

**Characterization of alcohol  
consumption during pregnancy in  
Sao Tome and Principe**  
***Caracterização da ingestão de bebidas  
alcoólicas na gravidez em São Tomé e  
Príncipe***

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## Abstract

**Introduction:** Alcohol consumption is the most common teratogen in pregnancy, leading to a range of lifelong conditions.

**Aim:** To characterize the intake of alcoholic beverages during pregnancy in Sao Tome and Principe, according to socio-demographic characteristics and comparing adolescents and adults.

**Methods:** A sample of 354 Santomean pregnant women was evaluated in a cross-sectional observational study. Participants were asked about the frequency and quantity of alcoholic beverages consumption and binge drinking habits. Women who reported to have consumed alcohol in the previous month were classified as current drinkers. The Chi-square test was used to compare proportions between adolescents and adults. A binary logistic regression model was used to estimate the association between current drinking and socio-demographics. Odds Ratios (OR) and respective 95% Confidence Intervals (95%CI) were calculated.

**Results:** The prevalence of current drinking was 21% in adolescents and 37% in adults ( $p=0.118$ ), and 10.3% of adolescents and 24.7% of adults reported a consumption of  $\geq 1$  standard drink/week. After adjusting for confounders, adolescents with children were more likely to be current drinkers than those without children (OR=78.8, 95% CI: 2.3-2742.5;  $p=0.017$ ) and adults with college education were less frequently current drinkers than those without schooling (OR=0.2, 95% CI: 0.05-0.7;  $p$  trend=0.007). The most frequently consumed drink was the sweet palm wine. Binge drinking was reported by 5.6% of adults.

**Conclusion:** The prevalence of current drinking during pregnancy is high in Sao Tome and Principe. Implementing public health measures that promote the restriction of alcohol consumption during pregnancy is crucial.

**Keywords:** Alcohol consumption, Pregnancy, Sao Tome and Principe, Adolescence, Adulthood.

## Resumo

**Introdução:** O etanol é a substância teratogénica mais comum na gravidez, levando a uma série de condições ao longo da vida.

**Objetivo:** Caracterizar a ingestão de bebidas alcoólicas durante a gravidez em São Tomé e Príncipe, de acordo com variáveis sociodemográficas e comparando adolescentes e adultas.

**Métodos:** Foi avaliada uma amostra de 354 mulheres grávidas santomenses num estudo observacional transversal. As participantes foram questionadas sobre a frequência e a quantidade de consumo de bebidas alcoólicas e hábitos de *binge drinking*. As mulheres que reportaram ter bebido bebidas alcoólicas no último mês, foram consideradas consumidoras atuais. O teste Qui-quadrado foi usado para comparar proporções entre adolescentes e adultas. Foi usado um modelo de regressão logística binária para estimar a associação entre o consumo atual e variáveis sociodemográficas. Foram calculados *Odds Ratios* (OR) e respetivos Intervalos de Confiança de 95% (IC 95%).

**Resultados:** A prevalência de consumo atual foi de 21% nas adolescentes e de 37% nas adultas ( $p=0.118$ ), e 10,3% das adolescentes e 24,7% das adultas consumiram  $\geq 1$  bebida padrão/semana. Após o ajuste para confundidores, as adolescentes com filhos eram mais propensas a serem bebedoras do que aquelas sem filhos (OR=78,8, IC 95%: 2,3-2742,5;  $p=0,017$ ) e as adultas com ensino superior eram menos frequentemente bebedoras do que aquelas sem escolaridade (OR=0,2; IC 95%: 0,05-0,7;  $p$  tendência=0,007). A bebida mais ingerida foi o vinho de palma doce. A prevalência de *binge drinking* foi de 5,6% nas mulheres adultas.

**Conclusão:** A prevalência de consumo atual durante a gravidez é alta em São Tomé e Príncipe. É essencial implementar medidas de saúde pública que promovam a restrição do consumo de álcool durante a gravidez.

**Palavras-chave:** Consumo de Álcool, Gravidez, São Tomé e Príncipe. Adolescência, Idade Adulta.

## Abbreviations

**95% CI** - 95% Confidence Intervals

**FASD** - Fetal Alcohol Spectrum Disorders

**OR** - Odds Ratios

**POPMISA** - *População Materno Infantil Sem Álcool*

**STP** - Sao Tome and Principe

**Table of contents**

Abstract .....	i
Resumo .....	iii
Abbreviations .....	v
Table of contents .....	vi
Glossary .....	1
Introduction.....	2
Aim .....	3
Population and Methods.....	4
1. Study design and sampling.....	4
2. Ethics .....	4
3. Data collection .....	4
4. Statistical analysis .....	6
Results .....	7
Discussion and conclusions.....	12
References .....	17



## Glossary

Sweet palm wine - wine directly extrated from the palm and consumed after a few hours of fermentation.

Palm wine/"ússua" - wine directly extrated from the palm and consumed after hours of fermentation.

"Cacharamba" - fermented traditional drink made with sugarcane.

## Introduction

Worldwide, alcohol consumption is an important risk factor for a large burden of disease and injury, accounting with 3 million deaths every year<sup>(1)</sup>. It is strongly linked to a diversity of cancers, including hepatocellular carcinoma, colorectal, esophageal and breast cancers, and associated with other health problems, such as HIV incidence, tuberculosis, cardiovascular and gastrointestinal diseases, aggression and violence<sup>(2, 3)</sup>. Nevertheless, public perceptions of alcohol are that it is more harmless than other drugs, and it is not considered as a carcinogen<sup>(2)</sup>.

According to the most recent Global Status Report on Alcohol and Health (2018), individuals over 15 years of age in Sao Tome and Principe (STP) consume on average 6.8L of pure alcohol *per capita* per year (6.3L in the WHO African Region), being wine and beer the most consumed alcoholic beverages. In addition, heavy episodic drinking, which is defined as 60 or more grams of pure alcohol on at least one occasion in the past 30 days, reaches 43.6% of the population<sup>(1)</sup>.

In STP, in 2017, cirrhosis was the fourth leading cause of death and the third leading cause of premature death, and the alcohol use was the fifth top cause of the most death and disability combined<sup>(4)</sup>. Therefore, excessive drinking has some economically, socially and health wise damaging consequences<sup>(5)</sup>.

In pregnancy, alcohol consumption can be much more dangerous and it is the most common teratogen<sup>(6)</sup>. Due to its capability to pass from mother to fetus through blood circulation, alcohol can result in a range of lifelong conditions known as fetal alcohol spectrum disorders (FASD)<sup>(7)</sup>. This condition includes fetal alcohol syndrome, characterized by pre and post-natal growth restriction, microcephaly, disorders of behavior, mental retardation, cardiac defects and

dysmorphic facies<sup>(6)</sup>. Besides these consequences, alcohol use is also associated with an increased risk of preterm delivery and low birth weight<sup>(8, 9)</sup>.

Specifically, teenage pregnancy is related with higher mortality and morbidity rates of the mother and child. It increases the risk of prematurity, intrauterine growth retardation, neonatal mortality, low birth weight and stillbirth<sup>(10, 11)</sup>. Furthermore, research suggest that adolescent girls are more susceptible to drink alcohol in excess during pregnancy than older women<sup>(12)</sup>.

According to the 2009 Demographic and Health Survey of STP, 22.8% of adolescents have already started their reproductive lives<sup>(13)</sup> and according to the 2014 Multiple Indicator Cluster Survey, 53% of women between 15 and 49 years old had at least one drink of alcohol on one or more days during the last month<sup>(14)</sup>. So there is a need for intervention regarding the reduction of these numbers.

Despite the available data, data on the detailed consumption of alcohol in STP, discriminating the types of beverages, especially during pregnancy, across socio-demographic groups, and particularly in adolescence, is scarce.

## **Aim**

The present study aimed to characterize the intake of alcoholic beverages during pregnancy in STP. The following specific objectives stand out: I) to compare the pattern of alcohol consumption among a representative sample of the Santomean female between adolescents and adults throughout pregnancy according to sociodemographic characteristics and trimester of pregnancy; II) to recognize the pattern of binge drinking during pregnancy; III) to characterize the types of alcoholic beverages ingested during pregnancy.

## Population and Methods

### 1. Study design and sampling

The present work was framed in the cross-sectional observational study named “População Materno Infantil Sem Álcool (POPMISA)” 2019-2020, conducted in STP by *Helpo - Organização Não Governamental para o Desenvolvimento*. A representative sample of 937 women, aged 13 to 78 years old, was recruited in the health centers of the 6 districts of the Sao Tome Island and in the Autonomous Region of Principe.

From the total POPMISA sample, 354 women, aged 15 to 48 years old, reported to be pregnant and were included in this study; from those 58 women were classified as adolescents according to the definition of the Demographic and Health Survey, which classifies adolescents as women aged 15 to 19 years<sup>(13)</sup>.

### 2. Ethics

The study protocol was approved by the Ethics Committee of the *Faculdade de Desporto da Universidade do Porto*.

In order to invite potential participants, the objectives and procedures involved in the study were explained, in particular its voluntary nature, anonymity and confidentiality of the information. Informed consent was obtained and no women refused to participate.

### 3. Data collection

Data on sociodemography, drinking habits and pregnancy status were collected using a structured questionnaire indirectly administered between May and June of 2019, and previously tested in a pilot sample.

Sociodemographic characteristics included age, number of children, household members, occupation, education level and district of residence. Age was categorized in two groups: adolescents (15 to 19 years old) and adults (20 to 48 years old). Number of children was grouped as 0, 1 to 2, 3 to 4 and > 4. Household members living with the participant women were grouped in the following categories: woman living alone, with her husband, children, parents or others. Regarding occupation, the following categories were defined: worker, student or unemployed. Education level was classified as without schooling, basic education, high school or university. District was defined as living in Água Grande, Cantagalo, Lembá, Lobata, Caué, Mé-Zóchi or Pagué, the seven districts of STP.

Participants were also asked about the habits of treating water, the daily meals usually consumed and the pregnancy trimester. The weekly frequency (none, < 1 day, 1 to 3 days and 4 to 7 days) of alcoholic beverages consumption - sweet palm wine, palm wine/"ússua", wine, beer, "cacharamba" (distilled traditional beverage), and others - in the previous 30 days was also collected.

Women who reported to have consumed any alcoholic beverage in the previous month were classified as current drinkers, and were asked how many glasses they usually ingest in each day of consumption (500 mL or 250 mL for sweet palm wine and "ússua", 200 mL for wine, 500 mL or 330 mL for beer, and 50 mL for "cacharamba"). To define the usual frequency of consumption, it was assumed that the midpoint of each exposure category represents the usual intake and that the consumption of participants classified in the same category is normally distributed with mean, which corresponds to the midpoint of the category. The midpoint was computed by adding half the difference between the upper and

lower limit of each category to its lower limit. For example, if a subject used to drink alcoholic beverages  $\geq 4$  days/week, it was compute  $4 + [(7-4)/2] = 5.5$ , so the usual frequency would be 5.5 times/week. Then, the usual number of drinks consumed per week in the previous month was computed multiplying the usual weekly frequency of consumption by the number of standard drinks usually consumed in each occasion. Standard drinks were calculated taking into account the alcohol content of each beverage<sup>(15)</sup>.

Categories of exposure among current drinkers were defined as 0 for pregnant women, according to recent recommendations<sup>(16)</sup>, and according to the established by the American Heart Association of the maximum daily intake of 1 standard drink for non-pregnant women<sup>(17)</sup>.

Binge drinking habits was obtained through the following question: "In the last 30 days how many days have you had 4 or more drinks on the same occasion?". To define categories of exposure to binge drinking in the previous month, the number of days each participant drank 4 or more drinks per week was grouped as follows: none, < 1 day, 1-3 days,  $\geq 4$  days.

#### **4. Statistical analysis**

Statistical analysis was performed in the IBM Statistical Package for Social Sciences (SPSS). All results are presented separately for pregnant adolescents and adults. Prevalence estimates with 95% confidence intervals (95% CI) were computed for different categories of alcohol consumption in the whole sample and among current drinkers, as appropriate.

Age-, education-, occupation-, number of children-, and pregnancy trimester- adjusted odds ratios (OR) were calculated by binary logistic regression

and were used to estimate the strength of the association between those variables and current drinking.

Chi-square test was performed to compare alcohol consumption categories between adolescents and adults. T-test and the Mann-Whitney test, as appropriate, were used to compare continuous variables between pregnant adolescents and adults.

## Results

Approximately three fifths of the sample lived in Água Grande and Mé-Zóchi and 12% of adolescents and 13% of adults reported to treat the water. Almost all participants reported to usually have breakfast, lunch and dinner. From the total sample, 13.3% of adolescents and 40% of adults reported to have 1 to 2 children. Most of women reported to live with their husbands (71.9% of adolescents and 85.8% of adults), half of adolescents were unemployed, 36.2% of them were student, and half of adults reported to be employed. Half of adolescents reported to attend/have attended high school and 41% of adults have completed basic education (Table 1).

Table 1. Socio-demographic characteristics of pregnant adolescents and adults of STP.

Socio-demographic characteristics	Adolescents (n=58)		Adults (n=296)	
	n	%	n	%
District <sup>a</sup>				
Água Grande	16	27.6	116	39.5
Cantagalo	4	6.9	21	7.1
Lembá	7	12.1	25	8.5
Lobata	9	15.5	22	7.5
Caué	2	3.4	12	4.1
Mé-Zóchi	18	31.0	73	24.8
Pagué (Príncipe)	2	3.4	25	8.5

Water treatment <sup>a</sup>				
Yes	7	12.3	36	12.6
No	50	87.7	250	87.4
Daily meals <sup>b</sup>				
Breakfast	57	100	283	97.3
Morning snack	5	8.8	70	24.1
Lunch	56	98.2	261	89.7
Afternoon snack	8	14.0	65	22.3
Dinner	56	98.2	285	97.9
Supper	1	1.8	6	2.1
Number of children <sup>a</sup>				
0	39	86.7	51	19.5
1 to 2	6	13.3	115	39.4
3 to 4	0	0	68	22.1
> 4	0	0	28	9.1
Household <sup>a b</sup>				
Alone	0	0	8	2.7
Husband	41	71.9	253	85.8
Children	5	8.8	107	36.3
Parents	15	26.3	25	8.5
Others	2	3.5	6	2.0
Occupation <sup>a</sup>				
Worker	8	13.8	139	48.6
Student	21	36.2	35	12.2
Unemployed	29	50.0	109	38.1
Education <sup>a</sup>				
Without schooling	2	3.5	56	19.2
Basic education	22	37.9	120	41.2
High school	29	50.0	83	28.5
University	5	8.6	32	11.0

<sup>a</sup> The sum of the number of participants in each category is lower than 58 for adolescents and 296 for adults due to missing data.

<sup>b</sup> The sum of the proportions is not 100% due to multiple options selected by the participants.

Out of the 354 pregnant women studied, 21% of adolescents and 37% of adults reported to have consumed alcohol in the previous month, and 10.3% of adolescents and 24.7% of adults reported a consumption of at least 1 standard drink per week (Table 2). About two thirds of participants reported not having consumed alcohol in the previous month.

Table 2. Prevalence of alcohol consumption, among pregnant adolescents and adults of STP.

Alcohol consumption (standard drinks in the previous month)	Prevalence of alcohol consumption				P
	Adolescents		Adults		
	%	(95%CI)	%	(95%CI)	
0 / week	79.3	(67.6 - 88.2)	62.8	(57.2 - 68.2)	



> 0 and <1 / week	10.3	(4.4 - 20.1)	12.5	(9.1 - 16.6)	
≥ 1 and ≤ 7 / week	8.6	(3.4 - 17.9)	14.9	(11.2 - 19.3)	
> 7 and < 28 / week	1.7	(0.2 - 7.8)	7.4	(4.9 - 10.8)	
≥ 28 / week	0	-	2.4	(1.1 - 4.6)	0.118

95% CI - 95% confidence interval.

The most frequently reported drink was the sweet palm wine, which was consumed at least 1 day per week by 18.6% of adolescents and 24.3% of the adults. Beer was the second most consumed drink by pregnant adults which was consumed at least 1 day per week by 2.0% of adolescents and 17.1% by adults. The second most consumed drink by pregnant adolescents was wine which was consumed at least 1 day per week by 7.8% of adolescents and 14.9% of adults. “Cacharamba” was ingested by 4.6% of adults and was not reported by adolescents. None of these women reported consumption of another type of drinks (Table 3).

The median number of standard drinks weekly consumed among current drinkers, in the previous month, was 1.3 in adolescents and 2.8 in adults,  $p=0.222$ ).

Table 3: Prevalence of alcohol consumption among pregnant adolescents and adults of STP.

Types of beverages (days/week)	Prevalence of alcohol consumption in the previous month				P
	Adolescents		Adults		
	%	(95%CI)	%	(95%CI)	
Sweet palm wine					
None	72.2	(59.3 - 82.8)	58.2	(52.3 - 63.9)	
< 1	9.3	(3.6 - 19.1)	17.5	(13.3 - 22.3)	
1 to 3	16.7	(8.6 - 28.2)	15.6	(11.7 - 20.3)	
4 to 7	1.9	(0.2 - 8.3)	8.7	(5.8 - 12.5)	0.103
“Ussua” <sup>1</sup>					
None	94.3	(85.7 - 98.4)	90.5	(86.5 - 93.6)	
< 1	1.9	(0.2 - 8.5)	3.4	(1.7 - 6.2)	
1 to 3	3.8	(0.8 - 11.6)	5.0	(2.8 - 8.1)	

4 to 7	0	.	1.1	(0.3 - 3.0)	0.767
<b>Wine</b>					
None	90.2	(79.8 - 96.2)	74.2	(68.6 - 79.3)	
< 1	2.0	(0.2 - 8.8)	10.9	(7.6 - 15.2)	
1 to 3	7.8	(2.7 - 17.6)	12.9	(9.2 - 17.4)	
4 to 7	0	.	2.0	(0.7 - 4.2)	0.074
<b>Beer</b>					
None	94.1	(85.1 - 98.3)	67.3	(61.5 - 72.7)	
< 1	3.9	(0.8 - 12.0)	15.6	(11.7 - 20.3)	
1 to 3	2.0	(0.2 - 8.8)	13.0	(9.4 - 17.4)	
4 to 7	0	.	4.1	(2.2 - 7.0)	0.002
<b>“Cacharamba”<sup>2</sup></b>					
None	100	.	95.4	(92.3 - 97.4)	
< 1	0	.	2.3	(1.0 - 4.7)	
1 to 3	0	.	1.5	(0.5 - 3.6)	
4 to 7	0	.	0.8	(0.2 - 2.5)	0.501

95% CI - 95% confidence interval.

<sup>1</sup> Palm wine after hours of alcoholic fermentation.

<sup>2</sup> Fermented traditional drink made with sugarcane.

Pregnant adolescents with children were likely to consume 79 times more than those without children (adjusted OR=78.8, 95% CI: 2.3-2742.5). There is a trend for unemployed adolescents consume less than those who are employed (OR=0.04, 95% CI: 0.0-1.0). A similar trend was observed for adolescents that were attending high school compared to those without schooling (OR=0.01, 95% CI: 0.0-1.1). The likelihood of pregnant adults who attend college of being current drinkers was 80% less than those without schooling (OR=0.2, 95% CI: 0.05-0.7). No statistically significant differences were observed between trimesters of pregnancy for current drinking among both groups of pregnant women. No consistent pattern was observed in current drinking by the number of children and occupation among pregnant adults (Table 4).

Table 4. Current drinking, among pregnant adolescents and adults of STP, according to the number of children, occupation, education level and trimester of pregnancy.

Participants' characteristics	Prevalence of current drinking <sup>1</sup>	
	Adolescents	Adults
	OR (95%CI)	OR (95%CI)
Number of children		
0	1	1
1 to 2	78.8 (2.3 - 2742.5)	1.6 (0.5 - 2.4)
3 to 4	-	1.1 (0.4 - 2.8)
> 4	-	0.9 (0.3 - 3.3)
P trend	0.017	0.731
Occupation		
Worker	1	
Student	1.3 (0.1 - 17.0)	0.3 (0.09 - 1.1)
Unemployed	0.04 (0.0 - 1.0)	0.7 (0.4 - 1.2)
P trend	0.029	0.370
Education		
Without schooling	1	1
Basic education	0.10 (0.0 - 3.6)	0.5 (0.2 - 1.1)
High school	0.01 (0.0 - 1.1)	0.4 (0.1 - 1.0)
University	0.04 (0.0 - 4.6)	0.2 (0.05 - 0.7)
P trend	0.336	0.007
Trimester of pregnancy		
1°	1	1
2°	4.7 (0.2 - 143.9)	2.2 (0.9 - 5.9)
3°	8.3 (0.2 - 332.0)	1.9 (0.7 - 4.9)
P trend	0.407	0.433

OR - Odds Ratio; 95% CI - 95% confidence interval.

<sup>1</sup> Pregnant women who reported to drink in the previous month.

None of the pregnant adolescents reported any binge drinking occasion in the previous month. Among the pregnant adults, 5.6% reported to have had binge drinking occasions in the previous month (2.8% less than 1 day per week; 1.2%, 1 to 3 days per week and 1.6%, 4 or more days per week) (Table 5).

Table 5. Prevalence of binge drinking, among pregnant adolescents and adults of STP.

	Prevalence of binge drinking				P
	Adolescents		Adults		
	%	(95%CI)	%	(95%CI)	
Number of days in the previous month with a consumption $\geq$ 4 standard drinks					
0/week	100	.	94.4	(91.1 - 96.8)	
<1 day/week	0	.	2.8	(1.3 - 5.4)	
1 to 3 days/week	0	.	1.2	(0.3 - 3.1)	
$\geq$ 4 days/week	0	.	1.6	(0.5 - 3.7)	0.424

95% CI - 95% confidence interval.

## Discussion and conclusions

One fifth of the pregnant adolescents and two fifths of the pregnant adults in STP were current drinkers. This high prevalence of consumption contradicts the recommendations that indicate that women should completely abstain from drinking alcohol during pregnancy<sup>(16, 18, 19)</sup>. This proportion is higher than the estimates from the Global Status Report on Alcohol and Health from 2018, which indicated that 12.1% of women aged between 15 and 19 years old are current drinkers in STP<sup>(1)</sup>. In addition, the prevalence of current drinking of the present study is also out of the range of the estimated prevalence of alcohol consumption for the pregnant adult population in Central Africa (2.2% to 12.6%)<sup>(20)</sup>.

Contrary to findings from a study conducted in Ghana<sup>(21)</sup>, this study revealed that adult women reported higher alcohol consumption than adolescents. A possible explanation for this may be due to the higher level of education that exists today compared to the past, allowing teenagers to be more informed about the consequences of alcohol. On the other hand, adolescents may have underreported alcohol consumption due to social stigmatization and desirability.

The results of the present study showed that the prevalence of current drinking by adults with university education was lower than those without schooling, in line with the findings from the abovementioned study in Ghana where alcohol consumers were mostly less educated. However, a systematic review and meta-analysis from eastern African countries revealed that university students presented the highest prevalence of alcohol use<sup>(22)</sup>. Different sociocultural reasons for consuming alcohol between countries and the fact that there are not many women attending university in STP may underlie these observed differences<sup>(23)</sup>.

Pregnant adolescents who have children were more frequently current drinkers, exposing children to an alcohol consumption environment from an early age. The social pressure imposed by the family, in particular the pressure on women to take care of the family, together with the fact that men often do not accept parental responsibility and financial issues, may contribute to explain higher consumptions among women with children.

This study showed no significant differences on the intake of alcohol along first, second and third trimesters of pregnancy, unlike other studies that demonstrate that alcohol consumption is higher in the first trimester and decreases when women realize that they are pregnant<sup>(24, 25)</sup>. This fact is of particular concern taking into account the risk of preterm delivery in alcohol drinkers, particularly in heavy drinking consumers, in the second and third trimesters of pregnancy<sup>(8)</sup>.

Heavy drinking episodes are a prevalent drinking pattern in many countries of Africa<sup>(26)</sup>. Lange, et al.<sup>(27)</sup> reported that the prevalence of binge drinking during pregnancy is higher in the African Region. In the present study, 4.7% of adult

pregnant women reported binge drinking in the previous month. This estimate was in line with findings previously observed in STP<sup>(1)</sup> and slightly lower than the observed in other African countries, like South Africa, where it was described a prevalence of binge drinking of 6.4%<sup>(28)</sup>. Although the prevalence of underage binge drinking was lower than the adult women, other authors have described that adolescents tend to consume less frequently, but more quantity in each occasion, and that adolescent binge drinking rate is high<sup>(29)</sup>. In the present study, the pregnant adolescents may have omitted this pattern of intake for fear of being judged, which may contribute to explain the fact that none have reported to consume more than 4 standard drinks on the same occasion.

Palm wine is a product extracted directly from the palm. The sugar cane is used in the preparation of fermented traditional drinks, as “cacharamba”, predominantly among communities of STP. Sweet palm wine was the most consumed drink among all pregnant women, followed by beer among adults and wine among adolescents. Other findings from STP showed that beer and wine are the most consumed alcoholic beverages<sup>(1)</sup>. However, those findings excluded the assessment of traditional beverages consumption, such as sweet palm wine, that we observed to be frequently consumed by the female population. It is estimated that the alcohol content of this drink is around 3%, similar to cider. However, the alcohol content varies according to the fermentation time and therefore the alcohol content may be higher. In STP, the palm wine that ferment longer is called “ússua”, but the fact that it is homemade prepared makes it difficult to have a unique estimate of its alcohol content. On the other hand, many Santomean mothers believe that the sweet palm wine does not contain alcohol and is not

harmful to them neither to their children. This drink has also a high local production and is cheaper, which can explain its higher consumption.

Beer is one of the pregnant women most preferred drinks in different countries, as evidenced in other studies<sup>(21, 25)</sup>. Brewed in the north of Sao Tome, the national “Rosema” beer is sold in bottles of 0.5L without label and is easily available.

As far as we know, this is the first report, in STP, that addresses alcohol consumption characterization during pregnancy across age, particularly discriminating teenagers and adults, yet some limitations stand out. There is no agreement on the alcohol content of sweet palm wine, “ússua” and “cacharamba”. These are homemade drinks and therefore the amount of alcohol is variable. In assuming this, there may have been underestimation of the number of standard drinks ingested. Nevertheless, this inaccuracy is difficult to avoid due to inherent cultural practices of alcohol consumption. Not taking the intake of traditional beverages into account would add a much large error in the quantification of the alcohol intake. Alcohol consumption was measured by the mean number of drinks ingested only in the previous month, which can mask the maximum exposure to alcohol and its exact moment caused by binge drinking.

Policy measures such as increasing the price of alcoholic beverages, limiting the availability of the markets where they are sold and banning alcohol advertising may contribute to reduce consumption and alcohol-related damage<sup>(30)</sup>. In STP, although important steps have been taken to control alcohol consumption, there is room for improvement. The national legal minimum age for off and on-premise sales of alcoholic beverages is set at 18 years old<sup>(1)</sup>. However, this is not followed

as cultural issues often overlap with legal ones. Besides that, according to the decree-law n°. 21/2016, the taxes of alcoholic beverages have become 20% in certain beverages, of which traditional beverages are not included. Because traditional beverages are homemade, they do not follow the laws of the country, making educational strategies important tools to control alcohol intake. National policies to restrict exposure on television, radio, print and billboards are measures that can also contribute to control alcohol consumption and that do not exist in STP<sup>(31)</sup>.

Awareness-raising measures for alcohol consumption during pregnancy in the country are therefore very important to decrease alcohol-related conditions. A pregnancy associated with this psychoactive drug is a high risk pregnancy, leading to mental disorders and growth delays in the child<sup>(6)</sup>. In this way, it is crucial to implement public health measures to change the unsafe drinking pattern during pregnancy in STP.

In conclusion, the high prevalence of current drinking observed in pregnant women in STP, including among adolescents, makes urgent to implement measures that can effectively reduce the use and misuse on alcohol during this period of life and thereafter.



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