



# Smoking in Nigeria: Estimates from the Global Adult Tobacco Survey (GATS) 2012

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## Authors' contributions

*This work was carried out in collaboration between all authors. Author FA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author FA managed the literature searches, analyses of the study was performed by authors EB and CW provided supervision and edited the manuscript. All authors read and approved the final manuscript.*

## Article Information

DOI: 10.9734/JSRR/2016/27278

### Editor(s):

(1) Arun Kumar Nalla, Department of Cancer Biology and Pharmacology, University of Illinois College of Medicine, USA.

(2) Luigi Rodino, Professor of Mathematical Analysis, Dipartimento di Matematica, Università di Torino, Italy.

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(3) Kenneth Nugent, Texas Tech University Health Sciences Center, USA.

Complete Peer review History: <http://www.sciencedomain.org/review-history/15706>

Original Research Article

Received 26<sup>th</sup> May 2016

Accepted 2<sup>nd</sup> August 2016

Published 7<sup>th</sup> August 2016

## ABSTRACT

**Aim:** Tobacco remains the leading cause of preventable deaths, causing about 6 million deaths globally every year. Despite the widely known health effects of smoking, the prevalence of tobacco use is gradually increasing in developing countries including Nigeria. This study was carried out to provide a clear understanding of the patterns, social distribution and predictors of smoking in Nigeria.

**Study Design:** Data on tobacco use and the socio-demographic as well as smoking related characteristics of ever smoked, never smoked and current smokers were obtained from the Global Adult Tobacco Survey (GATS). Global Adult Tobacco Survey is a cross-sectional, nationally representative population based survey implemented for Nigeria in 2012. The data comprises of responses from adults of 15 years of age and above. A cross-sectional stratified multi-stage cluster

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sampling was adopted for the survey with a sample of 11,107 systematically selected households.

**Methodology:** The analysis included generation of frequencies, proportions and means for relevant independent variables. Bivariate analysis using chi square test was done as well as multivariate logistic regression analysis after considering the clustering effect. Unadjusted odds ratios were also obtained. All statistical test were set at 5% level of significance.

**Results:** The overall smoking prevalence was 4.4%, in which 78.1% are daily smokers. The mean age of initiation of daily smoking was 20.5±5.9years. There was a significant association between age, gender, education, occupation, religion, region, location and smoking status. ( $p < 0.001$ ). The odds of cigarette smoking was highest within age ranges 25-34 (OR 2.68, 95% CI: 1.6-4.3) and 45-54 (2.43, 95%CI: 1.4-4.0) respectively, relative to 15-24 year olds. Gender was found to be an independent predictor of the probability of whether an adult smokes or not as women were about 30 times less likely to smoke than men (OR 0.03; 95% CI: 0.02-0.06).

**Conclusion:** Public health in Nigeria will benefit from measures that will aim at ensuring that the use of tobacco is kept low. More efforts should be made to prevent tobacco industry's strategies to expand the market of their products in the country.

*Keywords: Cigarettes; public health; smoking; tobacco.*

## 1. INTRODUCTION

Smoking remains the leading cause of preventable deaths, causing almost 6 million deaths globally every year [1]. Tobacco use is responsible for over 20 percent of all cancer deaths and 70 percent of all lung cancer deaths worldwide. It is also a risk factor for respiratory diseases (including asthma, bronchitis and emphysema) and cardiovascular diseases and stroke [2,3].

Despite all these, the number of smokers worldwide has now risen to about 1.3 billion and may well reach 1.5 billion by 2025 [4]. This increase in the consumption of tobacco is largely due to the targeting of young people and women by transnational tobacco companies. In response, global public health organisations aim to provide consistent anti-smoking policies across the world [5,6]. However, to design appropriate scientifically-based policies to control the use of tobacco, there is a need to understand the patterns and social distribution of smoking [7].

There have been numerous studies with the objectives of providing a scientific description of the social determinants of smoking. Pampel [8] found that high cigarette use was in urban; less educated and lower economic status workers. Decicca et al. [9] conducted a study using a measure of anti-smoking sentiment and merged it with micro-data on youth smoking in the United States in 1992 and 2000. The result showed a significant negative influence of anti-smoking sentiment on youth smoking and a weak

relationship between the price of cigarette and smoking among youths.

Accurate information on the prevalence, patterns and predictors of smoking in the world's poorest nations remains sparse [8]. For sub-Saharan Africa, in particular, a weak knowledge base limits the targeting of strategies to combat the potential growth of tobacco use and its harmful effect on future mortality. The strategies to combat the globalization of tobacco should be focused on better describing the extent and social distribution of the problem [10-12]. There is evidence that suggests that tobacco use is increasing in developing countries [13], and so surveillance of smoking prevalence can aid in developing locally grounded actions for tobacco control [1,14]. This will prevent an escalation of tobacco use in these countries and therefore forestall the probable public health burden of smoking in the incoming years.

In Nigeria, not much is known about the socio-demographic dimensions of smoking from a national perspective, even though there are existing studies on tobacco use among various sub-population groups. Desalu et al. [15], carried out a study to determine the epidemiology of tobacco smoking in the adult population of north-eastern Nigeria using a cross-sectional survey of 1793 adults in Yola. The prevalence of current smoking was 45.3% among males and 18.4% females, respectively. They conclude that the prevalence of tobacco smoking was very high in the study population.

Other studies have been carried out by Pampel [8] and John [8,16] which included Nigeria

among the 14 and 17 Sub-Saharan African countries in their respective studies. Their studies used the Demographic Health Survey for these countries, which included some segments of the population by age (15-49 yrs for women and 15-59 years for men). The primary reason for this age-biased inclusion criterion is because the Demographic Health Survey was primarily designed to investigate fertility and issues related to female health.

This study however, uses a nationally representative data, the Global Adult Tobacco Survey conducted in 2012 to investigate the socio-demographic correlates of tobacco smoking in Nigeria and aims at providing a baseline information for the design of tobacco control policies especially for adults aged 15 years and above and both men and women.

## 2. METHODS AND MATERIALS

### 2.1 Data

The Global Adult Tobacco Survey is a global standard for systematically monitoring adult tobacco use. It is a population-based survey that is nationally representative. The data comprises of responses from adults of 15 years of age and above with the use of a standard core questionnaire, sample design, data collection and management procedure, reviewed by experts. The sampling frame for GATS was based on the National Integrated Survey of Households (NISH) 2007/2012. The GATS survey targeted non-institutionalised men and women who consider Nigeria as their permanent place of residence. A cross-sectional stratified multi-stage cluster sampling was adopted for the survey with a sample size of 11,107 systematically selected households. The survey questionnaire was comprised of questions on the respondents' background, tobacco smoking, smokeless tobacco, cessation, secondhand smoke, economics, media, and knowledge, attitude and perceptions. The questionnaire was administered in English using a software program developed by RTI International for electronic data collection using handheld devices.

The survey included a household questionnaire and an individual questionnaire. Both based on the Core Questions, which was designed for use in countries implementing GATS. For the sampled household, the head of household or any adult member considered to have sufficient

knowledge about all members of the household was selected to answer questions about the household it is representing. Interviews of household representatives were completed for 9765 (88%) of selected households. The GATS contains information not captured in the earlier Demographic Health Surveys<sup>1</sup> and the Global Youth Tobacco Survey carried out in Nigeria. This positions the survey as the most robust data set for carrying out extensive estimates of social smoking determinants in the country.

### 2.2 Data Analysis

Secondary data analysis of the Global Adult Tobacco Survey was used to determine the social and demographic correlates of tobacco use. The analysis included the generation of frequencies, proportions and means for relevant independent variables. Bivariate analysis using chi square test was also done as well as multivariate logistic regression analysis after considering the clustering effect. Unadjusted odds ratios were also obtained. All statistical tests were set at 5% level of significance.

## 3. RESULTS

### 3.1 Smoking Characteristics of Nigerian Adults

As shown in Table 1, the prevalence of smoking was 4.4% and 78.1% are daily smokers. The mean age of initiation of daily smoking was 20.5±5.9 years. Majority of the respondents (68.4%) initiated daily smoking before 25 years with a higher proportion between ages 15 and 19. A total of 70.4% of current smokers smoked less than half a pack on a daily basis with about 7% of them smoked more than a pack of manufactured cigarettes every day.

### 3.2 Socio-demographic Factors Associated with Smoking

The prevalence of smoking was observed not to be similar in all demographic or socio-economic categories of the population and the largest smoking prevalence was seen among men (8.3%) as seen in Table 2. Prevalence of

<sup>1</sup> The NDHS only included individuals between ages 15-49 for women and ages 15-59 for men since the DHS was designed to study fertility. According to Pampel, (2007), the high end of the range excludes older smokers (60 and above) and may bias estimates of tobacco use among all adults. Also, the NDHS contains no information on age of initiation, former smoking and age of cessation and thus only considered current smoking behavior.

smoking was also found to increase with age and was the highest between ages 35-44 yrs and dropped consistently to 2.8% among those aged 65yrs and above. Government employees (8.9%) had the highest prevalence of current smokers compared to self-employed individuals (5.6%) and non-government employees (5.2%). In addition, students were found to have one of the lowest prevalence of smoking (1.3%). Traditional worshippers (14.2%) as well as rural residents (5%) had higher proportions of current smokers as compared to Christians/Muslims and urban dwellers. Table 2 also showed that smoking prevalence was the lowest in the North-West (3.3%) and South-West regions (3.4%) of the country and highest in North-central region (5.9%).

**Table 1. Smoking characteristics of Nigerian adults (GATS 2012)**

| Characteristics   | Frequency   | Percentage   |
|---|-------------|--------------|
| <b>Ever smoked</b>  |             |              |
| Yes   | 750         | 7.7          |
| No  | 9015        | 92.3         |
| <b>Total</b>  | <b>9765</b> | <b>100.0</b> |
| <b>Current smokers</b>  |             |              |
| Yes   | 429         | 4.4          |
| No  | 9336        | 95.6         |
| <b>Total</b>  | <b>9765</b> | <b>100.0</b> |
| <b>Smoking frequency(n=429)</b>                               |             |              |
| Daily   | 335         | 78.1         |
| Less than daily   | 94          | 21.9         |
| <b>Age at initiation of daily smoking(n=335)</b>              |             |              |
| 10-14 yrs   | 21          | 6.3          |
| 15-19 yrs   | 121         | 36.1         |
| 20-24 yrs   | 87          | 26.0         |
| 25-29 yrs   | 43          | 12.8         |
| 30yrs and above   | 28          | 8.4          |
| Can't remember  | 35          | 10.4         |
| <b>Number of manufactured cigarette smoked per day(n=335)</b> |             |              |
| None  | 14          | 4.2          |
| Less than ½ a pack  | 236         | 70.4         |
| ½ pack to < a pack  | 62          | 18.5         |
| A pack and above  | 23          | 6.9          |

Moreover, there was a significant association between age, gender, education, occupation, religion, region, location and smoking status ( $p < 0.001$ ).

### 3.3 Frequency of Smoking Cigarette among Current Smokers by Selected Socio Demographic Factors

Table 3 presents the frequency of cigarette smoking among current smokers with respect to the selected socio-demographic characteristics. About 80% of current smokers smoked daily and

this was observed to increase with age, highest among those with no form of education (84.4%), non-government employee (86.2%), separated/divorced (81.6%) and traditional worshippers (87.5%). In addition, respondents living in the North Eastern part of Nigeria (83.3%), rural areas (78.5%) and those in the lowest socio economic status (83.5%) had a higher proportion of daily smokers.

However, all these socio demographic factors were not found to be statistically significant with frequency of smoking ( $p > 0.05$ ).

### 3.4 Predictors of Current Smoking Status

Table 4 present the socio-demographic as predictors for smoking. The odds of cigarette smoking is the highest within age ranges 35-44 (OR 2.68, 95% CI: 1.6-4.3) and 45-54 (2.43, 95%CI: 1.4-4.0), respectively as they were about 3 times more likely to smoke than the base category. Gender was found to be an independent predictor of the probability of whether an adult smokes or not as women were about 30 times less likely to smoke than men (OR, 0.03; 95% CI: 0.02-0.06).

As seen in Table 2, adults with primary education had the highest proportion of current smokers. This was however, not found to be a significant correlate in a multivariate logistic regression (OR; 1.19, 95%CI: 0.87-1.63) but adults with university education were about 2 times less likely to smoked than those with no formal education (OR; 0.53, 95%CI: 0.33-0.83). Occupation was also found to be an independent predictor as all employment categories smoke less compared to government employees. Adults who were separated, divorced or widowed were also about 2 times more likely to smoke than single and married (OR;1.86, 95%CI: 1.14-3.01). Among the various regions, current smokers live in the North West were less likely to smoke compared to those in North Central (OR: 0.5, 95% CI: 0.35-0.73). In addition, rural dwellers were more likely to smoke compared to urban dwellers (OR; 1.34, 95%CI: 1.06-1.70).

## 4. DISCUSSION

This study used the Global Adult Survey (GATS) implemented for Nigeria in 2012 [17] to carry out a comprehensive study on the socio-demographic correlates of smoking in Nigeria. The overall prevalence of current smoking was 4.4% which when calculated by multiplying this proportion by the adult population (aged 15 and

**Table 2. Selected characteristics associated with current smoking among Nigerian adults. (GATS 2012)**

|                                | Smoking status   |                   | N (100)           | $\chi^2$ (p-value) |
|--------------------------------|------------------|-------------------|-------------------|--------------------|
|                                | Yes<br>n(%)      | No<br>n(%)        |                   |                    |
| <b>Age group</b>               |                  |                   |                   |                    |
| 15-24 yrs                      | 35 (1.5)         | 2291 (98.5)       | 2326 (100)        | 81.5(<0.001)       |
| 25-34 yrs                      | 134(4.7)         | 2724(95.3)        | 2858 (100)        |                    |
| 35-44 yrs                      | 129(6.5)         | 1857(93.5)        | 1986 (100)        |                    |
| 45-54 yrs                      | 72(6.3)          | 1064(93.7)        | 1135 (100)        |                    |
| 55-64 yrs                      | 38(5.3)          | 677(94.7)         | 715 (100)         |                    |
| 65yrs and above                | 21(2.8)          | 724(97.2)         | 745 (100)         |                    |
| <b>Gender</b>                  |                  |                   |                   |                    |
| Male                           | 415(8.2)         | 4643(91.8)        | 5058 (100)        | 359.1(<0.001)      |
| Female                         | 14(0.3)          | 4693(99.7)        | 4707 (100)        |                    |
| <b>Education</b>               |                  |                   |                   |                    |
| No formal education            | 109(3.5)         | 3004(96.5)        | 3113 (100)        | 22.6(<0.001)       |
| Primary                        | 119(6.2)         | 1804(93.8)        | 1923 (100)        |                    |
| Secondary                      | 139(4.1)         | 3257(95.9)        | 3396 (100)        |                    |
| University                     | 63(4.7)          | 1270(95.3)        | 1333 (100)        |                    |
| <b>Occupation</b>              |                  |                   |                   |                    |
| Government Employee            | 65(8.9)          | 666(91.1)         | 731(100)          | 141.9(<0.001)      |
| Non-government Employee        | 29(5.2)          | 527(94.8)         | 556 (100)         |                    |
| Self-employed                  | 296(5.6)         | 4996(94.4)        | 5292 (100)        |                    |
| Student                        | 15(1.3)          | 1177(98.7)        | 1192 (100)        |                    |
| Housewife                      | 1(0.1)           | 1335(99.9)        | 1336 (100)        |                    |
| Retired                        | 5(2.2)           | 218(97.8)         | 223 (100)         |                    |
| Unemployed                     | 15(3.4)          | 420(96.6)         | 435 (100)         |                    |
| <b>Marital status</b>          |                  |                   |                   |                    |
| Single                         | 105(4.1)         | 2444(95.9)        | 2549 (100)        | 1.8(0.402)         |
| Married                        | 286(4.6)         | 5967(95.4)        | 6223 (100)        |                    |
| Separated/divorced/<br>widowed | 38(3.8)          | 955(96.2)         | 993 (100)         |                    |
| <b>Religion</b>                |                  |                   |                   |                    |
| Christianity                   | 241(4.7)         | 4882(95.3)        | 5123 (100)        | 30.6(<0.001)       |
| Islam                          | 172(3.8)         | 4357(96.2)        | 4529 (100)        |                    |
| Traditional                    | 16(14.2)         | 97(85.8)          | 113 (100)         |                    |
| <b>Wealth quintile</b>         |                  |                   |                   |                    |
| Lowest                         | 80(3.9)          | 1961(96.1)        | 2041(100)         | 4.1(0.383)         |
| Low                            | 76(4.0)          | 1831(96.0)        | 1907 (100)        |                    |
| Middle                         | 94(4.8)          | 1860(95.2)        | 1954 (100)        |                    |
| High                           | 103(5.0)         | 1950(95.0)        | 2053 (100)        |                    |
| Highest                        | 78(4.3)          | 1732(95.7)        | 1810 (100)        |                    |
| <b>Region</b>                  |                  |                   |                   |                    |
| North central                  | 80(5.9)          | 1276(94.1)        | 1356 (100)        | 27.9(<0.001)       |
| North east                     | 48(4.0)          | 1150(96.0)        | 1198 (100)        |                    |
| North west                     | 74(3.3)          | 2179(96.7)        | 2253 (100)        |                    |
| South east                     | 68(5.6)          | 1140(94.4)        | 1208 (100)        |                    |
| South south                    | 76(5.6)          | 1288(94.4)        | 1364 (100)        |                    |
| South west                     | 81(3.4)          | 2305(96.6)        | 2386 (100)        |                    |
| <b>Location</b>                |                  |                   |                   |                    |
| Urban                          | 183(3.8)         | 4622(96.2)        | 4805 (100)        | 7.7(0.003)         |
| Rural                          | 248(5.0)         | 4712(95.0)        | 4960 (100)        |                    |
| <b>Total</b>                   | <b>430(4.4%)</b> | <b>9335(95.6)</b> | <b>9765 (100)</b> |                    |

above) of the country, shows a figure of about four million smokers [18,19]. This is higher than the estimate of Pampel [8] for the number of smokers in Nigeria which was reported to be

about 2.7 million smokers using NDHS [20]. Even though smoking prevalence might be fairly low which is good from public health's perspective, the number of smokers and tobacco

**Table 3. Frequency of smoking cigarette among smokers by selected socio demographic factors (GATS 2012)**

| Characteristics              | Frequency of smoking |                         | Total<br>N (100) | Chi-square<br>( p-value) |
|------------------------------|----------------------|-------------------------|------------------|--------------------------|
|                              | Daily<br>n(%)        | Less than daily<br>n(%) |                  |                          |
| <b>Age group</b>             |                      |                         |                  |                          |
| 15-24 yrs                    | 24(66.7)             | 12(33.3)                | 36 (100)         | 6.239 (0.284)            |
| 25-34 yrs                    | 109(81.3)            | 25(18.7)                | 134(100)         |                          |
| 35-44 yrs                    | 98(76.0)             | 31(24.0)                | 129(100)         |                          |
| 45-54 yrs                    | 54(76.1)             | 17(23.9)                | 71(100)          |                          |
| 55-64 yrs                    | 31(81.6)             | 7(18.4)                 | 38(100)          |                          |
| 65and above                  | 19(90.5)             | 2(9.5)                  | 21(100)          |                          |
| <b>Gender</b>                |                      |                         |                  |                          |
| Male                         | 323(78.0)            | 91(22.0)                | 414(100)         | 0.033(0.576)             |
| Female                       | 12(80.0)             | 3(20.0)                 | 15(100)          |                          |
| <b>Education</b>             |                      |                         |                  |                          |
| No formal education          | 92(84.4)             | 17(15.6)                | 109(100)         | 8.662(0.034)             |
| Primary                      | 94(78.3)             | 26(21.7)                | 120(100)         |                          |
| Secondary                    | 97(70.3)             | 41(29.7)                | 138(100)         |                          |
| University                   | 52(83.9)             | 10(16.1)                | 62(100)          |                          |
| <b>Occupation</b>            |                      |                         |                  |                          |
| Government employee          | 52(80.0)             | 13(20.0)                | 65(100)          | 10.796(0.095)            |
| Non-government employee      | 25(86.2)             | 4(13.8)                 | 29(100)          |                          |
| Self-employed                | 232(78.1)            | 65(21.9)                | 297(100)         |                          |
| Student                      | 8(50.0)              | 8(50.0)                 | 16(100)          |                          |
| Housewife                    | 2(100.0)             | (0.0)                   | 2(100)           |                          |
| Retired                      | 5(100.0)             | (0.0)                   | 5(100)           |                          |
| Unemployed                   | 11(73.3)             | 4(26.7)                 | 15(100)          |                          |
| <b>Marital status</b>        |                      |                         |                  |                          |
| Single                       | 84(80.0)             | 21(20.0)                | 105(100)         | 0.722(0.697)             |
| Married                      | 220(76.9)            | 66(23.1)                | 286(100)         |                          |
| Separated/divorced/widowed   | 31(81.6)             | 7(18.4)                 | 38(100)          |                          |
| <b>Religion</b>              |                      |                         |                  |                          |
| Christianity                 | 182(75.5)            | 59(24.5)                | 241(100)         | 2.505(0.286)             |
| Islam                        | 139(80.8)            | 33(19.2)                | 172(100)         |                          |
| Traditional                  | 14(87.5)             | 2(12.5)                 | 16(100)          |                          |
| <b>Region</b>                |                      |                         |                  |                          |
| North central                | 66(82.5)             | 14(17.5)                | 80(100)          | 4.655(0.459)             |
| North east                   | 40(83.3)             | 8(16.7)                 | 48(100)          |                          |
| North west                   | 56(74.7)             | 19(25.3)                | 75(100)          |                          |
| South east                   | 51(75.0)             | 17(25.0)                | 68(100)          |                          |
| South south                  | 55(72.4)             | 21(27.6)                | 76(100)          |                          |
| South west                   | 67(81.7)             | 15(18.3)                | 82(100)          |                          |
| <b>Location</b>              |                      |                         |                  |                          |
| Urban                        | 142(77.6)            | 41(22.4)                | 183(100)         | 0.45(0.461)              |
| Rural                        | 193(78.5)            | 53(21.5)                | 246(100)         |                          |
| <b>Socio economic status</b> |                      |                         |                  |                          |
| Lowest                       | 66(83.5)             | 13(16.5)                | 79(100)          | 1.75(0.780)              |
| Low                          | 60(77.9)             | 17(22.1)                | 77(100)          |                          |
| Middle                       | 71(76.3)             | 22(23.7)                | 93(100)          |                          |
| High                         | 78(76.5)             | 24(23.5)                | 102(100)         |                          |
| Highest                      | 60(76.9)             | 18(23.1)                | 78(100)          |                          |
| <b>Total</b>                 | <b>335(78.1)</b>     | <b>94(21.9)</b>         | <b>429(100)</b>  |                          |

use may actually be large considering the entire population of the country. According to Pampel [8], Nigeria had the largest number of smokers and yet among the countries with the lowest smoking prevalence of the 14 countries included in his study. At the other extreme, Namibia had the largest smoking prevalence among these

studied countries which only amounted to 114,000 smokers. Smoking prevalence increases with age up to a point and then it falls. Again, this could be as a result of income effect as older people are considered to have more income than younger individuals and because young smokers are less addicted than older

smokers [21-23]. Men generally smoked more than women. There was an inverse relationship between the level of education and smoking status [24,25].

Several studies have found that smoking prevalence is higher among males than it is among females. For instance, van Walbeek

[26], reported that a higher percentage of smokers were male compared to the proportion of female smokers in South Africa. He asserted that the prevalence gap closed a bit over the period of the study. Kislitsyna et al. [27], reported smoking prevalence to be higher among boys than girls (26.1% vs. 5.7%) in Russia.

**Table 4. Predictors of current smoking status among adult Nigerians (GATS 2012)**

|                            | O.R  | 95%CI     | p-value      |
|----------------------------|------|-----------|--------------|
| <b>Age group</b>           |      |           |              |
| 15-24 yrs                  | 1    |           |              |
| 25-34 yrs                  | 2.35 | 1.5-3.6   | <b>0.000</b> |
| 35-44 yrs                  | 2.68 | 1.6-4.3   | <b>0.000</b> |
| 45-54 yrs                  | 2.43 | 1.4-4.0   | <b>0.001</b> |
| 55-64 yrs                  | 1.83 | 1.0-3.2   | <b>0.036</b> |
| 65and above                | 0.92 | 0.4-1.8   | 0.810        |
| <b>Gender</b>              |      |           |              |
| Male                       | 1    |           |              |
| Female                     | 0.03 | 0.02-0.06 | <b>0.000</b> |
| <b>Education</b>           |      |           |              |
| No formal education        | 1    |           |              |
| Primary                    | 1.19 | 0.87-1.63 | 0.260        |
| Secondary                  | 0.72 | 0.52-1.01 | 0.060        |
| University                 | 0.53 | 0.33-0.83 | <b>0.000</b> |
| <b>Occupation</b>          |      |           |              |
| Government employee        | 1    |           |              |
| Non-government employee    | 0.52 | 0.32-0.84 | <b>0.008</b> |
| Self-employed              | 0.55 | 0.39-0.79 | <b>0.001</b> |
| Student                    | 0.22 | 0.11-0.42 | <b>0.000</b> |
| Homemaker                  | 0.18 | 0.04-0.82 | <b>0.026</b> |
| Retired                    | 0.28 | 0.10-0.77 | <b>0.014</b> |
| Unemployed                 | 0.58 | 0.30-1.16 | 0.099        |
| <b>Marital status</b>      |      |           |              |
| Single                     | 1    |           |              |
| Married                    | 0.85 | 0.62-1.15 | 0.297        |
| Separated/divorced/widowed | 1.86 | 1.14-3.01 | <b>0.012</b> |
| <b>Religion</b>            |      |           |              |
| Christianity               | 1    |           |              |
| Islam                      | 0.97 | 0.73-1.30 | 0.880        |
| Traditional                | 2.67 | 1.44-4.94 | <b>0.020</b> |
| <b>Region</b>              |      |           |              |
| North central              | 1    |           |              |
| North east                 | 0.65 | 0.44-0.97 | <b>0.038</b> |
| North west                 | 0.50 | 0.35-0.73 | <b>0.000</b> |
| South east                 | 1.09 | 0.74-1.58 | 0.656        |
| South south                | 0.90 | 0.62-1.29 | 0.570        |
| South west                 | 0.69 | 0.48-0.98 | <b>0.041</b> |
| <b>Location</b>            |      |           |              |
| Urban                      | 1    |           |              |
| Rural                      | 1.34 | 1.06-1.70 | <b>0.015</b> |
| <b>Wealth quintile</b>     |      |           |              |
| Low                        | 1    |           |              |
| Lowest                     | 0.84 | 0.59-1.18 | 0.312        |
| Middle                     | 0.94 | 0.66-1.33 | 0.736        |
| High                       | 0.99 | 0.69-1.41 | 0.958        |
| Highest                    | 0.83 | 0.56-1.22 | 0.354        |

Hosseinpoor et al. [28], in a study conducted among 48 low- and middle income countries using results from the World Health Survey, found crude weighted prevalence to be higher in middle-income country group compared with low-income country group for both men and women. However, while this difference was only marginal in men having more than 35% of men who smoked in these countries, the smoking prevalence in women was only 13% in middle-income countries and 6% in low-income countries. Other studies have also shown a higher prevalence in men than women. According to Jarallah et al. [29], this disparity could be due to socio-cultural and religion reasons.

From a policy perspective, the concentration of smoking initiation among individuals within the age ranged 15-29 implies that a higher proportion of the smoking problem lies with this segment of the population. This study suggests that even though cigarette use is initiated during the younger ages, smoking is more prevalent among young and middle-age adults (25-34yrs, 35-44yrs and 45-54yrs which then begins to drop thereafter as the smoker grows older such that the dichotomy is in terms of smoking participation and the intensity of smoking.

One key observation in the Global Adult Tobacco Survey is its failure to further elicit answers on the background of ever and current smokers in terms of factors that could be seen as a precursor for smoking initiation. This will enable researchers examine the psychosocial correlates of smoking initiation within the population. Also, factors that were prominent in quitting for those that already stopped can also be investigated and reinforced to encourage current smokers to quit. In an exploratory study of the socio-cultural risk influences for cigarette smoking among Southern Nigeria youth conducted by Ebge et al. [30], social cultural factors and the promotional activities of tobacco companies were seen to increase children exposure to cigarettes. Desalu et al. [15] conducted a study on the epidemiology of tobacco smoking among adults in North-East, Nigeria and found factors such as peer pressure, social acceptance, pleasure, stress/anxiety and advertisement as strong determinants of smoking initiation among the study population. In another study by Agagu et al. [31], parental and peer smoking status were found as predictors of current smoking.

This study revealed that University education had a significant negative association with current smoking status in Nigeria while other levels of education had similarities in terms of smoking prevalence. Other studies have also confirmed this relation between education and smoking status. Pampel [8] found that the level of education lowers the odds of smoking and that the lower the level of education attained the higher the use of tobacco in the countries studied. Also, according to Hosseinpoor et al. [28], education appeared to be a key determinant of smoking after controlling for other socio-demographic factors in their study sample. Being a male, aged 25-44 years, government employee, separated/divorced, living in rural areas and in North Central Nigeria were all independent predictors of current smoking status among Nigerian adults.

Similarly, just as observed in this study many other studies have shown that individual household's wealth index showed no effect on the choice of smoking [16]. For the categories of wealth quintile as used in this research, individuals in the middle and high wealth quintile had the largest smoking prevalence. In the six geopolitical regions of the country, smoking prevalence is the lowest in the South West, North West and South East. Findings from this study indicated a significant association between location (urban or rural) and smoking in Nigeria. It shows that there were more smokers living in rural areas than in cities.

## 5. CONCLUSION

With the overall smoking prevalence at about 5% as shown in this study which is good for public health, efforts should be made to ensure that tobacco use stays low. With rapid increase in population, demographic changes, rising urbanization and adoption of Western values among young people in Nigeria, the country remains an economically viable market for the tobacco industry. It is necessary for the government to fully adopt the provisions of the World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) to prevent the widespread of tobacco use and its associated epidemics.

## ACKNOWLEDGEMENT

This study was partly funded by the Economics of Tobacco Control Project, School of Economics, UCT, South Africa.



## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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