Alcohol consumption and associated risk factors in Burkina Faso: results of a population-based cross-sectional survey.

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Research article

Keywords: Alcohol consumption, Abusive alcohol consumption, Burkina Faso, Risk factors, Surveillance, WHO STEPS survey

Posted Date: October 28th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-36027/v2

Version of Record: A version of this preprint was published at BMJ Open on February 1st, 2022. See the published version at https://doi.org/10.1136/bmjopen-2021-058005.

Abstract

Background: Lifestyle modifiable risk factors are a leading preventable cause of non-communicable diseases (NCDs). Amongst them, alcohol and tobacco consumption are the most important. Studies characterizing the prevalence of alcohol consumption in low-income countries are lacking. This study describes the prevalence of alcohol use in Burkina Faso and its associated factors separately for urban and rural residents.

Methods: Data from the 2013 Burkina Faso World Health Organization (WHO) Stepwise approach to Surveillance (STEPS) were analyzed. The prevalence of alcohol consumption over the last 30 days were recorded and recoded into categories according to WHO recommendations: low alcohol consumption (<40g alcohol/day for men, <20g for women), mid alcohol consumption (between 40 and 59.9g/day for men and between 20 and 39.9g for women) and a heavy consumption (>60g/day for men and 40g for women). Logistic regression analyses identified factors associated with alcohol consumption use.

Results: In the whole population 3,559 (75.8% [72.5 – 78.7]) were not consuming any alcohol, 614 (12.9% [10.9 – 15.3]) had a low alcohol consumption, 399 (8.5% [7.1 – 10.1]) a mid alcohol consumption and 120 (2.7% [2.0 – 3.7]) a high consumption. Age was associated with alcohol intake with a gradient effect, older people having a higher risk (AOR = 2.31 [1.68 – 3.17] for the 55 – 64 years old compared to 25 – 34 group). Tobacco consumption was also significantly associated with alcohol intake with a gradient effect, those with higher tobacco consumption being at higher risk of abusive alcohol intake. When analyzing the risk of having abusive consumption in those consuming alcohol, we found a highly significant gender effect, with males having an increased risk (AOR = 2.53 [1.38 – 4.68]).

Conclusion: Our data showed an important burden of alcohol consumption in Burkina Faso with a strong relationship with age, gender and tobacco consumption and disparities across the different regions of Burkina Faso. To effectively reduce alcohol consumption in Burkina Faso, a comprehensive control program should consider these associated factors.

Background

The increase in life expectancy [1] combined with unhealthy behaviors and physical inactivity [2] are linked to a rise in non-communicable diseases (NCDs) such as cardiovascular disease, cancer, chronic respiratory disease, and diabetes [3]. Currently, the leading causes of ill health in the world, NCDs account for seven out of ten deaths worldwide [4].

Low and mid-income countries are facing the emergence of non-communicable diseases (NCDs) [5]. Although some risk factors have been identified such as high blood pressure [6], lack of physical activity [7], inadequate diet [8], etc., there is still a lack of comprehensive data on other modifiable risk factors, in particular tobacco and alcohol consumption [9], in Burkina Faso.

Recently, clear evidence of increased alcohol consumption and attributable harm in many low and mid-income countries has been highlighted [10]. Furthermore, it is predicted to have a more harmful effect if effective policy is not adopted [11]. Currently, the prevalence of alcohol intake among the African adult population is about 30% [12], which is lower compared to the rest of the world where 40% of the world's adult population consumes alcohol and the average consumption per drinker is 17.1 liters per year. Interestingly, the prevalence of lifetime abstention, the level of alcohol consumption, and the drinking patterns vary widely across regions of the world [13]. For exemple Eastern Europe and Southern Africa had the most detrimental pattern of drinking scores. At the same time, Europe (Eastern and Central) and sub-Saharan Africa (Southern and West) are the most important consumers of alcohol [13]. In Africa, among current drinkers, the prevalence of heavy drinking varied between 7% and 77% and the prevalence of daily light drinkers varied between 0% and 21%. Overall, drinking patterns varied significantly between and within the examined African countries [14].

One of the major current concerns related to alcohol consumption in Africa is that alcohol companies have targeted Africa as a new market. With the expected increases in the number of potential new alcohol consumers, especially young people and women, the African continent has indeed been identified by the alcohol beverage industry and market researchers as a key area for alcohol market growth [15, 16]. It is, therefore, of particular importance to identify subjects the most at risk of alcohol consumption. Currently, two major risk factors have been identified worldwide: gender with the male being more at risk [17] and the socioeconomic level where the effect is less clear as the associations between socioeconomic disadvantage and heavier drinking vary depending on country-level income [18]. A group that is particularly at risk because of the vulnerability of the fetus is the pregnant women [19–21]. There is currently a lack of information about the prevalence of alcohol consumption in Burkina Faso and the associated risk factors. Differences in cultural factors (e.g., beliefs and practices) may influence health status, but social, economic, and structural determinants of health during people's lifespans appear to be associated with health inequities between ethnic groups as well. Therefore, cultural influences should not be overemphasized as discrete explanatory factors for health inequities [22].

A first national survey was conducted in 2013 using the WHO STEPwise approach to risk factors surveillance (STEPS). The STEPS survey is a simple, standardized method for collecting, analyzing, and disseminating data in WHO member countries. It covered a representative sample of the adult populations. The first analyses performed were about the evaluation of cardiovascular risk [23]. In a previous study, we show that tobacco consumption was highly correlated with alcohol consumption in men [24]. Therefore, the aim of this study is to study the prevalence of alcohol consumption and their associated risk factors. Such kind of analysis is needed in order to drive more efficient prevention campaigns for both alcohol and tobacco consumption.

Methods

Study settings

Burkina Faso is a landlocked country in West Africa of 272 967.47 km^2. In 2020, the population was estimated at 20,903,273 inhabitants. The majority of the population (77.30%) lives in rural areas and rely on agriculture and livestock as main source of income [25].

The median age of the population is 17.9 years old. The total fertility rate is 5.2 (2018) and the life expectancy at birth was 62.3 years in 2019. As most of the low-income countries, Burkina Faso must face the double burden of infectious and chronic diseases. The country is regularly confronted with outbreaks such as measles, cerebrospinal meningitis and, malaria [26], while NCDs constitute a raising public health problem with only limited financial resources allocated.

In Burkina Faso, several sources of alcohol manufacturing exist: modern brewery and legally imported alcohol, prohibited alcohol mostly imported from neighboring countries and traditional beer manufacturers. Burkina Faso is a laic country with almost more than half of the population declared as being of Islamic faith.

Harmful alcohol use and its adverse events (i.e., road traffic accidents) is however an important and raising public health concerns in Burkina Faso [27].

Study design

This is an analytical cross-sectional study. The database collected during the baseline data of the WHO STEPS survey conducted in Burkina Faso in 2013 was used in this study. Complete details on the methodology and sampling procedure were described in the WHO STEPS 2013 Burkina report [28], and in previous studies using this database [23, 24, 29]. Briefly, the participants were selected using a three-stage cluster sampling process involving the selection of clusters, households, and individuals.

The protocol of the STEPS survey was reviewed and approved by the Ethics Committee for Health Research of the Ministry of Health, which gave clearance in accordance with regulations in force (Deliberation No. 2012–12- 092 of 05 December 2012). Written informed consent was systematically sought and obtained from all participants before inclusion in the study. The confidentiality of study participants was fully respected and the analyses performed did not identify any participant.

Study population

Participants of the study were adults of both sexes aged 25 to 64 years old who had been living in Burkina Faso for at least six months. Exclusion criteria were: people with disabilities hampering their ability to answer the questions (e.g., intellectual disabilities, serious mental disorders, cognitive impairment, etc.).

Sampling

The STEPS survey of Burkina Faso was conducted on a representative sample of 4,800 individuals, the response rate of the STEPS survey was 99.1% in Burkina Faso [26]. The sample size is estimated using the following Schwartz formula: $n \geq deff \frac{Z_\alpha^2\, p(1-p)}{\varepsilon^2} * sub/(1-t)$ for p (high blood pressure prevalence previously estimated at 29.3%; deff design effect fixed at 1.5, ε absolute error (5%); z_α fractile of normal distribution of 5% error (1.96)) [26]. The sample calculation was adjusted to account for a subgroup analysis of eight subgroups (sub) (four age groups, and two gender or two residence groups) and for a non-response rate (t) of 20%. After excluding participants with missing information about sampling weight, 4,692 individuals were included in the present analysis. The diagram flow of study participants is presented in Figure 1.

The study's sampling frame was based upon enumerations (EAs) from the 2006 general census of the population and housing (GCPH) and updated in 2010 during the Demographic and Health Survey in Burkina Faso. In the first stage, geographic areas were stratified into rural and urban, and EAs were selected with probability proportional to their size from both strata. A total of 240 EAs were selected: 185 from rural areas and 55 from urban areas. In the second stage, 20 households were selected from each EA. In the third stage, one person aged from 25 to 64 years in each household was selected using the Kish method.

Data collection

The STEPS questionnaire is made up of several modules that include demographic information, anthropometric measures, and behavioral measurement. A full description of the study design and the data collection has been published elsewhere [23, 29]. Briefly, All data on alcohol consumption were collected using a standardized questionnaire during face-to-face interviews in the language most spoken by the respondent. The questionnaires was pre-tested on the field before being used for the national survey. Alcohol consumption was assessed with the question 'Have you ever consumed any alcohol such as beer, wine, spirits or dolo'? If the answer is yes, the current alcohol consumption was assessed with the questions 'During the past 30 days, how many days did you consume alcohol drinks?' and 'When you are

drinking, what is the average number of drinks ?'. Four levels were defined: no consumption, low, mid, and abusive consumption (see Table 1 for WHO definition).

Table 1: Definition of recoded exposure variables.

Variables	Categories
Age groups	"25 to 34 years old", "35 to 44 years old", "45 to 54 years old", "55 to 64 years old"
Education	"None", "Primary", "Secondary", "Tertiary"
Marital status	"Single", "Married", "Divorced/widowed"
Occupational status	"Wage earner", "Self-employed", "Jobless", "Housemaker"
Alcohol consumption (WHO recommendations) [30]	None: Never intake of alcohol Low: intake of an average quantity of pure alcohol of less than 40 g per day for men and less than 20 g for women Mid: corresponds to taking an average quantity of pure alcohol of between 40 g and 59.9 g per day for men and between 20 g and 39.9 g for women Abusive: intake of an average quantity of pure alcohol greater than or equal to 60 g per day for men and greater than or equal to 40 g for women.

Note than one glass of alcohol (beer, wine, 'dolo') contains 10g of ethanol, the recall period is 30 days.

Study variables

The dependent variable was the mean alcohol consumption in the last 30 days. First, we analyzed alcohol consumption to define the profile of the drinker. Then we identify the profile of the abusive consumer, following WHO recommendations [30], amongst current drinkers.

The independent variables were: age, sex, education, marital status, occupational status and tobacco consumption.

Data analysis and processing

Some independent quantitative variables were transformed into categorical variables. The list of the variables with the recoded variables is presented in Table 1. Qualitative variables were described using proportions. The Chi-squared test was used in univariable analysis to test the association between the outcome and the categorical variables. Multivariable analysis was then performed: we used a logistic regression model fitted using stepwise backward regression modeling. We first analyzed the profile of alcohol consumption using ordinal logistic regression. Then to analyze the risk of abusive consumption among drinkers, we performed a second analysis using logistic regression grouping low and mid consumption as reference.

Crude and adjusted ORs were calculated for the studied variables and presented with 95% confidence intervals. We then analyzed discrepancies between the different regions using adjusted ORs for the different regions.

All the analyses were carried out using the survey function with the sampling weight option to account for the sampling design.

Statistics have been conducted in STATA (version 13), RStudio (version 1.1.442) with R version 3.4.4 and QGIS (version 2.18.19).

Results

Characteristics of the population are presented in Table 2. Most of the participants were rural residents (79.7%). The population was predominantly young, with the 25-34 years group representing 41.9%. Women were a bit more represented, with 54.3% of the total sample. Concerning the comparison between urban and rural residents there is no difference in term of age ($\chi^2(3) = 2.36$, $p = .51$), sex ($\chi^2(1) = 3.71$, $p = .054$), but there are statistically significant differences for the educational level ($\chi^2(2) = 924$, $p < .001$), the marital status ($\chi^2(2) = 233$, $p < .001$), the occupational status ($\chi^2(3) = 810$, $p < .001$).

Table 2: Socio-demographic characteristics of the study sample and prevalence of alcohol and abusive alcohol consumption

Variables	Participants, n (%)	Alcohol consumption [95% CI]	Abusive alcohol consumption, % [95% CI]
Age groups, years (n= 4,692)			
25 to 34 years	2,124 (42.0)	19.5 [16.5 – 22.9]	2.3 [1.5 – 3.6]
35 to 44 years	1,181 (27.9)	25.1 [21.4 – 29.3]	3.9 [2.4 – 6.3]
45 to 54 years	841 (18.6)	28.1 [23.4 – 33.3]	4.9 [3.1 – 8.0]
55 to 64 years	546 (11.5)	32.7 [26.4 – 39.6]	4.3 [2.0 – 8.8]
Sex (n = 4,692)			
Female	2,436 (54.3)	20.4 [17.1 – 24.0]	1.1 [0.6 – 1.9]
Male	2,256 (45.7)	28.8 [25.1 – 32.7]	6.4 [4.4 – 9.0]
Living environment (n = 4,692)			
Urban	945 (24.9)	27.1 [21.8 – 32.9]	5.6 [3.3 – 9.2]
Rural	3,747 (75.1)	23.3 [19.8 – 27.1]	2.8 [1.9 – 4.0]
Education (n = 4,684)			
None	3,622 (77.3)	22.0 [18.7 – 25.7]	2.5 [1.7 – 3.7]
Primary	728 (15.3)	28.0 [23.3 – 33.2]	4.7 [2.7 – 8.2]
Secondary	334 (7.3)	39.3 [31.8 – 47.2]	11.9 [6.4 – 21.1]
Marital status (n = 4,688)			
Single	333 (6.8)	31.4 [23.5 – 40.5]	7.1 [3.4 – 13.9]
Married	4,043 (87.2)	23.5 [20.4 – 26.9]	3.1 [2.2 – 4.3]
Divorced/Widowed	311 (5.9)	26.7 [20.8 – 33.7]	4.9 [2.2 – 10.8]
Occupational status (n = 4,692)			
Wage earner	281 (6.3)	37.8 [31.3 – 44.6]	13.6 [8.2 – 21.9]
Self-employed	3,249 (66.4)	24.1 [20.7 – 27.8]	3.8 [2.6 – 5.5]
Jobless	125 (2.9)	22.8 [15.3 – 32.4]	0.6 [0.1 – 4.4]
Housemaker	1,037 (24.5)	21.2 [16.4 – 27.1]	0.5 [0.1 – 1.8]
Tobacco consumption (n = 4,692)			
No	4,217 (90.8)	22.7 [19.6 – 26.0]	2.7 [1.9 – 3.7]
< 5 cigs/day	210 (3.8)	32.2 [25.0 – 40.4]	8.7 [4.3 – 16.7]
5 – 10 cigs/day	184 (3.6)	40.3 [32.0 – 49.1]	10.0 [4.9 – 19.2]
> 10 cigs/day	81 (1.7)	51.8 [36.2 – 67.1]	24.3 [7.7 – 55.5]

Alcohol consumption include the different level of consumption (low-mid and abusive)

In the whole population 3,559 (75.8% [72.5 – 78.7]) were not consuming any alcohol, 614 (12.9% [10.9 – 15.3]) had a low alcohol consumption, 399 (8.5% [7.1 – 10.1]) a mid alcohol consumption and 120 (2.7% [2.0 – 3.7]) an abusive consumption. There are important differences between the different regions of the countries; results are presented in Figure 2. In the Sahel region the prevalence is null while in the Sud-Ouest regions the prevalence for all the levels are statistically significantly higher than the country's average values.

The prevalence of abusive consumption was not different in urban setting and rural setting (4.3 % [2.5 – 7.3] versus 2.1% [1.5 – 3.1], p = .19) but the prevalence was higher in urban setting for heavy and moderate consumption (14.3% [12.1 – 16.5] versus 10.1% [9.1 – 11.1] respectively, p = .003). The repartition of consumption was statistically significantly different between urban and rural environment

(p =.001): There were a higher proportion of low alcohol consumption is rural area (13.3% compared to 11.8%) while in urban area there is more mid (11.4% Vs. 7.7%) and high consumption (3.1% Vs. 2.4%).

In a multivariable analysis (Table 3), first concerning the alcohol consumption there is a statistically significant gradient effect of the age (AOR = 1.52 [1.24 – 1.87], 1.88 [1.49 – 2.36] and 2.31 [1.68 – 3.17] for the 35-44, 45-54 and 55-64 years old respectively compared to the 25-34 years old group). There is also an important gradient effect associated with tobacco consumption (AOR = 3.88 [1.74 – 8.67] for subjects smoking more than 10 cigarettes per day). Another risk factor is the education level (AOR = 1.47 [1.13 – 1.91] and 2.60 [1.47 – 4.58] for primary and secondary levels respectively, compared to no education).

Table 3: Factors associated with alcohol and abusive alcohol consumptions in population aged 25 – 64 years.

Variables	Alcohol consumption			Abusive alcohol consumption		
	N	COR (95%CI)	AOR (95%CI)	n	COR (95%CI)	AOR (95%CI)
Age groups						
25 years to 34 years	413	1		41	1	
35 years to 44 years	303	**1.38 [1.12 – 1.72]****	**1.52 [1.24 – 1.87]*****	30	1.26 (0.68 – 2.33)	1.55 (0.84 – 2.86)
44 years to 54 years	234	**1.61 [1.28 – 2.02]*****	**1.88 [1.49 – 2.36]*****	30	1.41 (0.74 – 2.69)	1.91 (0.95 – 3.85)
55 to 64	179	**1.94 [1.43 – 2.63]*****	**2.31 [1.68 – 3.17]*****	19	0.93 (0.40 – 2.16)	0.99 (0.38 – 2.57)
Sex						
Female	496	1		22	1	
Male	633	**1.50 [1.23 – 1.83]*****	1.17 [0.91 – 1.52]	98	**4.28 (2.30 – 7.81)*****	**2.53 (1.38 – 4.68)****
Living environment						
Urban	250	1		30	1	
Rural	879	0.78 [0.56 – 1.10]	1.08 [0.71 – 1.64]	90	0.55 (0.26 – 1.13)	0.68 (0.34 – 1.36)
Education						
None	814	1		81	1	
Primary	198	**1.37 [1.07 – 1.75]***	**1.47 [1.13 – 1.91]****	19	1.47 (0.70 – 3.04)	0.89 (0.43 – 1.86)
Secondary	114	**2.46 [1.63 – 3.72]**	**2.60 [1.47 – 4.58]*****	19	**2.64 (1.27 – 5.50)***	1.25 (0.48 – 3.25)
Marital status						
Single	105	1		17	1	
Married	930	0.67 [0.44 – 1.01]	0.68 [0.44 – 1.03]	93	0.58 (0.29 – 1.16)	0.70 (0.32 – 1.53)
Divorced/Widowed	94	0.84 [0.53 – 1.32]	0.75 [0.45 – 1.26]	10	0.82 (0.26 – 2.56)	1.41 (0.45 – 4.46)
Occupational status						
Wage earner	102	1		20	1	
Self-employed	777	**0.48 [0.34 – 0.68]*****	0.85 [0.58 – 1.27]	4	**0.40 (0.19 – 0.82)**	0.51 (0.19 – 1.50)
Jobless	32	**0.44 [0.24 – 0.80]****	0.53 [0.28 – 0.99]	95	**0.06 (0.01 – 0.48)****	**0.05 (0.01 – 0.47)****
House maker	218	**0.41 [0.28 – 0.61]*****	0.95 [0.58 – 1.56]	1	**0.05 (0.01 – 0.24)*****	**0.14 (0.02 – 0.78)***
Tobacco consumption						
No	952	1		86	1	
< 5 cigs/day	67	**1.51 [1.08 – 2.09]***	**1.52 [1.08 – 2.15]***	14	**2.37 (1.02 – 5.50)***	1.71 (0.68 – 4.26)
5 – 10 cigs/day	70	**2.30 [1.57 – 3.36]*****	**2.29 [1.54 – 3.39]*****	11	1.87 (0.80 – 4.37)	1.20 (0.51 – 2.86)
> 10 cigs/day	40	**4.21 [1.93 – 9.13]*****	**3.88 [1.74 – 8.67]*****	9	**4.04 (1.07 – 15.23)****	2.26 (0.63 – 8.05)

For the alcohol consumption analysis, a ordinal logistic regression was performed, for abusive alcohol consumption analysis, a logistic regression was used with the reference are low and mid alcohol consumption.

* p = 0.05, ** p = 0.01, *** p < 0.001

COR = Crude Odds Ratios, AOR = Adjusted Odds Ratios.

Finally, we computed the risk of having abusive consumption in those consuming alcohol. Sex is an important risk factor with increased risk for the men compared to women (AOR = 2.53 [1.38 – 4.68]) as well as the occupational status with jobless people and housemaker associated with a decreased risk of having abusive consumption (AOR = 0.05 [0.01 – 0.47] and AOR = 0.14 [0.02 – 0.78] respectively).

The risk also varied from the different regions, AORs for the different regions of the countries are presented in Table 4. We observed that the *Sud-Ouest* region has a higher risk of consumption compared to the rest of the country. In the *Sahel*, *Est* and *Haut-Bassin*, the risks of consumption are significantly lower.

Table 4: Risk of alcohol consumption in the different regions of the country.

Region	N	Alcohol consumption	
		n	AOR (95%CI)
Centre	548	168	Ref
Boucle du Mouhoun	469	147	1.23 [0.63 – 2.39]
Cascades	166	45	0.58 [0.28 – 1.19]
Centre-Est	398	72	0.51 [0.24 – 1.06]
Centre-Nord	434	87	0.67 [0.35 – 1.29]
Centre-Ouest	390	121	0.94 [0.45 – 1.99]
Centre-Sud	217	51	0.66 [0.28 – 1.54]
Est	376	63	0.40 [0.22 – 0.74]**
Haut-Bassin	509	89	0.39 [0.24 – 0.66]***
Nord	420	72	0.66 [0.28 – 1.58]
Plateau Central	236	62	1.01 [0.37 – 2.75]
Sahel	315	4	0.02 [0.01 – 0.15]***
Sud-Ouest	214	148	5.63 [1.98 – 16.01]***

Model is adjusted for age, sex, living environment, education, marital status, occupational status and tobacco consumption.

* p = 0.05, ** p = 0.01, *** p < 0.001

Discussion

We report here the results of the first nationally representative survey on the prevalence and risk factors for alcohol consumption in Burkina Faso.

The overall prevalence of people with abusive alcohol consumption is 2.7% [2.0 – 3.7]. This consumption is lower compared to other African countries [12] and the rest of the world [13]. This prevalence might be underestimated because even though Burkina Faso is a laic country, the majority of its inhabitants have a religious faith that prohibits alcohol consumption that could prevent some people from declaring their

alcohol intake, this might be particularly truth in the Sahel region. In addition, alcohol consumption is blamed by society and could also lead to an under-declaration (positive social perception bias) [31].

We also found differences in the different regions of the country with the highest consumption found in the *Sud-Ouest* region. In this region almost each household produces local beer (*'dolo'*) this might explain this observation. The income disparities and the alcohol availability between the different regions could explain those differences [32]. From a public health perspective this region also have the highest prevalence of Hepatitis B and C [33]. The inhabitants of these regions seem to cumulate the hepatotoxic risk of Hepatitis and alcohol consumption. We found a null prevalence in the Sahel region, this is an entirely Muslim region and the desirability bias may be more important compared to other region.

We also found gender differences with an increased risk in men compared to women for abusive alcohol consumption. It is important to specify here that, following the WHO guidelines, the thresholds used to define the different levels of alcohol consumption are different for men and women (33 to 50% lower for women compared to men).

In most countries, the prevalence is higher in men compared to women [17, 34], but when adjusting for multiple factors such as social supports and financial aspects, this effect seems less important. Compared to men, more women are lifetime abstainers, drink less, and are less likely to engage in problem drinking, develop alcohol-related disorders or alcohol withdrawal symptoms. However, women drinking excessively develop more medical problems. Biological (sex-related) factors, including differences in alcohol pharmacokinetics as well as its effect on brain function and the levels of sex hormones, may contribute to some of those differences [35]. Since pregnant women are particularly vulnerable, we performed sub-group analysis. A subgroup of 299 out of the 2,449 (12.2%) women were pregnant during the survey, amongst them, 6 (3.9%) reported alcohol consumption, which is statistically lower compared to non-pregnant women (12.6%, $p = .001$).

Interestingly we observed that the age was significantly associated with alcohol consumption with a gradient effect of age on alcohol consumption but the risk of abusive consumption is not influenced by age. The influence of age on alcohol consumption is still unclear and not well documented in the literature, except for binge drinking, where young adults are the most at risk [36]. However, this result should be interpreted carefully, considering our study design. On the other hand, the results could be the results of preventive campaigns as reflected by a cohort effect A large Australian study including 7 cross-sectional waves showed indeed that male cohorts born between the 1965 and 1974 and female cohorts born between 1955 and 1974 reported higher rates of drinking participation ($P < 0.05$), while the most recent cohorts (born in the 1990s) had lower rates of participation ($P < 0.01$) [37].

Concerning the risk of switching to an abusive consumption among drinkers only two factors have been identified: the risk in increased in male (as for the general consumption) and decreased with the occupational status, probably due to financial constraints.

The association with tobacco consumption is probably one of the most important from a public health view because of the comorbidities and the double burden it presents for the population. In a previous study, we identified people most at risk of tobacco consumption in Burkina Faso: tobacco smoking among men was significantly associated with increased age and alcohol consumption. Analysis of risk factors for other tobacco use stratified by gender show that age, education, residence and alcohol consumption were significantly associated with consumption for women, age and alcohol consumption for men [24].

As recommended by the WHO, in this paper we presented risk factor associated to abusive alcohol consumption because of the proven negative effects. It is, however, interesting to note that from a medical point of view a limited and reasonable alcohol consumption could have some health related benefits: for example the relation between dementia and cognitive disorders is not linear and limited alcohol consumption has a protective role for dementia [38–40] or the protective effect of alcohol on cardio vascular risk, previously known as *'the French paradox'* [41–43]. However, these results must be interpreted with caution, especially since it is known that even in low doses, alcohol consumption transiently increases the risk of cardiovascular accidents [44]. Another important point is that considering the prevention side experiences showed that adopting a too strong position by prohibiting any consumption or behavior will lead to poor results [45, 46]. Considering these two aspects low alcohol consumption could be considered as acceptable.

The main limitation of this study is that alcohol (and tobacco) consumptions were obtained during interviews and is therefore dependent on the faith of the participants. There is therefore, both a risk of memory bias and social desirability, probably more marked during pregnancy. It can thus be estimated that the numbers and prevalence obtained in this survey underestimate the actual consumption. Another potential limitation is that some well-known risk factors for alcohol consumption were not included in the study because data on these variables have not been collected during the STEPS survey. Part of such variables is socioeconomic status. It is a transversal study; therefore there is a risk of survival bias indicating that elder participants with high consumption may die prematurely due to this consumption [47].

Despite these limitations, given the study design (cluster sampling design) and the sample size, the results of this study can be extended to the whole of Burkina Faso.

Conclusion

In this study, we reported on the burden of alcohol consumption and associated risk factors in a nationally representative sample of adults in Burkina Faso. Our data showed an important burden of alcohol consumption in Burkina Faso. Tobacco consumption is an important modifiable risk factor associated with alcohol consumption. Zone specific interventions are needed given the higher burden in urban centers and in some specific regions such as the *Sud-Ouest* region. Health policies in Burkina Faso must henceforth account for the control of alcohol and tobacco consumption since there is a strong

relationship between those two important risk factors of NCDs. Alcohol policies that regulate the physical availability of alcohol are associated with lower alcohol consumption in low- and middle-income countries [48] and should, therefore, be implemented.

List Of Abbreviation

DHS: Demographic and Health Surveys

NCD: Non-communicable disease

SSA: sub-Saharan Africa

STEPS: WHO STEPwise approach to surveillance

WHO: World Health Organization

Declarations

Ethics approval and consent to participate Consent for publication

The protocol of the STEPS survey was reviewed and approved by the Ethics Committee for Health Research of the Ministry of Health of Burkina Faso, which gave clearance in accordance with regulations in force (Deliberation No. 2012–12- 092 of 05 December 2012). Written informed consent was systematically sought and obtained from all participants before inclusion in the study. The confidentiality of study participants was fully respected and the analyses performed did not identify any participant.

Availability of data and materials

The dataset of the STEPS survey that was used in this research is available at the Ministry of Health upon request. Any request to reanalyze the data can be directed to Dr Brice Bicaba.

Acknowledgments

The authors are thankful to all the people involved in the STEPS survey. Bruno Bonnechère thanks people who help him during the analysis of the data in Burkina Faso.

Competing interests

The authors declare that they have no competing interests.

Funding

Bonnechère Bruno received a travel grant from ARES (https://www.ares-ac.be/fr/) to conduct the data analysis in Burkina Faso (second analysis of the STEP survey), interpret the data with local epidemiologists and write the manuscript. Kadari Cissé is funded by ARES.

Authors' contributions

BB and FKS conceived the study. BB, SS and CK proposed an early draft of the paper. FKS, SK, and ST made substantial contributions to the conception and design, analysis and interpretation of the data. KFS, KS and ST contributed significantly to revise the manuscript. All authors read and approved the final manuscript.

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Figures

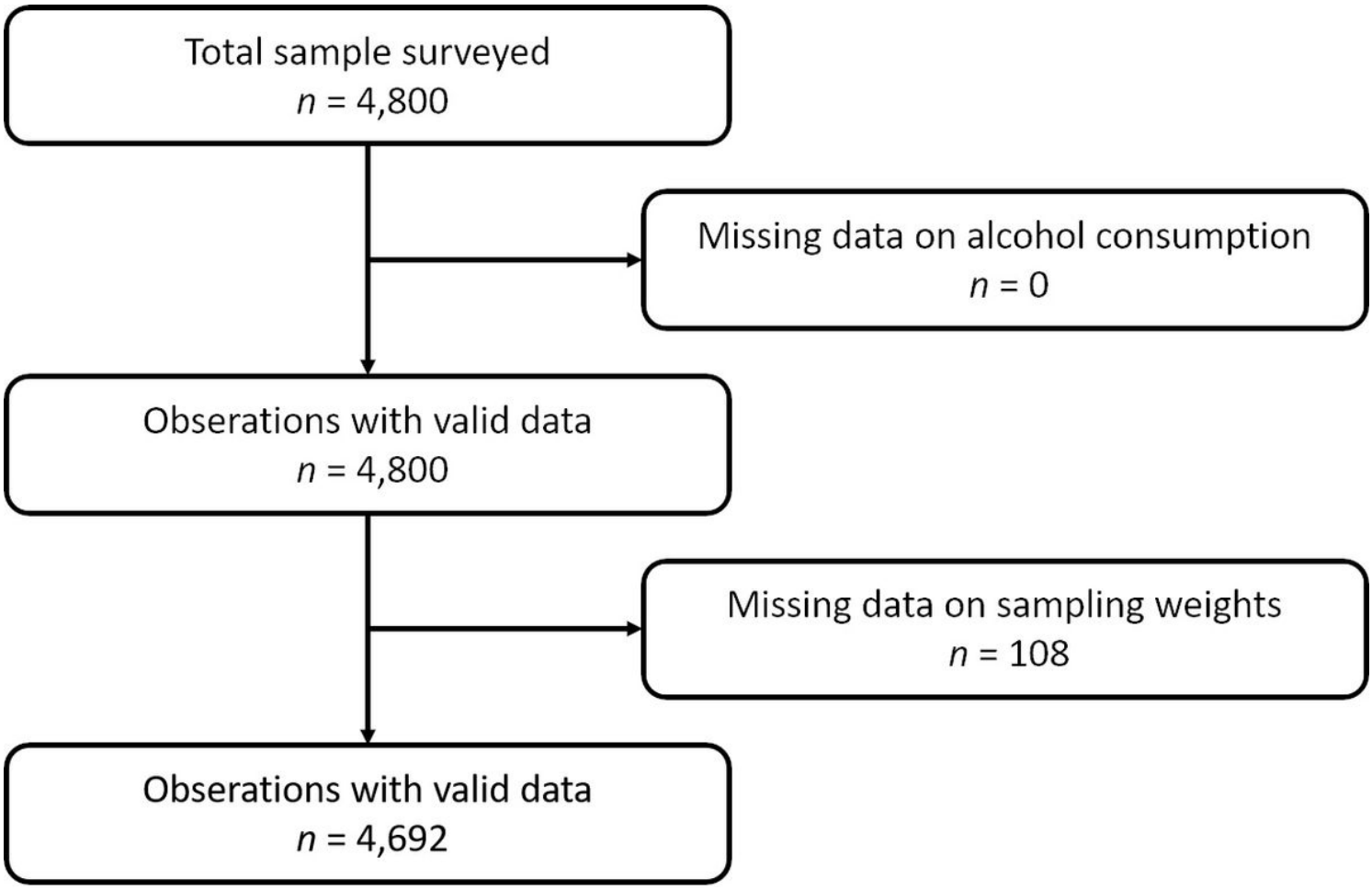

Figure 1

Consort Diagram describing study participants, exclusions and analytic sample size.

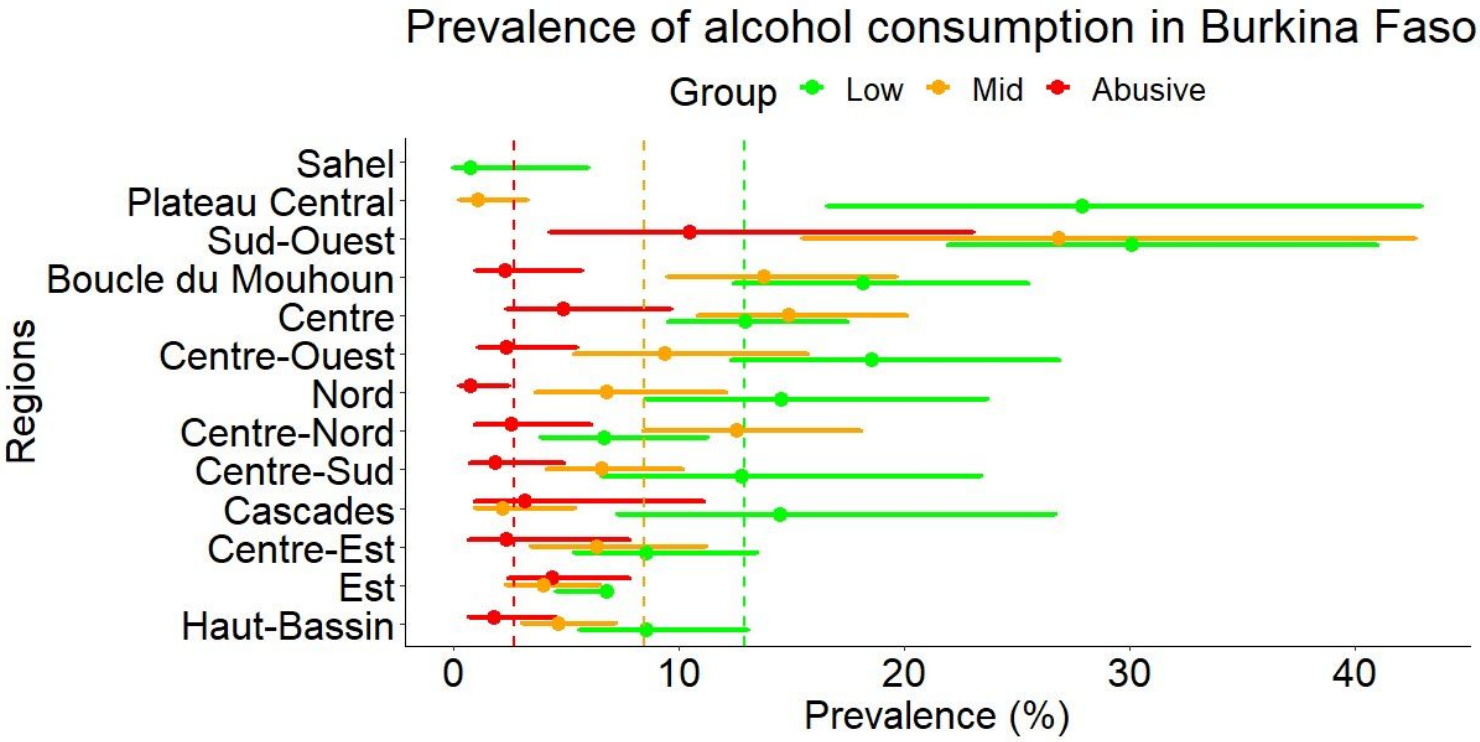

Figure 2

Prevalence of the level of alcohol consumption in the different regions of Burkina Faso. Vertical lines indicate the mean prevalence for the whole country.

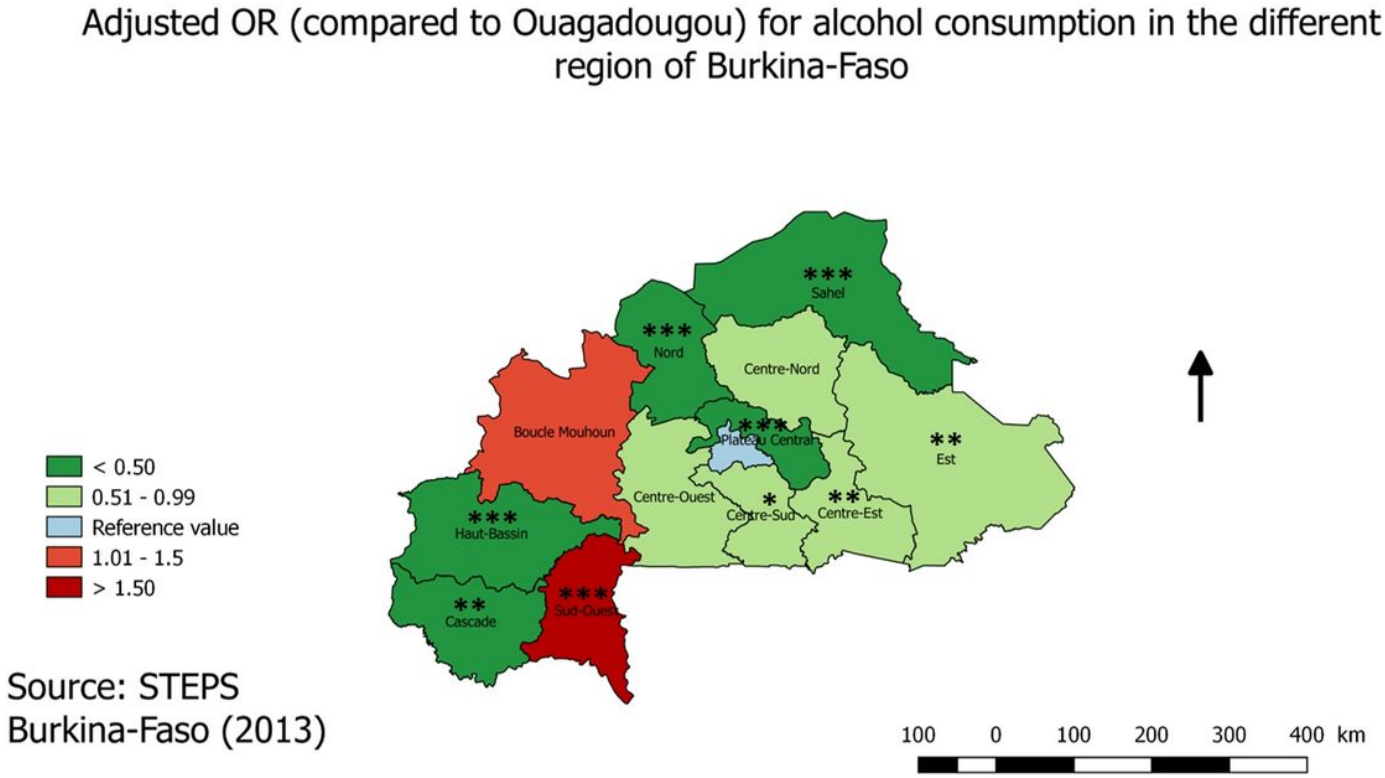

Figure 3

OR Adjusted for age, education, marital status, occupational status and tobacco consumption for alcohol consumption compared to the center region for the whole population * indicates statistically significant differences. Raw map has been downloaded and used with permission from GADM (https://gadm.org/) and updated with the result of this analysis.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- STROBEAlcohol.doc