

FACTORS ASSOCIATED WITH PRENATAL ALCOHOL CONSUMPTION AMONG PREGNANT WOMEN IN SOUTHERN ETHIOPIA: A COMMUNITY-BASED CROSS SECTIONAL STUDY

Kassaw Beyene Getahun¹, Yosef Alemayehu¹, Awol Arega¹, Gedife Ashebir², Dagninet Aleign³,
Getahun Deguale⁴, Yilkal Dagnaw⁴, Biresaw Wassihun⁵, Yilikal Tesfaye⁶, Truset Gelaw⁷

ABSTRACT

BACKGROUND: Prenatal alcohol consumption is a significant public health problem. Studies discover that there is no safe amount or safe time to drink alcohol during pregnancy, eventually affecting the foetus, neonate infant and children. Despite this effect, pregnant women in Ethiopia consume different alcohol containing beverages. This study was intended to assess prenatal alcohol use and associated factors among pregnant women in southern Ethiopia.

METHODS: A community based cross sectional study was employed from December 1 to 30, 2021, in southern Ethiopia among 573 pregnant women. A multi stage sampling was carried out. Data was analysed using statistical package for social science (SPSS) version 27.0 software. Binary logistic regression was used to assess the association between alcohol consumption with independent variables. P-value ≤ 0.05 with a 95% confidence interval was considered statistically significant.

RESULTS: The prevalence of alcohol use was found to be 22.7%. primiparity (AOR=2.12, 95% CI, 1.10, 4.09), having drinker partners (AOR= 3.01, 95% CI, 1.20, 3.94), uninformed on the risk of alcohol consumption (AOR= 3.90, 95% CI, 1.98, 7.70), presence of known medical problems (AOR= 0.09, 95% CI, 0.02, 0.31), depressive mental status (AOR=3.03, 95% CI, 1.15, 11.21) were found to have a statistically significant association with alcohol use.

CONCLUSION: This study found a high level of alcohol consumption. Interventions to create awareness on the adverse effects of alcohol are needed. Moreover, couples should be encouraged to seek preconception care to know their medical and mental health status. In addition, promoting husbands' involvement throughout the perinatal period may help reduce their influence on, and encouragement of, maternal alcohol consumption..

KEYWORDS: Alcohol consumption, Maternal, Pregnancy, Arba Minch, Ethiopia.

(The Ethiopian Journal of Reproductive Health; 2026; 18; 59-69)

1 Department Midwifery, Arba Minch University, Arba Minch, Ethiopia

2 Department Public Health, Arba Minch University, Arba Minch, Ethiopia

3 Department Medical Laboratory, Arba Minch University, Arba Minch, Ethiopia

4 Department Midwifery, Debre Markos University, Debre Markos, Ethiopia

5 Department Midwifery, Injibara University, Injibara, Ethiopia

6 Department Statics, Arba Minch University, Arba Minch, Ethiopia

7 Department Midwifery, Wollo University, Wollo, Ethiopia

INTRODUCTION

Prenatal alcohol consumption is a major public health problem because of the preventable enormous deleterious effects on a developing foetus¹. Worldwide, the majority of clinical and government guidelines advocate for pregnant women to abstain from alcohol consumption due to potential adverse effects on pregnancy outcomes^{2, 3}.

Globally the magnitude of alcohol consumption during pregnancy is estimated to be 10%⁴. People in Ethiopia including pregnant women highly consume alcohol beverages, especially the traditionally prepared alcohol beverages (Tella, Korefe, Tej, Areki, Chek ...) that have higher percentages of alcohol amount and easily accessible^{5, 6}. Thus, locally made alcohols are being used excessively without control in different holidays, festivals, parties, and in daily family meals and day to day life^{7, 8}. Some reports have shown that alcohol consumption is predominant in Ethiopia. For instance, Ethiopia has been ranked fifth among the ten top local alcohol drinking countries in the world⁹.

Study revealed that women might use alcohol as a coping mechanism to escape from pregnancy related stressful situations and emotional instability^{10, 11}. The drinking habits of alcohol can be also determined by the culture, attitude or other socio-demographic contexts of the society in which the pregnant mother belongs^{12, 13}.

The adverse effects of prenatal alcohol exposure can range from subtle developmental problems, or fetal alcohol effects, to full-blown fetal alcohol spectrum syndrome (FASS). However, it is not limited to infancy and childhood; prenatal exposure to alcohol, particularly in early pregnancy, has also been found to increase the likelihood of developing an alcohol disorder in adulthood^{14, 15}. World Health Organization (WHO) declared that there is no safe time and no safe amount to consume alcohol in pregnancy, the complete abstinence is recommended^{16, 17}.

Despite its serious consequences, evidence on alcohol consumption during pregnancy in Ethiopia is limited. This study assessed the prevalence of

maternal alcohol use and its associated factors among pregnant women in Southern Ethiopia

Methods and Clients

Study setting and design

A community based cross-sectional study design was conducted in Arba Minch, Sawla town and Jinka town from December 01 to 30/2021. Arba Minch, Sawla and Jinka town are the administrative cities of Gamo, Gofa, and South Omo zones, southern Ethiopia, which are 454, 495 and 531 kms south of Addis Ababa (capital city of Ethiopia) respectively.

Study Populations

All pregnant women who live in selected towns were the source population. All pregnant women who reside in selected kebeles of the town during the study period were the study population. All pregnant women who live in the three towns for six months and above were included in the study. However, women who were seriously ill and couldn't communicate during data collection period were excluded from the study.

Sample size determination and procedure

The sample size was calculated using a single population proportion formula by considering the following assumptions:

Assumptions: A 95% confidence level, margin of error (0.05)

$$n = \frac{(Z_{\alpha/2})^2 P (1-P)}{(d)^2} =$$

n= 359, p= 37.1% proportion of alcohol users in Addis Ababa¹⁸

Where:

P= proportion d = the margin error between the sample and the population (0.05). $Z_{\alpha/2}$ = critical value at 95% confidence level of certainty (1.96). By considering 10% non-response rate added to the value, it gives 390 and also by multiplying 1.5 times of the calculated sample size design effect, it

becomes 585 and it was the sample size of the study. Multi stage sampling technique was used. There are 14 zones in southern nation nationality and people (SNNP), out of which 3 Zones were selected using simple random sampling method and three towns were chosen using random sampling. List of the study subjects and the code of households were obtained from health extension workers (the lowest health professionals working at health posts) from each kebeles. Then the sample size for each of the selected kebeles was determined proportionally and selected using a systematic sampling method, in which every “kth ” intervals $K = N/n = 1693/585 = 2.89$. The first house was selected by lottery method and then every 3 house was interviewed. In cases of selected household with more than one eligible respondent, only one respondent was chosen by lottery method.

Study variables

Dependent variable: Prenatal alcohol consumption
Independent Variables

Socio-demographic characteristics: Age, Residence, Marital status, Education, Occupation, Income, Husband education

Obstetric and medical related factors like parity, gestational age, number of children, pregnancy plan status, previous history of abortion, antenatal care (ANC), Parity, History of preterm birth, past history of abortion, Intention to give birth, History of diabetes mellitus, and History of hypertension.

Individual & socio-cultural factors: Partner drinking habit, Cultural acceptability, Pressure from peer/partner, being served as meal, Social support status, Depression symptoms.

Awareness of clients: Awareness on risk of alcohol use on the foetus and herself.

Operational definition

Alcohol consumption was defined as intake of any alcoholic beverages in the course of the index pregnancy, while ‘binge drinking’ was defined as intake of four or more standard units of alcohol in a single occasion, and within 2 hours duration, in the course of the index pregnancy¹⁹.

The alcohol use screening tool, AUDIT-C, is the most popular shortened version of the 10-item AUDIT. It comprises of three items to assess alcohol consumption cross culturally and identify hazardous drinkers. **For men**, a score of ≥ 4 indicates hazardous or harmful alcohol use. **For women**, a score of ≥ 3 indicates hazardous or harmful alcohol use. Higher scores indicate a greater likelihood of risky drinking and potential alcohol-related problems²⁰.

Edinburgh Postnatal Depression Scale (EPDS) which has 10 items scored on a scale of 0–3; the score ranging from 0–30 and we used a cut-off point of 13 and above on the scale to identify women with depressive symptoms²¹.

Social support: the Oslo 3-items social support scale, which is considered one of the best predictors of mental health, covering different fields of social support and perceived way of getting assistance from neighbours. The sum ranges from 3 – 14 and the score shows poor support^{3–8}, moderate support^{9–11}, and strong support (12–14)²².

Cultural acceptability: the proportion of respondents who express neutral or positive attitudes toward pregnant women consuming alcohol, as measured by a 5-point Likert scale assessing perceived norms, social approval, and cultural beliefs²³.

Data collection tools

Data were collected using a semi-structured questionnaire adapted from previous studies. The questionnaire covered socio-demographic characteristics, the Edinburgh Postnatal Depression Scale (EPDS), the Oslo 3-item Social Support Scale, reproductive and medical factors, individual and socio-cultural factors, and client awareness. After obtaining written informed consent, six trained BSc midwives collected the data under the supervision of three MSc midwives. The questionnaire was translated into Amharic and back-translated into English to ensure consistency and accuracy.

Data quality assurance

A pretest was conducted on 5% of the sample to

ensure the consistency of the questionnaire. Data collectors and supervisors received two days of training before data collection. Data quality was maintained through daily supervision, checking for completeness and consistency, and immediate correction of identified issues. Final data verification was performed by the principal investigator before analysis.

Data processing and analysis

Data were collected using the Kobo Toolbox application and analyzed in SPSS version 26. Descriptive statistics were summarized using frequencies, percentages, means, and medians. Variables with a p-value <0.25 in the bivariate analysis were included in the multivariable logistic regression model. Model fitness was assessed using

the Hosmer–Lemeshow test, and multicollinearity was checked using Variance Inflation Factor (VIF). Statistical significance was declared at $p < 0.05$, and results were reported using adjusted odds ratios (AORs) with 95% confidence intervals

Results

Socio-demographic characteristics

A total of 573 pregnant women participated in the study, yielding a 97.9% response rate. The mean age was 26.1 ± 4.6 years. Most participants were married (92.0%), 34.6% had higher education, and 9.4% had no formal education. More than one-third (38.6%) were merchants or engaged in private business, and the median monthly household income was 5,600 ETB (IQR: 4,200 ETB) (Table 1).

Table 1: Socio-demographic characteristics of the study participants in, southern Ethiopia, 2021.

Variables	Frequency(n)	Percentage (%)	
Age	15-20	56	9.80
	21-30	406	70.80
	≥31	111	19.40
Marital status	Married	527	92
	Others*	46	8
Educational level	No formal education	54	9.40
	primary	193	33.70
	Secondary	128	22.30
	Above secondary	198	34.60
Occupation	Housewife	137	23.90
	Employed(Gov't/NGOs	157	27.40
	Private business	221	38.60
	Student	38	6.60
	Farmer	19	3.30
Family monthly income	<5600.00	281	49
	≥5600.00	292	51

Key=* widowed, separated, single

Reproductive and medical condition of the mothers Among the participants, 60.7% were multiparous, with 53.4% having five or more children. A history of preterm delivery and abortion was reported by 8.3% and 21.3% of women, respectively. Nearly all (95.8%) attended antenatal care, while 40.5%

had four or more ANC visits. Over half (50.8%) were in the third trimester, 84.8% had planned pregnancies, 72.6% desired future fertility, and 9.2% experienced medical illnesses during pregnancy, with hypertension (4.9%) and diabetes mellitus (2.4%) being the most common (Table 2).

Table 2: Obstetrics and medical characteristics among pregnant women in Southern Ethiopia, 2021, (n=573).

Variables		Frequency(n)	Percentage (%)
Parity	Nulliparous	70	12.20
	Primiparous	155	27.10
	Multiparous	348	60.70
Number of children (n=503)	<5	197	38.30
	≥5	306	61.70
History of preterm labor (PTL) (n=503)	Yes	42	8.30
	No	461	91.70
History of abortion (n=348)	Yes	72	21.30
	No	266	78.70
Antenatal care during the current pregnancy	Yes	509	95.30
	No	25	4.70
Any known medical illness	Yes	53	9.20
	No	520	90.80
The medical disease?	Hypertension	28	52.80
	CHD	3	5.70
	Genito urinary problem	5	9.40
	Diabetes mellitus	14	26.40
	Others	3	5.70
Gestational age	First trimester	62	10.80
	Second trimester	173	30.20
	Third trimester	291	50.80
	Unknown	47	8.20

PTL- preterm labor, LMP- Last Menstrual Period, US-ultrasound

Alcohol consumption and personal habits

Among the respondents 130(22.70%) of them consumed alcohol during the current pregnancy, of those drinkers 72(55.40%) of them consumed alcohol 2-3 times per week and regarding the types of alcohol used 32(5.60%) of them used beer, followed by wine and tella 17(3%). The most common reason for alcohol consumption is peer pressure 34(5.90%), social reason 30(5.20%)

followed by to get out from stress 27(4.70%). From all respondents, only 408 (71.20%) of them heard about the risk of alcohol consumption during pregnancy, health care providers 147(25.70%) were the main source of the information. Majority 396 (69.1%) of them were alcohol drinker in their pre pregnancy state. Most 479 (83.60%) of the women drunk coffee, 34(5.90%) of them were chewing chat and 26(4.50%) of women were smoke cigarette during the current pregnancy (Table 3).

Table 3: Prenatal alcohol consumption among pregnant women in southern Ethiopia, 2021.

Variables		Frequency(n)	Percentage (%)
Prenatal alcohol consumption	Yes	130	22.70
	No	443	77.30
Frequency of alcohol use	2-3 /week	72	55.40
	2-3/month	58	44.60
Reason of alcohol use	For relaxation	27	20.80
	For socialization	35	26.90
	Peer pressure	37	28.50
	To get out from stress	31	23.80
Pre pregnancy alcohol use	Yes	396	69.10
	No	177	30.90
Drinker Partner	Yes	396	69.10
	No	177	30.90
Partner encourage to drink alcohol	Yes	167	29.10
	No	406	70.90
Cultural acceptability of alcohol use	Yes	426	74.30
	No	147	25.70
Four or more standard units drinks on one occasion	Yes	35	26.90
	No	95	73.10
Heard about risk of alcohol use	Yes	408	71.20
	No	165	28.80
Source of information	Mass media	82	20
	HCPs	147	36
	Friend/family	79	19.40
	Mass media & HCPs	100	24.60

Social support and depressive symptoms

Majority 399(69.6%) of pregnant women had strong social support, 100(17.5%) had moderate social support and seventy four (12.9%) of them had poor social support during the current pregnancy from their social network. Regarding depressive symptom, fifty seven (9.9%) of pregnant women had depressive symptoms and 516 (90.1%) of them had no depression during pregnancy.

Factors associated with maternal alcohol consumption

In the bivariate analysis, educational level, parity, pre-pregnancy alcohol use, partner encouragement, medical illness, awareness of alcohol-related risks, partner alcohol use, future fertility desire, and depression were significantly associated with

prenatal alcohol consumption. In the multivariable binary logistic regression, primiparity, partner alcohol use, medical illness, lack of awareness about the risks of alcohol consumption, and depression remained independently associated with maternal alcohol consumption.

Pregnant women who are primiparous (AOR=2.12, 95% CI, 1.10, 4.09) were two times more likely to be alcohol drinker than those women who are multiparous. Pregnant women whose partners were alcohol drinker (AOR= 3.01, 95% CI, 1.20, 3.94) were three times more likely to drink alcohol as compared with women whose partners were alcohol drinker during pregnancy. Not being informed on the risk of alcohol consumption had significantly greater odds of being alcohol consumer (AOR= 3.90, 95% CI, 1.98, 7.70) than women who are

informed on the risk of alcohol consumption during pregnancy.

Pregnant women who had known medical problem (AOR= 0.09, 95% CI, 0.02, 0.31) were 91% less likely to take alcohol than women who had no any medical problem. The odds of being alcohol drinker was three times (AOR=3.03, 95% CI, 1.15, 11.21) more among pregnant women who are depressive mental status as compared to women who are not depressed (Table 4).

Table 4: Bivariate and multivariable analysis of factors associated with prenatal alcohol consumption in Southern Ethiopia, 2021, (n=573)

Variables	Alcohol use	Odd Ratio @ CI (95%)			
		Yes,N (%)	No,N(%)	COR	AOR
Educational level	Primary and no formal education	40(16.2)	207(83.8)	1	1
	2 ^{ry} and above	90(27.6)	236(72.4)	0.50(0.33,0.76)	0.60(0.34,1.06)
Parity	Null	24(34.3)	46(65.7)	0.65(0.38, 1.14)	0.85(0.39, 1.85)
	Primi	17(11)	138(89)	2.78(1.59, 4.87)	2.12(1.10,4.09)*
	Multi	89(25.6)	259(74.4)	1	1
Fertility desire	Yes	101(24.3)	315(75.7)	1	1
	No	29(18.5)	128(81.5)	1.41(0.89, 2.24)	1.26(0.69,2.31)
Pre-pregnancy alcohol use	Yes	63(15.9)	333(84.1)	3.21(2.14, 4.83)	0.99(0.03, 28.89)
	No	67(37.9)	110(62.1)	1	1
Partner alcohol drinker	Yes	63(15.9)	333(84.1)	3.21(2.14, 4.83)	3.01(1.20,3.94)**
	No	67(37.9)	110(62.1)	1	1
Partner encouraged you to drink alcohol	Yes	411(84.6)	75(15.4)	9.41(5.71,15.53)	11.04(0.94, 21.65)
	No	32(36.8)	55(63.2)	1	1
Having known medical illness	Yes	5(9.4)	48(90.6)	1	1
	No	125(24)	295(76)	0.32(0.12, 0.84)	0.09(0.02,0.31)*
Heard about risk of alcohol use	Yes	291(71.3)	117(28.7)	1	1
	No	152(92.1)	13(7.9)	4.70(2.56, 8.61)	3.90(1.98,7.70)**
Depressive symptom	Yes	52(91.5)	5(8.5)	3.36(1.51, 12.06)	3.03(1.15, 11.21)*
	No	390(75.6)	126(24.4)	1	1

*=p-value <0.05, **=p-value≤ 0.01, CI = Confidence Interval, COR = Crude Odds Ratio, AOR=Adjusted Odds Ratio

DISCUSSIONS

The results of this study revealed that the prevalence of alcohol use was found to be 22.7%. This finding was in line with the study findings done in Ghana (20.4%)²³. The magnitude of alcohol use in this study was higher than a facility based cross sectional study findings done in Gedeo zone, Ethiopia²⁴. A possible explanation for this difference is that our community-based study included both ANC attendees and non-attendees, whereas the Gedeo study included only women attending ANC. Women who receive ANC are more likely to receive counseling and education on the risks of alcohol use during pregnancy, which may contribute to a lower prevalence of alcohol consumption.

However, the prevalence of alcohol use in this study was lower than the prevalence of alcohol use reported from a study done in Bahr Dar town, Ethiopia (34%)²⁵. The possible explanation for this difference might be due to the difference in the screening tools used. In this study we used Alcohol Use Disorder Identification Test (AUDIT) which was less sensitive to screen alcohol use and might underestimate the prevalence of alcohol use than a tool used in Bahr Dar study Tolerance, Annoyed Cut down Eye opener (T-ACE)²⁶.

This study found that primiparity was a significant predictor of alcohol consumption during pregnancy. Primiparous women were twice as likely to consume alcohol during pregnancy compared with multiparous women. This finding is supported by the study conducted in Sub Saharan African countries²⁷. A possible explanation is that multiparous women have more frequent contact with health services through previous pregnancies and childbirths, increasing their exposure to health education and counselling on the harmful effects of alcohol consumption during pregnancy. This greater awareness may reduce their likelihood of drinking alcohol during pregnancy.

Pregnant women who had not heard about the harmful effects of alcohol use during pregnancy were 3.9 times more likely to consume alcohol than

those who were aware of its risks. This suggests that awareness of the adverse effects of alcohol on the fetus, newborn, infant, child, and mother plays an important role in reducing alcohol consumption during pregnancy. This finding was congruent with the studies conducted in Gondar, Addis Ababa, Ethiopia^{8, 22}, South Africa²⁸ and Nigeria²⁹. A possible explanation is that adequate awareness of the risks of alcohol consumption during pregnancy influences women's decisions to avoid drinking. Knowledge of the harmful effects of alcohol serves as an important motivator for adopting and maintaining healthy behaviours throughout pregnancy. Women who had their partners drank alcohol were three times more likely to report drinking than their counterparts. This finding was consistent with the studies conducted in Gondar town, Bahir Dar, Ethiopia^{22, 25}, Dodoma Region Tanzania³⁰, South Africa²⁸, and Kampala, Uganda³¹. Likewise, findings of a systematic review which was conducted in Sub-Saharan Africa revealed that male partners drinking behaviour is one of the risk factors for women to drink alcohol while pregnant³². A possible explanation is that partners often share similar lifestyle and substance use behaviours. Women whose partners consume alcohol may be more likely to drink due to shared drinking habits, partner influence, social pressure, and the difficulty of refusing repeated invitations to drink.

Furthermore, this study's finding revealed that depressive symptoms had significant association with maternal alcohol use while pregnant. Pregnant women with depressive symptom were 3.05 times more likely to use alcohol as compared to their counterparts. This correlation is supported by the study done in Gedeo zone, Ethiopia²⁴. This might be due to the fact that people with mental distress are more like to use alcohol to reverse the difficulties of sleep initiation, social engagement and lack of happiness which are hallmark symptoms of mental distress^{33, 34}.

Women who had never experienced medical complications in the pregnancy were more likely

to use alcohol in the pregnancy. This is in line with the study finding conducted in Nigeria³⁰. But, some studies have shown that there is no association between alcohol consumption during pregnancy and medical complication during pregnancy²⁵. This finding may be explained by the fact that women who have never experienced pregnancy-related complications may perceive themselves to be at lower risk and are therefore more likely to engage in risky behaviors, such as alcohol consumption during pregnancy. In our study maternal alcohol consumption had no statically significant association with adverse birth outcome, in contrast, the study done in Gondar town revealed that alcohol consumption during pregnancy was significantly associated with low birth³⁵.

Conclusions

The study findings revealed that alcohol use was common during pregnancy in southern Ethiopia. The predisposing factors for prenatal alcohol use were being primipara, having alcohol drinker partner, having medical disease, depression, and not ever heard information about the risk of alcohol drinking during pregnancy. Every couple in reproductive age should visit health facility and get pre conception care before getting pregnant and health care providers should provide information about the adverse effect of alcohol use on the developing foetus and on the mother.

Ethics approval and consent to participate

Ethical clearance was obtained from the Institutional Research Ethics Review Board of the college of medicine and health science, Arba Minch University (IRB/1165/21). All measures were employed to maintain human rights including written consent. All participants were informed about the objectives of the study and that their participation was voluntary. It was also clearly stated to the participants that the information they provided was for research purposes and strictly confidential.

Abbreviations

ANC: Ante Natal Care
EPDS: Edinburgh Postnatal Depression Scale
FASS: Fetal Alcohol Spectrum Syndrome
WHO: World Health Organization

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and/or analyzed during the current study are available here as S1 file and submitted as supplementary material.

S1 File. The dataset used for analysis of this study. (SAV)

Competing interests

The authors declare that they have no competing interests.

Funding

The authors received no specific funding for this work.

Authors' contributions

KB, YA, TG, and GA conceptualized the study. KB, GD, YD, YT, and YA led the analysis. KB and BW: wrote the original draft with inputs from KB and AA. All authors have reviewed and approved this final draft of the manuscript.

Acknowledgment

The authors thank all the study participants and data collectors.

Corresponding Authors:

Kassaw Beyene
College of Medicine and Health Sciences,
Arba Minch University, Arba Minch, Ethiopia
E-mail: Kassaw.kb3@gmail.com

REFERENCES

1. Adeyiga G, Udofia EA, Yawson AE. Factors associated with alcohol consumption: a survey of women childbearing at a national referral hospital in Accra, Ghana. *African Journal of Reproductive Health*. 2014;18(2):152-65.
2. Gibbs A, Sherwood K. Putting fetal alcohol spectrum disorder (FASD) on the map in New Zealand: A review of health, social, political, justice and cultural developments. *Psychiatry, Psychology and Law*. 2017;24(6):825-42.
3. Butt P, Beirness D, Cesa MF, Gliksman L, Paradis MC, Stockwell T. Alcohol and health in Canada: A summary of evidence and guidelines for low-risk drinking. Ottawa: Canadian Centre for Substance Abuse. 2010.
4. Popova S, Lange S, Probst C, Gmel G, Rehm J. Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: a systematic review and meta-analysis. *The Lancet Global Health*. 2017;5(3):e290-e9.
5. Soboka M TM, Feyissa GT, Hanlon C. Alcohol use disorders and associated factors among people living with HIV who are attending services in south west Ethiopia. *BMC Res Notes*. 2014;7(1):828.
6. Lee M RM, Seleshe S. Uniqueness of Ethiopian traditional alcoholic beverage of plant origin, tella. *Ethnic Foods*. 2015;2(3):110-4.
7. Wedajo Lemi B. Microbiology of Ethiopian traditionally fermented beverages and condiments. *International journal of microbiology*. 2020;2020.
8. Bitew MS, Zewde MF, Wubetu M, Alemu AA. Consumption of alcohol and binge drinking among pregnant women in Addis Ababa, Ethiopia: Prevalence and determinant factors. *PloS one*. 2020;15(12):e0243784.
9. countries T. to drink the local alcohol - Toptenz.net <https://www.toptenz.net/top-10-countries-to-drink-the-local-alcohol.php>.
10. hompson O AI. Prevalence of antenatal depression and associated risk factors among pregnant women attending antenatal clinics in Abeokuta North Local Government Area, Nigeria. *Depression research and treatment*. 2016;4(1):34-5.
11. atu A HD. Prevalence of antenatal depression and associated factors among pregnant women in Addis Ababa, Ethiopia: a cross-sectional study. *Reprod Health*. 2015;12(1):99.
12. Peadon E PJ, Henley N, D'antoine H, Bartu A, O'Leary C, Bower C, Elliott EJ. attitudes and behaviour predict women's intention to drink alcohol during pregnancy: the challenge for health professionals. *BMC public health*. 2011;11(1):584.
13. Petersen Williams P JE, Mathews C, Lombard C, Parry CD. Alcohol and other drug use during pregnancy among women attending midwife obstetric units in the Cape Metropole. South Africa. *Adv Prev Med*. 2014;8(7):27.
14. Alati R, Al Mamun A, Williams GM, O'Callaghan M, Najman JM, Bor W. In utero alcohol exposure and prediction of alcohol disorders in early adulthood: a birth cohort study. *Archives of general psychiatry*. 2006;63(9):1009-16.
15. Manning MA, Hoyme HE. Fetal alcohol spectrum disorders: a practical clinical approach to diagnosis. *Neuroscience & Biobehavioral Reviews*. 2007;31(2):230-8.
16. Seiler NK. Alcohol and pregnancy: CDC's health advice and the legal rights of pregnant women. *Public health reports*. 2016;131(4):623-7.
17. Butt P, Beirness D, Gliksman L, Paradis C, Stockwell T. Alcohol and health in Canada: a summary of evidence and guidelines for low-risk drinking. Ottawa, ON: Canadian Centre on Substance Abuse. 2011.
18. Tesfaye G, Demlew D, Habte F, Molla G, Kifle Y, Gebreegziabhier G. The prevalence and associated factors of alcohol use among pregnant women attending antenatal care at public hospitals Addis Ababa, Ethiopia, 2019. *BMC psychiatry*. 2019;20(1):1-10.
19. Martinez P RJ, Naidoo N, Clausen T. Alcohol abstinence and drinking among African women: data from the World Health Surveys. *BMC Public Health*. 2011;11(1):160.
20. Lopez MB LA, Conde K, Cremonese M. Psychometric properties of brief screening tests for alcohol use disorders during pregnancy in Argentina. <https://doi.org/10.1055/s-0037-1603744> PMID: 28609804. *Revista brasileira de ginecologia e obstetricia*. 2017;39(7).
21. Dibaba Y FM, Hindin MJ. The association of unwanted pregnancy and social support with depressive symptoms in pregnancy: evidence from rural Southwestern Ethiopia. <https://doi.org/10.1186/1471-2393-13-135> PMID: 23800160. *BMC pregnancy and childbirth*. 2013;13(1):135.
22. Addila AE, Azale T, Gete YK, Yitayal M. Individual and community-level predictors of maternal alcohol consumption during pregnancy in Gondar town, Northwest Ethiopia: a multilevel logistic regression analysis. *BMC pregnancy and childbirth*. 2021;21(1):1-14.
23. Adusi-Poku Y, Edusei AK, Bonney AA, Tagbor H, Nakua E, Otupiri E. Pregnant women and alcohol use in the Bosomtwe district of the Ashanti region-Ghana. *African journal of reproductive health*. 2012;16(1).
24. Mekuriaw B, Belayneh Z, Shemelis T, Hussien R. Alcohol use and associated factors among women attending antenatal care in Southern Ethiopia: a facility based cross sectional study. *BMC research notes*. 2019;12(1):1-7.

25. Anteab K, Demtsu B, Megra M. Assessment of prevalence and associated factors of alcohol use during pregnancy among the dwellers of Bahir-Dar City, Northwest Ethiopia, 2014. *Int J Pharma Sci Res Assess*. 2014;5(12):939-46.
26. Smith L, Savory J, Couves J, Burns E. Alcohol consumption during pregnancy: cross-sectional survey. *Midwifery*. 2014;30(12):1173-8.
27. Mulat B, Alemnew W, Shitu K. Alcohol use during pregnancy and associated factors among pregnant women in Sub-Saharan Africa: further analysis of the recent demographic and health survey data. *BMC Pregnancy and Childbirth*. 2022;22(1):1-9.
28. Morojele NK, London L, Olorunju SA, Matjila MJ, Davids AS, Rendall-Mkosi KM. Predictors of risk of alcohol-exposed pregnancies among women in an urban and a rural area of South Africa. *Social Science & Medicine*. 2010;70(4):534-42.
29. Onwuka CI, Ugwu EO, Dim CC, Menuba IE, Iloghalu EI, Onwuka CI. Prevalence and predictors of alcohol consumption during pregnancy in South-Eastern Nigeria. *Journal of clinical and diagnostic research: JCDR*. 2016;10(9):QC10.
30. Mpelo M, Kibusi SM, Moshi F, Nyundo A, Ntwenya JE, Mpondo BC. Prevalence and factors influencing alcohol use in pregnancy among women attending antenatal care in Dodoma region, Tanzania: a cross-sectional study. *Journal of pregnancy*. 2018;2018.
31. Namagembe I, Jackson LW, Zullo MD, Frank SH, Byamugisha JK, Sethi AK. Consumption of alcoholic beverages among pregnant urban Ugandan women. *Maternal and child health journal*. 2010;14(4):492-500.
32. Addila AE, Bisetegn TA, Gete YK, Mengistu MY, Beyene GM. Alcohol consumption and its associated factors among pregnant women in Sub-Saharan Africa: a systematic review and meta-analysis' as given in the submission system. *Substance abuse treatment, prevention, and policy*. 2020;15(1):1-14.
33. Hassan A. Household Food Insecurity and Mental Distress Among Pregnant Women in Southwestern Ethiopia: A Cross Sectional Study Design. *Food Insecurity and Disease: Apple Academic Press*; 2017. p. 49-66.
34. Geisner IM, Larimer ME, Neighbors C. The relationship among alcohol use, related problems, and symptoms of psychological distress: Gender as a moderator in a college sample. *Addictive Behaviors*. 2004;29(5):843-8.
35. Addila AE, Azale T, Gete YK, Yitayal M. The effects of maternal alcohol consumption during pregnancy on adverse fetal outcomes among pregnant women attending antenatal care at public health facilities in Gondar town, Northwest Ethiopia: a prospective cohort study. *Substance Abuse Treatment, Prevention, and Policy*. 2021;16(1):1-15.