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A COMPARISON OF ALCOHOL USE AND CORRELATES OF DRINKING PATTERNS AMONG MEN AND WOMEN AGED 50 AND ABOVE IN GHANA AND SOUTH AFRICA

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ABSTRACT

Alcohol use is an important part of the health profile of older adults, and little is known about the prevalence and correlates of drinking among this population in Ghana and South Africa. This study aimed to describe and compare the prevalence and correlates of drinking patterns among adults aged 50 and above in Ghana and South Africa, and to determine which correlates explain differences in drinking patterns between the two countries. We used data from the WHO Study on global AGEing and adult health (SAGE) conducted in Ghana and South Africa. The sample of participants aged 50+ was 4289 in Ghana and 3666 in South Africa. Alcohol measures included a self-report of the number of standard drinks consumed over the previous 7 days, from which we constructed the mutually exclusive drinking categories of lifetime abstainers, low risk and at risk drinkers by gender. We used multivariate analysis to identify independent correlates for the different drinking patterns and those contributing to drinking differences between countries. Lifetime abstainers comprised 41.9% and 74.6% of the Ghana and South Africa samples, respectively. Among current drinkers, there were significantly more at risk drinkers among both genders in South Africa compared to Ghana. Factors independently associated drinking patterns differed between countries and by gender, although similarities included religion and smoking. Smoking status contributed to the difference in drinking patterns between Ghana and South Africa more than socio-demographics. Different patterns of drinking and associated correlates exist among older adults between Ghana and South Africa, and differences in drinking patterns were more strongly associated with smoking than socio-demographics. Drinking may increase in Ghana as economic development continues, although other health behaviors such as smoking may also play an important role and should be monitored in future surveys.

INTRODUCTION

Diverse patterns of drinking alcohol exist in Africa, and use is generally most common among middle-aged and older adults (Clausen, Rossow, Naidoo, & Kowal, 2009). Drinking alcohol in older age can influence the symptom severity and disease progres-

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sion of chronic conditions such as cancer and cardiovascular diseases common among older adults (Moore et al, 2006, Parry, Patra, & Rehm, 2011). Further, different drinking patterns, such as moderate consumption or heavy drinking, can have differential health consequences among middle-aged and older adults relative to younger populations (Klatsky 2007, Russell, Cooper, Frone, & Welte, 1991).

Changes at the personal or societal level can change the ways in which one uses alcohol (Room, 2006, Combes, Gerdtham, & Jarl, 2011), such that comparisons between societies that have undergone different degrees of economic change can allow for projections of alcohol trends at different developmental stages. Ghana and South Africa represent two distinct places on the scale of national economic development in Africa. The World Bank classifies South Africa as an upper-middle income country, and Ghana was recently upgraded to a lower middle income classification (World Bank, 2011). Ghana currently has a stable government, and will likely develop further in the coming years. Some alcohol regulations exist, and the government is in collaboration with various stakeholders, including the alcohol industry, to develop a national alcohol policy (AfroNews, SABMiller). These circumstances make this a crucial time for observing where alcohol use stands today and projecting possible future trends through comparisons with other countries in the region that are more economically developed, such as South Africa. General population estimates present Ghana with "moderate" consumption and South Africa with "hazardous" consumption, characterized by a higher rate of binge drinking (Martinez, Røislien, Naidoo, & Clausen, 2011). However, drinking patterns among older adults in both Ghana and South Africa are lacking, and there is a gap in knowledge on the differences in the associated factors for drinking between countries at different stages of development in the region. Identifying commonly co-occuring and modifiable behavioral factors, such as tobacoo smoking, would present an opportunity to target interventions for risky health behaviors concomittently and with potential synergistic effects.

The purpose of this study is to compare alcohol use and associated factors among men and women aged 50 and above in Ghana and South Africa. We aim to observe the prevalence of different patterns of drinking, describe differences in determined associated factors, and to identify which factors contribute to differences in drinking patterns between Ghana and South Africa.

METHOD

Data collection

Data were collected through Wave I of the Survey on Global Ageing and Adult Health (SAGE) version 1.1.0, developed and implemented by the World Health Organization. The Survey was conducted in 2007-2009 in six countries, including Ghana and South Africa. The Survey collected individual data from nationally representative samples using a multi-stage cluster sampling design, approaching respondents aged 18+ years and oversampling among those aged 50 and above. Oversampling was achieved by having a target sample of 50+ households 5 times larger than that for younger households, and inviting all 50+ persons in an older household to participate. A standardized questionnaire collected data, and included measures of risk factors for health and current health status. SAGE protocols and procedures were approved by the ethics committees in each participating country and informed consent was obtained from all participants. The SAGE Survey is described in detail elsewhere (World Health Organization [WHO], 2011).

Sample

A total of 5092 participants comprised the Ghana sample, and 4037 the South Africa sample. In Ghana, 4289 (84%) were 50+ years of age, and 3666 (91%) in South Africa, for a total sample of 7955 persons aged 50 and above.

Alcohol measures

Alcohol measures included lifetime abstinence based on the response to the question "have you ever consumed a drink that contains alcohol?". If the participant responded positively, they were asked if they had consumed in the last 12 months and further queried on the number of standard drinks consumed on each of the previous 7 days. Based on these answers we made the following mutually exclusive frequency (F)-based variables: lifetime abstainers (never had a drink), previous drinkers (ever had a drink but not in the last 12 months), and 12 month drinkers (had a drink in the last 12 months but not in the last 7 days). We also constructed two mutually exclusive quantity-frequency (QF)-based variables among respondents who reported alcohol use in the last 7 days: low risk drinkers, defined as only 1-2 drinks per day over the last 7 days and no more than 7 in total for women and 14 in total for men, and at risk drinkers, defined as either at least 4 drinks on one day of the previous 7 for women and 5 drinks on one day for men, or 8 drinks in total for women and 15 for men. These definitions are based on the guidelines from the NIAAA for adult men and women (National Institute on Alcohol Abuse and Alcoholism, 2003). A country specific showcard was used with pictures to illustrate to the participant what was meant by a "standard drink", including alcohol equivalents, i.e. – 1 bottle of beer is 1 standard drink.

Other measures

The question "do you currently use any tobacco products?" was used to define current smokers as those who responded "yes, daily" and "yes, but not daily". Self-assessed health was based on the question "in general, how would you rate your health today?", and we constructed a dichotomous variable of self assessed good health to represent very good and good responses versus moderate, bad and very bad responses. Any chronic illness in the last 12 months was based on self-reported symptoms in the previous 12 months for arthritis, angina, diabetes, chronic lung disease and asthma.

Statistical Analysis

This is a secondary analysis of data from Wave I of the SAGE Survey. All data were weighted, with post-stratification adjustments for age and gender based on UN population estimates. Given the documented differences in drinking patterns between men and women, all analyses were stratified by gender. Frequencies are presented as weighted proportions, weighted means with standard errors, and sample sizes are unweighted raw numbers. Prevalences for lifetime abstainers, previous drinkers and 12 month drinkers are presented out of the total sample, and low risk and at risk drinkers are presented out of respondents who reported drinking in the last 7 days. Comparisons are presented among the two countries by gender. We estimated bivariate associations between sociodemographics, other variables of interest and the different F- and QF-based drinking variables using the Pearson chi-square test of independence, and we estimated adjusted associations with multinomial regression models relative to lifetime abstainers for each country by gender. To explore if and to what extent sociodemographic and health measure variables explained differences in QF-based drinking variables between the two countries, we fitted logistic regressions among the whole sample for country assignment in age adjusted models and models additionally adjusted for marital status, religion, ethnicity, education, work status, having any chronic illness in the last 12 months, self assessed good health and a final model further including smoking.

Upon descriptive analysis, the observed total number and weighted proportion of previous drinkers in South Africa was 51 and 1.5%, respectively. This group did not differ significantly on any sociodemographic variable from persons who drank in the last 12 months but not in the last 7 days (12 month drinkers), and was thus included in this group for all statistical analysis for South Africa. The resulting sample size and weighted proportion of the 12 month drinker group for South Africa was 248 and 12.0%, respectively.

Approximately 10% of the cases were missing data on ethnicity and religion in South

Africa. We used multiple imputation to handle these missing data. Correlation matrices between missingness for ethnicity and religion and other covariate values showed data were missing at random. We imputed 10 datasets using multinomial regression models for ethnicity and religion including all independent, dependent and structural sampling variables (ie – strata, probability sampling unit, weights) in the model. We used the imputed datasets for all the regression models.Statistical analysis and imputation was conducted using STATA version 11.0 (StataCorp, 2009), using the survey (svy) and multiple imputation (mi, mi svyset) command structures.

RESULTS

Prevalences of both the F-based and QF-based variables differed significantly between Ghana and South Africa (Table 1). Ghana and South Africa also differed significantly ($p<0.001$) on several sociodemographic and health measure variables, where South Africa had more people between 50 and 65 years of age (66.8% vs 55.5%), who were ever educated (75.3% vs 46.2%), Christian (86.4% vs 69.7%), urban residents (65.2% vs 41.0%), not currently working (65.0% vs 29.9%), did not have a chronic illness in the last 12 months (44.6% vs 34.9%), and were current smokers (23.8% vs 10.7%).

Prevalence of drinking

Lifetime abstention was higher among women than men in both countries, and in South Africa compared to Ghana in total (74.6% vs. 41.9%, $p<0.001$). Overall, being a previous drinker and 12 month drinker was more common in Ghana than South Africa ($p<0.001$), and there were no statistically significant gender differences in either country on these measures. Among those who ever drank, there were were 303 (33.7%) who drank in the last 7 days among women in Ghana, 175 (36.3%) among women in South Africa, 875 (56.1%) among men in Ghana and 315 (54.5%) among men in South Africa. Among those who drank in the last 7 days, estimates of the QF-based drinking variables, that is, 'low risk drinker' and 'at risk drinker' differed statistically significantly between South Africa and Ghana, where low risk drinkers were more common in Ghana (74.4% vs 62.8%) and at risk drinkers were more common in South Africa (37.2% vs 25.6%). There were no statistically significant differences between men and women on both the QF-based drinking variables in Ghana but there was a significantly higher proportion of at risk drinking among women relative to men in South Africa.

Table 1: Drinking prevalence by country and gender

Drinking status	Ghana			South Africa			
	Women (n=2052) % (SE)	Men (n=2237) % (SE)	Total (n=4289) % (SE)	Women (n=2108) % (SE)	Men (n=1558) % (SE)	Total (n=3666) % (SE)	p-value
Lifetime abstainer	52.2 (1.9)	32.5 (1.8)	41.9 (1.5)*	80.9 (1.5)	66.5 (2.1)	74.6 (1.4)*	0.000
Previous drinker	12.7 (1.0)	12.0 (0.8)	12.4 (0.7)	1.4 (0.4)	1.6 (0.5)	1.5 (0.3)	0.000
12 month drinker	18.9 (1.2)	17.6 (1.0)	18.2 (0.8)	10.8 (1.1)	13.6 (1.2)	12.0 (0.8)	0.000
Drank in the last 7 days	16.1 (1.3)	37.9 (1.7)	27.5 (1.3)	6.9 (0.9)	18.2 (1.7)	11.9 (1.0)	0.000
Low risk drinker[a]	73.9 (3.2)	74.7 (1.9)	74.4 (1.6)	52.8 (6.5)	67.6 (4.2)	62.8 (3.7)*	0.002
At risk drinker[a]	26.1 (3.2)	25.3 (1.9)	25.6 (1.6)	47.2 (6.5)	32.4 (4.2)	37.2 (2.1)*	0.002

[a] proportion estimated over persons who drank in the last 7 days.
*chi square test of independence between men and women, significant at the $p\leq0.05$ level.
p-values presented are for chi square tests between country totals.

Table 2: Prevalence of drinking patterns among adults aged 50 and above in Ghana by selected demographics and gender

Demographics	Women (n=2052)										Men (n=2237)										Total (N=4289)
	Lifetime abstainer		Previous drinker		12 month drinker		Low risk drinker		At risk drinker		Lifetime abstainer		Previous Drinker		12 month drinker		Low risk drinker		At risk drinker		
	(%)[a]	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	n[b] (%)[c]
Age (years)																					
50-64	51.4	1.9	48.5	3.6	57.8	2.5	59.8	3.7	69.0	5.8*	51.0	2.7	44.6	3.9	43.1	3.1	42.5	2.2	35.4	4.0*	**2321 (54.5)**
Married	30.3	1.8	25.3	4.0	31.1	2.9	31.7	3.9	44.3	7.2	87.5	1.5	87.7	2.1	80.5	2.3	82.8	1.6	84.3	2.9	2422 (58.9)
Ethnicity																					
Akan	60.2	2.9	52.4	4.2	47.4	3.5	30.7	4.2	39.4	7.0*	38.0	3.4	51.6	3.5	57.3	3.3	42.1	3.0	50.3	4.5*	2054 (48.7)
Ewe	4.7	0.8	8.9	2.5	13.2	3.0	11.5	2.1	6.4	3.2	4.7	1.2	5.0	1.6	8.5	1.5	8.0	1.3	9.6	2.5	291 (7.3)
Ga-Adangbe	7.0	1.1	15.9	2.7	14.2	2.4	16.8	2.9	12.3	4.1	5.7	1.1	17.0	3.1	8.1	1.6	12.4	1.9	13.5	2.9	437 (10.5)
Other	28.1	2.3	22.9	3.7	25.3	3.0	41.1	4.8	41.9	8.3	51.6	3.8	26.5	3.3	26.2	2.9	37.6	2.9	26.6	4.3	14.3 (33.5)
Religion																					
None/other	3.1	0.6	5.4	1.8	5.4	1.4	3.8	1.4	9.9	4.4*	4.0	0.9	3.1	1.0	6.6	1.5	9.0	1.7	16.7	3.1*	**240 (5.6)**
Christian	71.9	2.4	88.5	2.7	80.9	2.4	69.2	3.7	61.6	9.1	46.0	3.6	83.8	2.5	78.8	2.4	67.5	3.0	71.5	3.5	**2942 (69.7)**
Muslim	21.2	2.4	1.9	0.9	2.2	0.8	39.3	1.2	5.8	2.9	48.5	3.9	6.8	1.6	5.5	1.2	4.1	1.1	3.0	1.1	**678 (15.8)**
Indigenous	3.8	0.9	4.3	1.7	11.5	2.0	23.1	3.1	22.8	9.3	1.5	0.5	6.4	2.0	9.1	1.6	19.4	2.4	8.8	1.9	**416 (8.8)**
Ever schooled	30.6	1.8	45.8	3.9	41.2	3.1	30.7	3.8	31.7	6.3*	42.7	2.9	68.2	3.4	66.7	3.1	56.9	2.8	73.1	3.7*	**1932 (46.2)**
Residency																					
Rural	57.9	2.1	48.8	4.3	58.4	3.2	66.8	4.5	71.6	5.6	53.1	3.3	55.5	3.3	59.6	2.8	67.4	2.4	61.6	4.4*	**2535 (59.0)**
Currently working	67.0	1.8	55.4	3.3	66.1	3.0	70.7	3.3	79.9	5.4*	71.3	2.3	66.7	3.3	70.0	2.9	76.5	2.2	87.5	2.7*	**2963 (70.1)**
Any chronic illness <12mo	69.3	1.9	81.3	3.0	64.8	2.7	72.6	3.5	67.2	6.0*	59.9	2.8	67.5	3.4	58.4	2.7	58.6	2.7	61.7	4.2	**2701 (65.1)**
Self assessed good health	34.2	2.1	28.0	3.2	36.9	2.6	40.3	3.7	54.8	6.0*	48.2	2.4	38.8	3.2	45.4	2.5	47.7	2.5	47.5	4.1	1738 (41.2)
Current smoker	2.2	0.6	5.5	1.5	6.9	1.7	12.4	2.3	17.8	4.2*	8.9	1.2	7.5	1.7	10.8	1.5	26.1	2.3	26.0	3.5*	**533 (10.7)**

*significant at the p≤0.01
[a] proportions are weighted estimates
[b] sample sizes are unweighted numbers
[c] bold face type indicates significant difference from South Africa total values, p<0.000

Table 3: Prevalence of drinking patterns among adults aged 50 and above in South Africa by selected demographics and gender

Demographics	Women (n=2108)								Men (n=1558)								Total (n=3666)
	Lifetime abstainer		12 month drinker		Low risk drinker		At risk drinker		Lifetime abstainer		12 month drinker		Low risk drinker		At risk drinker		
	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	(%)	SE	n (%)
Age (years)																	
50-64	64.3	1.9	59.6	4.6	72.3	5.8	68.8	9.4	69.4	2.5	63.2	4.2	78.6	3.6	78.9	5.1	**2246 (66.8)**
Married	35.9	1.8	33.2	5.0	42.7	7.1	42.1	10.2	80.6	2.2	81.9	3.2	73.4	6.0	73.9	5.2	1914 (55.2)
Ethnicity																	
African/Black	75.3	2.1	67.2	4.9	72.1	6.9	65.9	12.7	73.8	3.1	68.9	4.2	73.4	5.9	82.6	5.2	1987 (73.9)
White	7.4	1.3	9.6	3.3	18.2	6.3	11.6	8.4	10.2	2.8	12.2	2.7	12.4	3.7	9.5	4.7	255 (9.2)
Coloured	12.6	1.4	21.3	4.3	7.7	2.9	21.8	12.0	11.4	2.1	17.0	3.5	12.3	4.6	5.9	2.3	649 (13.1)
Indian/Asian	4.4	1.0	1.9	0.7	2.0	1.3	0.7	0.7	4.6	0.9	1.9	0.6	1.8	0.6	2.0	0.8	289 (3.8)
Religion																	
None/other	6.6	0.9	9.9	2.9	5.9	2.8	11.6	5.7	10.3	2.3	13.9	3.7	12.3	3.0	17.9	5.2*	**329 (9.0)**
Christian	87.7	1.7	87.0	3,1	92.2	3.4	85.3	6.4	86.5	2.5	83.8	3.8	81.1	4.0	74.1	6.5	**2706 (86.4)**
Muslim	3.4	1.1	0.5	0.5	0.0	0.0	0.0	0.0	2.6	0.9	0.3	0.2	0.0	0.0	0.0	0.0	**95 (2.4)**
Indigenous	2.3	0.6	2.6	2.6	1.9	1.9	3.1	2.2	0.6	3.6	2.1	1.0	6.5	2.7	6.8	4.4	**55 (2.2)**
Ever schooled	74.9	2.2	67.5	4.9	57.4	8.6	76.3	8.2	77.4	3.0	80.6	3.6	81.4	4.4	75.6	6.7	**2314 (75.3)**
Residency																	
Rural	36.1	2.6	33.2	5.0	28.8	5.9	46.8	11.1	32.9	3.2	38.3	4.6	35.6	5.8	22.5	5.3	**1208 (34.8)**
Currently working	29.0	2.0	18.2	4.0	27.2	6.6	27.5	8.5	44.9	3.7	39.0	4.7	43.7	7.7	45.9	8.1	**967 (35.0)**
Any chronic illness																	
<12mo	56.2	2.5	73.4	4.6	59.3	8.7	49.4	10.6*	48.7	3.3	56.9	4.9	56.2	7.9	64.8	7.0	**1733 (55.4)**
Self assessed																	
good health	34.3	2.0	35.2	5.2	40.7	7.1	41.9	10.5	42.6	2.6	39.7	4.5	38.7	7.6	46.1	7.7	1413 (37.9)
Current smoker	15.1	1.4	37.8	4.8	39.5	7.2	70.2	10.5*	14.0	1.8	41.0	5.0	69.7	5.0	68.0	6.9*	**951 (23.8)**

*significant at the p≤0.01
[a] proportions are weighted estimates
[b] sample sizes are unweighted numbers
[c] bold face type indicates significant difference from Ghana total values, p<0.000

Drinking patterns and associated correlates

Weighted proportions and bivariate associations between selected sociodemographics, health measures and the F-based and QF-based drinking variables in each country by gender are presented in Tables 2 and 3. Adjusted associations are presented among each country by gender in Tables 4 and 5.

Table 4: Adjusted ORs for F- and QF-based drinking patterns among women and men aged 50+ in Ghana

Demographic variables	Women (n=2052)				Men (n=2237)			
	Previous drinker (vs lifetime abstainer) OR (SE)	**12 month drinker (vs lifetime abstainer) OR (SE)**	**Low risk drinker (vs lifetime abstainer) OR (SE)**	**At risk drinker (vs lifetime abstainer) OR (SE)**	**Previous drinker (vs lifetime abstainer) OR (SE)**	**12 month drinker (vs lifetime abstainer) OR (SE)**	**Low risk drinker (vs lifetime abstainer) OR (SE)**	**At risk drinker (vs lifetime abstainer) OR (SE)**
Age (years)								
50-64 (vs 65+)	-0.04 (0.19)	-0.17 (0.16)	-0.32 (0.21)	-0.60 (0.31)	-0.41 (0.22)	**-0.45 (0.20)**	**-0.46 (0.19)**	-0.44 (0.24)
Married (vs not married)	-0.28 (0.21)	-0.04 (0.19)	0.03 (0.23)	0.46 (0.30)	0.09 (0.27)	-0.51 (0.27)	-0.33 (0.26)	-0.25 (0.30)
Indigenous tribe								
Akan (vs other)	**-0.88**	**-0.79**	**-1.49**	**-1.01**	-0.17	-0.00	-0.37	-0.25
Ewe (vs other)	**(0.28)**	**(0.25)**	**(0.27)**	**(0.44)**	(0.26)	(0.24)	(0.28)	(0.34)
Ga-Adangbe (vs other)	0.13 (0.41)	0.45 (0.39)	-0.18 (0.39)	-0.83 (0.68)	-0.27 (0.56)	0.30 (0.44)	-0.06 (0.48)	0.32 (0.58)
	0.24 (0.33)	0.09 (0.27)	-0.06 (0.34)	-0.11 (0.48)	0.49 (0.39)	-0.23 (0.32)	0.10 (0.33)	0.30 (0.45)
Religion								
Christian (vs other)	-0.08	-0.01	0.03	-1.06	0.62	-0.18	-0.41	**-1.18**
Muslim (vs other)	(0.38)	(0.34)	(0.43)	(0.67)	(0.43)	(0.37)	(0.36)	**(0.42)**
Primal indigenous (vs other)	**-3.03 (0.60)**	**-2.69 (0.53)**	**-2.51 (0.60)**	**-2.97 (0.86)**	**-1.84 (0.53)**	**-2.76 (0.45)**	**-3.51 (0.56)**	**-4.38 (0.63)**
	-0.71 (0.47)	0.59 (0.41)	**-0.56 (0.34)**	0.36 (0.77)	**1.75 (0.66)**	**1.19 (0.57)**	**1.45 (0.54)**	0.04 (0.62)
Ever schooled (vs never)	**0.39 (0.18)**	0.29 (0.17)	0.08 (0.24)	0.01 (0.33)	**0.52 (0.24)**	**0.46 (0.23)**	0.30 (0.36)	**0.87 (0.28)**
Residency								
Rural (vs urban)	-0.28 (0.21)	-0.14 (0.19)	-0.03 (0.24)	0.11 (0.30)	0.14 (0.19)	0.17 (0.20)	0.23 (0.20)	0.05 (0.26)
Currently working (vs not)	**-0.42 (0.19)**	-0.18 (0.16)	0.06 (0.21)	0.26 (0.42)	-0.22 (0.24)	-0.18 (0.20)	0.20 (0.20)	0.95 (0.32)
Any chronic illness <12mo (vs none)	0.56 (0.22)	-0.13 (0.14)	0.37 (0.23)	0.23 (0.30)	0.35 (0.18)	-0.07 (0.19)	-0.25 (0.20)	0.10 (0.25)
Self assessed good health (vs moderate/bad/very bad)	0.06 (0.18)	0.18 (0.16)	0.47 (0.22)	**0.92 (0.29)**	**-0.43 (0.18)**	-0.13 (0.17)	-0.10 (0.19)	-0.12 (0.23)
Current smoker (vs not)	**1.51 (0.39)**	**1.56 (0.39)**	**1.84 (0.37)**	**2.51 (0.47)**	0.43 (0.32)	**0.65 (0.29)**	**1.58 (0.27)**	**1.78 (0.30)**

Bold typeface indicates significance at $p<0.05$ for comparison between drinking patterns

Table 5: Adjusted ORs for F- and QF-based drinking patterns among women and men aged 50+ in South Africa

Demographics	Women			Men (n=1558)		
	12 month drinker (vs lifetime abstainer)	Low risk drinker (vs lifetime abstainer)	At risk drinker (vs lifetime abstainer)	12 month drinker (vs lifetime abstainer)	Low risk drinker (vs lifetime abstainer)	At risk drinker (vs lifetime abstainer)
	OR (SE)	OR (SE)	OR (SE)	OR (SE)	OR (SE)	OR (SE)
Age (years)						
50-64 (vs. 65+)	-0.01(0.01)	**-0.04 (0.02)**	-0.04 (0.03)	0.02 (0.01)	-0.02 (0.02)	-0.01 (0.02)
Married (vs. not married)	-0.14 (0.26)	0.23 (0.32)	0.07 (0.52)	0.07 (0.26)	-0.45 (0.31)	-0.46 (0.30)
Indigenous tribe						
White (vs. African/Black)	0.37 (0.41)	**.95 (0.49)**	0.65 (0.91)	0.21 (0.39)	0.45 (0.48)	-0.68 (0.66)
Coloured (vs. African/Black)	0.39 (0.39)	-0.51 (0.55)	0.65 (0.53)	-0.01 (0.35)	0.10 (0.53)	**-1.71 (0.54)**
Indian/Asian (vs. African/Black)	-0.55 (0.89)	-0.46 (0.82)	-1.56 (1.07)	-0.71 (0.66)	-1.12 (0.82)	**-2.10 (0.72)**
Religion						
Christian (vs. other)	-0.51 (0.49)	0.15 (0.51)	-0.48 (0.64)	-0.31 (0.41)	-0.13 (0.42)	-0.52 (0.43)
Muslim (vs. other)	**-2.48 (1.19)**	-17.28 (10.6)	**-18.28 (9.95)**	**-2.52 (0.79)**	**-3.84 (1.60)**	-0.71 (1.30)
Primal indigenous (vs. other)	-0.73 (0.84)	-0.68 (1.19)	-0.28 (1.14)	0.75 (0.93)	**2.14 (0.91)**	2.01 (1.36)
Ever schooled (vs. never)	**-0.76 (0.23)**	**-1.46 (0.44)**	-0.16 (0.49)	0.20 (0.23)	0.18 (0.31)	-0.13 (0.45)
Residency						
Rural (vs. urban)	-0.38 (0.27)	-0.73 (0.39)	0.48 (0.49)	0.21 (0.22)	0.04 (0.35)	-0.75 (0.38)
Currently working (vs. not)	-0.37 (0.30)	-0.18 (0.33)	-0.62 (0.62)	0.13 (0.26)	0.25 (0.35)	**-1.01 (0.35)**
Any chronic illness <12mo (vs. none)	**0.62 (0.23)**	0.19 (0.38)	-0.14 (0.56)	0.26 (0.26)	0.17 (0.27)	0.10 (0.36)
Self-assessed good health (vs. moderate/bad/very bad)	0.20 (0.24)	0.27 (0.41)	0.34 (0.47)	0.07 (0.27)	-0.08 (0.29)	0.49 (0.41)
Current smoker (vs. not)	1.27 (0.24)	1.49 (0.30)	2.24 (0.50)	1.47 (0.27)	2.62 (0.29)	2.80 (0.38)

Bold typeface indicates significance at $p<0.05$

Among women, being a member of the Akan ethnic group significantly reduced the likelihood of being any kind of drinker in Ghana, while being White increased the likelihood of being a low risk drinker in South Africa. Subscribing to the primal indigenous religion significantly reduced the likelihood of being a low risk drinker compared to a lifetime abstainer among women in Ghana. Additionally, being ever schooled among women in Ghana increased the likelihood of being a previous drinker while it reduced the likelihood in South Africa for being a 12 month and low risk drinker. Having self-assessed good health increased the likelihood of being an at risk drinker in Ghanian women. Among men, subscribing to a primal indigenous religion was associated with an increased likelihood of engaging in previous, 12 month and low risk drinking in Ghana, and low risk drinking in South Africa. Additionally, being an at risk drinker was associated with ever being schooled and currently working among men in Ghana, while being Coloured reduced the likelihood among men in South Africa. In both countries among both genders being Muslim statistically significantly reduced the likelihood of engaging in any kind of active drinking pattern while being a current smoker increased the likelihood.

Differences for between-country drinking patterns

Table 6 shows differences in drinking pattern indices relative to lifetime abstainers between South Africa and Ghana after adjusting for models progressively including sociodemographic and health measures. Ghana shows statistically lower odds of participating in all drinking patterns, and these differences are partially explained by the introduction of smoking status for at risk drinking among women, and low risk and at risk drinking among men. For example, the proportion of at risk drinking among women in Ghana was 12.6% compared to 22.1% in South Africa, and the estimate changed from 0.68 in model 2 to 1.33 in model 3.

DISCUSSION

The results show marked differences in the prevalences of drinking patterns among men and women aged 50 years and above between Ghana and South Africa. Factors associated with the different drinking patterns also varied between genders and countries. The notable similarity between the countries and genders for all drinking patterns, however, is a positive association with smoking. Also, differences in at risk drinking among women, and low and at risk drinking among men were explained more by differences in smoking status than socioeconomic differences between the two countries.

The relatively low prevalence of lifetime abstinence and high prevalence of low risk drinking among older adults in Ghana is consistent with reports of a generally moderate drinking culture compared to South Africa (Clausen et al., 2009, WHO, 2011, Ghana Statistical Service, 2008). The lack of a gender difference in drinking patterns, including at risk drinking, among older adults in Ghana suggests equality of habits among those who engage in alcohol use even though lifetime abstention is more common among women.

The higher proportion of at risk drinkers in South Africa is also consistent with reports of an overall hazardous consumption culture, and demonstrates this pattern of drinking among older adults as well (WHO, 2011, South Africa Demographic and Health Survey, 2003). Higher rates of at risk drinking among older women compared to older men is also consistent with previous reports, including the 1998 Demographic and Health Survey (Parry et al., 1998). As our at risk drinker variable was a gender-specific composite of drinking behaviors, lower estimates may be expected if such drinking behaviors were examined individually (ie – binge drinking only) or if the same criteria were applied to women as men. For example, a US study among primary care patients aged 60 and above who reported drinking in the past 3 months identified 25% of women and 56% of men as at risk drinkers using the Comorbidity Alcohol Risk Evaluation Tool (Barnes et al., 2010). Besides a methodological artifact, the

Table 6. Differences in drinking patterns between Ghana and South Africa by gender in model s adjusted for 1. age, 2. plus marital status, ethnicity, religion, education, work status, chronic illness <12 months, good self-reported health, 3. plus smoking

Drinking pattern*	Women			Men		
	Ghana (vs South Africa) Model 1 OR (SE)	Ghana (vs South Africa) Model 2 OR (SE)	Ghana (vs South Africa) Model 3 OR (SE)	Ghana (vs South Africa) Model 1 OR (SE)	Ghana (vs South Africa) Model 2 OR (SE)	Ghana (vs South Africa) Model 3 OR (SE)
Low risk drinker	1.65 (0.19)	1.41 (0.20)	1.71 (0.23)	1.60 (0.17)	1.92 (0.26)	2.61 (0.25)
At risk drinker	0.72 (0.28)	0.68 (0.36)	1.33 (0.45)	1.29 (0.19)	1.75 (0.25)	2.47 (0.24)

* Lifetime abstention is the reference for each drinking pattern

gender difference could also be due to women having experienced more physical and psychological trauma relative to men in South Africa, and further to women in Ghana, which may be an important risk factor for drinking in this context.

Subscribing to the primal indigenous religion reduced the likelihood of being a drinker among women and increased the likelihood among men in both countries. This association could be understood as participation in traditional gender roles around alcohol use, where women brewed alcoholic beverages but did not imbibe and men would be the consumers (Willis, 2002). In Ghana, currently working and being educated were associated with at risk drinking among men and not women. This finding is consistent with a report by Blunch and Blunch which reported average per capita community expenditures as well as cultural factors to be associated with any alcohol consumption in male- and female-headed households, although the association between economy and consumption was stronger in male-headed households (Blunch & Blunch, 2009).

Overall, the differences in sociodemographic correlates of the different drinking patterns between Ghana and South Africa likely reflect differences in national cultures in general and the cultures around drinking in particular, with the exception of Muslim's consistent abstinence overall. The other common factor of current smoking for both genders in both countries represents an important correlate as it is modifiable and associated with the growing epidemic of non-communicable diseases in Africa (Dalal et al., 2011). Other large surveys have identified smoking as a correlate of harmful drinking among middle-aged and older adults (Choi & DiNitto, 2011) and there are concerns about the growing consumer market in Africa for the tobacco industry (Bitton, Green, & Colber, 2011).

In comparing South Africa and Ghana from the perspective of national economic development, on the surface the findings suggest drinking patterns may change among older adults in Ghana with economic gains. Specifically, an overall increase in at risk drinking may occur, particularly among women. Higher alcohol-related disability-adjusted-life-years have been documented in countries at higher levels of development, and among the higher socioeconomic groups within lower income countries (Rehm, Taylor & Room, 2006, Rehm et al., 2009). On the other hand, the associations within each country of proxy measures of economic environment, namely working for pay and being educated, with drinking pattern are few and inconsistent. Furthermore, these factors in conjunction with other sociodemographics contributed little to the relationship between drinking pattern and country assignment, suggesting economic differences at this stage of development between Ghana and South Africa may not directly influence differences in drinking behavior. Moreover, we observed cultural components such as religion and tribal affiliation as consistently associated with drinking patterns within each country, suggesting culture plays a stronger role than economy. There is also evidence asserting stability in drinking patterns over time even when total consumption varies, so while drinking overall may increase, the adoption of "risky" drinking among one particular group may not necessarily follow (Skog & Rossow, 2006). However, the breadth and depth of social, political and economic change rapidly underway in Ghana and other parts of Africa questions the applicability of this Western model in an African context. It is widely anticipated that these changes will mediate increases in alcohol consumption across populations, such that the dynamics of drinking behavior may change or become more apparent than observed here. Thus, surveillance of alcohol consumption should be monitored as Ghana and other emerging African economies move through stages of economic development to better understand the influence of development on drinking habits in the context of culture and other health behaviors.

In addition to contextual factors, smoking may explain changes in drinking patterns in Ghana as they occur, given the association between smoking and drinking among older adults

in Ghana and the contribution of smoking to the difference in drinking patterns between Ghana and South Africa,. Interestingly, a recent article from Ghana reported an increase in alcohol use and decrease in smoking between 2003 and 2008 in the general population attributable to a national healthy lifestyle program (Tagoe & Dake, 2011). However, it did not investigate the association between the two behaviors. If indeed smoking continues to decline in Ghana, it will be informative to observe if the decline occurs similarly among drinkers.

This study has limitations that deserve mention. Firstly, self-reports of alcohol use are commonly under-reports of actual alcohol use, particularly in contexts where alcohol use is stigmatized, and thus drinking prevalences among those who reported any drinking are likely underestimates, and lifetime abstention an overestimate. This may be particularly relevant in South Africa, where women are culturally and socially predisposed to denying alcohol use (Pretorius, Naidoo & Reddy, 2009). Secondly, the consumption of traditional homebrews was not queried in this survey, and it is known to make up a considerable proportion of what alcohol is consumed in both Ghana and South Africa (Luginaah & Dabkubo, 2003, Onya, Flisher, & Mashamba, 2009). Thirdly, the quantity-frequency drinking measures were based on guidelines derived from the epidemiology of alcohol use in a Western context and may not be optimal in measuring drinking in an African setting. Finally, the lack of a household, personal or community-level economic measure limited accounting for the contribution of economic variables with the different drinking patterns. With these considerations in mind, this study's strengths remain due to its representativeness, comparability, use of standard criterion and provision of relevant, useful information on the epidemiology of alcohol use among an important sector of the general population in Ghana and South Africa.

Given how common drinking is among older adults in Ghana and the anticipated growth of this group, further research is needed to understand the consequences of regular alcohol use. In South Africa, efforts should continue to identify and curb at risk drinking among older adults, in particular women. In both countries, clear and accurate public health messages about both the beneficial (Sun et al., 2011) and detrimental effects of different drinking habits should be conveyed to older adults. Brief screenings and primary care-based interventions for smoking and risky alcohol use simultaneously may be useful in synergistically mitigating harms from these behaviors.

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REFERENCES

AfroNews. *Ghana launches draft National Alcohol Policy*. http://www.afrol.com/articles/34979. (15 September 2011, date last accessed).

Barnes, A.J., Moore, A.A., Xu, H., et al. (2010). Prevalence and correlates of at-risk drinking among older adults: the project SHARE study. *J Gen Intern Med, 25*(8):840-846.

Bitton, A., Green, C., Colber, J. (2011). Improving the delivery of global tobacco control. *Mt Sinai J Med*, 78(3):382-93.

Blunch, N.J., Blunch, N.H. (2009). Cross-cultural componenets of alcohol consumption in Ghana. *Proceedings of the 14th Cross Cultural Research Conference*, Kristie Seawright and Scott M Smith (eds), Provo, UT: Brigham Young University.

Choi, N.G., DiNitto, D.M. (2011). Drinking, smoking, and psychological distress in middle and late life. *Ageing & Mental Health* 11 May;DOI:10.1080/13607863.2010.551343

Clausen, T., Rossow, I., Naidoo, N., Kowal, P. (2009). Diverse alcohol drinking patterns in 20 African countries. *Addiction*, 104:1147–54.

Combes, J.B., Gerdtham, U.G., Jarl, J. (2011). Equalisation of alcohol participation among socioeconomic groups over time: an analysis based on the total differential approach and longitudinal data from Sweden. *Int J Equity Health,*10:10.

Dalal, S., Beunza, J.J., et al. (2011). Non-communicable diseases in sub-Saharan Africa: what we know now. *International J of Epi*, 40:885-901.

Department of Health, Medical Research Council, OrcMacro. (2007). South Africa Demographic and Health Survey 2003. Pretoria: Department of Health.

Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro (2009). Ghana Demographic and Health Survey 2008. Accra, Ghana: GSS, GHS, and ICF Macro.

Klatsky, A.L. (2007). Alcohol, cardiovascular disease and diabetes mellitus. *Pharmacol Res*, 55:11.

Luginaah, I., Dabkubo, C. (20003). Consumption and impacts of local brewed alcohol (akpeteshie) in the Upper West Region of Ghana: a public health tragedy. *Soc Sci & Med*, 57:1747-60.

Martinez, P., Røislien, J., Naidoo, N., Clausen, T. (2011). Alcohol abstinence and drinking among African women: data from the World Health Surveys. *BMC Public Health*, 11:160.

Moore, A., Giuli, L., Gould, R., et al. (2006). Alcohol use, comorbidity and mortality. *J Am Geriatr Soc*, 54:757-762.

National Institute on Alcohol Abuse and alcoholism. (2003). Helping patients with alcohol problems: A health practitioner's guide. NIH Publication No. 03-3769.

Onya, H.E., Flisher, A.J., Mashamba, J.T. (2009). Cultural factors and home-brewed alcohol use in a rural community in South Africa. *East Afr J Public Health*, 6:37-42.

Parry, C.D., Pluddemann, A., Steyn, K., et al. (1998). Alcohol use in South Africa: Findings from the first demographic and health survey. *J of Stud Alcohol,* 66:91-97.

Parry, C.D., Patra, J., Rehm, J. (2011). Alcohol consumption and non-communicable diseases: epidemiology and policy implications. *Addiction*, 106:1718-1724.

Pretorius, L., Naidoo, A., Reddy, S.P. (2009). "Kitchen cupboard drinking": A review of South African Women's Secretive Alcohol Addiction, treatment history, and barriers to accessing treatment. *Soc Work Public Health*, 24:89-99.

Rehm, J., Taylor, B., Room, R. (2006). Global burden of disease from alcohol, illicit drugs and tobacco. *Drug Alcohol Rev*, 25:503-13.

Rehm, J., Mathers, C., Popova, S., et al. (2009). *Lancet* 2009;373:2223-33.

Room, R. (2006). Taking account of cultural and societal influences on substance use diagnoses and criteria. *Addiction*, 101(Suppl.1):31-39.

Russell, M., Cooper, M.L., Frone, M.R., Welte, J.W. (1991). Alcohol drinking patterns and blood pressure. *Am J Public Health*, 81(4):452-457.

SABMiller.(2011). *National alcohol policies*. http://www.sabmiller.com/index.asp?pageid=600. (15 September 2011, date last accessed).

Skog ,O.J., Rossow, I. (2006). Flux and stability: individual fluctuations, regression towards the mean and collective changes in alcohol consumption. *Addiction*, 101:959–70.

StataCorp. (2009). Stata Statistical Software: Release 11. College Station, TX: StataCorp LP.

Sun, Q., Townsend, M.K., Okereke, O.I., et al. (2011). Alcohol consumption at midlife and successful ageing in women: a prospective cohort analysis in the nurses' health study. *PloS Med*, 8(9):e1001090.

Tagoe, H.A., Dake, F.A. (2011). Healthy lifestyle behavior among Ghanaian adults in the phase of a health policy change. *Globalization and Health*, *7*:7.

Willis, J. (2002). Potent brews: A social history of alcohol use in East Africa, 1850-1999. Oxford: Currey.

World Bank. (2011). *Country Classification*. http://go.worldbank.org/AJGKUS0E80. (15 September 2011, date last accessed).

World Health Organization. (2011). WHO Study on global AGEing and adult health (SAGE). http://www.who.int/healthinfo/systems/sage/en/. (15 September 2011, date last accessed).

World Health Organization. (2011). Country profiles 2011: Ghana. http://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/en. (16 September 2011, date last accessed).

World Health Organization. (2011). Country profiles 2011: South Africa. http://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/en. (16 September 2011, date last accessed).