Alcohol consumption among tobacco farmers: prevalence and associated factors

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Abstract *This study aims to describe the prevalence of heavy drinking, high-risk alcohol consumption and associated factors among tobacco farmers. A cross-sectional study was carried out with 2,469 tobacco farmers over 18 years old in 2011. High-risk alcohol consumption was considered the intake of three or more standard doses per day for men or two or more for women. Heavy drinking was considered the intake of four or more standard doses per day for men and three or more for women. Hierarchical multivariate analysis was performed to investigate the association with socioeconomic, behavioral, and occupational variables. Results: The prevalence of high-risk and heavy drinking was of 4.7% and 1.09% among women and 30.8% and 4.8% among men, respectively. The factors associated with high-risk drinking for men and women were the percentage of income tobacco accounted for (PR 1.3 and 0.4), being an employee (PR 1.3 and 3.1), and use of pesticides (PR 1.5 and 2.1), respectively. Heavy drinking among men was associated with losing the crop (PR 1.6), attending religious activities (PR 0.3), and hours working in agriculture (PR 0.6). Occupational factors were associated wit high-risk alcohol consumption among men. The associated factors vary according to the pattern of consumption assessed.*

Key words *Alcoholism, Rural population, Rural population health, Cross-sectional studies*

Introduction

According to the World Health Organization, alcohol is a psychoactive substance that can cause addiction and that is widely consumed worldwide. Harmful alcohol use is responsible for several diseases such as alcohol addiction, liver cirrhosis, and cancer, among others. In 2012, 3.3 million deaths occurred around the world due to alcohol consumption, resulting in 139 million years of life lost or lived with disability[1].

Measuring and qualifying alcohol consumption is a complex task due to cultural differences, variability in measurement instruments, or a lack of standardized concepts. Consumption can be measured as different periods (currently[2-8], ever[7,9], number of days[4,8,10]) units of measurement (grams[3,11-15], milliliters[7,9], or number of standard doses[10,16-18]), or even as different consumption patterns (got drunk[4,7,8]). Scales such as AUDIT[5,14,17,19-24], CAGE[3,11,25], MAST[11], and the Diagnostic and Statistical Manual of Mental Disorders (DSM)[10,26] can also be used.

The prevalence of alcohol consumption among the rural population worldwide varies greatly, ranging from 1.4%[10,11,14,22,27] to 64%[12,15,17,19,27] for high-risk consumption among men and women, and from 4.5%[12,28] a 38%[3,13,20] for heavy drinking among men. Among farmers, the prevalence of high-risk alcohol consumption ranged from 18%[16] to 43%[17,27].

The factors positively associated with any alcohol consumption pattern in rural population were being male[5,14,21,22,24] and smoking[5,6,8,21]. Being unemployed was a risk factor for excessive drinking[13,24] and addiction[10]. Being a manual laborer[6] was associated with regular consumption[2] and excessive drinking[13]. Living in a household with more than six people[24], having had more than five adverse events in life, and spending less than half the life in a rural area[22] was associated with high-risk consumption. Working longer hours in the field, driving a motor vehicle or tractor, and using agricultural equipment were associated with consumption over the previous 30 days[29].

Being retired and having some type of social support[22] were protection factors against high-risk consumption while practicing some religion was negatively associated with alcohol-related disorders[30] and high-risk consumption[19,31]. Inconsistent findings were reported regarding the association of age[9,18,21,22,31], income[8,9,18,22], marital status[5,9,18,22,31], schooling[6,7,10,12,19,21,31], and hours of work in agriculture[32] with different consumption patterns.

The National Health Survey carried out in Brazil in 2013 showed that 20.3% of the rural population in Brazil consume alcohol[33], while 10.56% had consumed it in the previous 30 days[34]. A study on tobacco farmers in southern Brazil showed that alcohol consumption reaches 90% of that population[35]. However, no study assessed the factors associated with alcohol consumption. Tobacco farming is an important economic activity that involves around 700 municipalities in Brazil's south region and employs over 200 thousand families[36]. Therefore, given the magnitude of Brazilian tobacco farming and the scarcity of studies on the Brazilian rural population, this study aimed to describe the prevalence of heavy drinking and high-risk consumption of alcohol and its associated factors among tobacco farmers in southern Brazil.

Methodology

A population-based cross-sectional study was carried out on a random sample of tobacco farmers in the city of São Lourenço do Sul, RS, Brazil. Data were collected during the harvest of tobacco leaves in 2011 (January to March).

The city of São Lourenço do Sul is located in southern Rio Grande do Sul state. The land distribution in the city is characterized by large properties that produce corn and soybean and small properties that grow mainly tobacco[37].

Growing tobacco is preferred because this crop can be produced in small properties using the Integrated Production System. This system establishes interdependence between agricultural production and the subsequent industrial processing and is based on planning crops, technical and financial support, and guarantee of tobacco leaf purchase at prices established by the tobacco industry[38].

For sample selection, 1,100 invoices of tobacco sales from 2009, provided by the Department of Taxation and Finance of São Lourenço do Sul, were randomly selected. The sample was calculated in the software epi-info and used as parameters an estimate of the prevalence of high-risk alcohol consumption among non-exposed persons around 20% and an exposed/non-exposed ratio between 1:1 (age group) and 1:6 (workload). Thus, the sample studied (N=2,469) provided statistical power of 80% to examine associations with a prevalence ratio around 1.5 and a 95% confidence level.

The sample included rural workers over 18 years old who carried out agricultural activities

for at least 15 hours a week[39]. Individuals who did not live in rural areas, who moved to another city, or who were tobacco farmers in 2009 but quit in the following years were excluded. In this case, the productive unit was replaced by the closest tobacco-growing neighbor.

The interviews were carried out in the rural properties. The interviewers were community healthcare agents, former census officers of the Brazilian Institute of Geography and Statistics (IBGE), and other persons interested who knew the rural area and who preferably had their own means of transportation. All interviewers received training prior to the interviews. The questions were applied in digital format using a personal digital assistant (PDA). Weekly meetings were held and an abridged questionnaire was applied on a random sample of 10% of the respondents for quality control.

Two questionnaires were used. The first asked questions about the property (mechanization, crop loss) and socioeconomic issues (tobacco sale, income generated, land ownership, loans), while the other asked individual questions on the tobacco farmer such as demographic aspects (sex, age, living with a partner), behavioral aspects (alcohol use, religion, and smoking), occupational aspects (activities, length of working day), and comorbidities.

Smoking any type of cigarette was investigated and smokers were considered as those who consumed one or more cigarettes a day for at least one month, former smokers were those who had quit smoking for over a month, and non-smokers were those who had never smoked. Religious behavior was defined as taking part in religious activities. The investigation included occupational variables as tobacco-growing activities such as planting, harvesting, and pesticides application; workload, such as physical effort; and comorbidities, such as back pain. A screening instrument for minor psychiatric issues was also applied (SRQ – Self Report Questionnaire).

The CAGE questionnaire was employed to describe issues with alcohol. That instrument was validated in Brazil by Masur and Monteiro in 1983[40] and comprises four questions: Have you ever felt you needed to cut down on your drinking?; Have people annoyed you by criticizing your drinking?; Have you ever felt guilty about drinking?; Have you ever felt you needed a drink first thing in the morning (eye-opener) to steady your nerves or to get rid of a hangover?. The respondents were also asked about their favorite drink.

The multivariate analysis characterized the outcomes according to the definition of the Dietary Guidelines for Americans (2015)[41], which considered (1) High-risk consumption: exceeding moderate consumption, i.e., consuming > 2 doses a day for men and >1 dose a day for women and (2) Heavy drinking: ≥ 15 standard doses a week for men and ≥8 doses a week for women. In this investigation, the respondents were inquired about alcohol consumption on weekdays and weekends on the previous 30 days.

The data analysis calculated the prevalence and analyzed the association among independent variables for high-risk consumption of alcohol for men and women and heavy drinking only for men given the small sample of females. The crude and adjusted analyses were performed using Poisson regression, which assessed the statistical significance of the associations using Wald test of heterogeneity and linear trend test. The adjusted analysis followed a hierarchical model with backward selection that included demographic and economical variables in the first level, behavioral and occupational variables in the second level, and comorbidities in the third level. The variables with p-value ≤ 0.2 were maintained in the model and those with p < 0.05 were considered associated. The variable schooling was removed from the multivariate model because it was correlated with the variable age. The analysis was performed in the software Stata® 13.0.

The research was approved by the Research Ethics Committee of the Federal University of Pelotas. All respondents were properly informed about the research subject, the confidentiality of the information, and of the right to refuse taking part in the research were guaranteed. The participantes signed the informed consent term.

Results

2,469 tobacco farmers (59% of whom men) who lived in 912 rural properties took part in the study. Losses and refusals added up to 5.9%.

According to Table 1, 29.2% of the women were between 18 and 29 years old, 12.8% had no partner, and 45.2% were highly (≥ 90%) dependent on the income from tobacco, 47% did heavy physical effort, and 39.8% had been exposed to pesticides. 34% of those women often took part in religious activities and 14.3% had positive SRQ scores. Among the men, 25.9% had lost the crop due to hail, 5.4% were employees or lessees, 36.3% worked over 13 h a day on tobacco crops

Table 1. Demographic, economic, and occupational description of tobacco farmers stratified by sex. N = 2,452.

Variables	Women		Men	
	n	%	n	%
Demographic				
Age (years)				
18 to 29	294	29.2	403	27.5
30 to 39	229	22.8	342	23.4
40 to 49	246	24.5	316	21.6
>=50	236	23.5	403	27.5
Schooling				
0 to 4 years	441	43.9	645	44.0
5 to 8 years	173	47.1	732	50.0
9 or more	91	9.0	87	6.0
Marital status				
has a partner	876	87.2	987	67.4
no partner	129	12.8	477	32.6
Economic				
Percentage of income represented by tobacco				
up to 75%	301	30.2	438	30.0
76 to 89%	246	24.6	348	24.0
≥ 90%	451	45.2	668	46.0
Crop loss due to hail				
no	743	74.4	1,079	74.1
yes	256	25.6	377	25.9
Loan in 2010				
no	146	14.6	235	16.1
yes	853	85.4	1,221	83.9
Tobacco sale to a scammer				
no	474	47.4	694	47.7
yes	525	52.6	762	53.3
Occupational				
Labor relation				
land owner family	960	95.5	1,385	94.6
employee/lessee	45	4.5	79	5.4
Hours of agriculture work during harvest				
up to 8 h	195	19.5	124	8.5
9 to 12 h	556	55.4	805	55.2
≥13 h	252	25.1	530	36.3
Bale tobacco				
no/sometimes	295	29.4	187	12.8
often/always	707	70.6	1,275	87.2
Tends the vegetable garden				
no	146	14.5	918	62.8
sometimes	178	17.7	352	24.0
often/always	681	67.8	193	13.2
Delimbed trees in the previous year				
no/sometimes	731	73.1	551	37.8
often/always	270	26.9	907	62.2
Heavy physical effort				
no	532	53.0	360	24.6
yes	472	47.0	1,104	75.4

Table 1. continuation

Variables	Women		Men	
	n	**%**	**n**	**%**
Frequency of pesticide use per month during intense use periods				
No exposure	605	60.2	242	16.5
0 to 10 days	354	35.2	138	70.9
> 11 days	46	4.6	184	12.6
Behavioral				
Frequency of participation in religious activities				
no participation	24	2.5	45	3.2
sometimes	615	63.0	970	68.4
often	337	34.5	403	28.4
Smoker				
no	930	92.5	729	49.8
yes	31	3.1	457	31.2
former smoker	44	4.4	278	19.0
Comorbidities				
Back pain in the previous year				
no	332	33.1	572	39.1
yes	672	66.9	891	60.9
Positive Self Report Questionnaire (SRQ) score				
no	837	85.7	1,274	89.6
yes (men ≥ 6/women ≥ 8)	140	14.3	148	10.4

during the harvest period, and 31.2% were smokers.

Table 2 shows, regarding the prevalence of alcohol consumption, that more women were non-drinkers than men (68.3% vs. 18.2%). During the week, 9.9% of the men consumed up to one dose of alcohol and 20.7% consumed over three doses on the weekend. The prevalence of high-risk consumption on the seven days of the week and heavy drinking were 30.8% and 4.8% for men and 4.7% and 1.1% for women, respectively.

Table 3 shows the adjusted analysis of high-risk alcohol consumption for women. Age and percentage of income represented by tobacco were inversely associated with the outcome. High-risk consumption was two to three times more common among women who had no partner (PR 3.05), who were employees or lessees (PR 3.10), and who had been exposed to pesticides (PR 2.10).

The adjusted analysis of high-risk alcohol consumption for men (Table 4) shows that age was inversely associated with the outcome. Not having a partner (PR 1.28), percentage of income represented by tobacco (PR 1.31), being an employee or lessee (PR 1.34), having a loan in 2010 (PR 1.62), selling the tobacco to a scammer

(PR 1.39), using pesticides for over ten days (PR 1.54), and being a smoker (PR 1.46) were positively associated with the outcome.

Table 4 also shows that, regarding the occupational variables, high-risk alcohol consumption among men was more common among those who packed the tobacco (PR 1.52) and who worked over 12 hours a day during harvest (PR 1.81). Tending the vegetable garden and having a positive SRQ score was inversely associated with high-risk consumption. Taking part in religious activities and doing heavy physical effort lost significance in the adjusted analysis.

Table 5 shows that, for men, being 40 years old or more led to a higher prevalence ratio for heavy drinking than among those 39 years old or less (PR 1.84). Having lost the crop due to hail (PR 1.63), selling the tobacco to scammers (PR 2.10), being a smoker (PR 1.92), delimbing trees (PR 2.53), and having chronic lumbar pain (PR 2.10) were positively associated with the outcome. Those who took part in religious activities had a 70% lower prevalence ratio for heavy drinking. Working more than 12 hours a day during harvest lost significance in the adjusted analysis.

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Table 2. Prevalence of alcohol consumption patterns among tobacco farmers stratified by sex. N = 2,452.

Variables	Women		Men	
	n	%	n	%
What drink do you like?				
does not drink	687	68.3	272	18.2
beer	268	26.6	1,040	71.0
distilled beverages	2	0.1	72	4.9
wine	44	4.3	30	2.0
no preference	4	0.3	49	3.3
Alcohol intake on weekdays				
did not drink/occasional	990	98.5	1,209	83.0
up to one dose	12	1.2	145	9.9
two doses	2	0.2	65	4.5
three doses	0	0.0	19	1.3
over three doses	1	0.1	19	1.3
Alcohol intake on the weekend				
did not drink/occasional	887	88.3	610	41.7
up to one dose	71	7.0	146	10.0
two doses	38	3.8	259	17.7
three doses	3	0.3	145	9.9
over three doses	6	0.6	302	20.7
High-risk consumption				
on weekdays (5 days)	3	0.3	38	2.6
on the weekend	47	4.7	447	30.6
7 days	48	4.7	449	30.8
Episodic heavy drinking				
on weekdays	1	0.1	19	1.3
on the weekend	6	0.6	302	20.7
Heavy drinking	11	1.1	71	4.8
Positive CAGE score	1	0.1	69	4.7

Discussion

The present study indicates an important prevalence of high-risk alcohol consumption and heavy drinking among tobacco growers. In this context, the level of income diversification, extreme weather, debt, long hours of hard work, and the occupational risks linked to handling pesticides must be taken into account in the causal chain, as well as the variability of the associated factors according to the consumption pattern.

The several definitions of alcohol consumption patterns found in the literature hinder the comparability among studies. The prevalence of heavy drinking[3,12,13,20,28] and CAGE[3,11,25] among men and high-risk consumption among women[10,11,14,27] were comparable to the lowest ones

found in the literature, while both high-risk consumption[12,17,19,22,27] and episodic heavy drinking[20,42] among men were comparable to the highest prevalence.

In all alcohol consumption patterns, a higher prevalence is observed among men than among women, which matches the literature[2,3,5,6,10-14,17-20,22,26,28] that reports greater social acceptance of the practice among males. Social acceptance may favor greater consumption, but also lead to overestimated reports among men and underestimated reports among women. Alcohol was mainly consumed on the weekend[12] during reproduction moments, when the worker seeks relaxation[3], recreational activities, and festivities[4,28].

In the literature, the association between age and high-risk consumption or heavy drinking are inconsistent[3,7,9,13,19,21,22,28,31]. In this study, a higher frequency of high-risk consumption was found among young men and women[19,28], which reflects the cultural values and social norm that considers the practice acceptable and even incentives drinking in parties and gatherings in the communities[4,28]. In turn, the higher prevalence ratio of heavy drinking as age progresses among men may indicate the development of alcoholism. Other variables, such as marital status and percentage of income from tobacco were not associated with heavy drinking since, unlike high-risk consumption, biological and psychological factors seem to prevail in heavy drinking[43].

In this study, an association was found between marital status and high-risk consumption among men and women, but the literature reports inconsistent findings[4,7,13,20]. Family instability may be a reason for people with no partner to take on a risk pattern of alcohol consumption[4,20].

Since Brazil signed the Framework Convention for Tobacco Control[44], efforts have been expended to diversify production and decrease the dependency on tobacco crops. Indeed, 42% of the families have sought to replace tobacco farming by other activities and occupations[45]. An inverse association was found between the proportion of income represented by tobacco and high-risk consumption among women, while the group of men with 76 to 89% of income represented by tobacco had higher prevalence ratio. This contrasting finding between sexes seems to indicate that greater diversification of crops causes more uncertainty and stress for women, which increases high-risk consumption, while the men in the intermediate group of crop diversification are still largely dependent on a single crop and

Table 3. High-risk alcohol consumption: prevalence and associated factors among female tobacco farmers. N = 1,005.

Variables	Crude			Adjusted	
	%	PR	CI 95%	PR	CI 95%
First level					
Age (years)					
18 to 39	6.7	1		1	
≥ 40	2.7	0.40	0.21-0.75	0.47	0.25-0.90
Marital status					
has a partner	3.6	1		1	
no partner	12.4	3.39	1.91-6.01	3.05	1.70-5.47
Percentage of income represented by tobacco					
up to 75%	7.3	1		1	
76 to 89%	3.6	0.50	0.23-1.06	0.42	0.20-0.90
>90%	3.7	0.51	0.27-0.95	0.44	0.23-0.82
Labor relation					
land owner family	4.5	1		1	
employee/lessee	11.1	2.48	1.03-5.96	3.10	1.30-7.38
Second level					
Frequency of pesticide use per month during intense use periods					
no exposure	3.3	1		1	
with exposure	7.0	2.11	1.20-3.70	2.10	1.20-3.67

PR:Prevalence ratio. CI95%: 95% confidence interval. Adjusted: variables were adjusted for the other variables in the same level and in the levels above.

may have more debt and try to maximize profit by selling to scammers than the group whose income is 90% or more represented by tobacco. Besides the occupational aspects, it must be considered that the group with the greatest diversification may be related to lower economic level that, on the one hand, causes stress and, makes overall consumption less possible, particularly of alcohol.

Employees and lessees of either sex had higher prevalence of high-risk alcohol consumption. Similar data were found by a study in rural Africa, where the prevalence of regular alcohol consumption among female farmers was 26.1%, while the prevalence among wage laborers was 37.7%[4,46]. That may be because employees and lessees tend to have lower economic level, greater work demand, and less control on the amount and way to carry out their work. However, this finding differs from a study in Chile where 16.9% of land owners and 14.7% of employees showed at-risk consumption[16].

Taking part in religious activities was a protection factor against heavy drinking, but lost significance for high-risk consumption for men and had no association among women. Those who practice some religion often have a social network that helps solve issues with alcohol and maintain abstinence or a moderate alcohol consumption pattern[22,30]. Nonetheless, reverse causality may be in play since people occasionally do not drink because they take part in religion activities. Consistent with the literature, an association was found between smoking and high-risk consumption among men[5,8,13,21,35], but there was no statistical power to assess this association among women.

Daily work hours were directly associated with high-risk consumption among men (PR 1.81 for ≥ 13 h), but were a protection factor against heavy drinking (PR 0.6 ≥ 13 h). The time dedicated to production and the time dedicated to reproduction leisure activities where high-risk consumption is inserted seem to compete. On the other hand, heavy drinking may be a limiting factor for a more effective insertion into production resulting in the healthy worker effect[43].

Other occupational variables were positively associated both with heavy drinking (delimbing trees, PR 2.53) and with high-risk consumption (balling tobacco, PR 1.52; heavy physical effort, PR 1.19; use of pesticides, PR 1.54 on ≥ 11 days) among men. In agriculture, the stronger and the braver do the heavier work and take more risks.

Table 4. High-risk alcohol consumption: prevalence and associated factors among male tobacco farmers. N = 1,456.

Variables	Crude			Adjusted	
	%	PR	CI 95%	PR	CI 95%
First level					
Age (years)					
18 to 29	36.2	1		1	
30 to 39	34.1	0.94	0.77-1.14	1.01	0.82-1.23
40 to 49	30.1	0.83	0.67-1.02	0.91	0.73-1.13
≥ 50	23.2	0.63	0.51-0.79	0.75	0.59-0.96
Marital status					
has a partner	27.4	1		1	
no partner	37.9	1.38	1.18-1.61	1.28	1.08-1.51
Percentage of income represented by tobacco					
up to 75%	26.7	1		1	
76 to 89%	38.5	1.43	1.17-1.76	1.31	1.07-1.60
> 90%	29.9	1.11	0.92-1.35	1.01	0.83-1.23
Labor relation					
land owner family	30.2	1		1	
employee/lessee	41.5	1.37	1.04-1.81	1.34	1.03-1.76
Crop loss due to hail					
no	29.0	1		1	
yes	36.6	1.26	1.07-1.48	1.24	1.06-1.45
Loan in 2010					
no	19.7	1		1	
yes	33.1	1.67	1.28-2.20	1.62	1.24-2.13
Sale to scammer					
no	25.4	1		1	
yes	35.9	1.41	1.20-1.65	1.39	1.19-1.63
Second level					
Frequency of participation in religious activities					
no participation	47.7	1		1	
sometimes	30.7	0.64	0.46-0.89	0.73	0.53-1.02
often	29.1	0.60	0.43-0.86	0.72	0.50-1.02
Smoker					
no	27.2	1		1	
yes	35.7	1.31	1.10-1.56	1.46	1.22-1.73
former smoker	32.3	1.18	0.96-1.46	1.32	1.07-1.63
Hours of agriculture work during harvest					
up to 8 h	15.3	1		1	
9 to 12 h	29.6	1.93	1.25-2.96	1.39	0.92-2.10
≥13 h	36.1	2.35	1.53-3.62	1.81	1.19-2.74
Bale tobacco					
no/sometimes	17.6	1		1	
often/always	32.7	1.85	1.34-2.55	1.52	1.12-2.07
Tends the vegetable garden					
no	35.7	1		1	
sometimes	22.8	0.63	0.51-0.78	0.71	0.58-0.88
often/always	22.3	0.62	0.47-0.82	0.70	0.53-0.92
Heavy physical effort					
no	22.5	1		1	
yes	33.5	1.48	1.20-1.83	1.19	0.96-1.48

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Table 4. continuation

Variables	Crude			Adjusted	
	%	PR	CI 95%	PR	CI 95%
Frequency of pesticide use per month during intense use periods					
no exposure	20.3	1		1	
1 to 10 days	31.3	1.54	1.18-2.01	1.17	0.88-1.54
>11 days	41.8	2.05	1.52-2.78	1.54	1.12-2.13
Third level					
Positive SRQ score					
no	31.5	1		1	
yes	23.3	0.73	0.54-1.00	0.67	0.50-0.89

PR:Prevalence ratio. CI95%: 95% confidence interval. Adjusted: variables were adjusted for the other variables in the same level and in the levels above.

Table 5. Heavy drinking: prevalence and associated factors among male tobacco farmers. N = 1,456.

Variables	Raw			Adjusted	
	%	PR	CI 95%	PR	CI 95%
First level					
Age (years)					
18 to 29	3.2	1		1	
30 to 39	4.4	1.35	0.65-2.81	1.34	0.64-2.77
≥ 40	6.0	1.84	1.00-3.39	1.84	1.01-3.37
Crop loss due to hall					
no	4.2	1		1	
yes	6.9	1.64	1.02-2.62	1.63	1.02-2.61
Tobacco sale to a scammer					
no	3.1	1		1	
yes	6.5	2.14	0.31-3.53	2.10	1.27-3.47
Second level					
Frequency of partiipation in religious activities					
no participation	15.9	1		1	
sometimes	4.1	0.26	0.12-0.54	0.28	0.13-0.61
often	5.4	0.34	0.15-0.75	0.36	0.16-0.84
Smoker					
no	3.3	1		1	
yes	7.3	2.20	1.32-3.68	1.92	1.13-3.26
former smoker	5.1	1.51	0.81-2.94	1.54	0.80-2.98
Hours of agriculture work during harvest					
≤ 12 h	5.7	1		1	
≥ 13 h	3.4	0.59	0.35-1.01	0.60	0.35-1.03
Delimbed trees in the previous year					
no/sometimes	2.3	1		1	
often/always	6.3	2.67	1.47-4.83	2.53	1.39-4.58
Third level					
Chronic lumbar pain > 3 months					
no	4.4	1		1	
yes	10.5	2.39	1.32-4.31	2.10	1.16-3.80

PR:Prevalence ratio. CI95%: 95% confidence interval. Adjusted: variables were adjusted for the other variables in the same level and in the levels above.

Matching this higher risk profile are the women who are exposed to pesticides (PR 2.10). At the other end of the spectrum are the men who tend the vegetable garden (PR 0.70). Several studies have shown that manual laborers are at higher risk for alcohol consumption compared to other categories[2,6,13,16,47,48].

Positive SRQ score was a protection factor against high-risk consumption among men. This finding seems to be an effect of reverse causality since persons with minor psychiatric disorders may have a medical indication of avoiding consuming alcohol, particularly high-risk consumption, perhaps because of medications that contraindicate such consumption. The association of lumbar pain with moderate consumption has already been reported in the literature (PR 0.88), but the effect is inconsistent and depends on the alcohol consumption patterns assessed[49].

The present study indicates that high-risk consumption is a problem among the men in the population assessed and shows that, besides the well-established sociodemographic factors, occupational factors are associated with high-risk alcohol consumption among men. The study also shows that the factors associated vary according to the consumption pattern assessed.

This study used a random sample and had few losses, thus it is representative of the population of tobacco farmers. Alcohol consumption was assessed with objective measures regarding amount, frequency, and duration on weekdays and on the weekend, while the outcome categorization followed the norms of the Dietary Guidelines for Americans[41]. However, the instrument used has not been validated and the interviewers in this study belonged to the same community as the respondents, which may have underestimated the prevalence of the outcome.

The study contributes to expanding the knowledge on alcohol consumption patterns among family farmers, particularly tobacco farmers, and deepens the understanding of the role occupational factors on the outcomes being studied. Nevertheless, alcohol consumption is determined by cultural aspects with ethnical characteristics and care must be exerted when extrapolating the results.

Future studies should clearly state the alcohol consumption patterns investigated and assess several patterns so as to facilitate comparing the findings. The occupational factors related to alcohol consumption must be further investigated. Healthcare and education services must focus, as healthy lifestyles, on the importance of avoiding excessive alcohol consumption, of having a healthy diet, of not smoking, and of identifying a physical activity practice that is compatible with already very demanding labor.

Collaborations

JL Fávero and AG Fassa worked on designing, delineating, analyzing and interpreting the data, writing the article and approving the version to be published. RD Meucci, NMX Faria and NS Fiori worked on the design, analysis and interpretation of the data.

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