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CLINICAL STUDY

Risk factors for self-reported alcohol consumption during pregnancy

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ABSTRACT

BACKGROUND: Fetal alcohol syndrome (FAS) is the most common preventable cause of impaired fetal development. The amount of alcohol consumed by expectant mothers varies by country. Studies on the prevalence of alcohol use among pregnant women in Slovakia and the risk factors linked to alcohol consumption during pregnancy are scarce. Similarly lacking are the data regarding pregnant women's awareness of the negative consequences of alcohol use during pregnancy.

METHODS: The study comprised women who gave birth at the 2nd Department of Gynecology and Obstetrics between July 1, 2023, and December 31, 2023. All respondents received an anonymous retrospective questionnaire following childbirth. The questionnaire investigated alcohol consumption throughout the year preceding conception as well as during each of the trimesters. The questionnaire also included questions on the woman's plans to become pregnant, her demographics, and her awareness of the hazards associated with alcohol consumption during pregnancy.

RESULTS: A filled-out questionnaire was obtained from 402 women. Of these, 51 women (12.8%) reported being completely abstinent before becoming pregnant. Complete abstinence before pregnancy was the greatest strongest protection against drinking during pregnancy (RR: 0.03). Among the 351 women who drank before pregnancy, 108 women (30.8%) continued to drink while pregnant, which constitutes 26.9% of all pregnant women. Risk factors of alcohol use during pregnancy included unplanned pregnancy (RR: 1.32), inadequate knowledge of the negative consequences of alcohol intake during pregnancy (71.9% vs 75.4%), and heavy drinking prior to pregnancy (RR: 2.55).

CONCLUSIONS: In accordance with certain European data, the best means of protection against alcohol consumption during pregnancy include complete abstinence prior to conception, pregnancy planning, and high-quality education regarding the negative effects of alcohol during pregnancy *(Tab. 4, Ref. 19)*. Text in PDF www.elis.sk

KEY WORDS: fetal alcohol syndrome spectrum, alcohol drinking in pregnancy, pregnancy planning, prenatal alcohol exposure, pregnancy.

Introduction

Fetal alcohol syndrome (FAS) is the most frequent and preventable cause of delayed development and neurological issues in children (1). FAS is uncurable and affects the afflicted individual as well as the entire society, with lasting social and financial ramifications (2) Professional organizations, such as the World Health Organization, strongly advise against drinking alcohol while pregnant because a safe threshold for ethanol consumption has not yet been determined (3, 4).

Despite the availability of an objective assessment method of measuring the quantities of ethanol metabolites in meconium, most research on the prevalence of alcohol consumption in pregnancy is based on self-reported data from pregnant women (5). Large-scale population studies have validated self-reported alcohol intake during pregnancy, albeit with certain limitations (6, 7). However, we were unable to locate any research in the literature assessing the prevalence of alcohol use during pregnancy in Slovakia. Likewise, we found no pertinent literature assessing expectant mothers' awareness of the hazards of alcohol consumption. In this retrospective study, we used an existing questionnaire to assess pregnant women's knowledge on alcohol use. At the same time, we used a questionnaire to investigate their alcohol intake both before and during each trimester of pregnancy (9).

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Materials and methods

The study comprised women who gave birth at the 2nd Department of Gynecology and Obstetrics between July 1, 2023, and December 31, 2023. The exclusion criteria comprised age younger than eighteen, insufficient knowledge of the Slovak language, delivering a stillborn or severely ill fetus, and declining to participate in the study. Three days after delivery, women received an anonymous questionnaire covering demographics such as age, place of birth, number of children, and education level. Additionally, the questionnaire assessed awareness of alcohol's effects on pregnancy and alcohol use during each trimester of pregnancy.

The knowledge test comprised 16 statements about effects of alcohol on pregnant women. Participants rated each statement on a scale from total agreement to total disagreement. The questions varied in polarity, with four points awarded for a fully correct response and zero for a completely erroneous response. The findings of this study were computed as percentages of the maximum number of points, which was 64 (8). The questionnaire regarding alcohol consumption was designed in the form of a data-collection table, enabling the participants to record distinct numbers of drinks they had prior to pregnancy and during the subsequent trimesters. In this context, three dcl of beer, one dcl of wine, or zero to four dcl of base liquor or spirit constituted one drink. Less than half a drink per day was classified as light drinking, half a drink-to-two drinks per day as moderate drinking, and more than two drinks per day as excessive drinking (9). Being aware of the retrospective bias and deliberate underestimation of outcomes by pregnant participants, our objective was only to assess whether individuals acknowledged drinking alcohol during their pregnancy. An additional validated question on whether the pregnancy was planned was included in the questionnaire. The questionnaire also included six questions marked with X, designed by Barrett et al, to examine the preconception preparations and actions made by expectant mothers. A score greater than 10 indicated a planned pregnancy (10). The Czech translation of this survey was also effectively utilized (11).

Statistical analysis was performed using Excel and Open Epi. A p value less than 0.05 was considered statistically significant. The difference in means was tested through t-test for numerical variables, while the X2 test and Fisher exact tests were employed for categorical variables, as appropriate.

The study was approved by the Ethics Committee of the Faculty of Medicine of the Comenius University on October 12, 2022, under reference number EK/153/2022.

Tab. 1. Basic characteristics of study population.

	n	%
Age (average)	32.4 (20–46)	
35 years old or older	118	29.4
Primipara	183	45.5
Place of birth		
Foreign countries	17	4.2
Bratislava	77	19.1
Western Slovakia	175	43.5
Central Slovakia	59	14.7
Eastern Slovakia	74	18.4
Highest level of education		
Elementary school + high school education without graduation	18	4.5
High school education with graduation	68	16.9
University education	316	78.6
Unplanned pregnancy	147	36.6
Knowledge about the effects of alcohol during pregnancy (%)	74.6% (34.4–100.0%)	
Year preceding conception		
Total abstinence	51	12.7
Light drinking (less than ½ drink per day)	272	67.7
Moderate drinking (1/2–2 drinks per day)	75	18.7
Heavy drinking (2 drinks or more per day)	4	1.0
Alcohol consumption during pregnancy		
Total abstinence during trimester I	334	83.1
Total abstinence during trimester II	340	84.6
Total abstinence during trimester III	341	84.8
Total abstinence throughout pregnancy	294	73.1

Results

At the 2nd Department of Gynecology and Obstetrics, 1,057 women gave birth within the allocated time frame. Out of the 575 questionnaires distributed, 413 were returned, and 11 were deemed invalid due to incomplete responses. As a result, 402 were processed and assessed.

Table 1 provides a summary of the fundamental attributes of the group under analysis. Of the respondents, 51 women claimed total abstinence in the year prior to becoming pregnant (12.7%). Table 2 presents a comparison of specific features of women: those who reported no alcohol consumption before becoming pregnant and those who reported alcohol consumption during pregnancy. We found a statistically significant difference in the frequency of pre-pregnancy alcohol consumption among women with greater levels of education. Notably, none of the women who had abstained from alcohol before pregnancy began to drink during pregnancy. Thus, the greatest protective factor against alcohol consumption during pregnancy was complete abstinence prior to conception (RR 0.03). Furthermore, 294 women reported total abstinence throughout their pregnancies. Subtracting the aforementioned 51 women reporting complete pre-pregnancy abstinence from this number, we found that 243 women who had been consuming alcohol prior to pregnancy, also claimed, according to the questionnaire, that they ceased drinking once they became pregnant. Table 3 shows the comparison between these women and the 108 women who stated they had consumed alcohol at some point while pregnant.

Additionally, we found that being born in Eastern Slovakia was a protective factor against continued alcohol consumption during pregnancy (RR: 0.56). Conversely, moderate and heavy drinking prior to conception, lower levels of knowledge about the negative effects of alcohol during pregnancy (71.9% vs 75.4%), and unplanned pregnancy (RR: 1.32) were identified as risk factors for continuing alcohol intake during pregnancy

Tab. 2. Comparison of cohort characteristics for women abstaining and not abstaining from alcohol during the year preceding conception.

	Abstainers (n=51)	Non-abstainers (n=351)	p
Age	33.1 (24–42)	32.3 (20–46)	0.1859
35 years old or older	17 (33.3%)	101 (28.8%)	0.6061
Primipara	19 (37.2%)	164 (46.7%)	0.2629
University education	**29 (56.9%)**	**287 (80.9%)**	**0.0003**
Place of birth – Bratislava	10 (19.6%)	67 (19.1%)	1.0000
Place of birth – Western Slovak region	25 (49.0%)	150 (42.7%)	0.4859
Place of birth – Central Slovak region	6 (11.8%)	53 (15.1%)	0.7007
Place of birth – Eastern Slovak region	9 (17.6%)	65 (18.5%)	1.0000
Place of birth – foreign countries	1 (1.9%)	16 (4.5%)	0.6796
Unplanned pregnancy	20 (39.2%)	127 (36.2%)	0.7840
Knowledge about the effects of alcohol during pregnancy (%)	76.6 (46.9–93.8)	74.3 (34.4–100.0)	0.1929
Alcohol consumption during pregnancy	**0**	**108 (30.8%)**	**p<0.0001 (RR: 0.03 (95% CI: 0.00–0.50)**

Tab. 3. Comparison of risk factors for continued drinking during pregnancy.

	Alcohol consumption during pregnancy (n=108)	Total abstinence throughout pregnancy (n=243)	P, RR
Age	32.5 (22–41)	32.3 (20–46)	0.6683
35 years old or older	25 (23.1%)	76 (31.3%)	0.1518
Primipara	49 (45.4%)	115 (47.3%)	0.8244
University education	89 (82.4%)	198 (81.5%)	0.9639
Bratislava	19 (17.6%)	48 (19.7%)	0.7510
Western Slovak Region	50 (46.3%)	100 (41.1%)	0.4336
Central Slovak Region	19 (17.6%)	34 (14.0%)	0.4746
Eastern Slovak Region	**13 (12.0%)**	**52 (21.4%)**	**0.048 (RR: 0.56, 95% CI: 0.32–0.99)**
Foreign countries	7 (6,5%)	9 (3.7%)	0.3778
Unplanned pregnancy	**47 (43.5%)**	**80 (32.9)**	**0.0376 (RR: 1.32, 95% CI: 1.00–1.75)**
Knowledge about the effects of alcohol in pregnancy (%)	**71.9%**	**75.4%**	**0.0122**
Moderate drinking and heavy drinking before becoming pregnant	**42 (38.9%)**	**37 (15.2%)**	**<0.0001 (RR: 2.55, 95% CI: 1.75–3.73)**

(RR: 2.55). Table 4 compares the general characteristics of women who planned their pregnancy and those who did not. Finally, neither age, number of pregnancies, knowledge regarding alcohol consumption, abstinence, nor continuing drinking throughout the first trimester were found to be statistically significant risk factors.

Discussion

The average age of female participants was 32.4 years, exceeding the Slovakia's average age of 29.9 years in 2021 (12). The relatively high average age in our study may be attributed to unique conditions in the capital city, where better-educated women are more likely to give birth at an older age. Consequently, a high proportion of women in our study held a university degree (78.6%). Notably, the average test result regarding the effects of alcohol in pregnancy was 74.6% in our study group, with a variance ranging from 38.8% to 100.0% (8).

Before becoming pregnant, 12.7%, 67.7% 18.7% and 1.0% of women reported complete abstinence, light drinking, moderate drinking, and heavy drinking, respectively. We lack relevant data on alcohol consumption in a similar group of women. However, a 2007 study of female university students in Kosice, found that 20.3% of young women did not drink alcohol, while light drinking was reported in 70.1%, moderate drinking in 9.2% and heavy drinking in 0.2% of participants (13). According to our question-

Tab. 4 Comparison of characteristics of the cohort of women with planned and unplanned pregnancies.

	Planned pregnancy (n=255)	Unplanned pregnancy (n=147)	P, RR
Age (average)	32.47 (22–46)	32.41 (20–42)	0.8665
35 years old and older	70 (27.4%)	48 (32.6%)	0.3224
Primipara	121 (47.4%)	62 (42.2%)	0.3583
Knowledge of the effects of alcohol in pregnancy (%)	74.6% (35.9–100.0%)	74.7% (34.4–96.9%)	0.9363
Total abstinence in the last year before becoming pregnant	31 (12.1%)	20 (13.6%)	0.7840
Continued alcohol consumption during 1st trimester	34 of 224 (15.2%)	26 of 127 (20.5%)	0.2641

naires, 73.1% of mothers adhered to abstinence throughout their entire pregnancy, while 26.9% consumed alcohol at some point during one of the trimesters. This number aligns with global data, which shows that, on average, 25.6% of pregnant women consume alcohol (21.6–29.6%) (14).

In 2017, a survey involving over 7,000 women in Europe revealed that, on average, 15.8% of pregnant women consumed alcohol. The highest percentages were found in the United Kingdom and Russia (28.5% and 26.5%, respectively), while the lowest percentages were in Sweden and Norway (7.2% and 4.1%, respectively). Slovakia was not included in the research (15). Furthermore, as of now, Slovakia data are not available; this is the first pilot study to investigate alcohol intake among pregnant Slovak women.

Of the women who drank alcohol prior to becoming pregnant, 69.2% fully ceased drinking after becoming pregnant. Furthermore, we discovered that neither education level nor age was a risk factor for binge drinking. An interesting finding is that women who moved to Bratislava from eastern Slovakia had a statistically significant tendency to abstain from alcohol more frequently during pregnancy (RR: 0.56). However, the rationale for this observation remains unclear.

The occurrence of higher alcohol-related morbidity and mortality among women in the East Slovak region has not been documented, despite the widely held belief that this region consumes more alcohol. However, areas with higher concentrations of Roma populations were associated with this mortality (16). We did not track the participants' ethnicity.

Pregnancy-related alcohol consumption was found to be associated with unplanned pregnancy (RR: 1.32). According to a 2017 prospective study, pregnant women who did not plan their pregnancy consumed alcohol 31% more frequently than those who did (17).

A lesser degree of awareness among women about the negative consequences of alcohol consumption during pregnancy was also a risk factor for consuming alcohol during pregnancy. Women who abstained from drinking had a mean awareness score of 75.4%, whereas those who did drink had a mean score of 71.9% (p=0.0122). Similar findings were reported in the initial Israeli study (70.8% vs 74.2%) (8).

According to our research, heavy and moderate levels of alcohol consumption prior to pregnancy raised the odds of drinking alcohol during pregnancy (RR: 2.55). Similar findings were observed in an Australian study, which found that excessive pre-pregnancy drinking prior to becoming pregnant increased the likelihood of drinking alcohol during pregnancy (RR: 3.99) (18).

Our report indicates that 36.6% of newborns resulted from unintended pregnancies. A Czech survey from 2008 found that unplanned pregnancies accounted for 27.4% of all births (11). Research involving over 5,000 women in the United Kingdom revealed that, on average, only 54.8% of pregnancies were classified by women as being planned (19). If natural and induced abortions were excluded, the total number of planned births would align with our findings. This British study supports the hypothesis that risk factors for unintended pregnancy were younger age, drug and tobacco addiction, lack of sexual education at school, and lack of sexual experience during first sexual encounters.

There was no statistically significant difference observed in any of the study's variables, which we limited to age, parity, knowledge regarding alcohol consumption during pregnancy, pre-pregnancy alcohol abstinence, and alcohol consumption during the first trimester.

Conclusion

In line with existing data from other European studies, our study revealed a notable prevalence of alcohol consumption during pregnancy. Pre-pregnancy alcohol intake is a well-established risk factor for continued consumption of alcohol during gestation with heavier drinking exacerbating this even further. Other risk factor, specifically insufficient awareness regarding the harmful effects of prenatal alcohol exposure and unplanned pregnancy was identified as a contributor to this behavior. These two risk factors can be substantially alleviated through comprehensive education targeting young individuals. These initiatives should be focused on imparting knowledge about pregnancy planning, responsible parenting practices, and awareness about risks associated with alcohol consumption during pregnancy

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