An Epidemiological Study of Tobacco and Areca Nut Use in Rural Area of Western India

Krushna A Thakkar¹, Anukool H Pateria², Milind Naphade¹, Ujwala Naphade³, Swapnil Dahapute⁴, Pooja Wankhade⁵

Introduction
The tobacco and areca nut habit has a major social and cultural role in communities throughout the Indian subcontinent, south-east Asia, and parts of the western Pacific.¹ In recent years, the consumption of licit as well as illicit substances has increased throughout the world. The epidemic of tobacco use is one of the greatest threats to global health today. Particularly, alarming is the fact that the age of initiation into substance abuse is progressively falling.² Worldwide, the prevalence is highest among people of low educational background and the poor and marginalized.³ No authentic study has been done until date to reveal the status of substance abuse among the general population in Vadodara, Gujarat, western India. Lack of adequate information to form a basis of effective preventive strategies prompted us to conduct this study with the objective of studying the correlates of tobacco and arecanut and their commercial preparations among the general population of the rural area of Waghodia, Vadodara, Gujarat, and western India.

Materials and Methods
A descriptive cross-sectional epidemiological survey conducted in the geographic area of western India particularly Waghodia taluka, which was equally divided into four regions. The Waghodia taluka consists of 96 grampanchayats. From each region, two grampanchayats were selected with the simple random technique in which lottery method was used. The total of eight grampanchayats constituted the part of our study. The total of 25 villages coming under the jurisdiction of these grampanchayats were part of the study. Data were collected by conducting house to house survey then entered into the pretested proforma and statistical analysis was done using SPSS software and Chi-square test.

Results: 37.7% participants were having tobacco and areca nut related habits. The male participants dominated in having the habits. The maximum number of habitual participants were from the age group of 35-39 years. The prevalence of tobacco and areca nut use was high in illiterate and poor economic groups. The most common habit prevalent was tobacco consumption in various forms. In participants having tobacco consumption, the prevalence of habit of tobacco smoking was high. In participants having habit of consumption of smokeless tobacco, the most prevalent habit was the use of tobacco quid and snuff. Among various forms of areca nut chewing habit, gutkha chewing was the most commonly used form.

Conclusion: Tobacco and arecanut use were alarmingly high in rural area of western India.

Key Words: Areca nut, epidemiological study, tobacco, western India
substances included were tobacco—smoking (bidi, cigarette, and chilam), smokeless tobacco (tobacco quid, snuff, mishiri, and tobacco paste), areca nut (plain arecanut - backed/raw, gutkha, sweet supari, mawa, and pan masala), pan (plain pan, pan with tobacco, pan with arecanut, pan with tobacco and arecanut), and alcohol (local and branded). The collected data were entered, and statistical analysis was done using SPSS software and chi-square test.

**Results**

Data were collected on 14,223 samples who participated in the study. Out of which 7289 (51.24%) were male, whereas 6934 (48.76%) were female. Graph 1 shows age wise distribution of participants.

5370 (37.7%) participants were having harmful oral habits associated with tobacco and arecanut use (Habitual), out of which 3319 (61.64%) participants were males and 2051 (38.19%) participants were females which are statistically significant ($P < 0.0001$). Correlation of age and oral harmful habits was shown in Graph 2.

Maximum number of illiterate participants were having harmful oral habits which were statistically significant ($P < 0.0001$). From all the economic status, 35% of the participants were associated with one or the other harmful oral habits.

**Tobacco**

Distribution of participants according to habits shown in Table 1, which shows that the most common habit prevalent was tobacco consumption in various forms which was statistically significant. In tobacco, smoking tobacco (58.75%) was more prevalent than smokeless tobacco which suggests statistically significant data. The most common age group for tobacco smoking was 35-49 years, and the most common age group for use of smokeless tobacco was 35-39 years. Tobacco smoking was more prevalent in males and smokeless tobacco was more prevalent in females. Most common form of smoking tobacco was bidi (92.54%) which was more common in males, whereas in smokeless tobacco, the most commonly used form were tobacco quid and snuff, in which tobacco quid was more common in males (65.55%), whereas habit of snuff application, mishiri application, and tobacco paste application was more common in females.

**Arecanut**

Arecanut is the second most common oral harmful habit in rural area of western India. In which most commonly used a form of arecanut was gutkha, age group of 20-29 years (28.13%) had a high prevalence of arecanut and was more prevalent in males (58.18%).

**Alcohol habit**

Candid response to alcohol consumption is difficult to obtain in the dry state of Gujarat state with legal prohibition on the sale of alcohol. However during our survey, 5.26% participants revealed about habit alcohol consumption, in alcohol habitual 97.90% of participants were using locally made alcohol more commonly than branded alcohol it was more common in males and the age group of 35-49 years ($P < 0.0001$).

**Discussion**

According to the World health organization, nearly $1/3$rd of the global adult population (1.2 billion people, with female population being 200 million) are tobacco users. In India, there are 240 million tobacco users (195 million men and 45 million women) accounting for one-fifth of the world’s tobacco consuming population. Areca nut is the fourth most commonly used substance of abuse in the world after tobacco, alcohol, and caffeine. A substantial proportion of the world’s population is engaged in chewing areca nut, and the habit is endemic throughout the Indian subcontinent, large parts of South Asia, Melanesia Asian Pacific region for a long time and is common among migrated communities in Africa, Europe, and North America.

<table>
<thead>
<tr>
<th>Habit</th>
<th>Number of participants (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>2217 (15.59)</td>
</tr>
<tr>
<td>Arecanut</td>
<td>1987 (13.97)</td>
</tr>
<tr>
<td>Pan</td>
<td>43 (0.30)</td>
</tr>
<tr>
<td>Alcohol</td>
<td>387 (2.72)</td>
</tr>
<tr>
<td>Tobacco and arecanut</td>
<td>637 (4.48)</td>
</tr>
<tr>
<td>Tobacco and arecanut and alcohol</td>
<td>674 (4.74)</td>
</tr>
<tr>
<td>Arecanut and alcohol</td>
<td>74 (0.52)</td>
</tr>
<tr>
<td>Pan and alcohol</td>
<td>32 (0.22)</td>
</tr>
</tbody>
</table>
It was observed in this study that 37.7% participants had various types of harmful oral habits related to tobacco and arecanut use. Similar results were also observed by Rani et al., who concluded that 30% of the Indian population had different types of oral habits, and Makwana et al. analyzed that 33.12% of adolescents from rural areas of Jammagar district, Gujarat state had various types of harmful oral habits. Harmful oral habits were more common in males may be because Indian society being a male dominating society, majority of the ill habits, and easy availability of money with males is the major causative factor for ill health. Such observations were also reported by Majra and Basnet and Bala et al.

The prevalence rate of various types of harmful oral habits was high (49.30%) in the participants from the age group of 35-39 years (the middle age group). This finding is similar to the study conducted by Sinha and Gupta found that the prevalence rate of habit increased more than 80% by the age of 30 years and Rani et al. found that the prevalence of habit increased up to the age of 50 years.

The prevalence of use of tobacco and arecanut habit was more in illiterate participants (40.03%) and literate participants having education in between 5th and 8th standard (30.27%), but the prevalence of habit decreased significantly with the increase in the education status. Our findings were similar to the previous studies conducted by Bala et al. and Rani et al.

The habit was more in the participants from poor economic status (86.89%) (less than Rs. 5000 pm) in population of Waghodia taluka, Vadodara district. Similar results were noted by Rani et al. and Makwana et al. who found that the prevalence of habit was significantly higher in poor populations as compared to reach populations. The high prevalence of habit in poor people may be due to these group are usually less educated, under stress and under more socio-economic burden.

The most prevalent habit was tobacco consumption followed by arecanut consumption in various forms in rural area of western India. Our finding was partly similar to the findings of Bala et al., who observed that tobacco consumption was the most prevalent habit followed by alcohol consumption.

The prevalence of tobacco smoking (58.75%) was high as compared to smokeless tobacco. These findings well accord with the findings of Thankappan and Thresia where they observed that tobacco smoking was the most common form of habit. It was also noted that bidi smoking (92.54%) was the most prevalent habit as compared to the other forms of tobacco smoking. These findings strongly correlate with the findings of Rahman et al., who observed that bidi smoking was more prevalent among rural folks of South Asian countries. This can be explained by cheaper cost and easy availability of bidis in rural areas along with the lack of education/knowledge regarding deleterious effects of smoking tobacco on health in general and oral health, in particular, may be the probable cause for more use of bidis. The prevalence of tobacco smoking (40.42%) was high in the age group of 35-49 years, whereas the prevalence of use of various forms of smokeless tobacco (15.43%) was high in the age group of 35-39 years. These findings are similar to the findings of Bala et al. They observed that the tobacco smoking was common in the age group of 46-55 years, and the use of smokeless tobacco was common in the age group for use of is 26-35 years.

The prevalence of tobacco smoking was high in males (87.83%), whereas the prevalence of use of smokeless tobacco (64.01%) was high in females. Results which accords well with Bala et al. where they found that tobacco smoking was more prevalent in males and use of smokeless tobacco was more prevalent in females. However, results were contrary to the findings of Colombo et al. where they observed that tobacco smoking was more prevalent in females.

It was found that there was a high prevalence of use of tobacco quid (50.34%) and snuff (48.12%) in the group of participants consuming smokeless tobacco. These findings did not match with the study of Singh and Gupta, in which they concluded that 11.1% of participants had a habit of chewing zarda (raw tobacco). Furthermore, the findings of our study correlated with the study of Chadda and Sengupta where they found that 40% of participants had a habit of snuff use.

The prevalence of use of tobacco quid was high in males (65.55%), whereas use of snuff (94.44%), mishiri (77.78%), and tobacco paste (81.82%) was high in females. These results strongly correlate with the results of Singh and Gupta in which they observed that the habit of zarda (raw tobacco) was more common in males. However, our results contradicted with the results of Chadda and Sengupta where they observed that snuff application was more common in males.

It was also observed that gutkha chewing (77.64%) was the most common form of arecanut use. This observation was similar to the study conducted by Kishore et al. and Rajan et al. The prevalence of gutkha chewing (33.12%) was high in the age group of 20-29 years. This finding was similar to the findings of the study conducted by Rajan et al., who observed that gutkha chewing was more common in the age group of 15-25 years, and Bala et al. also observed that chewing gutkha was more common below 25 years of age.

In this present study, it was significant to note that the prevalence of all forms of arecanut chewing was high in males (58.18%) as compared to females. It is also pertinent to note that chewing of gutkha was prevalent in males. These findings were similar to the findings of Rajan et al. and Gupta et al. who observed that the prevalence of chewing arecanut in various forms was higher in males.
It was observed that consumption of locally made alcohol (97.90%) was more common as compared to branded alcohol. Our findings were similar to the findings of Negi et al.,\textsuperscript{17} who observed that the locally made alcohol was more common in rural areas of India. Our finding may be related to the low cost and easy availability of locally made alcohol in rural areas of India. It was also observed that the alcohol consumption (46.75%) was high in the age group of 35-49 years. This finding was similar to the findings of Negi et al.,\textsuperscript{17} who observed that the most common age group for consumption of alcohol was 40-49 years.

In the present study, it was observed that habit of alcohol consumption was more common in males (88.47%) as compared to females. Our results were similar to the findings of Mbatia et al.,\textsuperscript{18} who also noted that the prevalence of alcohol is more in males as compared to females.

**Conclusion**

Tobacco and arecanut use were alarmingly high in rural area of western India. This study will be helpful to planners and program managers in designing an appropriate preventive strategy in this region.

**References**