

# Analysis of Tobacco Smoking Patterns in Relation to Age and Employment Status: A Case Study of Kirinyaga Central Constituency

Munyiri LM<sup>1</sup>, Gachoki PK<sup>2</sup>, Gitonga JN<sup>3</sup>

<sup>1,3</sup>Department of Pure and Applied Sciences, Kirinyaga University, P.O Box 143-10300, Kerugoya, Kenya

<sup>2</sup>Department of Physical Sciences, Chuka University, P.O Box 109-60400, Chuka, Kenya

Corresponding authors' email; <sup>1</sup>lucasmunyiri@gmail.com; <sup>2</sup>pkgachoki@gmail.com

**Abstract**— Tobacco is dried leaves of the plant *Nicotina tabacum*. It contains the drug nicotine for the effects of which it's smoked, chewed or inhaled as powder, smoking being the most common method of consuming tobacco. Tobacco smoking originated among Native Americans in Eastern North America where tobacco is native. Tobacco smoking may be influenced by various factors which may include: individual level factors such as (age, gender, and social-class). A country's national economic development or its implementation on tobacco control policies may adhere to tobacco smoking. The general objective of this study was to examine if there exist a relationship between smoking, age and employment status. This study took into account the following variables; tobacco smoking as the dependent variable, age and employment status as the independent variable. The scope of the study was Kirinyaga Central Constituency, samples taken from its four wards. Stratified sampling was used, the target sample was 100. The study had a response rate of 97%. The main instrument of data collection was questionnaires; the data gathered was both qualitative and quantitative. Data was keyed in using epi-data software and analysed using SPSS. Data was analysed using descriptive statistics and multiple logistic regression analysis. The study also consisted of 3 hypotheses testing which were validated using Chi-Square tests of independence. The results revealed that employment status influences tobacco smoking from the multiple logistic regression analysis. The conclusion from this study was that there exists a relationship between employment status and tobacco smoking in Kirinyaga Central Constituency.

**Keywords**— Age, Employment Status, Tobacco Smoking, Multiple Regression Analysis, Chisquare Tests.

## I. INTRODUCTION

Tobacco is dried leaves of the plant *Nicotina tabacum* (Boonyapookana *et al.*, 2005). It is the most commonly grown of all plants in the *Nicotina* genus. Its leaves are commercially grown in many countries, Kenya included. It grows to heights between 1 to 2 metres to be processed to tobacco products (Kibwage *et al.*, 2008). Tobacco contains the drug nicotine for the effects of which it's smoked, chewed or inhaled as powder (snuff) the most common being smoking. The practice of tobacco smoking was believed to have begun as early as 5000-3000 BC (Kibwage *et al.*, 2008). Smoked tobacco products include cigarettes, cigar, loose tobacco which can be smoked in a pipe (Sifaneck *et al.*, 2006). The most common type of tobacco smokers are heavy smokers and light smokers. There are many factors that influence tobacco smoking but in this study our main factors were age and employment status. Tobacco smokers can be categorised into two; light smokers

and heavy smokers pipe (Sifaneck *et al.*, 2006). Reports from NACADA indicate that in Kenya, the current usage of tobacco products is 8.6%. Figures released by Kenya Tobacco Control Alliance indicate that since 2008 the prevalence of tobacco smoking in Kenya was estimated at 19% for males and 2% for females, central region leading with 30.4% (Kenya Standard Newspaper, 3 Jan 2015).

Tobacco smoking is adherent to people of different age irrespective of gender and 90% of the persistent smokers began smoking during adolescence or early adulthood (Arnson *et al.*, 2010). The Kenya Global Youth Tobacco Survey revealed that the number of school going children smoking was in the rise (Kenya Standard Newspaper, 3 Jan 2015). The rate of smoking among school going children went up by 77.8% from 2001 to 2008. Initiation to tobacco smoking is often influenced by a combination of perceived pleasure acting as a positive reinforcement and desire to respond to social peer pressure (Benowitz, 2010). Some of the heavy smokers are perceived to have begun as light smokers at an early age. As age increases, there is a very high chance of someone of either gender becoming a heavy smoker rather than a light smoker (Arnson *et al.*, 2010).

Employment status may be categorised into the following; employed, self-employed and unemployed; Work environments have witnessed dramatic changes in recent years as a result of globalization, competition, technological and economic uncertainty. Consequently, there is a growing concern that the workplace has adverse effects on the physical and psychological well-being of workers leading to work stress. In particular studies have shown that stress can induce several behaviours such as tobacco smoking (Azagba, 2011)

The association between job stress and tobacco smoking can be explained on two grounds. First, smoking could be used as an anti-anxiety or anti-depressant agent to relieve the impact of job stress (S Azagba, 2011). Second, job stress can reduce an individual's self-control which makes it difficult for current smokers to quit or reduce smoking intensity and may induce former smokers to relapse and start smoking again. Unemployment disrupts life and leaves its victims basking in disgrace (Sabanayagam & Shankar, 2011)). A deterioration of the individual begins at the sociological and psychological levels. According to the psychosocial hypothesis, tobacco smoking is influenced by feelings of stress (De & Santinelle, 2005). Unemployment leads to financial stigma, loss of social

roles, and social exclusion. Smoking is seen as a way of coping with stressful and uncontrollable social and economic problems in order to get short-term stress relief. An example of smoking as a stress reliever is that tobacco contains the drug nicotine which reduces anxiety and tension (Rondina et al., 2007).

Globally, several researches have been conducted related to tobacco smoking patterns. However, there still exist research gaps in relation to solving the underlying theory behind tobacco smoking. Various factors lead to tobacco smoking hence explaining the numerous tobacco smoking patterns. In Kenya, Central region is still one of the leading regions in tobacco smoking, this research intended to analyse tobacco smoking patterns in Kirinyaga Central in relation to age and employment status. The study took into account tobacco smoking as the dependent variable, age and employment status as the independent variables. This study sought to examine if age and employment status influence tobacco smoking.

## II. METHODOLOGY

Survey research design was used in this research to obtain data. The target population in this study were the residents of Kirinyaga Central Constituency both the youth and adults irrespective of gender. The size of the sample was determined using the formula Israel (2013).

$$n = \frac{N}{1 + N(e)^2}$$

Where: n- Desired sample size, N- Population size, e- Level of significance taken to be 0.1

$$n = \frac{113355}{1 + 113355(0.1)^2} = 100$$

The sample size is 100

The study used primary data. The main instrument for the data collection was questionnaires. The data collected was both qualitative and quantitative. The analysis involved generation of descriptive statistics and inferential statistics. The descriptive statistics were in form of summary tables while the inferential statistics involved fitting the multiple logistic regression model as well as computing the chisquare tests for association. The logistic regression model is used to predict the probability of the dependent variable taking the value 0 or 1 and is written mathematically as;

$$\text{logit}(p) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2,$$

where  $\beta_0, \beta_1, \beta_2$  &  $\beta_3$  are regression coefficients

In the chisquare tests for association, the chisquare test statistic was computed as;

$$X^2 = \frac{\sum_{i=1}^n \sum_{j=1}^n (O_{ij} - e_{ij})^2}{e_{ij}}$$

Where;  $O_{ij}$ - Is the observed value and  $e_{ij}$ - Is the expected value.

## III. RESULTS AND DISCUSSIONS

### Preliminary Analysis

The response rate for the study was 95% (Table 1)

Table 1. A summary table for the response rate of the respondents

Category	Frequency	Percentage (%)
Response	97	97
No response	3	3
Total	100	100

The percentage of smokers in the study was 39.2%. 59 while non-smokers were 60.8% (Table 2).

Table 2. A summary of smokers and non-smokers respondents

Tobacco smoking	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	38	39.2	39.2	39.2
No	59	60.8	60.8	100.0
Total	97	100.0	100.0	

The age group 37-47 had the highest number of tobacco smokers, while below 15 had no tobacco smokers. Age 15-25 had the highest number of non-smokers (Table 3).

Table 3. Distribution of tobacco smoking with age

		Age				
		Below 15	15-25	26-36	37-47	48&Above
Tobacco smoking	yes	0	6	9	15	8
	no	6	17	13	12	11

Self-employed people had the highest number of tobacco smokers at the same time had the highest number of non-smokers. Students had the lowest number of tobacco smokers (Table 4).

Table 4. Distribution of tobacco smoking with employment status

		Employment status			
		Student	Employed	Self-employed	Un-employed
		Count	Count	Count	Count
Tobacco smoking	yes	5	7	16	10
	no	19	14	21	5

A contingency table for tobacco smoking versus age showed that 28 out of 48 sampled males were smokers while 20 were non-smokers. Further, 10 out of 49 sampled females were smokers while 39 were non-smokers (Table 5).

Table 5. A contingency table for tobacco smoking versus gender

		Tobacco smoking		Total
		yes	no	
Gender	Male	28	20	48
	Female	10	39	49
Total		38	59	97

### Fitted Multiple Logistic Regression Model

The fitted multiple logistic regression is summarised in Table 6. The table provides us with the regression coefficients (B), the Wald statistic and the important Odds ratio (Exp (B)) for each variable category. The Exp (B) values shows that individuals of the age 26-36 are 108.962 times more likely to be Tobacco smokers. For the variable age, the reference category was the 48 years and above. The unemployed group was the reference category for employment status.

The parameters in the model can be interpreted as; Age 15-25; Holding other variables constant, the probability of being a smoker decreases by 2.412 times when an individual is

in age group 15-25 as compared to being in age group > 48 years.

*Age 26-36;* Holding other variables constant, the probability of being a smoker, increases by 4.691 times when an individual is in age group 26-36 as compared to being in age group > 48 years.

*Age 37-47;* Holding other variables constant, the probability of being a smoker, decreases by 0.962 times when an individual is in age group 27-47 as compared to being in age group > 48 years.

*Employed;* Holding other variables constant the probability of being a smoker decreases by 5.008 times, when an individual is employed as compared to an individual who is unemployed.

*Self-employed;* Holding other variables constant the probability of being a smoker decreases by 5.495 times, when an individual is self-employed as compared to an individual who is unemployed.

The significance the fitted model parameters were explained as follows using the Wald statistics;

Wald statistic was used to test the significance of the coefficients. Critical p-value (0.05).

$$W = \frac{\beta}{se(\beta)} \sim N(0,1)$$

*Overall Age-*The Wald statistic (0.182) >0.05, the overall age is not statistically significant.

*Age (15-25)* -The Wald statistic (0.01) <0.05, Age 15-25 is statistically significant.

*Age (26-36)* -The Wald statistic (0.068)>0.05, Age 26-36 is not statistically significant.

*Age (37-47)*-The Wald statistic (0.01) <0.05, Age 37- 47 is statistically significant.

*Employment status*-The Wald statistic (0.006) <0.05, the overall employment status is significant.

*Employment status (Student)*-The Wald statistic (0.000) <0.05, student is statistically significant.

*Employment status (Employed)* - The Wald statistic (0.057) >0.05, Employed is not statistically significant.

*Employment status (Self Employed)* - The Wald statistic (0.107) >0.05, Self-employed is not statistically significant.

*Age and Employment status* - The Wald statistic (0.01) <0.05, Age and Employment status is statistically significant.

Table 6. Multiple Logistic Regression Analysis

	B	S.E.	Wald	df	Exp(B)
Overall Age			.182	3	
Age(15-25)	-2.412	63.024	.001	1	.090
Age(26-36)	4.691	17.926	.068	1	108.962
Age(37-47)	-.962	25.148	.001	1	.382
Overall Employment status			.006	3	
Employment status(student)	.000	66.199	.000	1	1.000
Employment status(Employed)	-5.008	20.989	.057	1	.007
Employment status(Self-employed)	-5.495	16.824	.107	1	.004
Age and Employment status	.506	20.224	.001	1	1.658
Constant	-6.296	26.914	.055	1	.002

The fitted multiple logistic model equation can also be summarised as a model equation as;

$$P = \frac{1}{1 + \exp^{-(-6.296 - 2.412X_1(1) + 4.691X_1(2) - 0.962X_1(3) - 5.008X_2(2) - 5.495X_2(3) )}}$$

Where, P- probability of being a smoker, X<sub>1</sub>(1) - Age 15-25, X<sub>1</sub>(2) - Age 26-36, X<sub>1</sub>(3) - Age 37-47, X<sub>2</sub>(2) –Employed and X<sub>2</sub>(3) – Self-employed. This model can be used to predict the probability of an individual being a smoker given his age and employment status.

*Chisquare Tests for Association*

The chisquare tests were used in this study to tests the hypotheses if there was any association between age and cigarette smoking, employment status and cigarette smoking and interaction between age and employment with cigarette smoking.

**H<sub>01</sub>:** There is no relationship between age and tobacco smoking

The test statistic for this hypothesis is shown in table 7. Since P-value= 0.070>0.05, the null hypothesis is not rejected and the conclusion is that there is no association between age and cigarette smoking.

Table 7. The test statistic for test for relationship association between age and smoking

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.654 <sup>a</sup>	4	.070
Likelihood Ratio	10.759	4	.029
Linear-by-Linear Association	5.180	1	.023
No of Valid Cases	97		

**H<sub>02</sub>:** There is no relationship between employment status and tobacco smoking

The test statistic for this hypotheses is shown in table 8. Since P-value= 0.033<0.05, the null hypothesis is rejected and the conclusion is that there is association between employment status and cigarette smoking.

Table 8. The test statistic for test for relationship association between employment status and smoking

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.704 <sup>a</sup>	3	.033
Likelihood Ratio	8.880	3	.031
Linear-by-Linear Association	8.163	1	.004
No of Valid Cases	97		

**H<sub>03</sub>:** There is no relationship between (age and employment status) and tobacco smoking

The test statistic for this hypotheses is shown in table 9. Since P-value=0.429>0.05, the null hypothesis is not rejected and the conclusion is that there no association between interaction between age and employment status with cigarette smoking.

Table 9. The test statistic for test for relationship association between interaction between age and employment status with smoking

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.626 <sup>a</sup>	1	.429
Continuity Correction <sup>b</sup>	.000	1	1.000
Likelihood Ratio	.968	1	.325
Fisher's Exact Test			
Linear-by-Linear Association	.609	1	.435
N of Valid Cases	37		

#### IV. CONCLUSION

The aim of this study was to find out whether there exists a relationship between age, employment status, (age and employment status) and tobacco smoking. Based on the findings it's clear that there exists a relationship between employment status and tobacco smoking. Employment status can be used as a predictor for tobacco smoking.

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