

# A Study Of Use Of Smokeless And Smoking Forms Of Tobacco Among Agriculture Workers Of Villages In Murtizapur India

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**Abstract:** Use of both the forms smokeless and smoking of tobacco has increased during last 20 years in rural as well as in urban part of country. A sample data from 2924 workers engaged in agriculture farming in villages of Murtizapur tahsil of Akola district of Maharashtra India, was collected for various age groups. Two way Analysis of variance was carried out and 95% confidence interval are estimated for Tobacco, gutkha, Snuff chewers and smokers. It was observed that there are significant difference among age groups with respect to habit of use of tobacco, gutkha, snuff and smoking and also significant difference among Tobacco, gutkha, Snuff chewers and smokers. The pair wise comparison between various age groups is made by using critical difference.

**Key words:** Tobacco, Gutkha, Agriculture workers, ANOVA, confidence intervals, box-plot, critical difference

## 1. Introduction:

The smokeless form of tobacco refers to the consumption of tobacco, gutkha and snuff. Gutkha is sold in two forms locally made and product of gutkha companies. Locally made gutkha is prepared at paan centres. The second type of gutkha is sold under brand name of companies in sachets. Both these type of gutkha contains tobacco. The term snuff refers to the tobacco powder which is inhaled in nasal cavity. It is also used for teeth and gum cleaning in rural areas. The use of smokeless and smoking form of tobacco is increasing day by day in India and it has been observed that extensive use of Gutkha and tobacco could contribute to the development of oral cancer, Shah G et. al.<sup>7</sup>. The main reason for the use of tobacco in either forms in the rural areas is the lack of education and awareness among the people. Banerjee SC et. al.<sup>1</sup> observed people are using tobacco as mouth freshening, support for digestion, germ killing, astringency, mood enhancement, tension relief and oral cleaning. According to GATS<sup>3</sup> In India about 10 lakh people die due to tobacco related diseases. GATS<sup>3</sup> (Global Adult Tobacco Survey) revealed that more than 35% of adult in India use tobacco in various forms. According to GATS survey figures more than 163.7 million people use smokeless form, 68.9 million smoke while 42.3 million use both smokeless and smoking form of tobacco in India. Tobacco users, smokers and smokeless tobacco users in rural part of India is 35%, 15.1% and 29.3% respectively. The tobacco situation is unique because of vast spectrum of tobacco products available for smokeless and smoking use.

## 2. Methodology:

The sample data was collected from 2924 workers engaged in agriculture from a cluster of 6 villages Murtizapur, India. The main enquiry was set for data on chewing of tobacco, gutkha, snuff and smoking in the different age groups from the age of 18 years to 62 years.

The persons below 18 years and above 62 years were deliberately excluded from the study. Two way ANOVA was carried out to test the significance of difference among various age groups with respect to use of smokeless and smoking form of tobacco and also the significance of difference among four categories viz. chewing of tobacco, gutkha, snuff and smoking. The 95% confidence intervals for each of the above categories are estimated and data related to chewing of tobacco, gutkha, snuff and smoking are presented as box-and-whisker plot. Critical Difference (CD), the least significant difference for the pair wise comparison between the group means is used to identify the significantly different age groups with respect to use of either forms of tobacco.

## 3. Analysis and Results:

Data is analyzed as Two way ANOVA model for testing hypotheses related to differences among age groups with respect use of different forms of tobacco. Also the significance of difference among tobacco chewers, gutkha chewers, snuff users and smokers is tested. The significance of difference between smokeless tobacco users and smoking forms is also tested.

| Age groups | Smokeless tobacco Users |        |       | Smokers | Total users | Samples |
|------------|-------------------------|--------|-------|---------|-------------|---------|
|            | Tobacco chewer          | Gutkha | Snuff |         |             |         |
| 18-22      | 9                       | 26     | 0     | 16      | 51          | 215     |
| 22-26      | 13                      | 67     | 0     | 47      | 127         | 229     |
| 26-30      | 18                      | 69     | 1     | 81      | 169         | 319     |
| 30-34      | 22                      | 84     | 2     | 61      | 169         | 345     |
| 34-38      | 14                      | 47     | 2     | 32      | 95          | 259     |
| 38-42      | 17                      | 35     | 4     | 22      | 78          | 263     |
| 42-46      | 10                      | 22     | 8     | 13      | 53          | 185     |
| 46-50      | 13                      | 30     | 3     | 31      | 77          | 225     |
| 50-54      | 20                      | 34     | 8     | 30      | 92          | 289     |
| 54-58      | 17                      | 14     | 7     | 24      | 62          | 290     |
| 58-62      | 28                      | 9      | 9     | 13      | 59          | 305     |
| Total      | 181                     | 437    | 44    | 370     | 1032        | 2924    |

### 3.1. Two way model:

The linear model is  

$$x_{ij} = \mu + \alpha_i + \beta_j + \varepsilon_{ij}$$

$$(i = 1, 2, 3, \dots, k; j = 1, 2, 3, \dots, h)$$

$$(k = 11 \text{ and } h = 4)$$

$$\mu - \text{General average effect which always constant}$$

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$\alpha_i$  - is the effect due to  $i$ th row (age group)  
 $\beta_j$  - effect due to  $j$ th column (form of tobacco use).  
 $\epsilon_{ij}$  - Error effects due to chance.

**3.2. Hypotheses to test**

- i.  $H_{01}$ : No significant difference among age groups with respect to use of tobacco in different forms.
- ii.  $H_{02}$ : All the different forms of tobacco are insignificant.

| ANOVA               |          |    |          |            |            |
|---------------------|----------|----|----------|------------|------------|
| Source of Variation | SS       | df | MSS      | F observed | F critical |
| Rows                | 4666.909 | 10 | 466.691  | 2.25362    | 2.16458    |
| Columns             | 8755.455 | 3  | 2918.485 | 14.09318   | 2.92227    |
| Error               | 6212.545 | 30 | 207.085  |            |            |
| Total               | 19634.91 | 43 |          |            |            |

Both the hypotheses under the study are refuted at 5% significant level. Critical difference (CD) for testing pair wise differences between various age-groups and between different forms of use of tobacco is;

$$CD = t(0.05, errorDF) * \sqrt{[s_E^2 \left( \frac{1}{n_1} + \frac{1}{n_2} \right)]}$$

$$CD_{tobacco-form} = 1.697 * \sqrt{[207.0848 \left( \frac{1}{11} + \frac{1}{11} \right)]}$$

$$CD_{tobacco-form} = 10.41297$$

$$CD_{Age-group} = t(0.05, 30) * \sqrt{[s_E^2 \left( \frac{1}{4} + \frac{1}{4} \right)]}$$

$$CD_{Age-group} = 1.697 * \sqrt{[207.0848 \left( \frac{1}{4} + \frac{1}{4} \right)]}$$

$$CD_{Age-group} = 11.87258$$

**3.3 Pair wise comparison:**

As the absolute difference for the pairs shown in the table is greater than CD there is significant difference between the pairs at 5% level;

| Form    | Significant | Absolute difference |
|---------|-------------|---------------------|
| Tobacco | Gutkha      | 23.273              |
|         | Snuff       | 12.455              |
|         | Smoking     | 17.182              |
| Gutkha  | Snuff       | 35.727              |
| Smoking | Snuff       | 29.636              |

- i. Tobacco and Gutkha chewers, Tobacco chewers and snuff users, tobacco chewers smokers.
- ii. Gutkha chewers and snuff users.
- iii. Smokers and snuff users.

Pair wise comparison among different age groups

|       | Significant age groups | Absolute difference between average |
|-------|------------------------|-------------------------------------|
| 18-22 | 22-26                  | 19                                  |
|       | 26-30                  | 29.5                                |
|       | 30-34                  | 29.5                                |
| 22-26 | 38-42                  | 12.25                               |
|       | 42-46                  | 18.5                                |
|       | 46-50                  | 12.5                                |
|       | 54-58                  | 16.25                               |
|       | 58-62                  | 17                                  |
| 26-30 | 34-38                  | 18.5                                |

|       |       |       |
|-------|-------|-------|
|       | 38-42 | 22.75 |
|       | 42-46 | 29    |
|       | 46-50 | 23    |
|       | 50-54 | 19.25 |
|       | 54-58 | 26.75 |
|       | 58-62 | 27.5  |
| 30-34 | 34-38 | 18.5  |
|       | 38-42 | 22.75 |
|       | 42-46 | 29    |
|       | 46-50 | 23    |
|       | 50-54 | 19.25 |
|       | 54-58 | 26.75 |
|       | 58-62 | 27.5  |

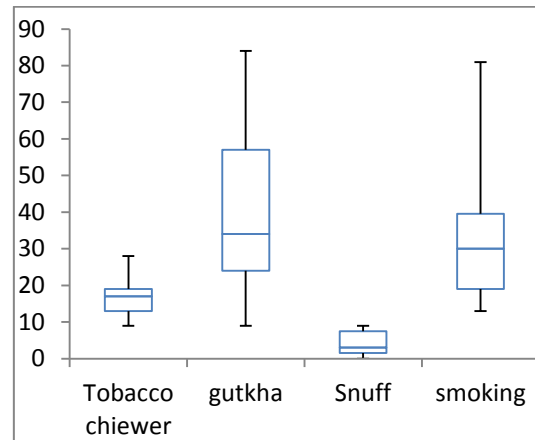
**3.4. Confidence intervals:**

The 95% Confidence intervals for average are estimated as;

| Sr. No. | 95% Confidence interval |                     |
|---------|-------------------------|---------------------|
| 1       | Tobacco chewer          | 16.45455 ± 3.120553 |
| 2       | Gutkha chewers          | 39.72727 ± 13.65385 |
| 3       | Snuff users             | 4 ± 1.919042        |
| 4       | Smokers                 | 33.63636 ± 12.06434 |

**3.5 Box plot:**

Representation of various forms of use of tobacco as box plot.



**Conclusion:**

It was observed that 35.29% of village workers use tobacco in both the forms, viz. smokeless and smoking forms. Use of tobacco in Smokeless form is found to 22.64% and that of smoking form is 2.65%. It was further revealed that age groups differ significantly with respect to use of tobacco in various forms. On pair wise comparison using critical difference among various forms of use of tobacco we observed that there is significant difference among groups of tobacco chewers, gutkha chewers, snuff users and smokers. Among these forms of use of tobacco there is no significant difference between habit of chewing gutkha and smoking. By comparing pair wise differences using critical difference we observed that the age groups differ significantly with respect use of tobacco in any form. More than 50% percent of people in the age groups 22-26, 26-30 and 34-38 use tobacco in smokeless and smoking form. Further 95% Confidence intervals; for tobacco chewers, gutkha chewers, snuff users and smokers are estimated as 16.455±3.121, 39.727 ± 13.654, 4 ± 1.919 and 33.636± 12.064 respectively. There is high proportion of people using tobacco in any form, specially use of gutkha, in the age group 22-34 years. We suggest

counseling to the workers to quit the use of tobacco, gutkha and smoking as these people are not aware of effects of tobacco and gutkha on human health.

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