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## Prevalence and determinants of tobacco smoking among HIV patients in North Eastern Nigeria.

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### Summary

People living with human immune deficiency virus (HIV) infection who smoke tobacco are more likely to develop several opportunistic infections, and also suffer complications from antiretroviral medication than the non smokers of tobacco. The burden of tobacco smoking amongst people living with this infection is poorly understood in the African population. The aim of this study was to establish the prevalence and determinants of tobacco smoking among HIV patients in North Eastern Nigeria. We enrolled 312 adult HIV sero-positive patients attending the Federal Medical Centre Yola, Nigeria. A modified World Health Organisation (WHO) recommended questionnaire was used to obtain information from consented subjects. The prevalence of current cigarette smoking among HIV patients was 22.1%. The male to female ratio of smokers was 2:1. Peer pressure (25.8%) and pleasure (25.8%) were reported as the most common reasons for smoking tobacco. Multivariate analysis shows that male gender, age ranged 40-49 years, alcohol drinking and CD4 T lymphocyte count <200cells/mm<sup>3</sup> were positively associated with tobacco smoking. The prevalence of tobacco smoking among HIV patients in North Eastern Nigeria was high. Therefore, smoking should be discouraged in people living with HIV to reduce their morbidity and mortality.

**Keywords:** *Prevalence, determinants, tobacco, adults, HIV, Nigeria.*

### Résumé

Les personnes vivant avec l'infection du virus immuno-déficient (VIH) qui fument du tabac sont plus susceptibles de développer plusieurs infections opportunistes, et souffrent aussi des complications due à la médication antirétrovirale que ceux qui ne

fument pas du tabac. Le fléau de tabac consomme parmi les personnes vivant avec cette infection est peu comprise au sein de la population africaine. Le but de cette étude était d'établir le taux et les déterminants de la consommation du tabac parmi les patients du VIH au Nord Est du Nigeria. Nous avons recruté 312 patients adultes séropositifs atteignant le centre médical fédéral de Yola au Nigeria. Un questionnaire modifié recommandé par l'Organisation Mondiale de la Santé(OMS) était utilisé pour obtenir des informations des sujets consentants. La prévalence de consommation courante de cigarettes parmi les patients du VIH était de 22%. Le ratio male sur femelle des fumeurs était 2:1 l'influence des camarades (25.8%) et le plaisir (25.8%) étaient reporté comme les raisons les plus communes de fumer le tabac. Des analyses multi variées montrent que le genre male, tranche d'âge de 40-49ans, buvant de l'alcool et le taux des lymphocytes CD4 < 200 cellules/mm<sup>3</sup> étaient associés positivement avec la consommation du tabac. La prévalence de consommation du tabac parmi les patients du VIH au Nord Est du Nigeria était forte cependant fumer devrait être déconseillé aux personnes vivant avec le VIH pour réduire leur morbidité et mortalité.

### Introduction

Tobacco smoking has been linked to the aetiology of many cardiovascular, respiratory and malignant diseases [1]. In the treated HIV infected population death is now dominated by non acquired immune deficiency syndrome (AIDS) related causes in which tobacco use is a predominant risk factor [2]. Smoking is also a significant cause of morbidity in HIV patient either actively or passively, active tobacco smoking seemed to attenuate the immune and virological response to antiretroviral therapy by 40% [3]. Side-stream smokes from passive smoking have been found to induce oxidative stress, reduce nutrient concentration and suppress immune function leading to susceptibility to opportunistic infections [3,4]. The smoking of tobacco does not make life with HIV easier due to the recognised association

between smoking and the risk of developing pulmonary infection like tuberculosis, pneumocystis pneumonia and Mycobacterium avium Complex (MAC) [5]. MAC which is a life threatening infection found in many people with HIV, has been found in tobacco product and is known to survive the smoking process [5]. The combination of HIV infection and some behavioural factors like tobacco use and alcohol intake may have the cumulative potential of worsening the disease condition. Sub-Saharan Africa has the highest number of HIV/AIDS cases and Nigeria with a population of 132 million account for one fifth of HIV infection in Africa [6]. This high prevalence places a great burden on the health systems, and for us to tackle the problem of tobacco and HIV we need to know the burden among this cross section of the population. There is paucity of data on the prevalence and determinants of tobacco smoking among HIV patients in sub-Saharan Africa. The aim of this study was to establish the prevalence and determinants of tobacco smoking among HIV patients in North Eastern Nigeria.

### Materials and methods

This cross-sectional study was conducted in the HIV clinic of the Federal Medical Centre Yola North East Nigeria from June to July 2007. The study setting is a tertiary health institution that serves as a referral centre for 20 local council's areas in Adamawa state and the adjoining villages located on Nigerian and Republic of Cameroon land border. The subjects were selected from patients attending HIV/AIDS clinic. The minimum sample size was calculated using this formula [7]  $N = d^2 (p) (1-p) / c^2$ , where N is the minimum sample size, d is the standard deviation at 95% confidence interval (=1.96), p is the seroprevalence rate of 4.4% for Nigeria in 2005 [8] and c the tolerated error which is 5%. The calculated minimum sample size was 65; this sample size was increased to get a true representative of the study population. A modified WHO recommended structured interviewer administered questionnaire was used by trained medical officers to obtain data from subjects in the clinic. The demographic information, smoking habits and CD4 T lymphocyte counts obtained were coded into the computer and analyzed using SPSS Version 14 computer statistical software. The frequency and descriptive analysis were also obtained to examine the characteristics of the tobacco smokers; Chi square test was used to test for significance and odd ratio to determine the association of independent variables of tobacco

smoking and ever smoked tobacco in the study. P value less than 0.05 was considered significant.

### Ethical approval

Ethical approval was obtained from the Federal Medical Centre Yola Nigeria and the participating subjects gave their verbal consent.

### Results

At the conclusion of the study, 312 HIV patients were recruited of which 177(56.7%) were females and 135 (43.3%) were males and their age ranged from 18 to 60 years. In this study, 81(26.0%) had smoked tobacco in their lifetime, 69 (22.1%) were currently smoking tobacco, 12(3.8%) were formerly smoking tobacco and 231(74.0%) never smoked tobacco in their lifetime. Among the 69 current smoker of cigarette 48(69.6%) were males while 21(30.4%) were females giving a male to female ratio of 2:1. The male and female specific prevalence of current smoking in this study was 35.6% and 11.9% respectively. The mean age of the current smoker was  $38.0 \pm 8.8$  years

Table 1 shows the tobacco smoking methods of HIV patients in north eastern Nigeria. The entire sixty nine (22.1%) current tobacco smokers reported the use of cigarette and none of them ever smoked cigar or pipe.

**Table 1:** Smoking habits of HIV patient in north eastern Nigeria

Methods of smoking	number (n)	percentage (%)
Cigarette	69	22.1
Pipe or cigar	0	0
Total= 312		

Table 2 shows that tobacco smoking is more common in HIV patients' age ranged 40-49, males and occupational group 2 (skilled and semi skilled manual workers), and lower socioeconomic status. It is also common in those who completed secondary school and the Fulani tribe.

By stratification, 6(1.9%) of the HIV subjects were mild smoker (1-10 sticks of cigarette per day), 36(11.5%) were moderate smoker (11-20 sticks of cigarette per day) and 27(8.7%) were heavy smoker of tobacco (>20 sticks per day). On the average the smokers spent  $160 \pm 20$  Naira ( $1.3 \pm 0.2$  US Dollars) daily to buy cigarette. Table 3 shows the reasons for smoking in adult HIV patient

in this study. It was because of peer pressure in 18(26.1%), pleasure in 18(26.1%), social acceptance in 12 (17.4%), stress in 9(13.0%) and advertisement in 3(4.3%).

**Table 2:** Demographic characteristics of the current smoker in adult HIV patients

Characteristics	Current smokers (N)	Percentage (%)
<i>Age range</i>		
15-19	-	-
20-29	15	21.7
30-39	21	30.4
40-49	24	34.8
50-59	9	13.0
>60	-	-
<i>Sex</i>		
Male	48	69.6
Female	21	30.4
<i>Occupation</i>		
Group1	24	34.8
Group2	36	52.2
Group3	9	13.0
Group4	-	-
<i>Education</i>		
None formal	6	8.7
Primary	18	26.1
Secondary	24	34.8
Tertiary	21	30.4
<i>S/economic status</i>		
Low	69	100.0
High	-	-
<i>Tribes</i>		
Others (31 tribes)	27	39.1
Fulani	21	30.4
Kilba	9	13.0
Bachama	6	8.7
Igbo	3	4.3
Hausa	3	4.3

*N=69*

*Group 1: Casual or lowest grade workers, pensioners, unemployed and unskilled*

*Group 2: Skilled and semi skilled manual workers*

*Group3: Intermediate managerial administrative or professional*

*Group 4: Higher managerial, administrative or professional.*

Fifty four of the current tobacco smokers (78.3%) believed it is harmful to their body however, 48(69.6%) wish to quit tobacco smoking because of its harmful effects, 21(30.4%) tried quitting once or twice, 27(39.1%) thrice or more, while 21(30.4%) never attempted quitting tobacco use. The doctors and health care workers previously advised 33(47.8%) to quit smoking. Amongst the former smokers 6 (50.0%) stopped smoking because of ill health, 3(25.0%) due to social pressure and 3(25.0%)

on their own volition. In this study, 39(12.5%) of HIV patients reported exposure to environmental smoking. Fifty one (73.9%) of the current smokers were of the opinion that smoking should be banned in public places, 18(26.1%) believed is not harmful and should not be banned in public places. Besides tobacco smoking, alcohol was regularly taken by 36(52.2%) of the smokers. The logistic regression analysis in table 4 shows that male gender, age ranged 40-49, alcohol drinking, and CD4 count <200cells/mm<sup>3</sup> have significant association with ever tobacco smoking, while the level of educational attainment and occupational groupings were not significantly associated with tobacco smoking.

**Table 3:** Reasons for tobacco smoking in HIV patients

Reasons	Number (n)	Percentage (%)
Peer pressure	18	26.1
Social acceptance	12	17.4
Pleasure	18	26.1
Stress/anxiety	9	13.0
Advertisement	3	4.4
Others	9	13.0

*N=69*

## Discussion

The prevalence of current cigarette smoking among HIV patient was 22.1%, this result was higher than 12.8%-15.2% reported among hospital patients in North East Nigeria [9,10] however, it was lower than 46.9% documented in a low-income multiethnic HIV/AIDS population in USA [11]. The high prevalence among people living with HIV/AIDS might be due to the positive association between risky sexual behaviour and cigarette smoking [12,13]. People who smoke tobacco are more likely to become HIV-infected or participate in high-risk behaviours that facilitate HIV transmission than those who do not. This has been shown in groups as diverse as Haitian women, gay men, and teenagers from Oregon USA [12-14]. Risky sexual behaviour and cigarette smoking association are also attributed to smokers ignoring HIV prevention messages. In many, smoking degrades the lining of the oral cavity or leads to minuscule ulcerations that could facilitate HIV transmission [12-14]. The male and female specific prevalence of current smoking among HIV patients in our study was 35.6% and 11.9% respectively; this was higher than 15.1% and 0.3% noted for hospital patients in Maiduguri, North Eastern Nigeria [9]. In this study, 87% of the smokers were below the age of 50 years, this agrees with similar report in the low income multiethnic HIV/AIDS patient from Houston

**Table 4:** Multivariate logistic regression of ever smoked tobacco and determinant of tobacco smoking in adult HIV patient

Characteristics	Ever used	Never used	Odd ratio	C.I	P value
<i>Age range (years)</i>					
15-19	0	3	1.00		
20-29	18	51	1.01	0.55-1.85	0.979
30-39	21	105	0.42	0.24-0.74	0.002
40-49	33	51	2.43	1.41-4.17	0.001
50-59	9	18	1.48	0.64-3.44	0.361
>60	0	3	-	-	-
<i>Sex</i>					
Female	24	153	1.00		
Male	57	78	4.66	2.69-8.07	<0.001
<i>Education</i>					
None formal	6	27	1.00		
Primary	63	165	1.46	0.86-.2.48	0.166
Secondary	60	132	0.84	0.50- 1.38	0.481
Tertiary	72	177	1.23	0.68- 2.22	0.493
<i>Occupational class</i>					
Group 1	27	96	1.00		
Group 2	48	150	0.79	0.47-1.32	0.361
Group 3	18	39	1.41	0.75-2.63	0.285
Group 4	0	6	-	-	-
<i>Alcohol drinking</i>					
No	36	183	1.00		
Yes	45	48	4.77	2.77-8.19	<0.001
<i>CD4 Count</i>					
≥500cell/mm <sup>3</sup>	3	6	1.00		
200-499cell/mm <sup>3</sup>	18	114	0.29	0.16-0.53	<0.001
<200cell/mm <sup>3</sup>	60	111	3.09	1.76-5.41	<0.001
Total = 312	81	231			

*Odd Ratio =1 (Referenced OR)*

*P<0.05 Significant*

*C.I =Confidence Interval*

USA [11]. Our result tends to support the assertion that HIV is synonymous with productive age group in the population. The entire current cigarette smokers belong to the lower socioeconomic class; this may be due to low patronage of the public health institution by the rich people and the unwillingness to disclose their retroviral status. Also lack of confidentiality of the medical workers, social stigma and publicity attached to HIV diagnosis of the affluent and role models in developing countries of which Nigeria is no exception. The smokers in this study takes  $15 \pm 2$  cigarette sticks per day and spent  $160 \pm 20$  Naira ( $1.3 \pm 0.2$  US dollar) daily for purchasing cigarette. The number of cigarette stick smoked per day in HIV population was higher than 11 sticks from the general population [6]. We found that 1.9% of the HIV patient were light smoker and 20.2% were moderate to heavy smoker of tobacco. This result is different

from similar study among in Syracuse New York where majority (44 %) of the HIV patients were light smoker [15]. One study has shown that heavy smokers were found to be three times more likely than light smokers to develop the respiratory infection. The moderate smokers were also found to have an increased risk of PCP, regardless of CD 4count, gender, ethnicity, or use of PCP prophylaxis [16]. More than a quarter of the current smokers equally reported peer pressure and pleasure as the reason for smoking, therefore the tobacco control policy should be targeted at the social groups. The tobacco quitting attempt in this study was 69.9% which is similar to 70.0% in HIV patient in France [2] but higher than 56.0% from general population of rural dweller in South West Nigeria [17]. The higher quitting attempt in the sero-positives patients might be due to frequent advice from friends and religious

leaders on lifestyle modification to improve their health status. Only 47.8% of the current smoker were previously advised by health workers to quit tobacco use, this is lower than 81% in low-income HIV-infected persons in USA [18]. The lack of advice by health workers in this study may be due to poor knowledge about tobacco cessation therapy, inadequate consultation time and lack of tobacco counselling unit in most hospitals. Tobacco smoking interferes with hepatic metabolism of antiretroviral (ARV) medications which can lead to reduction in their potency. Also due to interference in hepatic metabolism and drug interactions HIV patients were more likely to suffer adverse effects from antiretroviral medication. In view of these problems more emphasis on health education and tobacco awareness among this population is imperative. This study also revealed that 12.5% of the respondents reported exposure to environmental tobacco. Second-hand smoke has at least twice the amount of nicotine and tar, five times the amount of carbon monoxide, a deadly gas that causes tissue hypoxia. Regular exposure to second-hand smoke at home or at work compromised respiratory systems, increases the risk of tuberculosis and other lung disease by 25% and heart disease by 10% [19] therefore physicians and public health workers should energetically apply anti-smoking interventions in HIV populations. This study also revealed that the non-smokers have a higher mean CD4 count than the current smokers, the low CD4 in HIV patients is perhaps due to frequent opportunistic infections, prolonged vitamin deficiencies from malnutrition and bone marrow suppression [13,16,20]. The multivariate logistic regression analysis shows that male gender, age ranged 40-49, alcohol intake and CD4 T lymphocyte count  $<200\text{cells/mm}^3$  have the significant association with ever smoked tobacco, and were the determinants of tobacco smoking in HIV patients in this study.

The prevalence of tobacco smoking among HIV patients in our study was high in comparison to reported studies done in all hospital patients. With the advent of antiretroviral drugs people with the infection are now living longer however; smoking can easily interfere with their long term quality life therefore, people living with this disease should not be left out of national tobacco cessation programs. The stakeholders need to formulate a tobacco control policy that is adaptable to people living with HIV/AIDS. Tobacco smoking should be discouraged in people living with HIV to reduce their morbidity and mortality.

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### Competing interests

The author(s) hereby declare that we have no competing interests.

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