic regression analyses were performed to explore factors associated with the likelihood of current adolescent smokeless tobacco use. Multicollinearity was checked, and sensitivity and accuracy tests were conducted to evaluate the model's fitness. The effect values were reported as odds ratios (OR) with 95% confidence intervals (95% CI).

Results:

Of the 308 high school adolescents, 71 (23.0%) used smokeless tobacco, 67 (21.7%) were male, and four (1.3%) were female. The mean age of all participants was 15.42 (±SD5.6). The results showed significant differences in the

Table No 1:Association between smokeless tobacco users and non-smokeless tobacco users

Variables	n=308	Smokeless tobacco use		*X^2 P-value
		No n-237 (77.0%)	Yes n-71 (23.0%)	
Gender				
Male	203	136 (44.2)	67 (21.7)	<0.000*
Female	105	101 (32.8)	4 (1.3)	
Age in years (Mean 15.42 ± SD: 5.6)				
>13-<14	13	13 (4.2)	0 (0.0)	<0.033*
>14-<15	66	55 (17.9)	11 (3.6)	
>15- <16	105	73 (23.7)	32 (10.4)	
>16-< 17	124	96 (31.2)	28 (9.0)	
Study Class				
9th	96	75(24.4)	21 (6.8)	<0.741
10th	212	162 (52.6)	50 (16.2)	
Father education				
<Primary	6	1 (0.3)	5 (1.6)	<0.000*
Primary	23	19 (6.2)	4 (1.3)	
< Matric	40	22 (7.1)	18 (6.0)	
> Matric	239	195 (63.3)	44 (14.1)	
Mother Education				
<Primary	17	7 (2.3)	10 (3.2)	<0.000*
<Matric	33	18 (6.0)	15 (5.0)	
> Matric	210	180 (58.4)	30 (9.7)	
Parents Smoking				
No	264	209 (68.0)	55 (17.9)	<0.007*
One	42	28 (9.0)	14 (4.5)	
Both	2	0 (0.0)	2 (0.6)	
Use of SLT* by parents				
No	262	220 (71.4)	42 (13.6)	<0.000*
One	40	15 (5.0)	25 (8.1)	
Both	6	2 (0.6)	4 (1.3)	
Use of SLT by friend				
No	247	212 (68.8)	35 (11.3)	< 0.000*
Yes	61	25 (8.2)	36 (11.7)	
Exposure in public places				
No	273	224 (72.7)	49 (15.9)	< 0.000*
Yes	35	13 (4.3)	22 (7.1)	
Receive health education on the dangers of tobacco use				
No	214	164 (53.3)	50 (16.2)	< 0.001*
Yes	67	60 (19.5)	7 (2.3)	
Don't Know	27	13 (4.2)	14 (4.5)	
Perceived comfortable use of SLT on social occasions				
Indifferent	260	234 (76.0)	26 (8.4)	< 0.000*
Yes	27	0 (0.0)	27 (8.8)	
No	21	3 (1.0)	18 (5.8)	
Considered SLT more attractive				
Indifferent	279	235 (76.3)	44 (14.3)	< 0.000*
Yes	16	0 (0.0)	16 (5.2)	
No	3	2 (0.7)	11 (3.5)	

"SLT: smokeless tobacco, X^2: Chi-square test, *p-value ≤ 0.05"

associations between smokeless and non-smokeless tobacco users.

Table 2: Binary Logistic Regression Analysis of Variables Predicting Smokeless Tobacco Use Among High School Adolescents (N-308)

Factors	Univariate analysis		Multivariate analysis	
	cOR (95% CI)	p-value	aOR (95% CI)	p
Gender				
Male	12.43 (4.39-35.22)	<0.000 *	3.21 (0.78-16.47)	0.105
Female	1	-	-	-
Parent Smoking				
No	1	-	-	-
One	1.90 (0.933.85)	0.0752	5.04 (1.10-23.02)	0.873
Both	NA	-	-	-
Use of SLT by parents				
No	1	-	-	-
One	8.73 (4.2417.93)	<0.000 *	2.68 (0.73-9.77)	0.134
Both	10.47 (1.8559.04)	<0.007 *	19.36 (1.67-22.43)	<0.017*
Use of SLT by friend				
No	1	-	-	-
Yes	8.72 (4.67-16.26)	<0.001 *	4.36 (1.38-13.75)	<0.012*
Exposure in public places				
No	1	-	-	-
Yes	7.73 (3.64-16.41)	<0.000 *	2.04 (0.47-8.78)	0.336
Receive health education on the dangers of Smokeless tobacco use				
Yes	1	-	-	-
No	2.61 (1.12-6.07)	<0.025 *	1.31 (0.35-4.87)	0.679
Unknown	9.23 (0.16-0.89)	<0.000 *	0.64 (0.08-4.68)	0.649
Perceived comfortable using smokeless tobacco on social occasions.				
Indifferent	54.0 (14.89-19.71)	<0.000 *	27.69 (5.24-14.17)	<0.000*
Yes	NA	-	-	-
No	1	-	-	-
Considered SLT more attractive				
Indifferent	29.37 (6.29-13.11)	<0.000 *	5.10 (0.68-38.23	0.112
Yes	NA	-	-	-
No	1	-	-	-

*cOR: Crude odds ratio, aOR: Adjusted odds ratio, CI: confidence interval, *p-value ≤ 0.05, NA: not available*

For instance, gender (p <0.000), age (p <0.033), father's education (p <0.000), mother's education (p<0.000), parent smoking (p <0.007), parent use SLT (p <0.000), friend's use SLT (p <0.000), exposure to public places (p <0.000), receiving health education on the dangers of tobacco use (p <0.001), perceived comfortable using SLT on social occasions (p <0.000), and considering SLT more attractive (p <0.000).

Both univariate and multivariate logistic regression analyses performed and results shown in table no 2. Univariate analysis showed that male adolescents had a significantly higher likelihood of using smokeless tobacco (COR:12.43; 95% CI 4.39-35.22, p < 0.000). Nonetheless, this association became statistically non-significant after adjustment (AOR: 3.21; 95% CI 0.78-16.47, p = 0.105). Adolescents with parents who used SLT exhibited a strong association with SLT use (COR: 8.73; 95% CI 4.24-17.93 for one parent; COR: 10.47; 95% CI 1.85-59.04 for both parents), with significant adjusted odds for both parents (AOR: 19.36; 95% CI 1.67-22.43, p < 0.017). Use of SLT by a friend found a significant predictor in both univariate (COR: 8.72; 95% CI 4.67-16.26, p < 0.001) and multivariate analyses (AOR: 4.36; 95% CI 1.38-13.75, p < 0.012).

The univariate analysis revealed that public exposure to smokeless tobacco (SLT), lack of health education regarding the risks associated with smokeless tobacco, and a general indifference towards its appeal had notable effects. However, these effects were not significant after adjustments were made. In contrast, the perceived comfort level with smoking in social contexts continued to show significant results in both analyses (AOR: 27.69; 95% CI 5.24-14.17, p < 0.000).

Discussion:

The current study highlighted key predictors of smokeless tobacco (SLT) consumption among high school adolescents in Sindh, Pakistan. It provides important insights into the risk factors that could inform future prevention and intervention efforts. The findings revealed a notably high prevalence of SLT use, with a range of demographic, familial, and social influences significantly contributing to both the initiation and persistence of this behavior.

Univariate analysis revealed a significantly higher likelihood of smokeless tobacco (SLT) use among male adolescents. However, following adjustments, this association lost its statistical significance, suggesting that other variables, such as peer influence and parental behaviors, may account for much of this observed gender disparity. Consistent with published research, higher rates of SLT use among males in South Asia have been attributed to cultural norms that sanction or even promote tobacco use among men while discouraging it among women.[10,19] These findings underscore the importance of developing sex-specific interventions that address these social norms in future tobacco control efforts. This study found that parental use of smokeless tobacco (SLT) significantly predicts adolescent SLT use, mainly when both parents use SLT. This is consistent with earlier research and aligns with similar findings in Bangladesh and Pakistan, where parental tobacco use has been shown to influence adolescent behaviors.[10, 20] The control of smokeless tobacco (SLT) in the home can help reduce adolescents' perception of its use and prevent easy access to tobacco products. The study findings revealed that adolescents who had peers using SLT were more prone to engage in SLT themselves. The study findings revealed that adolescents who had friend(s) using SLT were more inclined to use smokeless tobacco them-

selves. This observation underscores the influence of peer dynamics in shaping adolescent behavior, consistent with previous research emphasizing the impact of peer influence on teenage decision-making and behavior.[21] Additionally, the impact of peer group pressure on smokeless tobacco use is a well-documented phenomenon, as adolescents often strive for social acceptance and conformity within their social circle.[22] This emphasizes the need for targeted interventions and support systems to address the role of peer influence in adolescent smokeless tobacco use. The multivariate analysis showed that exposure to smokeless tobacco (SLT) in public places did not significantly predict SLT use. However, a previous study showed that public exposure to tobacco products, including in markets and social gatherings, increases tobacco experimentation among adolescents.[23] This indicates that other factors may be more important in influencing SLT use and that public exposure alone may not be enough to trigger it. Therefore, environmental interventions, such as enforcing tobacco sale restrictions in public places, are necessary. In this research, it was found that adolescents who felt at ease using smokeless tobacco in social settings tended to have a different perception of it. This finding is consistent with earlier research indicating that such comfort may arise from peer pressure and social norms that view tobacco use as a means of social bonding.[24] These insights imply that interventions should aim to alter the social norms surrounding tobacco use, addressing both smoking and smokeless tobacco.

Limitation of study

This research has certain limitations. Firstly, the reliance on self-reported data may lead to reporting bias, as adolescents may not completely reveal their tobacco usage due to the influence of social desirability. Secondly, the study was limited to public high schools in the Hyderabad Sindh district, which may not accurately reflect smokeless tobacco usage trends in other demographics. Furthermore, the absence of biochemical validation to corroborate self-reported smokeless tobacco consumption could affect the data's reliability. It is crucial to take these limitations into account when analyzing the findings of this study.

Conclusion:

The study revealed a high prevalence of smokeless tobacco use among adolescents, a finding that necessitate that parents of teenagers and school administrators should take appropriate preventive measures to stop the consumption of smokeless tobacco among high school adolescents.

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