Factors associated with tobacco-smoking in Uganda's leading tobacco-growing regions

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Abstract

Background: Tobacco smoking is one of the determinants of health and social challenges in Uganda. Although ample information exists about smoking prevalence, less is known about the determinants particularly in the leading tobacco-growing regions of the country.

Data and methods: Secondary data were extracted from the 2016 Uganda Demographic and Health Survey dataset. The un-weighted and weighted samples were 16,800 and 14,791 respectively. Tobacco-smoking status, the outcome variable, was dichotomized into those who smoked and those who never smoked. Binary logistic regression was used to model the dichotomous outcome variable against a combination of predictor variables.

Findings: Overall being male, having low education, belonging to the poor wealth quintile and being of advanced age increased the odds of tobacco-smoking.

Conclusion: Sex, level of education, wealth index and age predicted tobacco-smoking. We recommend strengthening educational programmes, increased advocacy for reducing tobacco-smoking and improvement of socioeconomic status of the population.

Keywords: Health Smoking demographic Tobacco Uganda

Introduction

Tobacco smoking is an issue of concern in Uganda. The 2013 Global Adult Tobacco Survey (GATS) indicates that tobacco smoking prevalence was 10.3% and 1.8% among males and females, respectively (Uganda Bureau of Statistics 2013). The 2016 Uganda DHS shows the percentage of persons who smoked any type of tobacco was 9.4% and 0.8% for men and women, respectively (UBOS & ICF 2018). Although the percentage is on the decrease, the absolute numbers remain high.

Tobacco-smoking presents an opportunity and a challenge almost in equal measure. While it translates into financial returns to the tobacco growers, it is a challenge considering the adverse health and socio-economic effects on smokers and those in their vicinity. The WHO estimates that tobacco use is currently responsible for the death of about six million people across the world each year with many people losing their lives prematurely (World Health Organisation 2015). This total includes over half a million people estimated to die from the effects of second-hand smoke. Studies indicate that maternal smoking during pregnancy and postnatal exposure to tobacco smoke are predisposing factors to

heightened respiratory infections (Jedrychowski & Flak 1997). Smoking is one of the behavioural explanatory variables that significantly influence the odds of dying from non-communicable diseases (Udjo & Lalthapersad-Pillay 2014). Exposure to smoking has also been found to increase the risk of developing depressive disorders (Pasco et al. 2008) and has been associated with premature births (Ion & Bernal 2015).

The adverse effects of tobacco-smoking extend beyond undesired health outcomes. The practice is also associated with financial drain considering the cost of buying cigarettes and other tobacco products (Reddy et al. 2013). This has direct implications for the financial stability of the smokers especially among low income earners. In Uganda, the leading tobacco growing areas are West Nile, Bunyoro and Kigezi. The recent Uganda DHS indicates that tobacco-smoking prevalence in some of these areas is also high. For example while 24 percent of the men in West Nile smoke tobacco, the percentage is much lower in other regions such as Bukedi region at only 3 percent (UBOS & ICF 2018). Regional and spatial differences have similarly been established in other

demographic studies (Ikamari 2013; Bangha & Simelane 2007).

There are African countries which have put in places explicit legislative structures to control tobacco use. Uganda has a Tobacco Control Act that came into effect in 2015 and which is intended to control the demand and supply of tobacco as well as protect the environment from the effects of tobacco production and consumption. The Act is also intended to promote the health of persons and reduce tobacco related illness and deaths (Republic of Uganda 2015). Some scholars have made recommendations for smoking prevention which include preventing initial attempts, facilitating negative interpretation of initial attempts and retarding regular use (Nargis et al. 2017). However, despite the existence of policies and strategies to control tobacco use, the practice persists and still presence with adverse consequences.

There are differentials in tobacco smoking by socio-demographic factors and sex, age, level of education and marital status have been reported to be significant predictors of tobacco use in Uganda (Kiyingi 2018). Males were more likely to be current and former smokers compared to females. Other studies have similarly reported gender differences in tobacco use, especially when the type of tobacco product and variation across cultures are considered (Grunberg et al. 1991). However, it is argued that the generalization that more men than women have used tobacco products masks the reasons for these differences which require further interrogation.

Some studies have been conducted to estimate tobacco-smoking as well as non-communicable diseases prevalence in Uganda. However, many of these studies have mainly analysed prevalence by socio-demographic characteristics (Uganda Bureau of Statistics 2013). Most of the studies have not rigorously analysed tobacco smoking issues particularly in areas where smoking-prevalence is higher than the national average. This study aimed to unravel the predictors of tobacco-smoking in West Nile, Bunyoro and Kigezi Regions, which double as top tobacco-growing areas and places with high smoking prevalence in the country.

Conceptual framework

Various efforts have been made to conceptualise factors influencing smoking including those for adolescent smoking (Tyas & Pederson 1998). Multiple levels of influence, from cultural and social variables to individual factors, have been reported to be associated with the practice. Other studies posit that the price and availability of cigarettes are risk factors and indicate that substantial increase in the price of a pack of cigarettes would reduce the demand for cigarettes (The World Bank 1999; Jackson & Henriksen 1997). Scholarly investigations elsewhere have indicated that age, gender, income, perceived risk of harm as well as family and peer influence affect smoking (García Rodríguez et al. 2011).

The conceptual framework used in our study is guided by the principle that tobacco-smoking status is influenced by underlying background factors working through proximate factors. Age, sex, residence, region, married status, education and wealth index indirectly affect tobacco smoking through the intermediate factors (Figure 1). Knowledge, information, attitude, accessibility and affordability are hypothesised to be proximate factors that directly influence the status of tobacco-smoking.
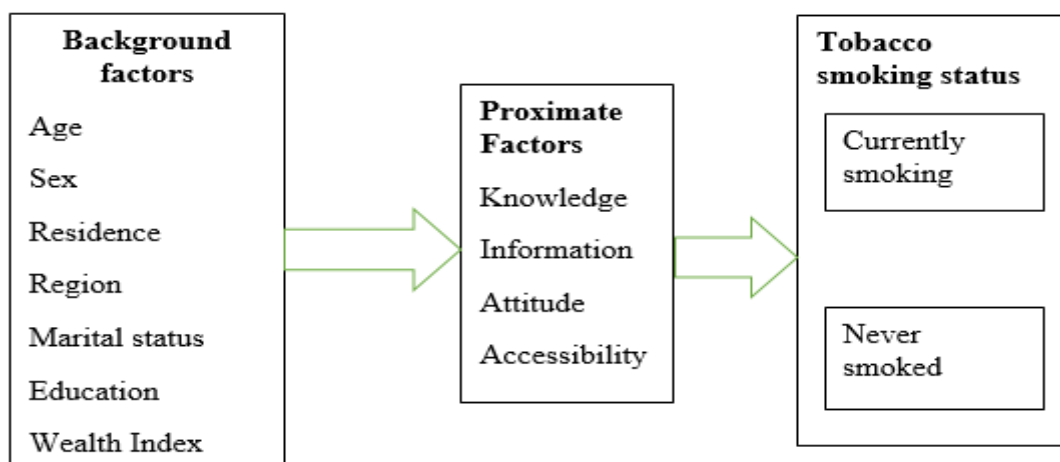

Figure 1: Pathways through which background factors may affect smoking status

Data, methods and scope

The paper uses secondary data extracted from the 2016 Uganda Demographic and Health Survey (UDHS) dataset (UBOS & ICF 2018). The 2016 national survey zoned the country into 15 regions namely Kampala, South Central, North Central, Busoga, Bukedi, Bugisu, Teso, Karamoja, Lango, Acholi, West Nile, Bunyoro, Tooro, Kigezi and Ankole Regions. West Nile, Bunyoro and Kigezi, the leading tobacco-growing areas, were selected for this study (Figure 2). Data for these regions was extracted from the DHS Personal Record file, UGPR7HDT. The un-weighted and weighted sample for the three regions was 16,800 and 14,791 respectively. The outcome variable for this study was derived from the questions that asked about the frequency an individual smoked inside the house. The response category to this outcome variable included: never, daily, weekly, monthly and less than one month. During analysis the response categories were dichotomized into those who never smoked coded as 0 while those who smoked were coded as 1.

The explanatory variables used included: age of respondent in years, sex of respondent (male or female), place of residence (rural or urban) and region (West Nile, Bunyoro and Kigezi). Others were education level (no education, primary, secondary and higher) and marital status (never married, married or formerly married). The latter marital status category comprised of divorced, widowed and separated. The last explanatory variable was wealth index which is a composite measure of a household's cumulative living standard. It was computed using principal component analysis from a household's ownership of selected assets, materials used for housing construction and type of water sources and sanitation facilities. The index was then segmented into five categories namely; poorest, poorer, middle, richer and richest. Since the outcome variable is binary, logistic regression was used to model the dichotomous outcome variable against a combination of predictor variables. Multicollinearity of predictor variables was tested using pairwise correlations while Hosmer-Lemeshow statistic tested for the goodness-of-fit of the model.

Figure 2 Uganda Demographic & Health Survey (2016) Regions
Source: UBOS & ICF (2018)
[West Nile, Bunyoro & Kigezi = Study regions]

Results

Background characteristics of household members

Fifty percent, 70% and 86% of the household members were under 15 years, were males and lived in rural areas respectively (Table 1). Forty-three percent, 33% and 24% lived in West Nile, Bunyoro and Kigezi regions respectively. Almost 6 in 10 (58%) were married while just under half (54%) had primary level of education. About 1 in 10 belonged to the richest quintile.

Table 1 Background characteristics of the studied population

Background characteristic	Number	Percent
Age		
0-14	7,330	50
15-29	3,538	24
30-44	2,025	14
45-59	1,111	7
60+	787	5
Sex		
Male	10,334	70
Female	4,457	30
Residence		
urban	2,039	14
rural	12,752	86
Region		
West Nile	6,331	43
Bunyoro	4,908	33
Kigezi	3,552	24
Marital status*		
Never married	1,913	26
Married	4,352	58
Formerly married	1,193	16
Education		
No education	5,042	34
Primary	7,959	54
Secondary	1,326	9
Higher	464	3
Wealth Index		
Poorest	3,984	27
Poorer	3,520	24
Middle	3,105	21
Richer	2,619	17
Richest	1,562	11
Total	**14,790**	**100**

*Total = 7,459 (excludes persons under 15 years)

Prevalence of tobacco smoking

The overall prevalence of smoking in the three areas was 23% which was higher than the national average of 15%. Table 2 indicates that about 1 in 3 of the household members in West Nile region (31%) were tobacco smokers. The corresponding percentages for Bunyoro and Kigezi regions were; 18 percent and 20 percent, respectively.

Table 2 Prevalence of tobacco-smoking by background characteristics and by region

Background Characteristics	Region								
	West Nile			Bunyoro			Kigezi		
	Currently smoking	Never smoked	Total	Currently smoking	Never smoked	Total	Currently smoking	Never smoked	Total
Age									
0-14	30.0	70.0	3,253	17.5	82.5	2,443	18.0	82.0	1,634
15-29	29.4	70.6	1,475	14.2	85.8	1,239	17.3	82.7	825
30-44	33.0	67.0	830	20.4	79.6	694	18.5	81.5	501
45-59	39.9	60.1	458	22.2	77.8	330	26.7	73.3	322
60+	36.7	63.3	315	22.9	77.1	203	30.0	70.0	269
	$\chi^2=27.3; p=0.000$			$\chi^2=25.7; p=0.013$			$\chi^2=45.4; p=0.000$		
Sex									
Male	38.3	61.7	4,220	18.7	81.3	3,669	22.5	77.5	2,445
Female	17.0	83.0	2,111	14.2	85.8	1,239	13.2	86.8	1,107
	$\chi^2=304.9; p=0.000$			$\chi^2=14.8; p=0.137$			$\chi^2=54.7; p=0.005$		
Residence									
Urban	22.5	77.5	761	10.3	89.7	750	19.3	80.7	528
Rural	32.4	67.6	5,570	18.9	81.1	4,159	19.7	80.3	3,024
	$\chi^2=31.1; p=0.175$			$\chi^2=37.3; p=0.046$			$\chi^2=0.039; p=0.933$		
Education									
No education	31.1	68.9	2147	18.3	81.7	1,771	19.6	80.4	1,125
Primary	32.3	67.7	3497	19.2	80.8	2,555	21.5	78.5	1,908
Secondary	26.4	73.6	494	8.9	91.3	456	13.5	86.5	375
Higher	24.2	75.8	193	5.5	94.5	127	10.0	90.0	144
	$\chi^2=11.8; p=0.118$			$\chi^2=48.5; p=0.000$			$\chi^2=28.7; p=0.000$		
Marital status									
Never married	31.6	68.4	791	15.0	85.0	609	22.5	77.5	513
Currently married	35.4	64.6	1741	19.0	81.0	1,465	20.6	79.4	1,146
Formerly married	25.6	74.4	545	17.0	83.0	391	19.5	80.5	257
	$\chi^2=19.1; p=0.001$			$\chi^2=5.6; p=0.271$			$\chi^2=1.6; p=0.390$		
Wealth Index									
Poorest	36.6	63.4	2,849	23.1	76.9	1,074	37.0	63.0	61
Poorer	31.0	69.0	1,565	23.6	76.4	1,261	23.5	76.5	695
Middle	26.9	73.1	7,051	15.6	84.4	1,127	24.8	75.2	1,273
Richer	24.8	75.2	723	11.3	88.7	820	15.3	84.7	1,077
Richest	15.8	84.2	488	8.0	92.0	628	6.7	93.3	446
	$\chi^2=115.2; p=0.039$			$\chi^2=136.5; p=0.001$			$\chi^2=133.0; p=0.004$		
Total	31.2	68.8	6,331	17.6	82.4	4,908	19.6	80.4	3,552

At 30 years and older, the prevalence of smoking increased linearly with age (p=0.000) except in West Nile where there was a slight decline after 59 from 40% to 37%. For all regions, the prevalence was higher among males than females and the association between smoking and sex was statistically significant for West Nile and Kigezi (p=0.000 and p=0.005, respectively). Smoking prevalence was slightly higher for persons in rural areas than those in urban areas but the association was not statistically significant except for Bunyoro where it was marginally significant (p=0.046). Prevalence of smoking decreased linearly from primary to higher education in Bunyoro and Kigezi and the association was statistically significant in both regions (p=0.000).

Smoking prevalence was highest among the married in West Nile region (35%) followed by the never married (32%) and formerly married (26%) and the association was statistically significant

(p=0.001). Association between marital status and smoking was not statistically significant in the two other regions. Overall, smoking prevalence decreased linearly with wealth index. The highest percentage of persons who were smoking was for those who were poor and poorest while the lowest was among those who were in the richest quintile. Association between wealth index and tobacco smoking was statistically significant in all regions (p=0.039, p=0.001 and p=0.004 for West Nile, Bunyoro and Kigezi respectively).

Predictors of tobacco-smoking
Table 3 presents results from logistic regression analysis of the factors predicting tobacco-smoking in the three regions. The predictors for West Nile region are first presented.

Older household members were more likely to smoke than their younger counterparts. Those aged

30-44 years (OR=1.5; p=0.004; CI=1.139-1.883) 45-59 years (OR=2.1; p=0.000; CI=1.547-2.860) and 60+ years (OR=2.084; p=0.000; CI=1.515-2.866) were more likely to smoke than their counterparts aged 15-29 years. In comparison with females, the males were more likely to smoke tobacco (OR=3.5; p=0.000; CI=2.246-5.523). The never married household members were more likely to engage in tobacco smoking than their married counterparts (OR=1.7; p=0.000; CI=1.216-2.289). Table 3 further shows that wealth index also predicted smoking in West Nile region. Household members who belonged to the poor and poorest quintiles were more likely to smoke than their counterparts belonging to the richest category (OR=3.3; p=0.000; CI=2.222-5.035 and OR=2.0; p=0.008; 1.200-3.214 respectively).

Table 3 further presents predictors of tobacco-smoking in Bunyoro region. Results indicate that older household members were more likely to smoke than their younger counterparts. Those aged 30-44 years (OR=1.7; p=0.003; CI=1.223-2.426) 45-59 years (OR=1.8; p=0.001; CI=1.297-2.555) and 60+ years (OR=1.8; p=0.007; CI=1.187-2.703) were more likely to smoke than their counterparts aged 15-29 years. In comparison with females, the males were more likely to engage in tobacco smoking (OR=1.6; p=0.030; CI=1.048-2.372). In comparison with persons of higher education, those with no education and primary education were more likely to be engaged in tobacco-smoking (OR=3.2; p=0.016; CI=1.255-8.082 and OR=2.7; p=0.031; CI=1.100-6.505 respectively). Table 3 further shows that wealth index also predicted smoking in Bunyoro region. Household members who belonged to the poor quintile were more likely to smoke than their

counterparts belonging to the richest category (OR=2.3; p=0.043; CI=1.030-5.30).

The predictors of tobacco smoking in Kigezi region are presented in the last three columns of Table 3. Residence, sex, education, marital status, age and wealth index predicated smoking in the area. Older household members were more likely to smoke than their younger counterparts. Those aged 30-44 years (OR=1.7; p=0.008; CI=1.168-2.688) 45-59 years (OR=3.0; p=0.000; CI=1.769-4.986) and 60+ years (OR=3.6; p=0.000; CI=2.125-6.102) were more likely to smoke than younger household members aged 15-29 years. The males were more likely than females to engage in tobacco smoking (OR=3.4; p=0.000; CI=2.035-5.697) while those who resided in rural areas were less likely to smoke than their counterparts living in the urban setting (OR=0.6; p=0.002; CI=0.460-0.827). Household members without formal education were more likely to smoke than those having higher education (OR=1.7; p=0.034; CI=1.044-2.908). The never married household members were more likely to engage in tobacco smoking than their currently married counterparts (OR=3.2; p=0.000; CI=2.134-4.875).

Three wealth quintiles were associated with tobacco smoking practice in Kigezi region. In comparison with the richest category, household members who belonged to the middle and poorer quintiles (OR=5.4; p=0.004; CI=1.770-16.514 and OR=7.1; p=0.001; CI=2.281-22.221 respectively) were more likely to engage in tobacco smoking. The odds of tobacco smoking in the region were highest for persons belonging to the poorest quintile. Those household members were almost 14 times as likely to smoke as those who belonged to the richest quintile (OR=13.6; p=0.000; CI=2.685-68.947).

Table 3 Predictors of tobacco-smoking by region and by background factors

Background characteristics	West Nile			Bunyoro			Kigezi		
	Odds Ratio	[95% Conf. Interval]		Odds Ratio	[95% Conf. Interval]		Odds Ratio	[95% Conf. Interval]	
Age									
15-29#	1.0								
30-44	1.5**	1.139	1.883	1.7**	1.223	2.426	1.8**	1.168	2.688
45-59	2.1**	1.547	2.860	1.8**	1.297	2.555	3.0**	1.769	4.986
60+	2.1**	1.515	2.866	1.8**	1.187	2.703	3.6**	2.125	6.103
Sex									
Female#	1.0								
Male	3.5**	2.246	5.523	1.6**	1.048	2.372	3.4**	2.035	5.697
Residence									
Urban#	1.0								
Rural	1.2	0.525	2.946	1.1	0.655	1.917	0.6**	0.460	0.827

Education									
No education#	1.2	0.571	2.419	3.2**	1.255	8.083	1.7**	1.044	2.908
Primary	1.3	0.674	2.660	2.7**	1.100	6.505	1.5	0.939	2.428
Secondary	1.1	0.555	2.054	1.4	0.604	3.356	1.0	0.515	1.777
Higher	1.0								
Marital status									
Currently married#	1.0								
Never married	1.7**	1.216	2.289	1.4	0.867	2.112	3.2**	2.135	4.875
Formerly married	0.9	0.662	1.245	0.9	0.628	1.387	1.4	0.937	1.987
Wealth Index									
Richest#	1.0								
Poorest	3.3**	2.222	5.035	2.0	0.995	4.314	13.6**	2.685	68.947
Poorer	2.4**	1.200	3.214	2.3**	1.030	5.301	7.1**	2.281	22.222
Middle	1.6	0.683	3.565	1.3	0.549	3.287	5.4**	1.770	16.514
Richer	1.7	0.683	4.382	1.0	0.454	2.404	3.2	0.993	10.137

\# = Reference category
**=Significant at 95% confidence level

Discussion

The findings show that the odds of tobacco smoking increased with age. In all regions persons aged 30 years and above were more likely to smoke than their counterparts aged 15-29 years. The rise of smoking prevalence with age could be associated with gradual rise in personal freedoms and financial independence as individuals' transit from youth to adulthood. The GATS study also indicated variation in the proportion of persons who smoked by age (Uganda Bureau of Statistics 2013). Variation in regional smoking prevalence by age has similarly been observed at global level (Jha et al. 2002).

Our study indicates that the odds of tobacco smoking were significantly higher among males than females. In West Nile for example, males were almost 4 times more likely to be engaged in tobacco-smoking than their female counterparts. Social and cultural factors could be associated with this disparity. In the Ugandan context, smoking by women particularly in public tends to be frowned upon. This is like a stigma of sorts that could translate into overall less likelihood of women engaging in smoking. Our finding dovetails with research findings in the Kasese area of western Uganda where tobacco smoking was more prevalent in men than women (Mondo et al. 2013). Studies elsewhere have indicated higher likelihood of male smoking in comparison with women. Systematic review of tobacco smoking prevalence in Sub-Saharan African countries has similarly indicated that the prevalence of smoking was consistently higher in men compared to women in the sub-Saharan African countries studied (Brathwaite et al. 2015).

Place of residence was a significant factor only in Kigezi region where the odds of smoking were significantly lower among household members living in the rural areas. This would seem to suggest that, overall, place of residence had little effect on smoking in the regions of study. The apparent low influence of residence on smoking prevalence could perhaps stem from the tendency for smoking patterns to change less as people migrate into towns. It could be that persons who did not practice smoking before migration may not necessarily adopt the practice in the new urban setting. The 2013 GATS similarly found no difference in smoking by residence among occasional smokers and the percentage of non-smokers was almost equal for both urban and rural areas (Uganda Bureau of Statistics 2013). While residence may have little effect on urban-rural smoking differentials in our investigation, other studies have reported differentials by urbanisation. For example, women in China are said to be increasingly taking to smoking in the urban areas, a tendency attributed to socio-cultural factors including Chinese acceptance of cigarettes as a traditional Chinese gesture of good will (Zhang et al. 2011). In addition, smoking is perceived as a symbol of personal freedom, independence and charisma.

Education was a significant predictor of smoking in Bunyoro and Kigezi Regions. Persons without formal and primary education had increased odds of smoking than those with higher education. It is likely that rising education increased knowledge and awareness levels of the risks associated with smoking and thus probably lowered the likelihood of smoking. School rules and regulations may also have had a bearing on smoking patterns during school times and translated into negative attitude to smoking among the educated persons in post-school times. Inverse association between education and smoking has been cited in other studies (Uganda Bureau of Statistics 2013) where prevalence of daily smoking decreased as educational level increased.

Marital status predicted tobacco smoking in West Nile and Kigezi. The odds of tobacco smoking were significantly higher among the never married household members than those who were married. This is perhaps expected since the former are more likely to be less restricted in behavioural traits than the latter. The never married may also be more prone to social and peer related acts that predispose them to smoking practice.

Lastly, wealth index predicted tobacco smoking in all three regions. In comparison with the richest quintile, the odds of smoking were significantly higher among the poor and poorest quintiles. The likelihood of smoking among the poorest quintile was particularly striking in the Kigezi region where persons belonging to the poorest quintile were almost 14 times more likely to smoke than their richest counterparts. The nexus between wealth and smoking could probably be explicable in terms of awareness and information that may be influenced by household resources. Mosley & Chen (1984) identified household income as being one of the background factors influencing information flow which in turn affected human survival. Global and regional smoking prevalence assessment has similarly indicated a tendency for males in low-income nations to have a higher prevalence of daily smoking than males in high-income countries (Jha et al. 2002).

Limitations
Tobacco use data in the UDHS dataset were available only on the status of smoking, the number of cigarettes smoked and type of tobacco smoked. Therefore it was not possible to analyse other pertinent tobacco-related issues such as reasons for smoking, attitude towards smoking or corollaries of tobacco use. One of the research implications of the study is therefore a need for a targeted survey that interrogates drivers and persistence of tobacco-smoking despite existence of messages that point to its adverse consequences.

Conclusion and implications
Age, sex, education and wealth index strongly predict tobacco smoking in the study areas. Overall being male, having low education, belonging to lowest quintile and being of middle/advanced age predict tobacco-smoking. The findings have several implications including intensifying awareness and advocacy campaigns among persons aged 30 years and above where smoking prevalence levels are high. Stakeholder need to consider strengthening educational programmes which could translate into increased share of the population with high educational grade attainment. The findings also call for improving the socioeconomic status of the population in the lowest wealth quintile who are associated with the highest odds of tobacco use.

Declaration of conflicting interests

Acknowledgements

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