Tobacco use and its determinants in the 2015 Kenya WHO STEPS survey

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prediction is measured by the variance of the index. Variables included in wealth index determination were: type of dwelling, ownership of the dwelling, construction materials of the dwelling, source of cooking fuel, source of lighting fuel, household possessions/ goods, source of water for household consumption, and type of sanitation

The majority of tobacco users reported doing so daily ($n = 477/605$, 78.8%), as shown in Table 1. Nine out of ten smokers reported this also (85%, $n = 406/477$). Those that reported ever having consumed alcohol, were also more commonly daily tobacco users ($n = 369/477$, 77.3%). There were similar findings of association for daily tobacco use (Table 4) as compared to current tobacco use (Table 3) by sociodemographic status. Two main differences were a stronger association with age (despite a smaller sample size), with those being in the 50–59 year age group having around three times higher odds than their

2 Breakdown by sociodemographic status across forms of tobacco used (smoked and smokeless)

Characteristic	Non user , (%)	One form only , (%)	Smoked & smokeless , (%)	Total ( )
Sex				
Male	1675 (76.6)	493 (22.6)	16 (0.7)	2186
Female	2203 (95.9)	92 (4.0)	3 (0.1)	2298
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 4*
Age groups				
18–29	1860 (90.2)	194 (9.4)	7 (0.3)	2062
30–39	886 (84.8)	150 (14.4)	7 (0.6)	1045
40–49	582 (83.8)	110 (15.9)	2 (0.3)	695
50–59	362 (81.8)	81 (18.2)	0 (0.0)	443
60–69	188 (78.4)	49 (20.7)	2 (1.0)	239
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 4*
Education level				
No formal education	450 (79.9)	107 (19)	6 (1.1)	563
Primary education	1722 (84.3)	313 (15.3)	8 (0.4)	2043
Secondary and above	1706 (90.9)	166 (8.8)	4 (0.2)	1877
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 4*
Residence				
Rural	2402 (86.5)	360 (13.0)	13 (0.5)	2776
Urban	1477 (86.5)	225 (13.2)	5 (0.3)	1708
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 4*
Occupation				
Unemployed	1583 (88)	211 (11.7)	5 (0.3)	1799
Employed	2295 (85.5)	374 (13.9)	14 (0.5)	2685
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 4*
Ever consumed alcohol				
No	2421 (95.0)	125 (4.9)	3 (0.1)	2549
Yes	1457 (75.3)	460 (23.8)	15 (0.8)	1934
*	*3 (.)*	*, , (13.1)*	*1 (0.4)*	*44 3*

younger counterparts with daily tobacco use. There was a slightly weaker association with alcohol use for those using tobacco daily, and marital status was no longer a determinant for daily tobacco use, after controlling for confounding. There was no statistical evidence of interaction with alcohol use affecting the outcome daily tobacco use.

4 Covariates associated with daily tobacco use in Kenya

Daily tobacco use	Crude Odds Ratio[a]		Adjusted Odds Ratio[a]	
	OR (95% CI)	-value	OR (95% CI)	-value
Sex				
Female	1.00		1.00	
Male	7.16 (5.52, 9.28)	< 0.001	7.48 (5.34, 10.48)	< 0.001
Age group				
18–29	1.00		1.00	
30–39	1.79 (1.38, 2.31)	< 0.001	1.35 (0.87, 2.08)	0.181
40–49	2.33 (1.77, 3.06)	< 0.001	1.39 (0.86, 2.23)	0.176
50–59	2.81 (2.08, 3.81)	< 0.001	2.57 (1.61, 4.11)	< 0.001
60–69	3.12 (2.16, 4.52)	< 0.001	1.36 (0.74, 2.51)	0.324
Education level				
No formal education	1.00		1.00	
Primary complete	0.77 (0.60, 1.00)	0.050	0.28 (0.18, 0.43)	< 0.001
Secondary and above	0.35 (0.26, 0.47)	< 0.001	0.12 (0.07, 0.20)	< 0.001
Residence				
Urban	1.00		1.00	
Rural	1.11 (0.91, 1.36)	0.288	0.63 (0.46, 0.85)	0.002
Occupation				
Unemployed	1.00		1.00	
Employed	1.14 (0.93, 1.38)	0.200	0.58 (0.45, 0.76)	< 0.001
Ever used alcohol				
No	1.00		1.00	
Yes	5.35 (4.28, 6.69)	< 0.001	2.54 (1.85, 3.49)	< 0.001
Episodic alcohol drinking				
No alcohol	1.00		1.00	
Binge drinking	8.03 (6.49, 9.93)	< 0.001	0.77 (0.30, 1.96)	0.588
Non-heavy drinking	3.41 (2.34, 4.97)	< 0.001	0.52 (0.06, 4.59)	0.560
Wealth band				
Poorest	1.00		1.00	
Second	0.76 (0.58, 1.00)	0.054	0.91 (0.58, 1.41)	0.665
Middle	0.76 (0.57, 1.01)	0.061	0.56 (0.33, 0.93)	0.026
Fourth	0.70 (0.53, 0.94)	0.018	0.69 (0.41, 1.15)	0.150
Richest	0.38 (0.28, 0.52)	< 0.001	0.47 (0.26, 0.86)	0.014
Marital status				
Not married	1.00		1.00	
Married	1.10 (0.87, 1.41)	0.429	0.73 (0.53, 1.02)	0.066
Formerly married	2.03 (1.48, 2.77)	< 0.001	1.41 (0.91, 2.17)	0.120

Key: [a]All sociodemographic variables (except occupation) were included in final regression models if found to be statistically significant. This was true except for occupation given the original coding of the variable in the survey that was not felt to be meaningful for our study. The variable sex was maintained in the three models, even though it was only found to have a statistically significant relationship with daily tobacco use given the hypothesized importance of the role of sex on tobacco use

Smokeless tobacco use was fairly evenly distributed across sex, with a slight increased prevalence of use amongst males (4%, as compared to 3.3% of females) Table 1. Around three quarters of smokeless tobacco users were in the poorest wealth quintile.

However, of all sociodemographic variables, only education level and occupation were found to have a statistically

significant association with using smokeless tobacco after controlling for confounding. An increase in the number of years of education was found to be protective. In respondents with at least a high school education, they had 100 times lower odds of using smokeless tobacco as compared to those that had never attended school (OR < 0.01, 95% CI 0–0.09), as shown in Table 5.

There was also statistical evidence for interactions indicating that the association of age with use of smokeless tobacco is dependent on whether or not respondents

5 Covariates associated with smokeless tobacco use in Kenya

Smokeless tobacco use	Crude Odds Ratio[a]		Adjusted Odds Ratio[a]	
	OR (95% CI)	-value	OR (95% CI)	-value
Sex				
Female	1.00		1.00	
Male	1.23 (0.90, 1.69)	0.189	1.51 (0.95, 2.41)	0.079
Age group				
18–29	1.00		1.00	
30–39	1.11 (0.71, 1.74)	0.635	0.94 (0.47, 1.87)	0.854
40–49	1.38 (0.85, 2.22)	0.190	2.04 (1.01, 4.11)	0.047
50–59	2.53 (1.59, 4.01)	< 0.001	1.99 (0.98, 4.03)	0.057
60–69	3.54 (2.11, 5.94)	< 0.001	1.1 (0.46, 2.66)	0.826
Education level				
No formal education	1.00		1.00	
Primary complete	0.13 (0.09, 0.19)	< 0.001	0.12 (0.06, 0.22)	< 0.001
Secondary and above	0.09 (0.06, 0.13)	< 0.001	0.01 (0, 0.09)	< 0.001
Residence				
Urban	1.00		1.00	
Rural	2.55 (1.73, 3.77)	< 0.001	1.38 (0.76, 2.52)	0.292
Occupation				
Unemployed	1.00		1.00	
Employed	0.47 (0.34, 0.64)	< 0.001	0.58 (0.39, 0.88)	0.009
Ever used alcohol				
No	1.00		1.00	
Yes	2.49 (1.79, 3.45)	< 0.001	2.58 (1.47, 4.54)	0.001
Episodic alcohol drinking				
No alcohol	1.00		1.00	
Binge drinking	5.19 (3.75, 7.19)	< 0.001	4.84 (1.55, 15.15)	0.007
Non-heavy drinking	1.04 (0.42, 2.55)	0.932	3.52 (0.22, 57.21)	0.377
Wealth band				
Poorest	1.00		1.00	
Second	0.31 (0.21, 0.48)	< 0.001	0.44 (0.22, 0.91)	0.026
Middle	0.21 (0.13, 0.35)	< 0.001	0.56 (0.28, 1.15)	0.117
Fourth	0.09 (0.04, 0.18)	< 0.001	0.04 (0, 0.57)	0.017
Richest	0.19 (0.11, 0.3)	< 0.001	0.16 (0.02, 1.08)	0.060
Marital status				
Not married	1.00		1.00	
Married	1.73 (1.07, 2.82)	0.026	1.21 (0.67, 2.2)	0.522
Formerly married	4.96 (2.9, 8.48)	< 0.001	2.48 (1.27, 4.83)	0.007

Key: [a]

engage in heavy episodic drinking. When comparing across sub-groups, those that reported heavy episodic drinking had higher odds of smokeless tobacco use, with up to 26 times higher odds amongst the oldest age group when compared to younger non-consumers of alcohol (OR 25.6, 95% CI 11.0–59.7). For the two lowest wealth bands, those that are binge drinkers also have a higher odds of smokeless tobacco use (OR 2.91, 95% CI 1.69–5 in the lowest, and OR 2.12, 95% CI 1.19–3.77 in the second lowest, respectively).

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This study provides the first nationally representative estimates on the prevalence of tobacco use alongside other leading risk factors for NCDs, and disease outcomes related to these risk factors. Overall, 13.5% of the respondents currently use tobacco. This is slightly higher than what was has been reported in the Kenya GATS conducted in 2014 at 11.6% [25], and in some previous studies in the country as shown by Gathecha et al. [27]. The prevalence of tobacco use was also higher in the STEPS as compared to the 2015 GBD study, where for example daily tobacco use for males was 18.6% compared to 14.9%, respectively [10]. The difference between the STEPS survey and GATS could be attributed to the different age ranges of the population sampled. The Kenya GATS examined respondents aged 15 years and above, which may include an age group (15–18 years) that have not yet engaged in tobacco use therefore lowering the prevalence estimate. Alternatively, differences in the STEPS and GATS could be explained by sampling approach. While both the STEPS and GATS use sample frames that originate from the Kenya National Bureau of

risks of smokeless tobacco use may have a significant role. There was a higher likelihood of smokeless tobacco use among rural residents than urban residents necessitating the need for intensified campaigns against smokeless tobacco in rural areas.

Alcohol use had a positive effect on current and daily tobacco use. This relationship was true for ever users of

use by other family members and peers were not collected in the STEPS survey.

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The use of tobacco has seen concerning trends in the African region in recent decades, Kenya notwithstanding. The 2015 Kenya WHO STEPS was unique in providing primary data on the status quo of tobacco use in the country. Interesting trends by sociodemographic status highlight the importance of focusing on young people, men, and those with lower levels of education. Concurrent usage of alcohol is associated with higher odds of risky tobacco use. Targeting tobacco prevention strategies amongst alcohol users is therefore recommended, including revisiting the public smoke ban for effective implementation. Further data is needed on the use of smokeless tobacco, and its impact on smoked tobacco products, as well as on the novel use of e-cigarettes, with considerations for health and societal implications.

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DHS: Demographic and Health Surveys; FCTC: Framework Convention on Tobacco Control; GATS: Global Adult Tobacco Survey; LMIC: Low- and Middle-Income Country; NASSEP V: National Bureau of Statistics household-based sampling frame; NCD: Noncommunicable Disease; PDA: Personal Digital Assistant; STEPs: Stepwise approach to surveillance; TAPS: Tobacco Advertising, Promotion and Sponsorship; WHO: World Health Organization

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