

## ORIGINAL RESEARCH ARTICLE

# Factors Associated with Alcohol Consumption: A Survey of Women Childbearing at a National Referral Hospital in Accra, Ghana

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## Abstract

A hospital based cross-sectional study was conducted to identify the factors associated with alcohol consumption in Ghanaian women of childbearing age. The sample consisted of 394 women of reproductive age, of which 234 were pregnant. Systematic random sampling was used to select respondents from the clinics of the Department of Obstetrics and Gynecology outpatient at the Korle Bu Teaching Hospital in Accra, Ghana. Data were collected using structured questionnaires and analyzed using SPSS for Windows version 17.0. In the three months preceding the survey, 37.6% imbibed alcoholic drinks, while 24.4% had ever imbibed an alcoholic herbal brew. Non-Islamic religion, not being in marital union, consuming an alcoholic herbal brew and considering alcohol was beneficial to health were strong predictors of alcohol consumption. We conclude that the prevalence of alcohol consumption is high among this cohort of Ghanaian women. Women should be screened for alcohol consumption and informed about the dangers of heavy alcohol consumption during pregnancy. *Afr J Reprod Health 2014; 18[2]: 152-165*.

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**Keywords:** alcohol, herbal brew, women, pregnancy

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## Résumé

Une étude transversale en milieu hospitalier a été menée afin d'identifier les facteurs associés à la consommation d'alcool chez les femmes ghanéennes en âge de procréer. L'échantillon était composé de 394 femmes en âge de procréer, dont 234 étaient enceintes. L'échantillonnage aléatoire systématique a été utilisé pour sélectionner les interviewées auprès des cliniques du Département d'Obstétrique et de Gynécologie ambulatoire hospitalier Universitaire de Korle Bu, à Accra, au Ghana. Les données ont été recueillies au moyen de questionnaires structurés et analysés à l'aide du logiciel SPSS pour Windows la version 17.0. Au cours des trois mois précédant l'enquête, 37,6 % ont imbibé des boissons alcoolisées, tandis que 24,4 % avaient déjà bu un breuvage à base de plantes alcooliques. La religion non islamique, n'étant pas dans l'union conjugale, la consommation d'un breuvage à base de plantes alcooliques et la considération de l'alcool comme étant bon pour la santé ont été de bons indices de la consommation d'alcool. Nous concluons que la prévalence de la consommation d'alcool est élevée dans cette cohorte de femmes ghanéennes. Les femmes devraient être examinées pour la consommation d'alcool et informés sur les dangers de la consommation d'alcool pendant la grossesse. *Afr J Reprod Health 2014; 18[2]: 152-165*.

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**Mots-clés:** alcool, bière à base de plantes, femmes, grossesse

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## Introduction

Alcohol consumption in childbearing women is a public health concern because of adverse health implications for the mother and baby. While the literature on the pattern of alcohol consumption among childbearing women has been well documented in many countries, very few such studies have been carried out in Ghana. The consumption of alcohol has been reported among young women in countries such as USA, Australia, Canada and the United Kingdom<sup>1,2</sup>. Estimates of

the prevalence of alcohol use by women have also been documented in African countries, including Botswana (30%), and Namibia (47%)<sup>3</sup>. According to the 2008 Ghana Demographic and Health Survey, the proportion of women in childbearing aged 15–49 years who drink alcoholic beverages is 18.0%<sup>4</sup>. A recent study using data from the World Health Organization's (WHO) World Health Survey found diverse drinking patterns among women in 20 African countries<sup>5</sup>. Ten per cent of women sampled were current drinkers, with the highest national rate of 30% reported in Burkina

Faso<sup>2</sup>. The proportion of female heavy drinkers varied between 4% in Ghana to 41% in Chad. Chad also had the highest proportion of risky single occasional drinkers of 58%<sup>2</sup>. In about half of the countries, increasing age was associated with increased likelihood of being a current drinker. In low and middle income countries which includes most African countries, factors associated with alcohol use among women include being single, higher socioeconomic status and higher levels of education<sup>2</sup>. Other factors are those that promote an enabling environment for alcohol consumption, which include minimal regulation of alcohol companies resulting in increased availability and distribution of alcoholic beverages, undue influences on national alcohol policies and high levels of social tolerance towards female drinking<sup>2</sup>.

Research shows that alcohol consumption during pregnancy is higher among African women compared to other parts of the world<sup>5</sup>. The amount of alcohol that is safe for the fetus has not been determined<sup>5,6,7</sup>. Damage to the fetus is more likely to occur with high amounts of alcohol and of particular risk is the pattern of drinking in which high amounts of alcoholic ( $\geq 5$  drinks) are consumed on one occasion referred to as binge drinking<sup>8, 9</sup>. Patterns of heavy drinking including episodic binge drinking and regular high consumption have been reported in African women. Examples include 38% and 20% of current female drinkers who drink heavily in Nigeria and Uganda respectively<sup>2</sup>. In a national study conducted in South Africa, 17% of women aged 15 years or older were current drinkers and among these, the prevalence of harmful or hazardous drinking was 17%<sup>10</sup>. Hazardous drinking is a pattern of alcohol consumption that places an individual at risk of adverse health events whereas harmful drinking involves a pattern that results in adverse events<sup>10</sup>. The relationship between alcohol consumption and risk is one of dose response and not one in which there is a threshold of consumption over which damage to the fetus occurs<sup>6,8</sup>. Also, not all children exposed to alcohol during pregnancy will be affected or are affected to the same degree. The level of harm is related to the amount of alcohol

consumed, and the frequency and timing of exposure<sup>2,6,8</sup>.

Irrespective of the level of consumption, alcohol intake during pregnancy can cause a wide range of physical and neuro-developmental conditions in the unborn child known as the Fetal Alcohol Spectrum Disorders (FASD), the most popular among these being the Fetal Alcohol Syndrome (FAS)<sup>1,6,7</sup>. FAS is characterized by specific facial features, prenatal and postnatal growth retardation, and central nervous system structural or functional abnormalities<sup>1,5</sup>. It has been estimated that for every child born with FAS, there are three children who may not present with all the features of the syndrome but suffer some neuro-behavioural deficit<sup>7,9</sup>. Alcohol consumption in pregnancy has also been associated with miscarriage, preterm birth, still birth and low birth weight<sup>1,6,7,11</sup>. However, many women do not recognize pregnancy until the fourth to sixth week of gestation. Consequently, unintended fetal alcohol exposure during the peri-conceptual period or during early pregnancy is common<sup>1</sup>. Binge drinking may contribute to slight intellectual deficiency in childhood<sup>7,11</sup> and fetal alcohol exposure has been associated with an increased risk of developing early and late onset of alcohol disorders in early adulthood<sup>2,8</sup>. Binge drinking tends to pose a greater risk of harm to the fetus than drinking a comparable amount over a longer period because of the peak blood alcohol concentration which is a major factor<sup>7,11</sup>. Alcohol also poses a substantial health risk to the mother through substance dependence, depression, liver cirrhosis, diabetes, breast cancer and HIV infection<sup>2,3,12</sup>.

Alcohol consumption during or outside pregnancy is a modifiable risk factor. In order to design effective health promotion strategies to reduce alcohol consumption in the peri-conceptual period and during pregnancy, it is pertinent to understand the potential factors which influence alcohol consumption in childbearing women. This study was conducted among childbearing women in a national referral hospital obstetric and gynecologic outpatient facility in Accra, Ghana, to identify the factors associated with alcohol consumption and to determine

whether these factors differ by pregnancy status.

## Methods

### *Study design and site*

This was a cross sectional study conducted between August and September, 2011 at the Obstetrics and Gynecology Department of the Korle-Bu Teaching Hospital (KBTH). The hospital is located in Korle Gonno, a suburb of Accra, the capital city of Ghana. It is the oldest of the three referral hospitals in Ghana. The hospital has a workforce of over 4000, 17 clinical departments and several other units. It has a bed capacity of 2000. In 2010, a total of 357,086 patients were seen through the outpatient departments with an average daily out-patient attendance of 1500 and an average daily admission of 150 patients<sup>13</sup>. Interviews were conducted at the Obstetrics and Gynecological Outpatients department where an average of 190 patients is seen daily, comprising 113 obstetric patients and 77 gynecologic patients.

### *Study subjects*

Study subjects comprised pregnant women attending the Obstetrics Outpatient Department (OOPD) and non-pregnant women attending the Gynecological Outpatients Department (GOPD), all aged 15 to 49 years. Females below the age of 15 and above 49 years, those who were critically ill or required emergency care and those who declined consent to participate in the study were excluded.

### *Sampling*

A sample size of 394 was obtained using the formula  $N = Z^2Pq/d^2$  where  $N$  = minimum sample size,  $Z$  = standard normal deviate at the level at 95% confidence level,  $P$  = proportion of childbearing women who consumed alcohol once in the past seven days based on the 2008 GDHS<sup>4</sup>,  $q = (1 - P)$ ,  $d$  = level of precision at 5%<sup>14</sup>, and allowing for a non-response rate of 10%. By proportional allocation, based on the daily attendance at the Obstetrics and Gynecology outpatient clinics respectively, the number of women required to participate from the OOPD and

GOPD were 234 and 160 respectively. Systematic sampling was used to select the study participants, with the starting point obtained by simple ballot based on the respective sampling intervals of 1:19 for Obstetrics and 1:22 for Gynecology. Folders of the patients attending the clinics each day are collected and arranged for them to see the doctors. These were numbered serially and a systematic random sampling used to select the folders of patients till the required number of respondents was reached for the day. All patients whose folders were selected and were willing to participate were interviewed by the first author after having been seen by the doctors. Interviews were conducted at the records unit of each department which ensured privacy of interviews and avoided health workers' interference.

### *Data collection and analysis*

A pre-tested, structured questionnaire adapted from a previous study<sup>1</sup> and modified to reflect the local context was used for the study. It was divided into the following sections: socio-demographic characteristics, alcohol consumption status, knowledge about the general effects of alcohol, knowledge about the effects of alcohol in pregnancy and attitude towards alcohol consumption in pregnancy.

The dependent variable was alcohol consumption. Independent variables were socio-demographic factors (age, marital status, educational status, occupation, ethnicity, religion and number of children), pregnancy status, knowledge, attitude and risk of drinking. Adequate knowledge about general effects of alcohol consumption on an individual was assumed if an individual mentioned  $\geq 4$  effects of alcohol, those who mentioned 2-3 effects were assumed to have fair knowledge while those who mentioned 0 - 1 effect were assumed to have poor knowledge. The same pattern of scoring was applied to knowledge of effects of maternal alcohol on the child. No options were provided for general effects of alcohol on an individual to prompt spontaneity. Options provided for effects of alcohol on a child were: Fetal Alcohol Syndrome, low birth weight, low IQ, mental retardation, delayed development, learning disabilities, behavioural problems and attention deficit disorder.

The attitude of women towards maternal alcohol consumption was determined by reactions to statements regarding awareness of effects on the fetus and childhood, quantities of alcohol consumed, individual and social acceptance of maternal alcohol consumption. The attitude was regarded as negative if they indicated they were concerned, disappointed, upset or angry. It was regarded as positive if they indicated they were comfortable or not bothered. Since most women drink during events, both the type and number of events attended in a month were determined. The risk of drinking was regarded as high if the individual attended  $\geq 4$  occasions in a month, moderate if she attended 2 -3 occasions in a month and minimal if she attended 0 - 1 occasions in a month. The units of alcohol consumed in each drink were equivalent to 1 unit if one shot of spirit, one glass of wine or one small bottle of beer was consumed, while one large bottle of beer was equivalent to two units of alcohol<sup>15</sup>.

Data were validated and analyzed using SPSS for Windows version 17.0. Quantitative variables were summarized using range, mean and standard deviation. Categorical variables were presented as simple frequencies and percentages. Chi-square test was used for evaluating the association between categorical variables and statistical significance assumed at  $p < 0.05$ . Significant variables were subjected to bivariate and multivariate analysis using binary logistic regression. Crude and adjusted odd's ratio (OR) were computed with 95% confidence intervals (95% CI).

### Ethical Considerations

Ethical approval was obtained from the ethical and protocol review committee of the University of Ghana Medical School. Individual informed consent was obtained from all respondents after all clarifications regarding the study had been made.

## Results

### Socio-demographic Characteristics

The socio-demographic characteristics of the women are presented in Table 1. A total of 394 women participated in the study. The mean and standard deviation for age was 30.4 +/-8 years.

**Table 1:** Socio-demographic characteristics of childbearing women attending the Obstetric and Gynaecological outpatient Clinics at a National Referral Hospital, Accra, Ghana, (n = 394).

Characteristics	Number (%) n = 394
<b>Age (years)</b>	
<20	34(8.6)
20-29	163(41.4)
30-39	138(35.1)
40-49	59(14.9)
<b>Marital status</b>	
Never married	119(30.2)
Married	207(52.5)
Divorced/separated/widow	35(8.8)
Cohabiting	33(8.4)
<b>Religion</b>	
Christian	264(67.0)
Moslem	85(21.6)
African traditional religion	26(6.6)
Others	4(1.0)
<b>Ethnicity</b>	
Ga	90(22.8)
Akan	108(27.4)
Ewe	78(19.8)
Northerner	80(20.3)
Others*	38(9.6)
<b>Educational status</b>	
Non-formal	31(7.9)
Primary	45(11.4)
Secondary	191(48.4)
Post secondary	122(31.0)
Others (Islamic)	5(1.3)
<b>Occupation</b>	
Trading	67(17.0)
Services/artisanship	79(20.1)
Government employee	62(15.7)
Farmer/fishmonger	23(5.8)
Homemaker/unemployed	91(23.1)
Student	61(15.5)
Others	11(2.8)
<b>Parity</b>	
Nulliparous	132(33.5)
Multiparous	262(66.5)
<b>Pregnancy status</b>	
Pregnant	234(59.4)
Non-pregnant	160(40.6)

\*Others = Ga, Ewe, Northerner, Hausa, Non-Ghanaians

The ages of the women ranged from 15 to 49 years and the modal age group was 20-29 years (41.4%). The major ethnic groups were Akan 108 (27.4%) and Ga 90 (22.8%). The predominant religion was Christianity 264 (67.0%). One hundred and ninety one women had completed secondary education (20.8%) while 122 (31.0%) had post secondary education. Two hundred and

seven (52.5%) women were married; 119 (30.2%) were single; while 35 (8.8%) were divorced, separated or widowed. Most women were homemakers 91 (23.1%), while 79 (20.1%) engaged in various services and 67 (17.0%) were traders. Among all respondents in the sample, 234 (59.4%) were pregnant at the time of the interview and 160 (40.6%) were nulliparous.

### Alcohol Consumption

Table 2 presents the pattern of alcohol consumption by the women. One hundred and forty eight (37.6%) women acknowledged drinking some alcohol in the three months preceding the survey. The main brand of alcohol was beer or stout 143 (36.3%). One hundred and forty eight women did not consume alcohol, while 143 (36.3%) women consumed  $\leq 5$  units a week. One hundred and six (26.9%) women drank alcohol prompted by occasions or events while 51 (12.9%) drank alcohol daily. Since most women drank during events, both the type and number of events attended in a month were determined. More than half of the women attended certain events at least once a month: naming ceremony 207(52.5%), wedding 231 (58.6%) and funeral 208 (52.8%). Based on the sum of events attended per month, one third (131) of the women had little risk of alcohol consumption while two thirds (263) had moderate to high risk of alcohol consumption.

Alcohol consumption in the first trimester was acknowledged by 76 (19.3%) of all respondents and 32.5% of the 234 pregnant women. When asked if they had ever become pregnant a few weeks/months after binging on alcohol, 85 (21.6%) women acknowledged this. Excluding a quarter of the women who were not sure if they had ever taken any local herbal brews containing alcoholic spirits, 96 (24.4%) women admitted that they had taken a herbal brew at some time and it was mainly for abdominal problems (6.3%), fever (4.1%) and gynecological conditions (3.6%) (Not shown). Among all respondents, 74 (18.8%) women had ever taken a herbal brew during pregnancy while 59 women (25% of those pregnant) had taken an alcoholic herbal brew in the current pregnancy.

**Table 2:** Selected characteristics of alcohol consumption among childbearing women

attending the Obstetric and Gynaecological outpatient clinics at a National Referral Hospital, Accra, Ghana, (n = 394)

Characteristics	Number (%) n = 394
<b>Alcohol consumption status (in the last 3 months)</b>	
No alcoholic drink	246(62.4)
Had an alcoholic drink	148(37.6)
<b>Type of alcoholic drink consumed</b>	
Beer/stout	143(36.3)
Illicit gin (akpeteshie)	58(14.7)
Wine	33(8.4)
Others	12(3.0)
Never drank at anytime	148(37.6)
<b>Quantity of alcohol consumed at any time (units/week)</b>	
$\leq 5$	143(36.3)
6-15	90(22.8)
$>15$	12(3.1)
Never drank at anytime	149(37.8)
<b>Frequency of alcohol consumption consumed at any time</b>	
Daily	51(12.9)
1-3 times/week	79(20.1)
Monthly	10(2.5)
Occasions/events	106(26.9)
Never drank at anytime	148(37.6)
<b>Risk of alcohol consumption*</b>	
Minimal risk	131(33.3)
Moderate risk	77(19.5)
High risk	186(47.2)
<b>Number attending specific events at least once a month**</b>	
Naming ceremony	207(52.5)
Wedding	231(58.6)
Funeral	208(52.8)
Cultural festival	56(14.2)
<b>Became pregnant &lt; 3 months after binge drinking</b>	
Yes	85(21.6)
No	309(78.4)
<b>Consumption of alcoholic drinks in the first trimester of pregnancy</b>	
Yes	76(19.3)
No	158(40.1)
Non-pregnant	160(40.6)
<b>Ever consumed herbal brew containing alcoholic spirits</b>	
Yes	96(24.4)
No	201(51.0)
Not sure/Don't know	97(24.6)
<b>Ever consumed alcoholic herbal brew during any pregnancy</b>	
Yes	74(18.8)
No	320(81.2)
<b>Consumption of alcoholic herbal brew in index pregnancy</b>	
Yes	59(15.0)
No	175(44.4)
Not pregnant	160(40.6)

\* Based on the number of events attended in a month:  
Minimal risk = attended <2 events/month, moderate risk =  
Attended 2-3 events/month, high risk = attended  $\geq 4$   
events/month;

\*\*Multiple responses present (yes only)

**Knowledge about effects of alcohol**

In Table 3, a total of 239 (60.7%) admitted they knew some general effects of alcohol on human health. While 325 (82.5%) women acknowledge that the effects of alcohol consumption were mostly harmful, 64 (16.2%) women felt there were beneficial effects of alcohol such as protecting the heart (6.9%). Not shown majority (54.8%) of the women was rated as having poor knowledge and only 5 (1.3%) women were rated as having adequate knowledge. One hundred and thirty (33.0%) women felt alcoholic herbal brews are beneficial to human health and gave the following as major reasons: useful for managing fever 26 (6.6%), abdominal problems 23 (5.8%) and gynecological problems 21(5.3%) (Not shown).

Regarding knowledge about effects of maternal alcohol consumption shown in Table 4, 152 (38.6%) women felt that a baby born of a woman who drinks alcohol regularly was different from any other baby while 153 (38.8%) were not sure. Only 7 (1.8%) women could adequately describe the differences.

**Table 3:** Knowledge about the effects of alcohol among childbearing women attending the Obstetric and Gynaecological outpatient clinics at a National Referral Hospital, Accra, Ghana, (n = 394)

Variable	Number (%)
<b>Knew about effects of alcohol on health</b>	
Yes	239(60.7)
No	155(39.3)
<b>Knowledge status regarding the effects of alcohol on health</b>	
Adequate	5(1.3)
Fair	20(5.1)
Poor	216(54.8)
None	153(38.8)
<b>Considered alcohol had a beneficial effect on health</b>	
Yes	64(16.2)
No	325(82.5)
Not applicable	5(1.3)
<b>Considered alcohol was harmful during pregnancy</b>	
Yes	216(54.8)
No	18(4.6)
Not applicable	160(40.6)
<b>Considers alcoholic herbal brews beneficial to health</b>	
Yes	130(33.0)
No	264(67.0)

**Table 4:** Knowledge of health effects of maternal alcohol consumption reported among childbearing women attending the Obstetrics and Gynaecology outpatient clinics at a National Referral Hospital, Accra, Ghana, (n = 394)

Variable	Number (%)
<b>Can maternal alcohol consumption affect the unborn child?</b>	
Yes	159(40.4)
No	235(59.6)
<b>Is a baby born to a woman who drinks alcohol regularly different from any other baby?</b>	
Yes	152(38.6)
No	89(22.6)
Don't know	153(38.8)
<b>Effects of maternal alcohol consumption known to respondents</b>	
Low birth weight	71(18.0)
Mental retardation	37(9.4)
Fetal Alcohol Syndrome	18(4.6)
Low intelligence quotient	30(7.6)
Delayed development	30(7.6)
Learning disabilities	23(5.8)
Behavioural problems	12(3)
Attention deficit	6(1.5)
<b>Knowledge status regarding effects of maternal alcohol consumption on the baby or child</b>	
Adequate	7(1.8)
Fair	34(8.6)
Poor	119(30.2)
Did not know	234(59.4)
<b>How did you know that maternal alcohol consumption contributes to these conditions?</b>	
Observation and comparison	55(14.0)
Media	36(9.1)
Health worker	31(7.9)
Family	19(4.8)
Peers/Neighbour	9(2.3)
Others	10(2.5)
Did not know	234(59.4)
<b>Noticed any of these problems within your family?</b>	
Yes*	48(12.2)
<b>Noticed any of these problems within your community?</b>	
Yes*	92(23.4)

\*Yes responses only

One hundred and fifty nine (40.4%) women had heard about any effects of maternal alcohol consumption on the unborn child, but generally few women could describe specific disorders. The effect that was most described was low birth weight by 71 (18.0%) women followed by mental retardation by 37 (9.4%) women. The least described effect was attention deficit disorder

which was mentioned by only 6 (1.5%) women. Overall, 7 (1.8%) women or 4.4% of those who knew effects of alcohol consumption during pregnancy on the child had adequate knowledge. Regarding the sources of knowledge about the various conditions in children attributed to maternal alcohol consumption in pregnancy, individual observation and comparison with other children ranked highest; indicated by 55 (14.0%) women. This was followed by the media 36 (9.1%) and health workers 31 (7.9%) women. Forty eight (12.2%) women had observed some of the conditions described occurring in the family and 92 (23.4%) observed them among children within their communities. When asked, the main reasons provided for what would make a pregnant woman drink alcohol regularly included inability to break an existing drinking habit (28.9%) and to relieve the pregnancy symptoms (24.6%). Demonic possession (7.1%) was the least mentioned reason.

#### ***Attitudes towards alcohol consumption in pregnancy***

The majority of the women expressed strong disagreement with these statements: that it is permissible for a pregnant woman to be intoxicated (68.3%); that pregnant women should drink alcohol (63.2%); and that maternal alcohol consumption cannot affect the unborn child (55.1%). In addition, majority disagreed that women can drink more than 3-4 units of alcohol per day (41.4%), that women should drink <14 units of alcohol per week because the level of maternal alcohol consumption does not affect the degree to which the child is harmed (40.4%).

Most women expressed ambivalence or disagreement about maternal alcohol consumption resulting in lifelong disabilities (57.3%), members of the community being unconcerned (54.1%) and women not being aware of effects of alcohol in pregnancy (51.6%). However, data from the survey that showed majority of the women had a negative attitude towards maternal alcohol consumption as observing a pregnant woman drink alcohol made them feel concerned (31.5%) or angry (24.1%). The intensity of feelings were high

(rated 4-5) for 244 (61.9%) women.

#### ***Factors of associated with alcohol consumption in childbearing women***

Results of bivariate analysis are presented in Table 5. Religion, educational status, marital status, occupational status, risk of alcohol consumption, having ever consumed an alcoholic herbal brew and considering alcohol as beneficial was associated with consumption alcoholic drinks in the three months preceding the survey. Of these, religion (OR 2.64, 95% CI 1.46-4.79), marital status (OR 1.69, 95% CI 1.08-2.63), having ever consumed an alcoholic herbal brew (OR 1.90, 95% CI 1.13-3.21) and having considered alcohol as beneficial (OR 2.41, 95% CI 1.32-4.41) emerged significant from the multivariate model. Not shown the only significant factor which differed by pregnancy status was marital status ( $\chi^2 = 20.54$ , DF=1,  $p < 0.001$ ). However, pregnancy status as a factor was eliminated in the bivariate analysis.

Table 6 shows that women who had ever consumed an alcoholic herbal brew tended to be multiparous, of Akan ethnic group, had consumed an alcoholic herbal brew during any pregnancy, considered alcohol as beneficial to health, and consumed alcohol in the three months preceding the survey. They tended to have a high risk of alcohol consumption based on number of events attended per month and noticed alcohol-related disorders among children in the family. In the multivariate model, three factors were significant: high risk of alcohol consumption (OR 9.79, 95% CI 4.24-22.62), having consumed an alcoholic herbal brew during pregnancy (OR 7.31, 95% CI 3.27-16.34), and having considered alcohol as beneficial to health (OR 3.07, 95% CI 1.44-6.53).

Of the four factors associated with imbibing alcoholic herbal brews during any pregnancy: ever having imbibed an alcoholic brew (OR 3.79, 95% CI 2.19-6.57), a positive attitude (favorably disposed) towards maternal alcohol consumption (OR 2.11, 95% CI 1.08-4.12), lack of awareness of effects of maternal alcohol consumption on the unborn child (OR 2.08, 95% CI 1.15-3.76) remained significant. Parity was eliminated in the multivariate model.

**Table 5:** Predictors of alcohol consumption in the three months preceding the survey among women of childbearing age at National Referral Hospital in Accra, Ghana (n = 394)

Characteristics	Number (%)		Unadjusted OR	Adjusted OR †
<b>Religion</b>	Consumed alcohol (n = 148)	Did not consume alcohol (n = 246)	OR(95% CI)	OR(95% CI)
Moslem	19(12.8)	66(26.8)	1.0	
Others	129(87.2)	180(73.2)	2.49(1.43-4.35)	2.64(1.46-4.79) <sup>§</sup>
<b>Marital status</b>				
Not in marital union	83(56.1)	104(42.3)	1.74(1.16-2.63)	1.69(1.08-2.63) <sup>§</sup>
In marital union	65(43.9)	142(57.7)	1.0	
<b>Educational status</b>				
<Secondary	82(55.4)	108(43.9)	1.59(1.05-2.39)	1.57(0.99-2.48)
≥Secondary	66(44.6)	138(56.1)	1.0	
<b>Occupation</b>				
Non-formal employment	132(89.2)	200(81.3)	1.89(1.03-3.49)	1.50(0.76-2.96)
Formal employment	16(10.8)	46(18.7)	1.0	
<b>Risk of alcohol consumption</b>				
High risk	109(73.6)	154(62.6)	1.67(1.07-2.61)	1.44(0.88-2.36)
Low risk	39(26.4)	92(37.4)	1.0	
<b>Ever imbibed an alcoholic herbal brew</b>				
Yes	52(35.1)	44(17.9)	2.49(1.56-3.98)	1.90(1.13-3.21) <sup>§</sup>
No	96(64.9)	202(82.1)	1.0	
<b>Considered alcohol had a beneficial effect on health</b>				
Yes	35(23.6)	29(11.8)	2.32(1.35-3.99)	2.41(1.32-4.41) <sup>§</sup>
No	113(76.4)	217(88.2)	1.0	

\*Christians, African traditional religionists, atheists; <sup>§</sup>statistically significant at  $p < 0.05$ ; †Adjusted for all the independent variables indicated in the table

**Table 6:** Predictors of ever drinking an alcoholic herbal brew among women of childbearing age at National Referral Hospital in Accra, Ghana (n = 297)

Characteristics	Number (%)		Unadjusted OR	Adjusted OR †
<b>Ethnicity</b>	Had ever drank an alcoholic herbal brew (n = 96)	Never drank an alcoholic herbal brew (n = 201)	OR(95% CI)	OR(95% CI)
Akan	20(20.8)	64(31.8)	1.0	
Others*	76(79.2)	137(68.2)	0.56(0.32-1.00)	0.69(0.34-1.41)
<b>Parity</b>				
Nulliparous	23(24.0)	84(41.8)	0.44(0.25-0.76)	0.99(0.50-1.96)
Multiparous	73(76.0)	117(58.2)	1.0	
<b>Alcohol consumption status based on the 3 months preceding the survey</b>				
Drank alcohol	44(45.8)	139(69.2)	2.65(1.61-4.37)	1.21(0.59-2.49)
No alcohol	52(54.2)	62(30.8)	1.0	
<b>Quantity of alcohol intake</b>				
Not at all	20(20.8)	95(47.3)	1.0	
≥1 unit of alcohol	76(79.2)	106(52.7)	3.41(1.94-5.99)	1.94(0.88-4.29)
<b>Risk of alcohol consumption</b>				
High risk	87(90.6)	99(49.3)	9.96(4.75-20.87)	9.79(4.24-22.62) <sup>§</sup>
Low risk	9(9.4)	102(50.7)	1.0	
<b>Ever imbibed an alcoholic herbal brew while pregnant</b>				
Yes	60(62.5)	180(89.6)	5.14(2.79-9.49)	7.31(3.27-16.34) <sup>§</sup>
No	36(37.5)	21(10.4)	1.0	
<b>Considered alcohol had a beneficial effect on health</b>				
Yes	66(68.8)	178(88.6)	3.52(1.91-6.49)	3.07(1.44-6.53) <sup>§</sup>
No	30(31.2)	23(11.4)	1.0	
<b>Noticed alcohol-related disorders among children within the family</b>				
Yes	77(80.2)	184(91.5)	1.0	
No	19(19.8)	17(8.5)	2.67(1.32-5.41)	2.07(0.88-4.87)



\*Others = Ga, Ewe, Northerner, Hausa, Non-Ghanaians; \*\*Based on number of events attended per month:  $\geq 2$  events were coded as high risk and  $< 2$  events were coded as low risk; §statistically significant at  $p < 0.05$ ; †Adjusted for all the independent variables indicated in the table.

## Discussion

The correlates of alcohol consumption in childbearing women in this study provided both supporting evidence as well as differences when compared with previous literature. In the three months preceding the survey, 38% of women reported consuming some alcohol, often less than or equal to one standard bottle of beer or stout per week. A similar pattern was observed in the 2008 Ghana Demographic and Health Survey (GDHS) where 37% of women aged 15-49 years who consumed alcohol, did so once in the week preceding the survey<sup>4</sup>. Evidence from the Global School-based Student Health Survey, 2004, suggests that consumption of alcoholic drinks is high among younger females aged 13 -15 years in Ghana<sup>12</sup>. In the survey, Ghana ranked 4<sup>th</sup> with 29.3% after Seychelles, Zambia and Namibia, among the 12 African member states for which data was available<sup>12</sup>. Alcohol consumption is known to be high in younger women<sup>1,10-12,16</sup>, and younger age is associated with alcohol consumption in pregnancy<sup>6,10,17</sup>. However, the present survey shows different results. Age was not significantly associated with alcohol consumption in the previous 3 months ( $p = 0.835$ ) nor was it associated with the risk of alcohol consumption based on the number of events attended per month ( $p = 0.593$ ). The reason for the difference between the survey results and previous literature in relation to age is not clear and may need to be explored further.

Alcohol consumption is associated with a range of adverse outcomes in both pregnant and non-pregnant women. Inadvertent or intentional fetal exposure to maternal alcohol in early gestation results in the range of cognitive and structural/functional impairments that are dose dependent<sup>8</sup>. Alcohol consumption is a known risk factor for breast cancer and cardiovascular disorders, which are among the leading causes of mortality among women in low and middle income countries<sup>18</sup>. In these countries, 1% and 5% of deaths respectively in women of reproductive age have attributed to the harmful consumption of

alcohol<sup>18</sup>. Some cohort studies have revealed an approximately 30% increase in the risk of breast cancer among drinkers<sup>19</sup>. One study indicates that for every additional 10g per day, the risk rises by 7%<sup>19</sup>. Studies in sub-Saharan Africa have shown that alcohol consumption is a risk factor for poor cardiovascular outcomes and it is correlated with increased risk of glucose intolerance and diabetes mellitus<sup>20</sup>. Through risky behaviour such as unsafe sex, it also contributes to the burden of HIV/AIDS which is the leading cause of death among adult women in Africa and in women of reproductive age globally<sup>18</sup>. A study in Ghana showed that women who drank alcoholic beverages had a risk of developing sexual dysfunction that was twice that of those who did not drink<sup>21</sup>. A recent study in Burkina Faso showed that body odours of volunteers consuming beer enhanced mosquito activation and orientation, and therefore attractiveness of volunteers to mosquitoes which is a risk factor for malaria<sup>22</sup>. By a similar effect on odour, pregnant females are twice as attractive to Anopheles vectors as their non-pregnant counterparts<sup>22</sup>. This finding has implications for the females living in malaria endemic areas, particularly during pregnancy as the fetus may also be at risk.

Among the sociodemographic factors, religion was strongly predictive of alcohol consumption as well as marital status. Women who practiced other religions were over two and a half times more likely to have consumed alcoholic drinks compared to Moslems. This is hardly surprising because the Islamic faith is associated with high rates of alcohol abstention<sup>11</sup>. Women in other marital states (single, divorced, separated and widowed) were seventy per cent more likely to consume alcohol compared to married women. This contrasts with previous studies in Ghana. An earlier study in Bosomtwe district in Ghana reported the highest proportion of drinkers to be married<sup>5</sup> and a WHO National Survey on Global Ageing and Adult Health (SAGE) among persons aged 50 years and above in Ghana showed that currently married women had the highest prevalence of frequent heavy drinking based on

marital status of the women surveyed<sup>23</sup>. However, other studies have reported higher drinking rates among single women<sup>3,11,17</sup>. Those who considered that alcohol had a beneficial effect in our survey, were twice as likely to have consumed alcohol as those who considered otherwise. In this survey, 64 women considered alcohol had a beneficial effect; particularly that it protects the heart. Sixty four per cent of the women who considered alcohol had a beneficial effect were pregnant at the time of the survey. Although evidence from studies on light to moderate drinking has been inconclusive, it has been suggested that it offers a beneficial impact on morbidity and mortality for ischaemic heart disease and stroke<sup>12,24,25</sup>. However, this beneficial effect disappears with a minimum of one heavy drinking occasion per month<sup>11,26</sup>.

Among the pregnant women, 92% (55% of all women) considered alcohol had harmful effects yet 20% of these women became pregnant soon (< 3 months) after consuming 'so much alcohol'. Furthermore the three heaviest drinkers (>20 units/week) were all pregnant at the time of the survey. The proportion of pregnant heavy drinkers at 1.3% exceeds 0.2% reported in an urban obstetric population in Ireland<sup>11</sup> but is lower than almost 2% reported in the United States<sup>27</sup>. This places the infants born to these women at a greater risk of FASD. A previous report from north Queensland suggests that FAS is predicted by maternal self report of alcohol use before and during pregnancy<sup>28</sup>. Although similar proportions of all women acknowledged that alcohol had harmful effects on the unborn child, 40%, and that an infant born to a woman who drank alcohol regularly differs from any other baby, 39%, only 1.8% had adequate knowledge of specific effects. For instance, less than 10% of respondents mentioned features consistent with FAS, attention deficit, behavioural problems, learning disabilities, mental retardation, delayed development and low intelligence quotient. Adequate knowledge was based on the ability to mention at least four effects of fetal alcohol exposure. The pattern was similar in Bosomtwe district in Ashanti Region where 78% of pregnant women knew alcohol had harmful effects but only 21% provided correct answers<sup>5</sup>. In a sample of 157 pregnant women in

Mongoro municipality, Tanzania, 29% knew about the effects of alcohol on the unborn child<sup>29</sup>.

The use of alcoholic spirits in herbal brews as a remedy for various ailments appeared to be a source of alcohol consumption in childbearing Ghanaian women. The results of this study showed that nearly a quarter of the women had imbibed alcoholic herbal brews. Lack of awareness of the effects of maternal alcohol consumption on the unborn child was significantly associated with drinking alcoholic herbal brews during pregnancy. This was further reinforced by a favourable attitude towards maternal consumption of alcohol and ever having imbibed an alcoholic herbal brew. During pregnancy, consumption of alcoholic drinks in the first trimester and alcoholic herbal brews were similar, 19.3% and 18.8% respectively. In the index pregnancy, 15% of women had imbibed an alcoholic herbal brew. The value for alcohol consumption in the first trimester is lower than 25.2% reported in United States<sup>7</sup>. All values for alcohol consumption in any form are slightly lower than 21.4% reported in Sydney, Australia<sup>30</sup>, nearly 20% reported by the Institute of Medicine<sup>16</sup>, 20.4% reported in Bosomtwe, Ghana<sup>5</sup> and much lower than 33% reported in Sao Paulo, Brazil<sup>6</sup>. In Canada and Tanzania, relatively lower rates of 11% and 6.4% respectively were reported<sup>29,31</sup>. Peadon and co-authors reported that lack of knowledge about the effects of alcohol use in pregnancy on the unborn child was associated with the intention to drink alcohol if pregnant<sup>1</sup>. In contrast, knowledge of specific differences found in infants with fetal alcohol exposure and effects of alcohol on an individual were not associated with alcohol consumption or drinking alcoholic herbal brews in the present study.

Women considered alcoholic herbal brews had some beneficial effects on health. A third of all women perceived imbibing alcoholic herbal brews to be beneficial especially for fevers, abdominal discomfort, gynaecological problems and as a haematinic. A similar array of conditions for which herbal preparations were thought to be effective were reported by Oreagba and others<sup>32</sup>. Herbal preparations either in crude or refined forms are used by 65% to 80% of the global population as their primary form of health care<sup>32,33</sup>.

The prevalence of herbal medicine use during pregnancy ranges from 7% to 55% depending on sociocultural characteristics and ethnicity<sup>34</sup>. Our survey results showed that a quarter of the pregnant women had imbibed alcoholic herbal preparations in the current pregnancy. In Ghana, herbalists and traditional birth attendants offer herbal preparations taken by childbearing women in order to enhance their wellbeing and that of the baby, prevent complications and treat a variety of conditions, especially fever<sup>35</sup>. Women may take herbal preparations because this is traditionally required and some believe herbal preparations offer spiritual protection and ensure a safe birth<sup>35</sup>. More than 10% of pregnant women reported the use of herbal medicinal products in Finland, Australia and United States compared to 46% and 68% reported in Nigeria<sup>33,36</sup>. In developing countries, some alcoholic herbal preparations are advertised on radio, television, in commercial vehicles and at lorry parks as “wonder drugs” with a broad range of therapeutic claims. Convinced consumers may perceive herbal preparations as better alternatives to orthodox drugs prescribed by physicians but it has been suggested that for nearly 60% of natural herbal products the safety in pregnancy is unknown<sup>35</sup>. Pregnant women are at risk of inadvertently taking alcohol as most of these preparations are alcohol based. Herbal medicinal products may contain significant levels of pure alcohol as a result of its use as an extraction solvent in liquid extracts and tinctures or when added as diluents to liquid herbal preparations<sup>36</sup>. The use of pure alcohol is necessary for extraction of some constituents that are important for efficacy<sup>36</sup>. The harm to the fetus will depend on the timing of alcohol exposure and stage of organogenesis, which makes the period of early gestation critical<sup>34</sup>.

More than half of the women drank mainly at events especially weddings, naming ceremonies and funerals. Attendance at social events was used to determine risk of alcohol consumption in this study because of the anecdotal observation that majority of women may not necessarily drink alcohol on their own. Women who had a high risk of alcohol consumption were nearly ten times more likely to imbibe alcohol alcoholic herbal brews. It is possible that women who drank

alcohol at social events more often, found it easy to imbibe alcoholic spirits used in these brews. Drinking alcoholic beverages and alcoholic herbal brews are associated but the temporal sequence was not determined in the present study. Some women perceived that alcoholic beverages were beneficial to health including a palliative option for physical discomforts in early pregnancy. This was suggested by major reasons proffered by respondents as to why a pregnant woman may drink alcohol: inability to break an existing habit (29%), relieving pregnancy symptoms (25%), family problems (18%) and stress at work (12%). A small proportion of women suggested that alcoholic herbal brews could serve as an abortifacient. Drinking an alcoholic brew during pregnancy was nearly four times more common among women who had ever taken an alcoholic herbal brew. This may reflect a similar observation that alcohol use before pregnancy is a risk factor for alcohol use during pregnancy<sup>7,16</sup>.

Alcohol-related disorders among children in the family and within the community observed by less than a quarter of the women have important implications. Women who observed these disorders in the family were tended to be less likely to have ever consumed an alcoholic herbal preparation but this was confounded by other factors. Evidence suggests that the effects of prenatal alcohol exposure are dose-related<sup>8,26</sup>. Heavy drinking (over 48-60 grams of ethanol/day or 6 units/day) may cause FAS in 4-6% of infants borne by these mothers<sup>7</sup>. The syndrome is characterized by an array of features including prenatal and postnatal growth deficiency, short stature, developmental delay, fine motor dysfunction, microcephaly and facial dysmorphism<sup>7,8,38</sup>. The observation of alcohol-related disorders may be an indication of high risk drinking patterns within the family. A seven fold increased risk of FAS has been reported among African Americans compared to Caucasians suggesting genetic susceptibility to fetal alcohol exposure<sup>8</sup>. Furthermore following the birth of a single child with FAS, the risk of another child being affected increases 800 times for subsequent pregnancies<sup>38</sup>. Evidence from a study in Atlanta, United States suggests that women who give birth to children with FAS have a higher risk of early

mortality, irrespective of whether or not alcohol consumption continued during pregnancy<sup>39</sup>. In the study, maternal (mother's own mother) alcohol use correlated significantly with mortality. This underscores the importance of alcohol screening and preventive education be offered as part of a pre-conception and prenatal package to all women. Preconception counseling has been shown to reduce alcohol use during the first three months of pregnancy<sup>40</sup>. Schools and other family and community agents of instruction should target adolescent girls early, possibly before a habit is established.

The present study has the limitation of recall bias based on retrospective reports of the women and social bias based on the general impression that drinking is unacceptable for women since the study was facility based. However, alcohol consumption was considered over three months which allowed for the possibility of recognizing patterns that may not be correctly identified using the 7-day in interval reported in most studies. In this sense, it was considered the strength of the study. It was also not possible to make cause-effect conclusions and to generalize the findings to all women in Ghana because of the study design. The findings may be considered preliminary impressions about alcohol use in childbearing women and an addition to the existing body of literature that highlights problems for further research.

## Conclusion

Inadequate knowledge of the risks of alcohol consumption in pregnancy by these vulnerable women is a health promotion policy measure worth considering by the Family and Reproductive Health Unit of the Ghana Health Service. Given the known harmful effects of fetal alcohol exposure, the difficulties in defining a minimum dose that will affect the embryo and the exact dose response relationship, concerted efforts are required to limit alcohol consumption in young adults before and during pregnancy. As the availability of alcoholic herbal brews is a risk factor associated with maternal alcohol consumption and is rife in African communities, information, education and communication about the potential harm of local unregulated

preparations should be intensified through community channels and gatekeepers, educational institutions, women's groups, churches, community based health planning services, health centres and media. Regulatory boards can forge partnerships with community volunteers to identify sellers of alcoholic herbal brews for awareness creation, reformulation, efficacy and safety testing of products. Terminating illicit channels and substituting these with alternative sources of livelihood is an ultimate goal. Advertisements promoting alcohol should be regulated in the light of overall evidence and country specific reports. Education of adolescent girls (in and out of school), and pregnant women during antenatal clinic visits to promote awareness about the potential harm of alcohol consumption is essential. Hopefully this will set the stage for the adoption of healthy lifestyles and preserve our future generations from unnecessary alcohol-related harm.

## Acknowledgement

The authors are grateful to the management and staff of the Department of Obstetrics and Gynecology Outpatient Department of the Korle Bu Teaching Hospital for their support. We thank all the women who by their participation made this study possible. No funding was received for the study.

## Conflict of Interest

The authors declare there is no conflict of interest.

## Contribution of Authors

GA collected data and conducted preliminary analysis. EU and AY were responsible for the methods and final analysis of data. GA and AY contributed to the draft manuscript. EU wrote the paper. All authors reviewed and approved the manuscript.

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