

Original Research Article

Prevalence and attitude towards cigarette smoking among young adults in rural and urban communities in Kano State, North-Western Nigeria

Aliyu Ibrahim Shehu¹, Nazeef Mohammed^{1*}, Musa Zakka¹, Usman Iliyasu¹,
Aisha Aliyu Ibrahim², Aisha Aliyu Abulfathi³, Amina Kwaku⁴

¹Department of Community Medicine, Federal University of Health Sciences, Azare, Bauchi State, Nigeria

²Department of Family Medicine, Murtala Mohammed Teaching Hospital, Kano, Nigeria

³Department of Community Medicine, University of Maiduguri, Maiduguri, Nigeria

⁴Department of Community Medicine, Aminu Kano Teaching Hospital, Kano, Nigeria

Received: 12 August 2025

Revised: 24 September 2025

Accepted: 25 September 2025

*Correspondence:

Dr. Nazeef Mohammed,

E-mail: nazeefmohammed@fuhhsa.edu.ng

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Cigarette smoking is a primary cause of preventable death worldwide, killing more than 7 million people annually. It poses a major public health challenge, as over half of 1.2 billion smokers are young adults. The prevalence and attitudes toward cigarette smoking among young adults in Kano State's rural and urban areas are poorly understood. This study aimed to assess and compare the prevalence and attitudes toward cigarette smoking among young adults in these communities.

Methods: A comparative cross-sectional descriptive study design was employed. Structured, interviewer-administered questionnaires adapted from the modified WHO global youth tobacco survey were administered to 894 young adults (urban; 447 and rural; 477) selected using a multistage sampling method. Data were analysed using IBM SPSS statistics v20.

Results: The overall prevalence of ever smoking among young adults was 24.8% (95% CI: 22.1-28.1), significantly higher in rural (30.3%, 95% CI: 26.0-35.0) than urban communities (19.4%, 95% CI: 15.8-23.3) ($p < 0.001$). The overall prevalence of current smoking was 14.5% (95% CI: 12.2-17.0), higher in rural (16.7%, 95% CI: 13.3-20.4) than urban communities (12.2%, 95% CI: 9.1-15.3), although not statistically significant ($p = 0.065$). Over half of the respondents had a positive attitude toward cigarette smoking, with a higher proportion in urban compared to rural communities ($p < 0.05$).

Conclusions: The prevalence of cigarette smoking was higher in rural than urban communities. Urban communities showed positive attitudes toward smoking. Maintaining positive attitude towards smoking affects quitting.

Keywords: Attitude, Cigarette smoking, Prevalence, Rural, Urban, Young adults

INTRODUCTION

Cigarette smoking is the leading cause of preventable death globally, posing a major public health threat, especially among young adults.¹ Over half of the 1.2 billion smokers worldwide are young people, with smoking often beginning during adolescence or early adulthood and continuing into later life.² This early

initiation increases the risk of chronic non-communicable diseases (NCDs) such as cardiovascular, cerebrovascular, and respiratory conditions.³ The tobacco epidemic has already claimed about 100 million lives in the 20th century and is projected to cause up to one billion deaths in the 21st century if urgent global action is not taken. By 2030, over 80% of tobacco-related deaths will occur in

developing countries, which are now primary targets of multinational tobacco companies.⁴

Tobacco is expected to become the leading cause of death worldwide by 2030, surpassing combined fatalities from malaria, HIV, tuberculosis, maternal mortality, road accidents, homicide, and suicide. Tobacco use contributes to around 11% of deaths in developing nations. In response, the World Health Organization (WHO) has promoted strong measures under the Framework Convention on Tobacco Control (FCTC), with a target of a tobacco-free world by 2040. The 2013 WHO global action plan aimed to reduce tobacco use by 30% and premature mortality from NCDs by 25% by 2025. Tobacco is unique in that it kills many users when used as intended, causing both non-communicable and communicable diseases.^{5,6}

Young adults are particularly vulnerable to smoking due to environmental, social, and psychological factors. Influences such as peer pressure, parental smoking, stress relief, weight control, and exposure to tobacco advertising all contribute. These individuals are more susceptible to nicotine addiction, often becoming dependent faster than older adults. Low socioeconomic status, poor academic performance, low self-esteem, and easy access to tobacco products also play a significant role.^{7,8}

The public health burden of smoking extends to economic consequences. Tobacco use diverts household resources from basic needs to harmful products and increases national healthcare costs. In developing countries like Nigeria, smoking exacerbates poverty and inequality. For example, the prevalence of cigarette smoking in Nigeria is higher in rural areas than in urban ones, and Kano State consistently records high smoking rates and related drug offences. Smoking not only affects health but also undermines social and economic development, including the achievement of sustainable development goals (SDGs).^{9,10}

National policies like Nigeria's National Tobacco Control Act 2015 aim to curb tobacco use by banning sales in public spaces and through online platforms. Programs by the Ministry of Health and the National Drug Law Enforcement Agency (NDLEA) target young adults for counselling and rehabilitation. However, more localized studies are needed to identify specific determinants of smoking among youth in areas like Kano State, where tobacco use is alarmingly high.^{11,12}

Understanding the prevalence and attitudes towards cigarette smoking among young adults is critical for effective public health interventions. With a strong link between smoking and lifelong addiction and disease, focusing on prevention among young people is essential to ending the tobacco epidemic. Which is why the study aimed at assessing and comparing the prevalence and attitudes towards cigarette smoking among young adults

in rural and urban communities in Kano State, north-western Nigeria.

METHODS

Study design and setting

A comparative cross-sectional study was conducted in Kano State, northwestern Nigeria. The study was conducted between December 2023 to April 2024. Gwale and Dawakin Tofa are two local government areas (LGAs) in Kano State, north-western Nigeria, with distinct urban and rural characteristics. Gwale LGA is one of the eight urban LGAs within the Kano metropolis, bordered by Dala, Ungoggo, Kano Municipal, and Kumbotso LGAs. As of 2024, it had an estimated population of 469,442, including approximately 140,832 young adults.¹³⁻¹⁵ The area is predominantly inhabited by Hausa and Fulani Muslims, with trading and farming as the main occupations. Gwale comprises ten wards and hosts around 42 healthcare facilities, both public and private. The LGA has a strong educational presence with over 1,056 primary and 661 secondary schools, in addition to higher institutions like Bayero University (old site), Federal College of Education, and Aminu Kano Institute of Islamic and Legal Studies. The area also features historical and cultural sites such as Goron Dutse and the old city gates. Leatherwork and blacksmithing are notable crafts, and women are primarily engaged in domestic roles or petty trading.

The Kano State Hisbah Corps, based in Sharada industrial estate with about 30 industries, actively addresses substance abuse, including cigarette smoking, through public education programs.¹⁶ Dawakin Tofa LGA, a rural area located about 20 km from Kano city, has a projected population of 354,271 with about 106,281 young adults as of 2024. It consists of 11 wards and 635 settlements, mainly inhabited by Hausa and Fulani, with minority ethnic groups. The people are largely farmers and artisans involved in pottery, basket making, and trading, especially at the Dawanau International Market. The area has 50 health facilities, including a general and psychiatric hospital.¹³⁻¹⁵

Study population

The study population were young adult males and females aged between 18-25 years¹⁷ residing in the study areas. Young adult males and females aged between 18-25 years, residing in the study areas for at least one year and who understood the language of the questionnaire (Hausa) were included in the study. Whereas young adult males and females aged between 18-25 years and residing in the study areas for at least one year but temporarily absent throughout the period of data collection, and respondents who felt that the information they were giving was private and voluntarily opted out were excluded.

Sample size determination

The sample size was determined using the formula for comparing two independent proportions.¹⁸

$$n_c = \frac{\{Z1 - \alpha/2\sqrt{2P(1-P)}\} + Z1 - \beta\sqrt{P_1(1-P_1) + P_2(1-P_2)}}{(P_1 - P_2)^2}$$

Where:

n represents the minimum required sample size per group

Z_α (1.96) corresponds to 5% type I error

Z_β (0.84) corresponds to 80% power

P_1 (0.213) Proportion of young adult smokers in a rural area.¹⁹ P_2 (0.138) Proportion of young adult smokers in an urban area.²⁰ P (0.176) is the average of P_1 and P_2 .

The calculation yielded a minimum sample size of 402 participants per group. To account for non-response, the sample size was increased by 10% based on the finding from a similar previous study in North-Western Nigeria was used.²¹ Hence, $n = 402/0.9 = 446.7 = 447$ (447 young adults were recruited from each of the two study areas, making a total of 894 young adults).

Sampling techniques

A multistage sampling technique was employed in this study to ensure a representative selection of young adults from both urban and rural settings in Kano State.

Stage 1: selection of local government areas

The local government areas (LGAs) were first stratified into urban and rural categories. From the list provided by the Kano State Ministry of Health, Gwale (urban) and Dawakin Tofa (rural) LGAs were selected using simple random sampling by balloting. For both selections, each LGA was assigned a unique serial number written on identical paper pieces, placed in a tin, and drawn randomly without replacement. The LGA corresponding to the selected number was chosen as the study site.

Stage 2: selection of wards

From the ten wards in Gwale and eleven in Dawakin Tofa, three wards were selected from each LGA using simple random sampling by balloting. Each ward was assigned a serial number and drawn one at a time without replacement, ensuring approximately 25% representation of the total wards in each LGA.

Stage 3: selection of settlements

Within the selected wards, three settlements were randomly chosen from each, using the same balloting method. This resulted in a total of 18 settlements across

the two LGAs. Each settlement was assigned a serial number, drawn randomly without replacement, and selection was done separately for each ward.

Stage 4: selection of houses/households

Systematic sampling was used to select houses. All houses in the selected settlements were numbered to form a sampling frame. The sampling interval was calculated by dividing the number of houses by the required sample size. A starting point was randomly chosen using a random number table, and subsequent houses were selected by adding the sampling interval. In houses with more than one household, one was selected randomly.

Stage 5: selection of respondents

Eligible young adults in each household were identified. If more than one was present, a respondent was chosen by balloting. If no eligible respondent was found in a selected house, the next house was used. If the sample size was not met after exhausting all sampled houses, a nearby settlement within the selected ward was included, and the same selection procedures were repeated.

This rigorous multistage sampling ensured representative participation from both urban and rural areas, maintaining scientific validity and demographic balance in the study.

Data collection methods and tools

Study instruments

A modified WHO global youth tobacco survey (GYTS) questionnaire was used, tailored for young adults and expanded based on the study's conceptual framework.^{22,23} It included four sections: socio-demographics, smoking history, attitudes toward smoking, and additional determinants aligned with the study's objectives to enhance conceptual relevance and data accuracy. The questionnaire was systematically built into Excel format, underwent validation using Nafundi's XLS offline protocol, and was subsequently converted to XML format for implementation through open data kit (ODK). The internal consistency was validated with a Cronbach's alpha of 0.78, indicating reliable instrumentation.

Study variables and measurements

Independent variables included socio-demographics, personal beliefs about smoking effects, and interpersonal influences like peer pressure, accessibility, and media. While the dependent variable was cigarette smoking behaviour, measured by whether respondents have ever smoked or are current smokers. Prevalence (proportion of current and ever cigarette smoking) was measured as percentage with 95% confidence interval estimates. The smoking attitudes was measured using the 17 points scoring system adapted from the "development and validation of a scale measuring attitude towards

smoking". Each attitude in favour of smoking is scored one (positive attitude towards smoking). Total scores of ≥ 9 signifies aggregate positive attitude while < 9 signifies negative aggregate attitude towards smoking.²⁴

Data collection and quality control

Twelve research assistants who were community health extension workers (6 for each LGA) were recruited and trained for this study. The study instruments underwent pretesting and post-testing in two different LGAs which had similar characteristics to the study areas but were not included in the main study. Approximately 88 copies of the questionnaires (44 in Tarauni-urban LGA and 44 in Bunkure-rural). This process checked the feasibility of the instruments and familiarised research assistants with data collection procedures. Adjustments to the tools were made based on pretesting observations.

Quality control measures included real-time monitoring of data collection through the ODK system. The principal researcher supervised and coordinated the data collection process, ensuring adherence to protocols and maintaining data quality. GPS tracking of research assistants during interviews at households provided additional quality assurance. Overall, the CDC/AFENET's six elements of field data quality approach were applied in this study.

Data analysis

Data entry was initially done using Epi-Info by two clerks, then cross-checked in Microsoft Excel sheets to minimize errors. The dataset was cleaned, and inconsistent or missing data were verified using the original questionnaires. SPSS version 20.0 was used for analysis. Variables like age and income were summarized using the mean with standard deviation and the median with range, respectively. Smoking prevalence (ever and current) was reported as percentages with 95% confidence intervals. Attitudes towards smoking were measured using a 17-item scale adapted from validated sources and compared across urban and rural LGAs. Bivariate analysis was performed using Chi-square and Fisher's exact tests for proportions, and t-tests for comparing means. Variables with $p < 0.05$ (and < 0.10 where relevant) and those identified in literature were included in a multivariate logistic regression to adjust for confounders. Significance was set at $p < 0.05$.

Ethical considerations

The study adhered to ethical protocols, obtaining ethical clearance from multiple authorities. Primary ethical approval was secured from the health research ethics committee of Aminu Kano Teaching Hospital, followed by additional approval from the ethical committee of the Kano State Ministry of Health. Permission to conduct the study was obtained from the Kano State Ministry for local government and the primary health care (PHC) Departments of Gwale and Dawakin Tofa LGA,

respectively. The research team engaged with community leaders to ensure cultural sensitivity and community acceptance. Before individuals were recruited for the study, their informed consent was sought by explaining to them the purpose and nature of the study as well as the voluntary nature of participation in the study.

RESULTS

Socio-demographic characteristics of young adults

Four hundred and forty-seven (447) questionnaires each were administered to youths in the rural and urban LGAs, making a total of 894. Of these, 417 (response rate of 93.3%) in the urban and 412 (response rate of 92.2%) in the rural communities were completed, making a total of 829 completed questionnaires. Reasons for non-completion of some questionnaires include mistaken interviewing of adults not found to be within the age range of 18-25 years and the respondents feeling that the information required was private and they voluntarily opted out.

The mean ages ($\pm$ standard deviation, SD) of young adults in both the urban and rural communities were nearly similar, 21.9 $\pm$ 2.1 years and 21.6 $\pm$ 2.2 years, respectively (t-test 2.3, p value 0.02). All the respondents were within the age range of 18-25 years in both the urban and the rural areas, and the majority (57.1% in general, 60.7% urban and 53.4% rural) were within the age group of 21-25 years.

About two-third (68.8% in general; 68.1% urban and 69.4% rural) were male, most (99.8% urban and 99.5% rural) were of the Islamic faith, and majority (89.7% in general; 99.1% urban and 88.6% rural) were Hausa-Fulani by tribe and less than one-fifth (16.8% in general; 15.3% urban and 18.2% rural) were currently married. The main occupation of the respondents in urban community was business (32.3%), others were civil servants (16.3%) as opposed to farming for those in rural areas (28.9%) and few civil servants (5.6%). About one-third (32.6%) of the respondents in the urban community had tertiary education as against one in seven (14.1%) of the rural respondents, although most of the respondents (81.5% urban and 77.2% rural) had formal education. The average monthly income of the urban respondents ranged from ₦700 to ₦72,000, with a median of ₦8,000 and was higher than that of the rural respondents of ₦500 to ₦45,000, with a median of ₦5000 (Mann-Whitney U test $-z = -8.028$, $p < 0.0001$). The majority of both the urban (82.0%) and the rural (97.3%) respondents had low incomes, i.e. below the minimum wage of 18,000 per month.

The young adults in the two communities statistically significantly differed in their age range ($p = 0.032$), education levels ($p < 0.001$), occupations ($p < 0.001$) and incomes ($p < 0.001$) (Table 1).

Table 1: Socio-demographic characteristics of youths in urban and rural communities (n=829).

Socio-demographics	Urban (n=417) N (%)	Rural (n=412) N (%)	χ^2 test statistics	P value
Age-groups (years)				
18-21	164 (46.1)	192 (53.9)		
22-25	253 (53.5)	220 (46.5)	4.475	0.034*
Sex				
Male	284 (49.8)	286 (50.2)		
Female	133 (51.4)	126 (48.6)	166	0.684
Religion				
Islam	416 (50.4)	410 (50.4)		
Christianity	01 (33.3)	02 (66.7)	346	† 0.622
Tribe				
Hausa-Fulani	379 (50.9)	365 (49.1)		
Other tribes	38 (44.7)	47 (55.3)	1.186	0.276
Marital status				
Married	64 (46.0)	75 (54.0)		
Single	342 (50.9)	330 (49.1)		
Divorced	8 (66.7)	4 (33.3)		
Widowed	3 (50.0)	3 (50.0)	2.338	0.496
Occupation				
Civil servant	68 (74.7)	23 (25.3)		
Driving	11 (73.3)	4 (26.7)		
Farming	26 (17.9)	119 (82.1)		
Business	134 (58.3)	96 (41.7)		
Others**	178(51.1)	170 (48.9)	95.855	<0.001*
Educational status				
Informal	77 (45.0)	94 (55.0)		
Primary	42 (48.3)	45 (51.7)		
Secondary	162 (43.0)	215 (57.0)		
Tertiary	136 (70.1)	58 (29.9)	40.577	<0.001*
Income (Naira)				
<1000	13 (30.2)	30 (69.8)		
1000-4999	92 (42.4)	125 (57.6)		
5000-9999	125 (38.5)	199 (61.4)		
10000-14999	73 (65.2)	39 (34.8)		
15000-19999	61 (81.3)	14 (18.7)		
≥20000	53 (91.4)	5 (8.6)	108.113	<0.001*

*Statistically significant difference † Fisher's Exact Test ** Tailoring, weaving, barbing, laundry, mechanic, shoemaking, plumbing, bricklayer.

Table 2: Proportion of cigarette smokers and non-smokers among young adults in urban and rural communities (n=829).

Smoking status	Urban (n=417) N (%) (95% CI)	Rural (n=412) N (%) (95% CI)
Ever smoked	81 (19.4) (15.8-23.3)	125 (30.3) (26.0-35.0)
Current smokers	51 (12.2) (9.1-15.3)	69 (16.7) (13.3-20.4)
Ex-smokers	30 (7.2)	56 (13.6)
Never smoked	336 (80.6)	287 (69.7)
Ever smoked		
Male	60 (21.1) (16.2-25.7)	107 (37.4) (32.2-43.0)
Female	21 (15.8) (9.8-21.8)	18 (14.3) (8.7-20.6)
Current smokers		
Male	42 (14.8) (10.9-19.4)	67 (23.4) (18.2-28.7)
Female	9 (6.8) (3.0-11.3)	2 (1.6) (<1.0- 4.0)

Table 3: Comparison of prevalence of ever smoked cigarette across the same category of socio-demographic characteristics of young adults in urban and rural communities.

Socio-demographics	Ever smoked cigarette		Statistical test				
	Urban N (%)	Rural N (%)	χ^2 test	cOR	95% CI		P value
Residence (n=206)	81 (19.4)	125 (30.3)	13.222	0.554	0.402	0.763	<0.001*
Age range (years)							
18-21 (n=78)	33 (20.1)	45 (23.4)	0.568	0.823	0.406	1.367	0.451
22-25 (n=12)	48 (19.0)	80 (36.4)	18.032	0.410	0.270	0.622	<0.001*
Sex							
Male (n=167)	60 (21.1)	107 (37.4)	18.246	0.448	0.309	0.650	<0.001*
Female (n=39)	21 (15.8)	18 (14.3)	0.114	1.125	0.568	2.227	0.735
Religion							
Islam (n=204)	80 (19.2)	124 (30.2)	13.467	0.549	0.398	0.758	<0.001*
Christianity (n=2)	1 (100.0)	1 (50.0)	0.750	2.000	0.500	7.997	†1.000
Ethnicity							
Hausa-Fulani (n=191)	72 (19.0)	119 (32.6)	18.037	0.485	0.346	0.679	<0.001
Other tribes (n=15)	9 (23.7)	6 (12.8)	1.724	2.121	0.680	6.612	0.189
Marital status							
Married (n=29)	11 (17.2)	18 (24.0)	0.971	0.657	0.284	1.520	0.325
Single (n=177)	70 (19.8)	107(31.8)	12.645	0.532	0.375	0.753	<0.001*
Occupation							
Employed (n=24)	15 (22.1)	10 (43.5)	3.957	0.368	0.135	1.004	0.047*
Unemployed (n=181)	66 (18.9)	115 (29.6)	11.276	0.556	0.393	0.785	0.001*
Education							
Informal (n=46)	25 (32.5)	21 (22.3)	2.208	1.671	0.846	3.330	0.137
Formal (n=160)	56 (16.5)	104 (32.7)	23.530	0.406	0.280	0.587	<0.001*
Average monthly income (Naira)							
<18,000 (n=190)	65 (19.0)	125 (31.2)	14.355	0.518	0.368	0.730	<0.001*
≥18,000 (n=16)	16 (21.3)	0 (0.0)	2.883	0.000	0.000	0.000	0.090

*Statistically significant difference, † Fisher's Exact Test, cOR = cumulative odds ratio, CI = confidence interval.

Prevalence of cigarette smoking among young adults

The prevalence of ever-smoked cigarettes among young adults was higher in rural areas (30.3%; 95% CI: 26.0-35.0), and the prevalence of current cigarette smoking was also slightly higher in rural areas (16.7%; 95% CI: 13.3-20.4). The proportion of people quitting smoking was higher in the rural area, with a higher proportion of ex-smokers (13.6%). The majority of the smokers were. The proportion of current smoking was found to be higher among males in the rural (23.4%; 95% CI: 18.2-28.7), as opposed to females, where the study found that the proportion of current smoking was higher among females in the urban (6.8%; 95% CI: 3.0-11.3) (Table 2).

Prevalence of ever smoked cigarettes among young adults in urban and rural communities

The proportion of ever smoked cigarette among the youths was statistically significantly higher in rural areas compared to urban, among the same category of respondents; age group 22-25 year (36.4%), the Hausa and Fulani (32.6%), single (31.8%), formal education (29.6%), employed (43.5%), unemployed (29.6%) and those with low income (31.2%) (Table 3).

Prevalence of current cigarette smoking

Among male sex, there was a significantly higher prevalence among rural males (23.4%) than urban males. For female, there was higher proportion among the urban female (6.8%) than rural female, higher in rural among 22-25 years (15.8%), employed (26.1%) and those with formal education (16.4%), as opposed to informal, there was higher prevalence among those without formal education in urban (32.5%) than those in rural (Table 4).

Attitude towards cigarette smoking

More than 50% of the overall young adults in this study have a positive attitude towards individual cigarette smoking behaviour, that smoking makes young adults have more friends (56.3%), feel more comfortable (55.5%), look more social (51.4%) and more mature (57.7%). However, they have a negative attitude towards smoking, as smoking causes harm and were in favour of banning and quitting smoking. In comparison between urban and rural areas, the study found that there was a statistically significant ($p<0.05$) higher proportion of the respondents who have an individual positive attitude towards smoking in the urban areas compared to those in the rural areas (Table 5).

Table 4: Comparison of prevalence of current cigarette smoking across the same category of socio-demographic characteristics of the young adults in urban and rural communities.

Socio-demographics	Current cigarette smoking		Statistical test				
	Urban N (%)	Rural N (%)	χ^2 test	cOR	95% CI		P value
Residence (n=120)	51 (12.2)	69 (16.7)	3.416	0.693	0.469	1.024	0.065
Age range (years)							
18-21 (n=45)	24 (14.6)	21 (10.9)	1.095	1.396	0.746	2.613	0.295
22-25 (n=75)	27 (10.7)	48 (21.8)	10.958	0.428	0.267	0.714	0.001*
Sex							
Male (n=109)	42 (14.8)	67 (23.4)	6.875	0.567	0.370	0.869	0.009 *
Female (n=11)	9 (6.8)	2 (1.6)	4.268	4.500	0.953	21.250	0.039*
Religion							
Islam (n=118)	50 (12.0)	68 (16.6)	3.516	0.687	0.463	1.019	0.061
Christianity (n=2)	1 (100.0)	1 (50)	0.750	2.000	0.500	7.997	†1.000
Ethnicity							
Hausa-fulani (112)	45 (11.9)	67 (18.4)	6.111	0.599	0.388	0.902	0.013*
Other tribes (n=8)	6 (15.8)	2 (4.3)	3.279	4.219	0.800	22.260	†0.132
Marital status							
Married (n=23)	9 (14.1)	14 (18.7)	0.530	0.713	0.286	1.777	0.467
Single (n=97)	42 (11.9)	55 (16.3)	2.791	0.692	0.449	1.067	0.095
Occupation							
Employed (n=9)	3 (4.4)	6 (26.1)	9.060	0.131	0.030	0.577	†0.007*
Unemployed(n=111)	48(13.8)	63 (16.2)	0.858	0.825	0.549	1.240	0.354
Education							
Informal (n=42)	25(32.5)	17 (18.1)	4.725	2.178	1.071	4.427	0.030*
Formal (n=78)	26 (7.6)	52 (16.4)	11.917	0.424	0.257	0.697	0.001*
Average monthly income (Naira)							
<18,000 (n=117)	48 (14.0)	69 (17.2)	1.400	0.786	0.526	1.172	0.237
≥18,000 (n=3)	3 (4.0)	0 (0.0)	0.456	0.000	0.000	0.000	†1.000

*Statistically significant difference, † Fisher's exact test, cOR = cumulative odds ratio, CI = confidence interval.

Table 5: Indices of attitude towards cigarette smoking among young adults in urban and rural communities (n=829).

Indices	Urban (n=417) N (%)	Rural (n=412) N (%)	χ^2 test statistics	P value
Smokers have more friends	280 (67.1)	187 (45.4)	38.986	<0.001*
Smokers have more confidence	215 (51.6)	197 (43.4)	5.469	0.019*
Smokers feel more comfortable	252 (60.4)	208 (50.5)	8.301	0.004*
Smokers feel calmer	174 (41.7)	144 (35.0)	4.023	0.045*
Smokers look more attractive	162 (38.8)	164 (39.8)	0.080	0.778
Smokers look more social	204 (48.9)	222 (53.9)	2.043	0.153
Smokers look more matured	250 (60.0)	228 (55.3)	1.806	0.179
Have more weight control	174 (41.7)	164 (39.8)	0.317	0.574
Smoking is harmful to health	383 (91.8)	376 (91.3)	0.092	0.762
Smoking harmful to economy	362 (86.8)	293 (71.1)	30.780	<0.001*
Smoking is harmful to environment	383 (91.8)	349 (84.7)	10.220	0.001*
Harmful to near-by non-smoker	354 (84.9)	297 (72.1)	20.152	<0.001*
Favour of banning smoking	310 (74.3)	252 (61.2)	16.477	<0.001*
Want to quit smoking now	46 (90.2)	58 (84.5)	6.669	0.010*
Ever tried to quit smoking	49 (95.2)	68 (98.1)	5.174	0.023*
Health reason for quitting	44 (86.1)	55 (79.7)	4.532	0.033*
Ability to quit smoking if wish	50 (98.1)	60 (87.0)	39.643	<0.001*

*Statistically significant difference.

Table 6: Attitude towards cigarette smoking across socio-demographic characteristics of young adults in urban and rural communities.

Socio-demographics	Urban N (%)	Rural N (%)	χ^2 test statistic	cOR	95% CI		P value
					Lower	Upper	
Residence (n= 232)	117 (50.4)	115(49.6)	0.002	1.007	0.745	1.394	0.062
Age-group (years)							
18-21 (n=97)	49 (29.9)	48 (25.0)	1.062	1.278	0.801	2.040	0.303
22-25 (n=135)	68 (26.9)	67 (30.55)	0.738	0.839	0.563	1.252	0.390
Sex							
Male (n=164)	65 (22.9)	99 (35.6)	9.564	0.561	0.388	0.811	0.002*
Female (n=68)	52 (39.1)	16 (12.7)	23.290	4.414	2.352	8.283	0.001*
Religion							
Islam (n=231)	116 (27.9)	115 (28.0)	0.003	0.992	0.732	1.344	0.958
Christianity (n=1)	1 (100.0)	-	3.000	-	-	-	†0.333
Tribe							
Hausa-Fulani (n=212)	102 (26.9)	110 (30.1)	0.949	0.854	0.621	1.174	0.330
Other tribes (n=20)	15 (39.5)	5 (10.6)	9.710	5.478	1765	17.004	0.002*
Marital status							
Married (n=38)	14 (21.9)	24 (32.0)	1.782	0.595	0.277	1.280	0.182
Single (n=194)	103 (29.2)	91 (27.9)	0.404	1.114	0.799	1.553	0.525
Occupation							
Employed (n=26)	16 (23.5)	10 (43.5)	3.351	0.400	0.148	1.084	0.067
Un-employed (n=206)	101 (28.9)	105 (27.0)	0.347	1.102	0.798	1.520	0.556
Educational status							
In-formal (n=61)	27 (35.1)	34 (36.2)	0.023	0.953	0.508	1.788	0.881
Formal (n=171)	90 (26.5)	81 (25.5)	0.085	1.053	0.743	1.493	0.770
Average monthly income							
<18,000 (n=215)	100 (29.3)	115 (28.7)	0.028	1.028	0.748	1.412	0.866
≥18,000 (n=17)	17 (22.7)	-	3.108	-	-	-	0.078

*Statistically significant difference, † Fisher's Exact Test, cOR = cumulative odds ratio, CI = confidence interval.

The aggregate attitude towards cigarette smoking among the youths who have ever smoked cigarettes, in both the urban and rural LGAs, was similar (59.3% versus 60.8%) (Figure 1).

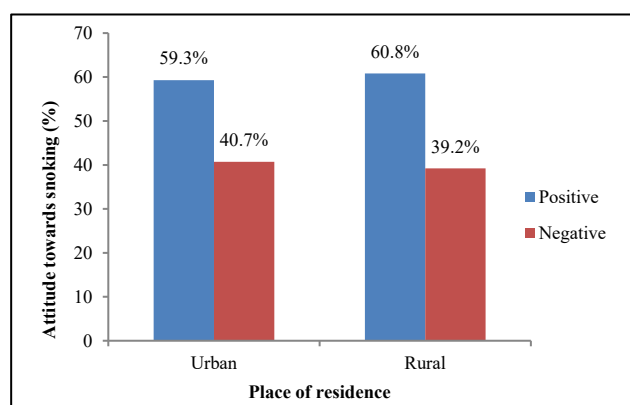


Figure 1: Attitude of ever cigarette smokers towards smoking in urban and rural communities.

The aggregate attitude towards cigarette smoking among current cigarette smokers was statistically significantly

higher in the rural compared to the urban communities (81.2% versus 56.9%) (Figure 2).

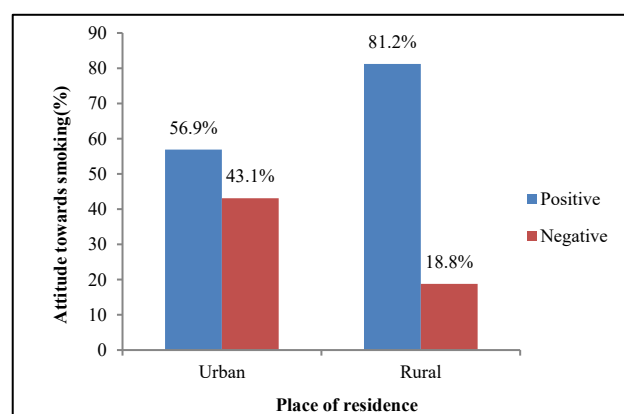


Figure 2: Comparison of attitude of current cigarette smokers in urban and rural communities.

There was a significant difference in positive attitude towards smoking (<0.05) between different genders. Higher among the rural males (35.6%), as opposed to females, with a proportion higher among urban females (39.1%) and other tribes (39.5%).

DISCUSSION

This study investigated the pattern and prevalence of cigarette smoking among young adults in Kano State, Nigeria, revealing significant findings concerning both smoking behaviour and socio-demographic influences. It identified an alarming increase in the proportion of young adults who have tried smoking, with 24.8% of respondents reporting they had ever smoked. This figure is notably higher than 16.1% recorded in a previous 2008 survey (GYTS) and the 10% found in Sokoto State.^{25,26} The rising rates in Kano State suggest the region has become a focal point for the tobacco industry, likely due to a conducive demographic and legislative framework.²⁷

The study posits that smoking initiation among young adults is influenced by their social environment, particularly through peer relationships. This aligns with social learning theory, which suggests that behavior is heavily affected by one's surroundings.²⁸ Comparatively, the prevalence of smoking observed in Kano mirrors findings from other regions in Nigeria, such as Kwara State, where a similar 25% had ever smoked, and national trends which reveal that over one-third of individuals aged 18-25 have tried smoking.^{14,29} Additionally, the surgeon general's global report stated that nearly one in three young adults had ever smoked, with one in four among those attending higher schools.⁷

Interestingly, the study revealed a significant disparity based on residence, with 30.3% of respondents from rural areas having ever smoked compared to 19.4% in urban settings. This difference could partly be attributed to social and physical characteristics typical of rural areas, including fewer social amenities and migration influences, which can heighten peer group pressures.^{7,30} The study also noted that older young adults (aged 22-25) had a higher propensity to smoke, aligning with findings from similar studies conducted in South Africa and England.^{30,31}

Demographic comparisons revealed that males had a significantly higher prevalence of smoking than females, particularly in rural areas. Among these males, those from the Hausa-Fulani ethnic group, single individuals, the unemployed, and those with lower educational attainment were found to be particularly vulnerable to smoking. The study indicated that the smoking rates were over three times higher in certain socio-demographic groups, particularly among younger males in rural settings.

In terms of current smoking behaviour, approximately 14.5% of respondents identified as current smokers, a figure significantly higher than reports from Sokoto State, where less than 10% of both in-school and out-of-school youths were current smokers.^{21,32} Factors contributing to this trend may include the cosmopolitan and densely populated nature of Kano, which heightens peer influences aligned with social cognitive theory.²⁸ Although the figures in Kano are higher than those in

some other Nigerian studies, they are still lower than those in parts of northeast Nigeria due to various socio-political factors like displacement and youth unemployment amid longstanding conflicts.³³

Responses from young adults in Kano reflected attitudes toward smoking that are consistent with global trends, where peer and familial acceptance of smoking behaviours can heavily sway individual choices.⁷ Comparisons between rural and urban residents also revealed notable patterns; even though current smoking rates were slightly higher in rural areas (16.7% versus 12.2%), the differences were not statistically significant.

The investigation further highlighted that males in rural areas were disproportionately affected compared to urban male smokers, while urban female smokers represented a higher portion than those from rural locales. These variations in attitudes can be explained by differing behavioural norms and levels of exposure to smoking contexts.³⁰

Analysis of socio-economic factors revealed that current smoking rates were significantly higher among those with lower income, particularly individuals earning below the minimum wage. More than half of the respondents expressed a positive attitude toward smoking, likely due to a mixture of misinformation about nicotine addiction and a desire to conform to social norms or appear more mature.⁸ Overall, the study emphasized that while there is a general increase in both lifetime and current smoking figures among young adults in Kano, the reasons for this rise are complex and multifaceted. Factors noted include peer influence, social environments, economic status, and demographic disparities.

This study is limited by its cross-sectional design, potential recall bias, and social desirability bias from self-reported smoking behaviour. Data collection was limited to available young adults during the study period, possibly affecting representativeness due to non-response or incomplete data. Questionnaires were administered privately to minimize bias.

CONCLUSION

The study concluded by proposing actionable recommendations: community leaders should support anti-smoking campaigns and educational initiatives, parents ought to engage with their children's smoking behaviours, and health institutions should encompass smoking cessation strategies within their services. Authorities were urged to promote educational programs highlighting the dangers of smoking, enforce regulations against tobacco consumption, and facilitate research into smoking interventions.

In summary, the findings underscore the urgent need for comprehensive tobacco control strategies in Kano State, focusing on youth engagement and social behaviour

dynamics, to curb this worrying trend in smoking prevalence among young adults.

ACKNOWLEDGEMENTS

Authors are grateful to Prof. S. Abubakar, Prof. Z. Iliyasu and Prof. H. S. Idris for their significant support, contributions and guidance. And a big thanks to the community leaders, research assistants and the participants, for their maximum support and cooperation you provided during the study.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee of Aminu Kano Teaching Hospital, followed by additional approval from the Ethical Committee of the Kano State Ministry of Health

REFERENCE

- World Health Organization Report on the Global Tobacco Epidemic; Warning about the Dangers of Tobacco, WHO. 2011. Available at: <https://www.who.int/publications/i/item/9789244564264>. Accessed on 12 April 2024.
- World Health Organization "Tobacco Fact Sheet" WHO 2014. Available at: <https://www.who.int/news-room/fact-sheets/detail/tobacco>. Accessed on 12 April 2024.
- Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P. Priority actions for the non-communicable disease crisis. *Lancet*. 2011;377(11):1438-47.
- Fawibe AE, Shittu AO. Prevalence and characteristics of cigarette smokers among undergraduates of University of Ilorin, Nigeria. *Niger J Clin Pr*. 2011;14(2): 201-5.
- Bandason T, Rusakaniko S. Prevalence and associated factors of smoking among secondary school students in Harare. *BMC Open Access*. 2010;8(12):1-9.
- World Health Organization Report on the Global Tobacco Epidemic. WHO. 2015:106. Available at: <http://apps.who.int/202A1F3B-eng.pdf>. Accessed on 12 April 2024.
- Centers for Disease Prevention and Control; Youth and Tobacco use. Preventing tobacco product use among youth is critical to ending the tobacco epidemic in the United States. CDC 2009. Available at: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm. Accessed on 16 February 2024.
- Kandel ER, Kandel DB, Hopkins DP. The role of public policies in reducing smoking prevalence in California: Results from the California Tobacco Policy Simulation Model. *Am J Prevent Med*. 2014;38(2):932-43.
- World Health Organization. Tobacco and its environmental impact: an overview. Available at: <https://escholarship.org/uc/item/8tp3r5rc>. Accessed on 13 October 2024.
- Laurence PN, Bennett AM. Non-medical use of drugs, Tobacco; effect of chronic smoking. *Clinical Pharmacology*. 7th edn. Churchill Livingstone: Singapore; 1993:330-335.
- Giovino GA, Henningfield JE, Tomar SL, Escobedo LG, Slade J. Epidemiology of tobacco use and dependence. *Epidemiologic Rev*. 1995;17(1):48-65.
- Rigotti NA, Kruse GR, Livingstone-Banks J, Hartmann-Boyce J. Treatment of tobacco smoking: a review. *Jama*. 2022;327(6):566-77.
- Jha P, Chaloupka FJ. The economics of global tobacco control. *BMJ*. 2000;321(7257):358-61.
- Kano State Master list of Settlement. eHealth Africa. 2015. Available at: <https://static1.squarespace.com/static/59c4f88bd7bdce1454815703/t/59f9b265e4966bfedcde6e59/1509536386780/eHA+2015+Annual+Impact+Report+FINAL.pdf>. Accessed 29 July 2024.
- Kano state Ministry of Health. Kano State Strategic Development Plan II (2017-2021), 2018.
- NPHCDA, HERFON, UNICEF, PACT and SCI. Primary Health Care Under One Roof Implementation Scorecard III Report. National Primary Healthcare Development Agency; 2015.
- Newman. Preferred Terms for Life Stages/Age Groups. "Development Through Life" A Psychological Approach. 13th edn. Academic Search Premier and SocIndex. PsycInfo., ERIC Library of Congress; 2018.
- Lwanga SK, Lemeshow S. Sample size determination in health studies A practical manual. World Health Organization; 1991:38.
- Yahya SJ, Hammangabdo A, Omotara BA. Factors influencing the onset of cigarette smoking among adolescents in Konduga Local Government Area, Niger J Med. 2010;19:275-8.
- Aliyu SU, Chiroma AS, Jajere AM, Gujba FK. Prevalence of physical inactivity, hypertension, obesity and tobacco smoking: a case of NCDS prevention among adults in Maiduguri, Nigeria. *Am J Med Sci Med*. 2015;3(4):39-47.
- World Health Organization. Tobacco industry interference with tobacco control. Available at: <https://escholarship.org/uc/item/98w687x5>. Accessed on 16 March 2024.
- Goodman J. Tobacco in history: The cultures of dependence. Routledge; 2005.
- Mohler P, Dorer B, Jong J, Hu M. Adaptation. Cross-Cultural Survey Guidelines. 2016 Available from: <https://ccsg.isr.umich.edu/chapters/adaptation/>. Accessed on 20 March 2024.
- Shore TH, Tashchian A, Adams JS. Development and validation of a scale measuring attitudes toward smoking. *J Soc Psychol*. 2000;140(5):615-23.
- Ekanem IE, Anunobi CC, Malami SA, Jibrin PG, Ebem S, Seconi OO. Global Youth Tobacco Survey, Nigeria Report (GYTS) 2008; Updated: Ekanem IA,

- Asuzu MC, Anunobi CC, Malami SA, Jibrin PG, Ekanem AD, et al. Prevalence of tobacco use among youths in five centres in Nigeria: A Global Youth Tobacco Survey (GYTS) approach. *J Community Med Prim Health Care*. 2010;22(1/2):62-7.
26. World Health Organization, Tobacco Free Initiative (TFI). Tobacco and Poverty: A vicious circle. World No Tobacco Day 2004. Available at: https://applications.emro.who.int/dsaf/EMRPUB_2004_EN_773.pdf. Accessed on 16 March 2024.
27. Blecher E, Ross H. Tobacco Use in Africa: Tobacco Control through Prevention. American Cancer Society. 2013.
28. Salawu FK, Danburam A, Desalu OO, Olokoba AB, Agbo J, Midala JK. Cigarette smoking habits among adolescents in Northeast Nigeria. *Afr J Respir Med*. 2009;(9):12-5.
29. Scollo M, Winstanley M. Tobacco in Australia: facts and issues. Melbourne: Cancer Council Victoria; 2018.
30. Hamilton LC, Hamilton LR, Duncan CM, Colocousis CR. Place matters: challenges and opportunities in four rural Americas. *Rep Rural Am*. 2008;1(4):1-32.
31. Nigerian Population Commission- NPC and ICF International Nigeria Demographic and Health Survey Abuja, Nigeria: DHS, 2013. Available at: <https://dhsprogram.com/pubs/pdf/fr293/fr293.pdf>. Accessed on 1 July 2024)
32. Raji MO, Muhammad H, Usman AM, Muwafaq U, Oladigbolu RA, Kaoje AU. Smoking among out-of-school adolescents in Sokoto metropolis, *Health Sci. J*. 2017;11(3):501.
33. Lo J, Patel P, Roberts B. A systematic review on tobacco use among civilian populations affected by armed conflict. *Tobacco Control*. 2016;25(2):129-40.

Cite this article as: Shehu AI, Mohammed N, Zakka M, Iliyasu U, Ibrahim AA, Abulfathi AA, et al. Prevalence and attitude towards cigarette smoking among young adults in rural and urban communities in Kano State, north-western Nigeria. *Int J Community Med Public Health* 2025;12:4937-47.