

Article

Alcohol Control Policies in 46 African Countries: Opportunities for Improvement

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Abstract

Aims: There is little information on the extent to which African countries are addressing alcohol consumption and alcohol-related harm, which suggests that evaluations of national alcohol policies are needed in this region. The aim of this article is to examine the strength of a mix of national alcohol control policies in African countries, as well as the relationship between alcohol policy restrictiveness scores and adult alcohol per capita consumption (APC) among drinkers at the national level.

Methods: We examined national alcohol policies of 46 African countries, as of 2012, in four regulatory categories (price, availability, marketing and drink-driving), and analyzed the restrictiveness of national alcohol policies using an adapted Alcohol Policy Index (API). To assess the validity of the policy restrictiveness scores, we conducted correlational analyses between policy restrictiveness scores and APC among drinkers in 40 countries.

Results: Countries attained a mean score of 44.1 of 100 points possible, ranging from 9.1 (Sao Tomé and Príncipe) to 75.0 (Algeria), with low scores indicating low policy restrictiveness. Policy restrictiveness scores were negatively correlated with and APC among drinkers ($r_s = -0.353$, $P = 0.005$).

Conclusions: There is great variation in the strength of alcohol control policies in countries throughout the African region. Tools for comparing the restrictiveness of alcohol policies across countries are available and are an important instrument to monitor alcohol policy developments. The negative correlation between policy restrictiveness and alcohol consumption among drinkers suggests the need for stronger alcohol policies as well as increased training and capacity building at the country level.

INTRODUCTION

Drinkers in African countries consume 13% more alcohol per capita than the average among drinkers globally (WHO, 2014a), and per unit of alcohol consumed, people living in under-resourced countries experience a greater burden of disease compared with those in higher income countries (Rehm *et al.*, 2009). According to the World Health Organization (WHO), although a large proportion of the African

population abstains from alcohol (58%), alcohol consumption among African adults, aged 15 and older, is projected to increase throughout the next decade (WHO, 2014a). However, alcohol is already a leading risk factor for death and disability in sub-Saharan Africa (Lim *et al.*, 2012). The changing alcohol environment in Africa suggests the need for stronger alcohol control policies to reduce alcohol-related harm among drinkers, as well as to protect those who abstain from alcohol.

Numerous alcohol control policy options have been found to reduce alcohol consumption and related health and social problems (Room *et al.*, 2005; Anderson *et al.*, 2009a; Babor *et al.*, 2010). Evidence-based policy options include regulating alcohol's availability (e.g. reducing outlet density, and decreasing days and hours of sales), reducing alcohol's affordability (e.g. increasing the price through taxation), restrictions on alcohol marketing, and drink-driving countermeasures (e.g. maximum blood alcohol concentration (BAC) limits of ≤ 0.05 g/dl) (Babor, 2010).

In 2010, the WHO's *Global Strategy to Reduce Harmful Use of Alcohol*—endorsed by the World Health Assembly (WHO, 2010), and the *Regional Strategy on Reduction of the Harmful Use of Alcohol*—endorsed by the Regional Committee of the African Region (WHO Regional Office for Africa, 2010), proposed evidence-based strategies to reduce the harmful use of alcohol. There is little information available on the extent to which African countries have implemented strategies to control harmful alcohol consumption. Evaluations of the national alcohol policy environments across the region are therefore needed to monitor progress toward implementing the WHO's strategies and to identify areas where countries could strengthen their prevention policies. Despite the conceptual, methodological and political challenges when comparing alcohol policies across countries (Ritter, 2007; Paschall *et al.*, 2009), recent studies have developed measurement scales that provide a framework for such analyses (Karlssohn and Osterberg, 2001; Babor and Caetano, 2005; Brand *et al.*, 2007; Carragher *et al.*, 2014; Cook *et al.*, 2014; Parry, 2014).

Researchers have reviewed the alcohol policy environment in specific African countries, such as South Africa (Parry, 2010, 2014). However, to our knowledge, no studies have comparatively assessed the restrictiveness of national alcohol policies across the African continent. This article aims to examine the strength of a mix of national alcohol control policies, as of 2012, in African countries. Alcohol policies in four regulatory categories (price, availability, marketing and drink-driving) are evaluated. Additionally, we examine the relationship between alcohol policy restrictiveness scores and adult alcohol per capita consumption (APC) among drinkers at the national level.

METHODS

Data sources

Data on national alcohol policies in 46 African countries collected in the 2012 WHO Global Survey on Alcohol and Health (WHO, 2012) were analyzed. National alcohol policies are made up of a set of individual policies, strategies and implementing actions (WHO, 2007). Country focal points, appointed by their respective Ministries of Health, completed the surveys with a regional response rate of 100%. The survey was offered in English, French and Portuguese. We used data from the 2008/9 survey to assess changes in perceived levels of policy enforcement over time, for which comparable data were available.

National data on alcohol consumed in 2012 were obtained from two main sources: the Global Information System on Alcohol and Health (WHO, 2014b) and published surveys. The measures of consumption included both recorded and unrecorded alcohol. Details on the use of country specific alcohol consumption estimates are described in the *Global Status Report on Alcohol and Health* (WHO, 2014a) and elsewhere (Poznyak *et al.*, 2013).

Alcohol Policy Index

To evaluate the restrictiveness of alcohol policies, we adapted the Alcohol Policy Index (API) from Brand *et al.* (2007). We used an updated

source to identify the levels of evidence for effectiveness for each of the alcohol control policies (Babor *et al.*, 2010) assigning one, two or three 'plus-signs' (i.e. '+', '++', '+++') to indicate evidence for limited, moderate and high effectiveness in the scientific literature (Table 1).

In addition, we developed a comprehensive weighted scoring system, consistent with Brand *et al.*'s methodology, with differences as noted. We ranked countries based on the calculated total restrictiveness score, where higher scores indicate increasing restrictiveness. We used the effectiveness ratings to assign weights of 1, 2 or 3 to each of the alcohol control policies included in the API (e.g. policies given one plus-sign received a weight of 1 and policies with three plus-signs received a weight of 3). We created a scale that ranged from 0–100 points, using points proportionate to the assigned weights across the alcohol control policies. Due to available data, we included four regulatory categories (rather than the five categories used by Brand *et al.*, omitting the 'drinking context'). The control policies within each of the categories also differed. To design a scale that reached a score of 100, our scoring system with ten control policies was as follows: $(4.546 \text{ points} \times 2 \text{ policies with limited effectiveness}) + (9.091 \text{ points} \times 4 \text{ policies with moderate effectiveness}) + (13.637 \times 4 \text{ policies with high effectiveness}) = 100 \text{ points}$.

We included 10 main control policies in the API. Six of the 10 were comprised of several sub-policies (rather than a single policy) due to policy distinctions by alcoholic beverage type, on- and off-premise restrictions, or marketing media types. When sub-policy data were available, we calculated an average of the sub-policy scores and used the average as the policy-level score in the regulatory category calculations. We assigned countries points proportionate to the restrictiveness of the written policies. We determined the percentage of partial points awarded for intermediate levels of restriction according to the number of restrictiveness categories. For example, the maximum points possible for having alcohol excise taxes was 13.6 points, which we awarded to countries with excise taxes on beer, wine and spirits. Countries that had excise taxes on only one or two beverage types earned 50% of the points, or 6.8 points, and countries without any alcohol excise taxes earned zero points. For policies with four options, points were allocated in four ways. For example, regarding BAC limits, countries were given 100% of the points for BAC limits of 0.00–0.02 g/dl, 67% for 0.03–0.05, 33% for >0.05 , and no points if they had no written BAC policy. We calculated the regulatory category score by summing the points awarded for policies within the category. We derived a weighted mean score by summing the multiplication of each regulatory category score by the percentage of the maximum points possible in that regulatory category. The formula to calculate the weighted mean score was as follows:

$$\text{Weighted mean score} = \text{price scores} \times 18.2\% + \text{physical availability scores} \times 40.9\% + \text{marketing scores} \times 4.5\% + \text{drink-driving scores} \times 36.4\%$$

The total policy restrictiveness score is the sum of the regulatory category points.

For the API, data were obtained for 1000 of the 1012 policies (22 sub-policies \times 46 countries) based on the country level information collected in 2012. Less than 1.0% of the data were missing, including one country (Mauritania) that reported a total ban on alcohol instead of responding directly to the survey questions. Consistent with the WHO methodology (WHO, 2014a), we did not make the assumption that a total ban on alcohol suggests the greatest level of restriction across all regulatory categories, nor that it obviates the need for specific policies. We did not assign scores to countries with missing data on any of the policies and eliminated them from the ranking ($n = 6$). Forty of 46 African Member States (87.0%) were included in the final ranking.

Table 1. Evaluation methods for the Alcohol Policy Index

Regulatory category	Level of evidence for effectiveness <i>Evaluation categories</i>		
	Limited	Moderate	High
Price	Additional levy on specific products <i>No, Yes</i>		Excise tax <i>None, 1–2 beverage types only, all beverages^a</i>
Physical availability		Government monopoly on retail sales <i>None, 1–2 beverage types only, all beverages^a</i> Restrictions on hours and/or days of sales <i>Average between on- and off-premise restrictions (None, Hours or days, Hours and days)</i> Restrictions on outlet density <i>Average between on- and off-premise restrictions (No, Yes)</i>	Minimum legal purchase age <i>Average between on- and off-premise restrictions (None, <18, 18, >18)</i>
Marketing	Restrictions on marketing exposure <i>Overall average level of restriction (None, Voluntary/Self-regulation, Partial, Total Ban) across medias (National television, National radio, Print media and Billboards)</i>		
Drink-driving countermeasures		Sobriety checkpoints <i>No, Yes</i>	Lowered BAC <i>No policy, >0.05, 0.05–0.03, 0.00–0.02</i> Random breath testing <i>No, Yes</i>

Source: Babor T, Caetano R, Casswell S *et al.* (2010) *Alcohol: No Ordinary Commodity*. New York: Oxford University Press.

^aAll beverages included in the survey: Beer, wine, spirits

Data analysis

Descriptive analyses were conducted using SPSS (version 20.0). We examined countries' regulatory categories, selected based on evidence of effectiveness for reducing alcohol-related harms (Babor *et al.*, 2010). We included data on perceived enforcement of existing policies collected in the 2008/2009 and 2012 WHO surveys (WHO, 2012, 2014a,b). The perceived level of enforcement of existing policies was evaluated using a scale from 0 to 10, in which 10 indicated optimal enforcement in both 2008/09 and 2012 surveys.

We tested all variables for normality using Shapiro–Wilk test and found that price ($W = 0.565$, $df = 40$, $P = 0.000$), marketing ($W = 0.714$, $df = 40$, $P = 0.000$) and drink-driving ($W = 0.925$, $df = 40$, $P = 0.011$) were not normally distributed. Therefore, we used the non-parametric Spearman correlation coefficient to test the validity of the API, and calculated the correlation between API and APC among drinkers. Due to very high levels of alcohol abstinence in Africa, and variables (like cultural factors) that can affect consumption, the measure of consumption among drinkers, as opposed to the whole population is the most appropriate to use.

RESULTS

National alcohol policies

African countries have implemented various alcohol control policies in the regulatory categories of price, physical availability, alcohol marketing and drink-driving (Table 2).

Price

Eighty-four percent of the countries had alcohol excise taxes, although fewer adjusted the tax rates for inflation, ranging from 19% of countries that inflation-adjusted taxes on spirits to 26% that inflation-adjusted taxes on beer (Table 2).

Physical availability

The majority of countries had a licensing system for the production and retail sales of alcoholic beverages, varying by beverage type (Table 2). Countries more commonly had on-premise sales restrictions (e.g. bars, restaurants) than off-premise restrictions (e.g. liquor stores). The perceived average level of enforcement among all reporting countries in 2012 was 4.8 for on-premise sales restrictions, and 4.5 for off-premise sales. However, the perceived level of enforcement of on-premise increased by 0.9 points from the 2008/09 survey and the off-premise sales restrictions increased by 1.2 points. The minimum legal purchase age (MLPA) limit ranged from age 15 years for off-premise sales to age 21 years for on- and off-premise sales. Nine (19%) countries did not have a MLPA policy for on-premise sales and 12 (26%) did not have such policy for off-premise sales (excluding Mauritania that has a total ban on alcohol).

Alcohol marketing

The majority of countries (70%) had no legally binding regulations for alcohol marketing (Table 2). Only 15% of the countries had restrictions on alcohol sponsorship and 13% had retail sales promotion

Table 2. National alcohol control policies in 46 African countries

Domain	Alcohol policies	Number of countries (%)
Pricing	1. Alcoholic beverages, adjusted for inflation	Beer/wine/spirits 12 (26%)/10 (21%)/9 (19%)
Taxation	2. Excise tax	Beer/wine/spirits 43 (93%)/41 (89%)/39 (84%)
Physical availability	3. Licensing	Beer/wine/spirits
	a. Production	38 (82%)/30 (65%)/29 (63%)
	b. Licensing for retail sales	41 (89%)/39 (84%)/40 (86%)
	4. Restrictions	Hours/density/location
	c. On-premise Sales	24 (52%)/12 (26%)/26 (56%)
	d. Off-premise Sales	17 (36%)/10 (21%)/21 (45%)
	5. Minimum legal purchase age	None/16–18 years/21 years/total ban
	e. On- premise sales	9 (19%)/33 (71%)/3(6%)/1 (2%)
	f. Off- premise sales	12 (26%)/31 (67%)/2(4%)/1 (2%)
	6. Restricting consumption in public venues	Statutory ban or restrictions/voluntary agreement or self-regulation/no restriction
	g. Health care establishments	33 (71%)/8 (17%)/5 (10%)
	h. Educational buildings	32 (69%)/8 (17%)/6 (13%)
	i. Government offices	33 (71%)/6 (13%)/7 (15%)
	j. Sports events	19 (41%)/7 (15%)/20 (43%)
	k. Leisure events	7 (15%)/10 (21%)/29 (63%)
Marketing	7. Legally binding regulations	
	a. Alcohol advertising	14 (30%)
	b. Product placement	10 (21%)
	c. Alcohol sponsorship	7 (15%)
Drink-driving	d. Sales promotion	6 (13%)
	8. BAC Limits (in g/dl)	None/0.00–0.02/0.05/>0.05
	a. General population	7 (15%)/6 (13%)/9 (19%)/21 (45%)
	9. Sobriety checkpoints	15 (32%)
	10. Random breath testing	24 (52%)

Source: WHO (2012) *Global Survey on Alcohol and Health*. Geneva: World Health Organization.

restrictions. In 2012, the perceived average level of enforcement for existing advertising restrictions was 6.4, up from 4.9 in 2008/09.

Drink-driving countermeasures

Forty-five percent of the countries had a legal BAC limit for drivers in the general population above 0.05 g/dl and 15% did not have a policy based on BAC limits (Table 2). In 2012, the perceived average level of enforcement of drink-driving countermeasures was 4.3, a slight increase from 4.0 in 2008/09. Fifty-two percent of the countries used random breath testing and nearly one-third had sobriety checkpoints.

Policy restrictiveness scores

Table 3 shows the estimated alcohol policy restrictiveness scores from the API by country and regulatory category. As shown in the last column, the countries that have implemented a more restrictive mix of alcohol control policies include Algeria Equatorial Guinea, Lesotho, Liberia, Madagascar and Zambia, while Sao Tomé, Serra Leone, Togo, Gambia, Gabon and Ethiopia appear to have the least restrictive mix of policies. The bottom row of the table provides the mean policy scores across countries for each regulatory category. Of 100 points possible, the mean total restrictiveness score was 44.1, ranging from 9.1 in São Tomé and Príncipe to 75.0 in Algeria.

The apparent restrictiveness of control policies varied across regulatory categories (Table 3). Countries had a mean score of 12.6 out of a possible 18.2 points for pricing policies, representing 69% of the possible points. Of the 40.9 points possible for policies related to physical availability, countries earned 14.6 points (i.e. 36% of the points

possible). Countries earned 14.8 of 36.4 points for drink-driving policies (i.e. 41% of the points possible) and 1.1 of 4.5 points (i.e. 24% of the points possible) for alcohol marketing restrictions.

Correlation between alcohol policy restrictiveness scores and alcohol consumption

To validate the total alcohol policy restrictiveness score, we assessed the correlation between the API variables and the APC among drinkers. For alcohol consumption, the average consumption among drinkers in Africa in 2012 was 16 l of pure alcohol. Levels of consumption vary widely, ranging from 1.94 l in the Comoros to 34.3 l in Chad. We found significant negative correlation between the alcohol policy restrictiveness score and APC among drinkers ($r_s = -0.353$; $P = 0.005$), as well with weighted score ($r_s = -0.332$; $P = 0.005$) and rank ($r_s = -0.357$; $P = 0.005$), indicating that as country's total restrictiveness score or ranking increases, the APC among drinkers decreases.

DISCUSSION

Our findings demonstrate that alcohol control policies have been implemented, to some degree, in all countries. However there is substantial room for improvement across the majority of the continent. For instance, most countries have alcohol excise taxes, yet the effectiveness of these taxes may erode over time, as they are typically not adjusted for inflation. Failure to adjust for inflation means that alcohol becomes cheaper relative to disposable income, which could lead to increased alcohol consumption and related problems (Parry *et al.*, 2003; Elder

Table 3. Estimated alcohol policy restrictiveness scores by country and regulatory category

Countries	Price ^a (max 18.2)	Physical Availability ^b (max 40.9)	Marketing ^c (max 4.5)	Drink-driving countermeasures ^d (max 36.4)	Total restrictiveness score ^e	Weighted mean score ^f	Rank ^g
Algeria	13.6	29.5	4.5	27.3	75.0	24.7	40
Angola	13.6	9.1	1.1	18.2	42.0	12.9	19
Benin	13.6	2.3	0.0	22.7	38.6	11.7	16
Botswana	13.6	18.2	0.4	18.2	50.4	16.6	27
Burkina Faso	13.6	0.0	0.0	NA	NA	NA	NA
Burundi	13.6	6.8	0.0	NA	NA	NA	NA
Cameroon	13.6	15.9	2.3	18.2	50.0	15.7	24
Cape Verde	13.6	13.6	1.9	4.5	33.7	9.8	9
Central African Republic	13.6	22.7	0.0	4.5	40.9	13.4	18
Chad	6.8	13.6	0.4	9.1	29.9	10.1	7
Comoros	13.6	18.2	0.0	27.3	59.1	19.8	32
Congo	13.6	25.0	0.0	0.0	38.6	12.7	17
Cote d'Ivoire	6.8	22.7	0.0	4.5	34.1	12.2	10
Democratic Republic of Congo	13.6	9.1	2.3	13.6	38.6	11.3	15
Equatorial Guinea	13.6	27.3	0.0	27.3	68.2	23.6	39
Eritrea	13.6	13.6	0.0	22.7	50.0	16.3	25
Ethiopia	13.6	13.6	0.4	4.5	32.2	9.7	8
Gabon	13.6	6.8	0.0	4.5	25.0	6.9	6
Gambia	13.6	9.1	2.3	0.0	25.0	6.3	5
Ghana	13.6	9.1	1.1	18.2	42.0	12.9	20
Guinea	13.6	9.1	0.0	13.6	36.4	11.2	12
Guinea-Bissau	13.6	0.0	0.0	NA	NA	NA	NA
Kenya	13.6	29.5	NA	0.0	NA	NA	NA
Lesotho	13.6	25.0	0.0	27.3	65.9	22.6	38
Liberia	13.6	18.2	0.0	31.8	63.6	21.5	36
Madagascar	13.6	27.3	4.5	18.2	63.6	20.5	37
Malawi	18.2	9.1	0.0	27.3	54.5	17.0	30
Mali	0.0	0.0	0.0	22.7	22.7	8.3	4
Mauritania	Total ban	Total ban	Total ban	Total ban	Total ban	Total ban	Total ban
Mauritius	13.6	22.7	4.5	9.1	50.0	15.3	26
Mozambique	18.2	18.2	0.0	18.2	54.5	17.4	29
Namibia	13.6	18.2	0.0	27.3	59.1	19.8	33
Niger	13.6	18.2	4.5	0.0	36.4	10.1	13
Nigeria	13.6	9.1	3.0	9.1	34.8	9.6	11
Rwanda	13.6	18.2	0.8	18.2	50.8	16.6	28
Sao Tome and Principe	0.0	0.0	0.0	9.1	9.1	3.3	1
Senegal	6.8	22.7	4.5	13.6	47.7	15.7	23
Seychelles	13.6	9.1	NA	18.2	NA	NA	NA
Sierra Leone	13.6	0.0	3.4	0.0	17.0	2.6	2
South Africa	13.6	13.6	1.5	9.1	37.9	11.4	14
Swaziland	6.8	27.3	0.0	22.7	56.8	20.7	31
Togo	13.6	4.5	0.0	0.0	18.2	4.3	3
Uganda	13.6	11.4	0.0	18.2	43.2	13.7	21
United Republic of Tanzania	13.6	15.9	0.0	18.2	47.7	15.6	22
Zambia	13.6	20.5	0.0	27.3	61.4	20.8	35
Zimbabwe	13.6	22.7	4.5	18.2	59.1	18.6	34
<i>Mean policy score</i>	<i>12.6</i>	<i>14.6</i>	<i>1.1</i>	<i>14.8</i>	<i>44.1</i>	<i>13.7</i>	

Data are missing on one or more of the policies.

NA, not available.

^aPrice includes policies on additional levy's on specific products and alcohol excise taxes.

^bPhysical availability includes government monopoly on retail sales, restrictions on hours/days of sales, restrictions on outlet density and minimum legal purchase age.

^cMarketing includes national policies to restrict exposure on TV, radio, print and billboards.

^dDrink-driving countermeasures include sobriety checkpoints, lowered BAC and random breath testing.

^eThe total restrictiveness score is the sum of the regulatory category points. Low impact scores indicate countries with the least restrictive policies and high scores indicate countries with the most restrictive policies.

^fWeighted mean score is calculated by summing the multiplication of each regulatory category score by the percentage of the maximum points possible in each regulatory category (e.g. price scores were multiplied by 18.2%, physical availability scores were multiplied by 40.9%).

^gCountry rank position based on total restrictiveness score ($n = 40$). Low scores indicate countries with the least restrictive alcohol policies and high scores indicate countries with the most restrictive alcohol policies.

et al., 2010). With expected economic development in the region and the increasing amount of disposable income, alcohol will continue to become more affordable and therefore people's ability to buy alcohol will also increase (Babor *et al.*, 2010). Additionally, with increases in industrially-manufactured alcoholic beverages (Babor *et al.*, 2015; Jernigan and Babor, 2015), our results also suggest that countries are missing an important source of government revenue.

Approaches to reduce the availability of alcohol, such as licensing systems have also been implemented. However, despite evidence for the effectiveness of other availability policies (Anderson *et al.*, 2009a; Babor *et al.*, 2010), such as restrictions of outlet density, sales prohibitions at specific events, and regulations on the days and hours of sales, these measures have not yet been implemented in the majority of African countries.

In the regulatory category of alcohol marketing, we found substantial variations in the restrictiveness of policies across countries. This may reflect the political unpopularity of such measures, as well as strong lobbying from the global alcohol industry, as has been noted in previous policy studies (Crombie *et al.*, 2007; Gordon and Anderson, 2011; Cook *et al.*, 2014; Ferreira-Borges *et al.*, 2014). A growing body of evidence suggests that alcohol marketing restrictions can effectively reduce harmful consumption among adults and youth (Nelson *et al.*, 2013), and may be most important in high-abstinence populations (Obot, 2013). With the weak or non-existent controls on alcohol marketing in many countries, youth are at increased risk of being exposed to alcohol marketing, which has been associated with increased consumption (Anderson *et al.*, 2009b). Given this situation and the existing difficulties of policy enforcement where such controls exist, the most appropriate alcohol advertising policy to implement in African countries may be a total ban on alcohol advertising, promotion and sponsorship, as is being proposed for South Africa (Jernigan, 2013).

Evidence indicates that establishing a low maximum legal BAC limit and strong, consistent enforcement can reduce traffic injuries and fatalities (Shults *et al.*, 2001). However, our study shows that ~60% of the countries either had a legal BAC limit above 0.05 g/dl or did not have any established BAC limit for driving. Establishing or lowering a national legal BAC limit for drivers is an important policy measure, given the large proportion of the alcohol-related burden of disease for Africa caused by unintentional injuries, including road traffic crashes (Roerecke *et al.*, 2008). Currently South Africa is considering a 0.00 g/dl BAC limit for all drivers (Department of Transport, South Africa, 2015).

Our methods to assess the strength of policies using the API show that it is possible to measure a mix of alcohol control policies in developing countries, adding to the growing body of literature evaluating alcohol control policies worldwide (Karlsson and Osterberg, 2001; Babor and Caetano, 2005; Brand *et al.*, 2007; Cook *et al.*, 2014). Our findings on the correlation between alcohol control policies and APC among drinkers is consistent with existing evidence suggesting that restrictive alcohol control policies may yield reductions in alcohol consumption (Babor *et al.*, 2010). The negative correlation between policy restrictiveness and APC among drinkers, suggests that a stronger policy mix could potentially reduce the APC among drinkers and supports the usefulness of our API methodology.

Our study has several limitations. Data on alcohol policies were collected via reports from country focal points, so it is possible that data collected do not capture all existing alcohol-related policies and regulations. However, efforts have been made to cross-check data with published reports and through a process of approvals from countries to verify the accuracy of the data. Furthermore, data on the

implementation and enforcement were collected, but there may be discrepancies due to variations across different parts of the country or a lack of standardization in the way individual respondents are likely to report on the extent to which policies are implemented or enforced. For this reason, and because measuring enforcement presents a challenge due to the difficulty in securing objective data, we have only used this measure in our descriptive analysis to portray changes in perceived level of enforcement occurring in alcohol policies from 2008 to 2012 (dates of the surveys). This type of analysis has been used before in one attempt to assess alcohol policy development and implementation in Africa (Parry, 2014) but more research is needed on instruments to more accurately measure levels of implementation and enforcement of alcohol policies. Perceived level of enforcement has therefore not been incorporated into our API instrument.

In addition, the cross-sectional nature of our measures does not allow us to assess causality; we cannot be certain that restrictive policies lead to reduced alcohol consumption. Furthermore, our study leaves open the possibility that some of the observed co-variation could be the result of low consumption countries being more prone to adopt restrictive policies because of religious or cultural reasons. We also did not assess the sensitivity of our API instrument. Finally, ~30% of the alcohol consumed in Africa is unrecorded (WHO, 2014a), so our estimates of the correlation between the strength of alcohol policies and consumption are limited by the challenges of measuring alcohol use in each country. Improved methods for estimating unrecorded alcohol are needed.

Nevertheless, our findings have important public health implications, as they provide a way to compare the strength of national alcohol control policies across a large sample of countries in a developing region. This is the first study evaluating a mix of written alcohol policies and their apparent association with alcohol consumption in Africa. Moreover, the study constitutes a much needed first step to monitor alcohol control policy developments in a region where the alcohol environment is rapidly changing. Future research should assess how the enforcement of alcohol control policies influences population level alcohol consumption, and whether the strength of alcohol policies is increasing or decreasing over time. Our study has focused on analyzing alcohol policy measures in countries, as reported by country focal points. Although in our article, we did not discuss the concept of 'alcohol policy', future studies should explore the value of policy approaches currently being used in African countries. Parry (2005) put forth this question and the possible added value of having an explicit and articulated national policy (or strategy), constituted by an organized set of values, principles, and objectives that establishes concrete actions and targets to be attained. Having explicit national alcohol policy in African countries would help make necessary resources more available and reduce the barriers encountered through the implementation of *ad hoc* or fragmented policy measures across different departments and levels of government.

CONCLUSION

The API used in this study is a useful tool for international comparisons and can be used to monitor alcohol policy developments in various regulatory categories. Given the correlation between restrictive alcohol policies and reduced consumption, our study demonstrates the need for stronger alcohol control policies in the African region. Government leaders and decision makers at the country level would benefit from increased training and capacity building that focuses on effective development and implementation of alcohol control policies

to prevent increases in alcohol consumption and related adverse consequences.

AUTHOR CONTRIBUTIONS

C.F.-B., M.B.E., C.D.H.P., S.D. and T.B. contributed to the writing, revision and finalization of the draft. C.F.-B. conceptualized the underlying research and coordinated regional data collection. C.F.-B., M.B.E. and C.D.H.P. were responsible for analyzing data. M.B.E. was responsible for adapting the API methods for use in this study.

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CONFLICT OF INTEREST STATEMENT

None declared.

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