Prevalence and determinants of hookah smoking among emerging adults in South-South Nigeria

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ABSTRACT

The study investigated the prevalence and determinants of hookah smoking otherwise known as shisha in Nigeria, where the habit is gaining popularity. It focuses on the South-South geopolitical zone of Nigeria, and the assumptions of the Routine Activity Theory and the Diffusion of Innovations Theory were adopted to guide the study. Cross-sectional research design and multiple sampling technique were employed to select 738 respondents from locations, such as Sit-Outs, bars, and lounges/nightclubs in the study area, based on the calculated sample size. To facilitate efficient data collection and reduce potential data entry errors, Open Data Kit (ODK) Collect mobile application was used to administer a structured questionnaire. The respondents were within the age range of 18 to 32 years with a mean age of 25 SD± 4, the findings showed 74.7% past/ever smoked hookah and 60% current hookah smoking prevalence, and highlighted a historical engagement and experimentation with hookah within the study's target population. State-wise prevalence was examined among the states, result indicates that Rivers State had the highest prevalence, while Akwa Ibom State had the lowest prevalence. Results of the Chi-square and Analysis of Variance (ANOVA) statistical tests showed significant relationships between demographic, psycho-social factors and the prevalence of hookah smoking among emerging adults in the study area and no significant difference in the prevalence of hookah smoking across the states. Regulatory refinement and reinforcement and development of target-based education and media literacy campaigns regarding the dangers of hookah smoking were recommended.

Keywords: *Emerging adults, Hookah, Prevalence, Shisha, Smoking, Tobacco, Waterpipe.*

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Highlights of this paper

- Hookah smoking also known as shisha or waterpipe smoking is an issue that requires public health attention and intervention. The paper looked into how common and what factors are related to hookah (shisha) smoking among young people in South-South, Nigeria.
- Findings from the paper has shown that hookah smoking is gaining popularity in the South-South region of Nigeria, especially among the youth population.
- The recommendations given in the paper are therefore, important for policymakers, health professionals, and educators in implementing evidence-based interventions to reduce the increasing popularity of hookah smoking among young people in Nigeria and the study area.

1. BACKGROUND TO THE STUDY

According to the World Health Organization (WHO) report on the global tobacco epidemic, smoking in any form is a dangerous risk behaviour that leads to many human health problems and public health hazards. Smoking is a significant cause of disease and death worldwide there are approximately 1.1 billion smokers worldwide, with 80% living in low- and middle-income countries. About 8 million deaths worldwide are attributed to tobacco smoking, and this number is projected to increase (World Health Organization (WHO), 2019). World Health Organization (WHO) (2021) further noted that over 136 countries have adopted the 2003 WHO Framework Convention on Tobacco Control (WHO FCTC) and implemented at least one of the 2008 WHO Monitor, Protect, Offer, Warn, Enforce and Raise (WHO MPOWER) measures to reduce tobacco demand and increase people's awareness of associated risks and consequences of tobacco smoking and use.

Cigarette smoking has been considered as the most common and appealing method of tobacco use in most part of the world. However, with the increase in public health efforts and public awareness of the harms associated with cigarette smoking has successfully decreased the prevalence of cigarette smoking, alternative forms of tobacco smoking are currently rising, hookah smoking otherwise known as shisha, nargile, bory, hubble bubble, hubbly bubbly, arghile, goza and water pipe is one of the popular alternative methods of tobacco use worldwide (Hirpa et al. (2021).

Hookah smoking is a practice that originated from the Eastern Mediterranean region and is gaining global popularity as a form of combustible tobacco smoking that involves heating tobacco or flavoured tobacco with charcoal and inhaling the smoke through specially designed ornately carved clays, metals, bottles or plastics in the form of flasks or pots, with fitted pipes or long hose which enable tobacco smoking as it is bubbled through water filters (Aslam, Saleem, German, & Qureshi, 2014; Sameerur et al., 2012; Wong, Alias, Aghamohammadi, Aghazadeh, & Hoe, 2016). As a cultural phenomenon, hookah flasks vary in shape, size, appearance and the kind of tobacco smoked (Daniels & Roman, 2013). In most regions of the world, hookah smoking involves the heating of flavoured or non-flavoured tobacco, often mixed with molasses, honey, vegetable glycerol, and fruity syrup through a perforated aluminium foil, and the aromatic smoke passes through water before being inhaled by the smokers through a long hose (Al-Kazwini, Said, & Sdepanian, 2015).

Hookah smoking poses a multifaceted challenge to public health. The American Society of Clinical Oncology (2017) warns people all over the world not to smoke any form of substance, as smoking affects the heath adversely. As compared with cigarette smoke, the aromatic smoke inhaled from hookah contains nicotine and significantly higher quantities of arsenic, nickel, cobalt, chromium, lead and other toxic heavy metals (Daniels & Roman, 2013). Studies such as Al-Kubati, Al-Kubati, Al'Absi, and Fišer (2006); Monzer, Sepetdjian, Saliba, and Shihadeh (2008); Sepetdjian, Shihadeh, and Saliba (2008); Aljarrah, Ababneh, and Al-Delaimy (2009) and Dangi, Kinnunen, and Zavras (2012) suggest that hookah smoking could result in long-term health defects which include cancer, respiratory health issues, acute increased heart rate and systolic and diastolic blood pressure. Besides the smoke of the hookah being a health

risk owing to tobacco use, additional health risks have been noted in AL-Nour Gassim, Mehmet, Ünal, and Mollahaliloğlu (2023) for instance, sharing a waterpipe is a contributing factor to the spreading of tuberculosis, mononucleosis, bacteria and viruses.

Like other sub-Saharan African countries, over the years, hookah smoking as an alternative form of tobacco consumption available in different flavours has become an escalating trendy pleasure pursuit ingrained in the social behaviours of young people in Nigeria. While hookah smoking is still new in Nigeria compared to the countries in the Mediterranean and other parts of the world, the practice is rising particularly among young people. Therefore, the light of this backdrop necessitates this sociological inquiry on the determinants and prevalence of hookah smoking among emerging adults in South-South, Nigeria.

1.1. Statement of the Problem

Emerging adulthood has been conceptualized as the transiting period from adolescence to adulthood and spans 18 t0 30 years of age (Arnett, 2000). It is an important developmental period during which young people are confronted with a variety of life changes, transitions and experiences such as identity explorations, a new job, marriage, change in roles and responsibility etc. which could increase susceptibility or vulnerability to engaging in a variety of health-risk behaviours, most notably experimentation with alcohol, tobacco and other forms of drug/substance use (Agunbiade & Aransiola, 2016).

Globally, most smoking habits begin in adolescent age and early adulthood. Onoh, Dairo, Balogun, and Fawole (2023) reports that 88% percent of smokers experiment with their first smoking behaviour between ages 13 to 18 years, and 43.8 million adolescents aged 13 to 15 years use cigarette or some form of tobacco, causing prolonged use, addiction and dependence. In the face of the efforts for controlling the tobacco epidemic through the ratification of the 2003 WHO FCTC in 2005, and the National Tobacco Control Act (2015), tobacco use is becoming increasingly attractive and appealing to Nigeria's emerging adult population (Onoh et al., 2023). Studies such as Nwhator (2012) and Onoh et al. (2023) have shown that over 748,800 Nigerians aged 15 years or older use tobacco related substances every day. According to The American Society of Clinical Oncology (2017) people smoke, heat, sniff, inhale or chew tobacco using different methods and in recent times, hookah is gradually replacing cigarettes as a form of tobacco use among youth in many developed and developing countries and the evidence put forward in available literature, indicates the high prevalence of hookah smoking in different regions of the world and the practice has become a social and public health phenomenon as with cigarette smoking.

In Nigeria, the tobacco industry is flourishing in manufacturing and distribution and the obvious unrestricted availability and accessibility of hookah flasks/pots and aromatic sweetened flavours in lounges, nightclubs, hotels, bars, sit-outs, cafés, restaurants, parties and social gatherings are at the fore of promulgating the vogue of hookah smoking for smokers and their friends in major urban centres and some rural communities. Although, studies by Lasebikan, Ola, and Lasebikan (2019); Fagbule and Cadmus (2022); Otakhoigbogie, Osagbemiro, and Akaji (2022) and Jones and Okpako (2021) have attempted investigations into hookah smoking in some cities and universities in Nigeria, there is limited information on hookah smoking among emerging adults in states of the South-South Geopolitical Zone, hence, this sociological investigation.

1.2. Objectives of the Study

The main goal of the research was to investigate the prevalence of hookah smoking in South-South, Nigeria. More precisely, it was aimed to determine how identified factors relate to the prevalence of hookah smoking among emerging adults in the study area.

1.3. Research Questions

The study was guided by the following research questions:

i. What is the prevalence of hookah smoking among emerging adults in the study area?

ii. What is the prevalence of hookah smoking among emerging adults in the different states of the study area?

iii. What are the factors related to the prevalence of hookah smoking among emerging adults in the study area?

1.4. Research Hypothesis

The following null hypotheses were formulated:

i. *There is no significant difference in the prevalence of hookah smoking among emerging adults in states in the study area.*

ii. *There is no significant relationship between demographic, psycho-social factors and the prevalence of hookah smoking among emerging adults in the study area.*

1.5. Scope of the Study

The scope of this study was designed to provide an understanding of the prevalence and determinants of hookah smoking in Nigeria. The study focused on geographical, population and methodological scopes as the key dimensions:

Geographical Scope: The study considered the variations in cultural practices, economic conditions, and regulatory frameworks within Nigeria and the study area, and to ensure that the study findings are reflective of the broader population, a representative sample of the study area was selected.

Population Scope: The study concentrated on young adults aged 18 to 39 years, recognizing this demographic as a critical cohort for understanding hookah smoking and tobacco consumption in the study area.

Methodological Scope: The study ensured that the determined sample size aligns with feasibility and the practicability of data collection within the targeted population and study area and quantitative method of data analysis was employed.

2. LITERATURE REVIEW

2.1. Prevalence of Hookah Smoking

Evidence of increased popularity and prevalence of hookah smoking have been reported in several studies. Aslam et al. (2014) conducted a literature review on relevant empirical studies and also identified data on the epidemiological variations and health effects of hookah smoking. Several studies also, have reported on the prevalence of Shisha smoking in different countries. In United States, Sutfin et al. (2011) reported 40.3% prevalence rate of hookah tobacco smoking. Also Smith et al. (2011) reported 40% prevalence of hookah use from 2005 – 2008 among students at the University of San Diego and in similar study, Brockman, Pumper, Christakis, and Moreno (2012) reveals the prevalence of life time hookah smokers as 27.8% in two universities of United States.

According to Maziak (2011) hookah smoking represents the second global tobacco epidemic and the practice is spreading among populations worldwide. Statistics reported by Braun, Glassman, Wohlwend, Whewell, and Reindl (2012) revealed that 15.4% of students had previously smoked shisha and 6% did so within past 30 days, while another study Jamil, Elsouhag, Hiller, Arnetz, and Arnetz (2010) evaluated the prevalence of hookah smoking to be 26%. Jordan and Delnevo (2010) reports prevalence of 9.7% among the three thousand and ten New Jersey high school students while Grekin and Ayna (2008) unearths that 15% of students had used Shisha once in their life time.

Studies such as Khan et al. (2008); Jawaid et al. (2008); Jaffri, Yousuf, and Qidwai (2012) and Sameerur et al. (2012) have been conducted in Pakistan to assess the prevalence of Shisha use. Khan et al. (2008) revealed 22.7% of

medical and dental students of Karachi smoked hookah. Jawaid et al. (2008) reported a high prevalence 53.6% in the study carried out at Aga Khan University. In a similar vein, Jaffri et al. (2012) found 49% prevalence of current smokers at the Preston University and Karachi University, and also reported that 3.3% smoke hookah daily, 7.1% 1–2 times/week, 38.6% occasionally. Also, Sameerur et al. (2012) in cross sectional study revealed 61% prevalence occasional hookah smokers in four cities of Pakistan. According to Nisar et al. (2007) 19% of tobacco smokers in semi urban community of Karachi were hookah users.

Al-Naggar and Bobryshev (2012) reported that Shisha smoking prevalence in Malaysia is at 20%. Nakkash, Khalil, and Afifi (2011) found that 59.8% of Lebanese adolescents were smoking hookah, with 60% of those aged 13-20 had tried smoking shisha at least once. Similarly, in Saudi Arabia, Amin, Amr, Zaza, and Suleman (2010) and Aslam et al. (2014) reported a prevalence of hookah smoking among adolescents. Studies such as Aslam et al. (2014) and Maziak et al. (2004) found that 62.6% of male and 29.8% of female university students were regular hookah smokers in Syria, and in Sharjah, United Arab Emirates, Saravanan, Attlee, and Sulaiman (2019) reported prevalence of hookah smoking among university students, with 38.9% currently smoking shisha.

The prevalence of hookah smoking is increasing in Africa, in a study by Merwe et al. (2013) hookah smoking was found to be common among young people in South Africa and it was also reported that 66% of students at the University of Cape Town (UCT) had smoked a hookah pipe, while 18% were currently smoking hookah pipe. In a similar note, Daniels and Roman (2013) results indicated that 40% of the respondents were current hookah users and 70% of users smoked the hookah on a daily basis, Senkubuge, Ayo-Yusuf, Louwagie, and Okuyemi (2012) 18.6% prevalence while a previous study Combrink et al. (2010) reported 60% prevalence of hookah use in northern provinces of South Africa. Omotehinwa, Japheths, Damascene, and Habtu (2018) reported 26.1% prevalence of shisha use among private university students in Rwanda, in Sudan Othman, Aghamohammadi and Nik Farid reported 13.4% prevalence among high school students, Getachew, Lewis, Britton, Deressa, and Fogarty (2019) reported that 7.1% high school students in Addis Ababa and surrounding rural areas have smoked hookah.

Dida, Kassa, Sirak, Zerga, and Dessalegn (2014) showed that among high school students in Bale (Southeast, Ethiopia) 5.6% were current users of shisha. Hirpa et al. (2021) further reported the prevalence of hookah use among High School Students in some Ethiopian cities, Hawassa had 7.1%, Addis Ababa had 4.8%, and Adama had 2.6%. Logo et al. (2020) reported in the 2017 Global Youth Tobacco Survey (GYTS) that 3.1% of ever use of shisha in the age group of 11–17 years in Ghana and in another study, Ngahane et al. (2023) reported 26% prevalence of shisha smoking among university students in Cameroon.

Some studies investigated hookah smoking among university students in Nigeria. Lasebikan et al. (2019) a location-based study reported a 7.1% prevalence of hookah smoking in Night clubs in Ibadan, Nigeria. Another study, Fagbule and Cadmus (2022) reported 8.7% ever used prevalence among medical students in Ibadan. Otakhoigbogie et al. (2022) 24.7% prevalence of hookah smoking among students in the University of Port Harcourt. Igwe, David, Okuma, and Njemanze (2021) reported 12.5% prevalence of hookah smoking among university students in Ebonyi State. Kanmodi et al. (2019) also reported a high prevalence of hookah smoking among active smokers in Kebbi State, North-West Nigeria.

2.2. Determinants of Hookah Smoking

Studies such as Wong et al. (2016) and Amin et al. (2010) identified peer pressure, the belief of pleasure enhancement and reduction of tension and addiction as some of the factors that influence the prevalence of hookah smoking. According to Ngahane et al. (2023); Lasebikan et al. (2019); Akl et al. (2013); Maziak et al. (2004) and Al-Lawati, Muula, Hilmi, and Rudatsikira (2008) hookah smoking has experienced increasing use due to acceptance,

appeal, social relevance as a symbol of fashion and the perception of its being less addictive and less hazardous to health because of the addition of fruit flavours. Merwe et al. (2013) also reported the influence of peers as a major determinant the initiation of using hookah. Othman, Aghamohammadi, and Nik Farid (2019) reported age, sex, education and peer pressure as the individual factors influencing hookah smoking.

2.3. Theoretical Framework

The study's theoretical foundation was based on the assumptions of the Diffusion of Innovations Theory and the Routine Activity Theory. The Diffusion of Innovations Theory, was developed by sociologist Everett Rogers in 1962, to explain the spread of new ideas, technologies, or innovations within a society. The theory outlines the process through which an innovation is adopted by individuals or groups over time (Iyengar, Van den Bulte, & Lee, 2015). The key elements and assumptions of the Diffusion of Innovations theory can be applied to explore the diffusion and adoption of hookah smoking within communities and social networks (Valente, Dyal, Chu, Wipfli, & Fujimoto, 2015).

The Routine Activity Theory (RAT) was developed by Cohen and Felson (1979) to examine how behaviour is influenced by daily routines and activities. The assumptions of RAT can be applied to understand how the routine activities of emerging adults create opportunities for the prevalence of hookah smoking.

Therefore synthesizing the assumptions of the Routine Activity Theory and the Diffusion of Innovations Theory, provides explanation and understanding of hookah smoking as an innovative behaviour that evolve and spread within the daily lives of youths as a routine activity, environmental influences, adopter characteristics, and critical mass within the study area.

3. METHODOLOGY

3.1. Research Design and Locale

The study adopted a multi-stage cross-sectional descriptive quantitative research design. The study area was South-South geopolitical zone of Nigeria, Nigeria. The South-South geopolitical zone of Nigeria is made up of six states namely; Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers states. The capitals of these states are major cities in the region. Other major towns include; Warri, Ughelli, Sapele, Agbor, Eket, Abak, Ikot-Ekpene, Oron, Amasoma, Sagbama, Ikom, Ogoja, Obudu, Auchi, Ekpoma, Mbiama, Choba, Otuoke, etc.

3.2. Study Population and Sample Size

The population scope of the study comprises all emerging adults (18 -30 years) residing in the study area at the time of the study. This formed the target population from which the representative sample was drawn for the study and a minimum sample size for each of the South-South states was statistically determined using the margin of error population proportion technique as follows:

$$n = Z^2 \frac{Pq}{e^2}$$

Where:

n = Sample size.

Z= Z value for 95% confidence level.

P= Estimated proportion of the population.

q= 1-P.

e = Margin of error.

The minimum sample size was determined considering the following criteria: an assumed 7.1% (0.071) hookah prevalence obtained from Lasebikan et al. (2019) a desired ±5% (0.05) margin of error, a 95% (1.96) confidence level. To carter for attrition, ± 20% (21) of the calculated sample was added to the sample size. Therefore, the minimum sample size was 102 + 21 = 123. The attrition rate was obtained from a previous study Onoh et al. (2023). To determine the sample size, the calculated minimum sample size (123) was multiplied by the total number of South-South states (6), therefore, the calculated sample size was 738.

3.3. Sampling Technique

Multiple sampling technique was adopted for the study. The procedure began with the cluster sampling technique, the study maintained the already existing senatorial districts delineation and each of the South-South states were divided into three (3) Senatorial Districts. In the second stage, purposive sampling technique was used to select two towns/area from each of the three (3) senatorial districts of the states. Asaba and Agbor were selected for Delta North senatorial district; Ughelli and Sapele for Delta Central senatorial district; Ozoro and Edjeba for Delta South Senatorial district; Uyo and Mbierebe for Akwa Ibom North-East Senatorial District; Ikot Ekpene and Abak for Akwa Ibom North-West Senatorial District; Eket and Oron Akwa Ibom South Senatorial District; Amassoma and Yenegoa for Bayelsa Central, Sagbama Town and Toru-Orua for Bayelsa West, Otuoke and Otuogidi for Bayelsa East; Ogoja and Obudu for Cross River North senatorial district; Ikom and Ugep for Cross River Central senatorial district and Calabar and Akamkpa for Cross River South Senatorial district; Benin City and Okada for Edo State South Senatorial district, Auchi and Iyamho for Edo North, Ekpoma and Uromi for Edo Central; Port Harcourt City and Choba for Rivers East, Ogale and Onne-Eleme for Rivers South East, Mbiama and Omoku for Rivers West. This gave rise to thirty-six (36) towns.

In the third stage, convenience sampling technique was used to select 783 respondents from Sit-Outs, Bars, Lounges/Nightclubs and street corners in the selected towns. In order to avoid selection bias, Sit-Outs, Bars, Lounges/Nightclubs and their customers were given equal opportunities to participate in the study regardless of their location or accessibility. The objective of the study was explained to the managers/proprietors and eligible respondents and consent was obtained to conduct the study. The locations and individuals who refused to give consent were excluded from the study because participation was voluntary.

3.4. Research Instrument and Data Collection Procedure

The primary data collection instrument was a structured questionnaire. Given the nature of the study, Open Data Kit (ODK) Collect was used to administer the instrument. The questions that featured in the deployed questionnaire concentrated on the respondents' socio-demographic characteristics and the study's specific objectives. A two-day virtual training sessions on using ODK Collect for data collection and research ethical issues bothering on privacy and confidentiality, consent seeking, how to relate with respondents before and after the study, administration and management of questionnaire was organized for twelve Enumerators/Research Assistants (RAs). ODK Collect v2023.3.1 was installed on the Enumerators/Research Assistants (RAs) Android devices. The study leveraged on ODK Collect app offline capabilities to facilitate efficient data collection and submissions were automatically synced when an internet connection was available.

The content validity of the instrument was established by giving out the draft version of the questionnaire to some experts in the area of Medical Sociology, Public Health Education, for content vetting. The ODK Collect question types, skip logic/patterns and validations contributed in reducing potential data entry errors. To ensure the reliability of the instrument and the competence of the Enumerators/Research Assistants (RAs) on the use of the

ODK data collection tool, a pilot test was conducted with a subset of 73 respondents selected from 12 Sit-Outs, Bars, Lounges/Nightclubs in the study area and the collected data was subjected to statistical test using the Pearson Product Moment Correlation Coefficient at a 0.05 level of significance and a coefficient of 0.71 was obtained. The bars/locations selected for the pilot test were not included in the actual study.

The fieldwork was conducted from October, 2023 to December, 2023 and the study adhered to ethical standards, ensuring informed consent, anonymity and confidentiality of data. After completion of the data collection, the data were exported, sorted and presented descriptively. The Chi-square and Analysis of Variance (ANOVA) statistical techniques were employed to test the formulated hypotheses at 0.05 level of significance and corresponding degrees of freedom, using Microsoft Excel Analysis Toolpak.

Table 1. Socio-demographic characteristics of the respondents.

Characteristics (N = 738)	**Frequency**	**Percentage (%)**
Sex		
Male	531	72.0
Female	207	28.0
Age		
18 – 20	126	17.1
21 – 23	149	20.2
24 – 26	183	24.8
27 – 29	151	20.5
30 – 32	129	17.5
Mean age =	25	SD± = 4
Marital status		
Single	584	79.1
Married	137	18.6
Divorced/Separated	17	2.3
Widowed	0	0.0
Religion		
Christianity	617	83.6
Islam	23	3.1
Traditional religion	98	13.3
Others	0	0.0
Educational level		
No formal education	43	5.8
Primary	75	10.2
Secondary	373	50.5
Tertiary	247	33.5
Employment status		
Unemployed	283	38.3
Self-employed	252	34.1
Employed	203	27.5
Income per month		
< ₦ 10,000	113	15.3
₦ 10,000 – ₦ 19,000	187	25.3
₦ 20,000 - ₦ 29,000	306	41.5
₦ 30,000 - ₦ 40,000	132	17.9
Mean income =	₦ 207812	SD± = ₦ 22891.8

Source: Fieldwork (2023).

4. DATA PRESENTATION AND DISCUSSION OF FINDINGS

Table 1 indicates that Seven Hundred and Thirty-Eight (738) respondents were selected from the study area based on the calculated sample size. The socio-demographic characteristics of the respondents as presented in the table indicates that 72 % (n=531) were male, while 28 % (n= 207) were female. Ages ranged from 18-32 years with a mean age of 25 (SD± 4). Majority of the respondents were age 24-26 with 24.8 % (n=183) while 18-20 years

constituted 17.1 % (n= 126). As indicated in the table, Majority of the respondents 79.1% (n=584) were single, 18.6% (n= 137) were married, while 2.4 % (n= 17) were divorced/separated. On religious affiliation, the table indicates that 83.3% (n= 617) of the respondents were Christians, 13.3% (n= 98) practiced African Traditional Religion, 3.1% (n= 23) were Islam while other forms of religion had no response.

The table indicates that majority of the respondents were literate, as 50.5% (n=373) have completed secondary education, 33.5% (n=247) have attained tertiary level of education. Majority of the respondents 38.3% (n= 283) were unemployed, 34.1% (n= 252) were self-employed while 27.5% (n= 203) were employed. Most of the respondents 41.5% (n= 306) reported a monthly income in the range of ₦20,000 - ₦ 29,000 while 15.3% (n= 113) reported a monthly income in the range that was less than ₦10,000 with a mean income of ₦ 20782 (SD± 22892).

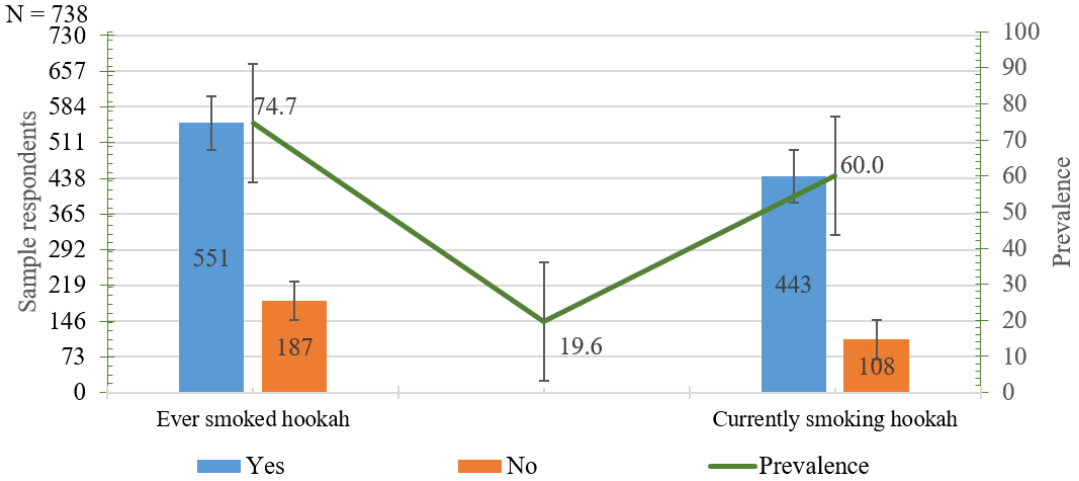

Figure 1. Prevalence of hookah smoking in the study area.

Source: Fieldwork (2023).

4.1. Prevalence of Hookah Smoking

Figure 1 shows the accessibility and prevalence of hookah smoking among the sampled respondents. The figure indicates that 74.7% (n= 551) have ever smoked hookah while 60% (n=443) were currently smoking hookah as at the time the study was conducted.

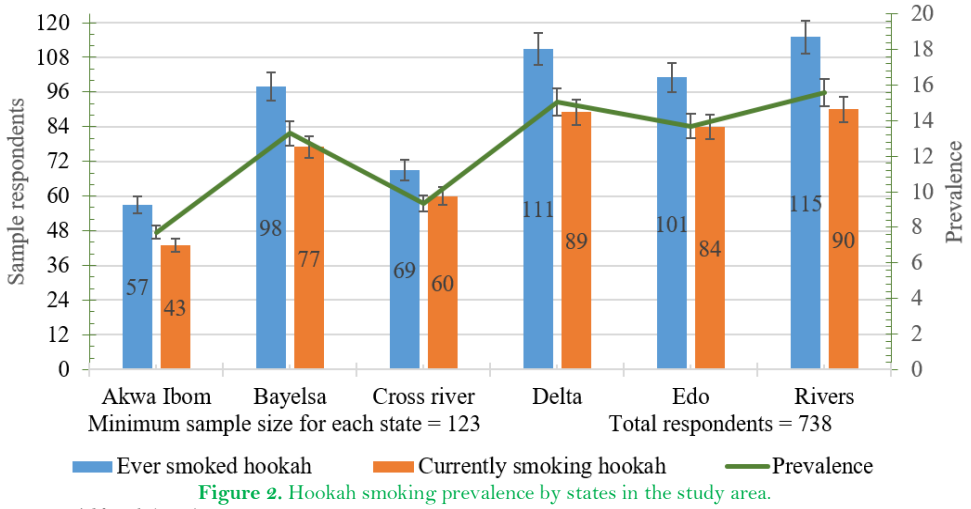

Figure 2. Hookah smoking prevalence by states in the study area.

Source: Fieldwork (2023).

Figure 2 shows the hookah smoking prevalence by states among the sampled respondents. Rivers State had 15.6% (n= 115) ever smoked hookah prevalence, 12.2% (n= 90) current hookah smokers, the prevalence in Delta state was 15% (n= 111) ever smoked and 12.1% (n= 89) current hookah smokers, Edo state was at 13.7% (n= 101) ever smoked hookah, 11.4% (n=84), Bayelsa State had 13.3% (n=98) ever smoked hookah and 10.4 (n=77) current smokers of hookah, Cross River state had 54% (n=69) ever smoked hookah, 8.1% (n=60) of current smokers while 5.8% (n=43) were currently smoking hookah and 7.7% (n=57) had ever smoked hookah in Akwa Ibom State.

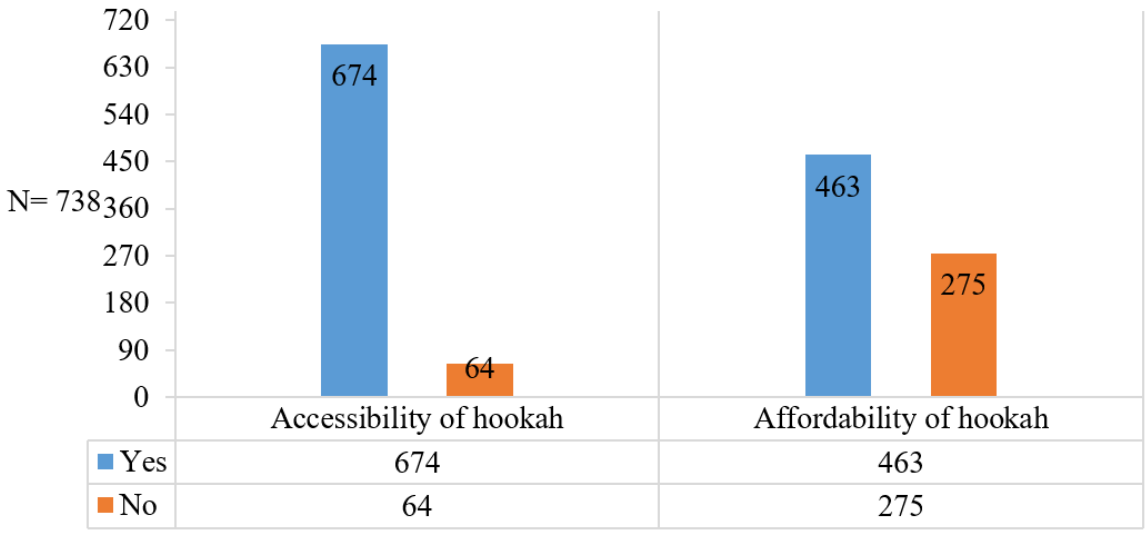

Figure 3. Accessibility and affordability of hookah smoking.

Source: Fieldwork (2023).

Figure 3 shows the accessibility and affordability of hookah smoking among the sampled respondents. The figure indicates that as at the time the study was conducted 91.3% (n= 674) of the respondents reported that hookah is easily accessible while 62.7% (n= 463) of the respondents reported that hookah is affordable in the study area.

Table 2. Analysis of variance (ANOVA) to test for differences in mean of hookah smoking prevalence between the states.

Ever smoked Hookah						
Source of variation	**Sums of Squares (SS)**	**Df**	**Mean Squares (MS)**	**F**	**P-value**	**F crit**
Between states	0	5	0	0	1	4.39
Within states	16563	6	2760.5			
Total	16563	11				
Currently smoking hookah						
Source of variation	SS	Df	MS	F	P-value	F crit
Between states	1380.42	5	276.08	0.17	0.97	4.39
Within states	9890.5	6	1648.42			
Total	11270.92	11				

Source: Fieldwork (2023). (Microsoft excel analysis toolpak computation).

Table 2 shows the summary of the Analysis of Variance (ANOVA) to test for differences in mean of hookah smoking prevalence in the states. The table shows F value = 0 and P-value = 1, *Fcrit* value = 4.39 for the differences in mean of ever smoked hookah prevalence between the states, and F value = 0.17 and P-value = 0.97, *Fcrit* value = 4.39 and degree of freedom (df) = 5 for the differences in mean of ever smoked hookah prevalence between the states at 0.05 level of significance.

Table 3. Chi-Square Test for the relationship between identified factors and the prevalence of hookah smoking among emerging adults in the study area.

Determinants	Level of significance	x^2	P-value	Df	Cv	Str
Gender	0.05	13.34	0.00	1	3.84	Significant
Age	0.05	9.78	0.04	4	9.49	Significant
Marital status	0.05	15.73	0.00	2	5.99	Significant
Educational status	0.05	23.16	0.00	3	7.81	Significant
Employment	0.05	70.91	0.00	2	5.99	Significant
Income	0.05	21.55	0.00	3	7.81	Significant
Peer influence	0.05	21.12	0.00	1	3.84	Significant
Curiosity	0.05	17.77	0.00	1	384	Significant
Substance influence	0.05	4.62	0.03	1	3.84	Significant
Attractiveness/Flavour	0.05	11.55	0.00	1	3.84	Significant
Media influence	0.05	31.20	0.00	1	3.84	Significant
Stress/Relaxation	0.05	50.58	0.00	1	3.84	Significant

Source: Fieldwork (2023).

4.2. Discussion of Findings

In order to ensure the representativeness of the study based on the statistically determined minimum sample size, Seven Hundred and Thirty-Eight (738) respondents were systematically selected from the study area, thereby giving a 100% response rate. All the respondents reported to know about the practice of hookah smoking. To determine the prevalence of hookah smoking among emerging adults in the study area as at the time the study was conducted, findings indicate 74.7% past/ever smoked hookah prevalence and 60% current hookah smoking prevalence was recorded among the sampled respondents. The highlighted prevalence indicates a significant historical engagement and experimentation with hookah smoking within the study's target population in the study area. The prevalence obtained in this study is higher than previous studies such as Lasebikan et al. (2019) and Fagbule and Cadmus (2022) and although, the prevalence in this study was higher, it corroborates the prevalence that was recorded in previous studies.

The study further examined a State-wise prevalence among the states in the study area, findings indicate that Rivers State had the highest prevalence 15.6% ever smoked hookah and 12.2% current hookah smokers, while Akwa Ibom State had the lowest prevalence 5.8% currently smoking hookah and 7.7% ever smoked hookah. The State-wise prevalence obtained among the states in the study area was compared with previous studies conducted in the region and other parts of Nigeria. The prevalence of hookah smoking (ever used and current) obtained in this study for Rivers State is higher than the report from Jones and Okpako (2021) a previous study conducted on the prevalence of shisha-aided flavoured tobacco smoking in public universities in Rivers State and lower than the 24.7% prevalence among university students in Port Harcourt reported in Otakhoigbogie et al. (2022). The prevalence obtained in the respective states were higher than the prevalence reported in the previous studies, however, the 5.8% prevalence for current hookah smokers in Akwa Ibom was lower than the 7.1% prevalence Lasebikan et al. (2019) reported for Ibadan. A comparative analysis was carried out to statistically determine state-wise prevalence variations and to test hypothesis one. Results of the deployed Single Factor Analysis of Variance (ANOVA) analysis showed evidence to accept the formulated null hypothesis at 0.05 level of significance and corresponding degree of freedom (Table 2), therefore, there is no significant difference in the prevalence of hookah smoking among emerging adults across states in the study area.

The study explored the determinants of hookah smoking and evaluated the relationship between the identified determinants and hookah smoking in the study area. The identified determinants were grouped as socio-economic and demographic determinants (gender, age, marital status, educational status, employment and income) and psycho-social determinants (peer influence, curiosity, substance influence, attractiveness/sweetened flavour, media influence and stress/relaxation). Accessibility, availability and affordability were also identified as determinants of hookah

smoking among emerging adults in the study area. Findings from the study showed a high accessibility of 91.3% and 62.7% affordability. This implies that emerging adult population in the study area has easy access to hookah, and this observed high accessibility and affordability could likely contribute to the high prevalence of hookah smoking obtained in the study. The easy access to hookah, as well as the availability of hookah without strict restrictions and regulations in hotels, lounges, Nightclubs, Bars, sit-outs, social gatherings and homes corroborates previous studies such as Dadipoor et al. (2019) and Pashaeypoor, Negarandeh, Nikpeyma, and Abadi (2019).

In testing hypothesis two, the formulated null hypothesis was rejected because the chi-square test results showed evidence of statistically significant relationships at 0.05 level of significance and corresponding degrees of freedom (Table 3). Therefore, there was a significant relationship between demographic, psycho-social factors and the prevalence of hookah smoking among emerging adults in the study area. This finding is consistent with previous studies Lasebikan et al. (2019); Jawaid et al. (2008); Jaffri et al. (2012) and Braun et al. (2012).

5. CONCLUSION

In culmination, this study sought to provide valuable insights into hookah smoking prevalence among emerging adults in South-South Nigeria. The findings of the study not only highlight the prevalence but also incorporate the significance of determinants into the analysis. In summary, the determinants influencing hookah smoking prevalence among emerging adults in the study area are multi-faceted and the empirical evidence underscores the significant relationship of socio-economic and psycho-social factors in shaping the prevalence of hookah smoking. The study would serve as a scholarly cornerstone to provide future inquiries into hookah smoking among youths and contributes to the broader dialogue on substance use and youth's well-being in Nigeria.

6. RECOMMENDATIONS

1. Regulatory Refinement and Reinforcement: The National drug law enforcement agency, the Ministries of Health (States and Federal), policymakers and relevant stakeholders should collaborate to refine, strengthen regulatory measures and policies related to tobacco and hookah accessibility, advertising, marketing, sales and usage especially in public spaces, including the enforcement of existing tobacco and substance control laws. To reduce the accessibility and prevalence, hookah retailers and proprietors in the hospitality sector should be engaged to promote responsible selling practices, proper signage on the health risks of hookah smoking and regulatory guidelines.

2. Education and Media literacy campaigns: Public health education campaigns and interventions should be designed and implemented to address the determinant factors contributing to the prevalence in the study area. Media literacy campaigns on the dangers of hookah smoking should be launched and promoted on various online and digital platforms.

3. Further Research: Considering the dynamic nature of substance use, further investigations of hookah smoking would be warranted in the study area and other regions of Nigeria.

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