

The impact of perinatal maternal alcohol intake on lactation: Results from a Greek survey during the COVID-19 pandemic

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Abstract

Aim: The aim of the present study is to assess the impact of perinatal maternal alcohol intake on lactation during the COVID-19 pandemic.

Material and methods: This is a prospective, descriptive cohort study conducted during the COVID-19 pandemic in Greece. Women were recruited from five tertiary maternity hospitals during January-December 2020. A total of 847 mothers participated and data were collected during their hospitalization in the maternity hospital using a structured questionnaire. Follow-up included an interview via telephone, at 1, 3 and 6 months postpartum.

Results: We report significantly lower alcohol intake during the antenatal period (3.4%), lactation period (3.1%) and after cessation of breastfeeding (5.1%) in comparison with the pre-pregnancy period (22.4%, $p < 0.001$ for all correlations). Rates of alcohol intake during pregnancy, lactation and after breastfeeding discontinuation had no significant difference ($p = 0.848$). Mothers who consumed more alcohol after discontinuation of breastfeeding (AOR = 11.51; 95% CI: 2.80 – 47.32, $p < 0.001$) were significantly more likely to cease breastfeeding. Furthermore, lower weekly alcohol intake after breastfeeding cessation ($\beta = -31.81$, SE: 6.47, $p < 0.001$) was associated with longer breastfeeding duration.

Conclusions: Perinatal maternal alcohol intake was reduced in comparison to the pre-pregnancy period. This downward trend, compared to Greek studies carried out before the COVID-19 pandemic, indicates that this unprecedented pandemic might have contributed to the reduction of addictive substance use, possibly due to fear of illness during the vulnerable perinatal period. The involvement of spouses/partners and families in alcohol rehabilitation and abstinence programs would possibly increase the effectiveness of these programs and therefore improve overall public health.

Keywords: Maternal alcohol intake; Perinatal; Pregnancy; Lactation; Breastfeeding; COVID-19

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1. Introduction

Healthcare professionals (HPs) experience difficulties when dealing with alcohol intake by women in childbearing age. Poor awareness and knowledge about substance abuse in the perinatal period may result in a range of adverse obstetric and neonatal outcomes [1].

Alcohol consumption is an extremely harmful factor during pregnancy and lactation. Globally, the prevalence of prenatal alcohol use is about 10% [2], while the estimated prevalence in the Greek population is between 9.3% and 11% [3,4]. Although the risk of fetal harm from antenatal alcohol use is well known, the exact amount as well as the period of exposure required to cause it has not yet been clarified. Therefore, the focus of professional counseling is mainly on prophylactic abstinence and most of the experts support that there is no safe cut-off point at any stage of pregnancy. The dose-response relationship suggests that high alcohol consumption during pregnancy increases the risk of complications and adverse outcomes such as preterm delivery, low birth weight and small for gestational age neonates [5]. Besides, maternal alcohol overconsumption during pregnancy is closely associated with adverse neonatal outcomes, such as neonatal withdrawal syndrome, and can also cause a range of permanent physical and neurobehavioral disorders known as fetal alcohol spectrum disorders (FASD) [2]. It is also recommended that lactating women avoid alcohol intake as it can negatively affect both the nursing newborn/infant and lactation. In particular, when alcohol is consumed in large quantities, it may cause drowsiness, sleep disturbances, irritability, weakness and abnormal weight gain in the newborn/infant, and there is a possibility of reduced maternal milk ejection reflex. In addition, alcohol consumption disrupts the hormonal profile responsible for milk production and consequently reduces the supply of breast milk to the neonate/infant [2,6]. To make more definite conclusions, however, more surveys are needed as research data are scarce.

There is a wide range of factors that contribute to maternal substance abuse. These factors include, but are not limited to, maternal features and social characteristics, mental health and multiple environmental stressors. The COVID-19 pandemic, however, was an emerging factor affecting all patient populations, including pregnant and lactating women. At the beginning of the pandemic period, due to concerns about possible perinatal transmission of SARS-CoV-2 from mother to fetus/neonate and anxiety about perinatal outcomes, combined with the social constraints imposed by the pandemic, women's psychological well-being may have been affected, resulting in possible increased substance use as a coping mechanism [7]. In order to improve the quality of perinatal care, HPs should provide appropriate direction for intervention programs that focus on issues beyond substance abuse and offer comprehensive care that addresses every aspect of a woman's life.

We sought to evaluate perinatal maternal alcohol intake during the COVID-19 pandemic. The objectives were to investigate possible correlations among alcohol intake, maternal breastfeeding at six months postpartum, duration and discontinuation of breastfeeding. The research hypothesis was that maternal alcohol consumption during the perinatal period would have increased due to the COVID-19 restrictions, compared to previous studies in Greece.

2. Material and methods

This is a prospective, descriptive cohort study, conducted during the COVID-19 pandemic. Data were collected during the year 2020 (January - December) from five tertiary hospitals in Attica, Greece. Three of them were public and two of them were private. This study is part of a larger research protocol studying causes of reduced duration and discontinuation of breastfeeding [8]. Preliminary results on addictive substance use reported in a smaller sample have been published previously [9]. The study was conducted in accordance with the guidelines of the Declaration of Helsinki and was approved by the Ethics Committees of all hospitals.

The methodology of the research study has been extensively described in a previous published article [9] and is summarized here as follows:

The study population consisted of mothers who were hospitalized in the maternity ward. Mothers were excluded due to insufficient understanding of the Greek language, absence of permanent telephone number for subsequent post-hospital telephone follow-up, presence of complications in childbirth that required further hospitalization for increased care and birth of newborns with congenital malformations that prevented breastfeeding. To increase the precision of the study, the stratified sampling method was used to include observations from all socio-demographic strata, which is presented in Figure 1.

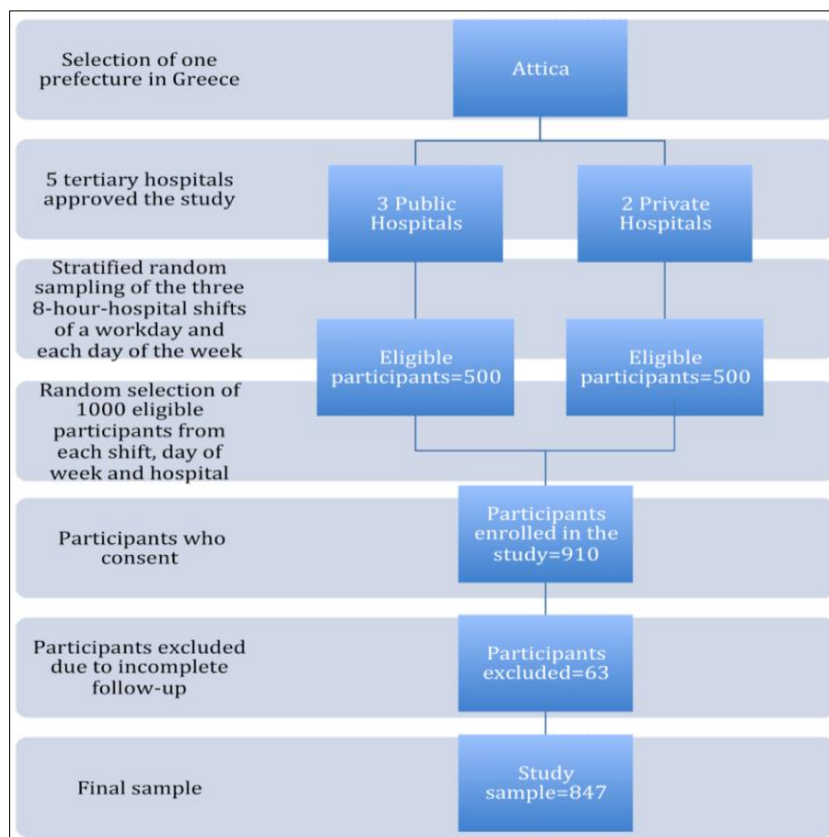


Figure 1 Flowchart of the multistage stratified random sampling method used in the study. (Attica/Greece 2020; N=847)

After signing the informed consent form, the mothers completed the questionnaire during their hospitalization. Follow-up was then conducted by telephone contact at the 1st, 3rd and 6th month postpartum. Automatic coding was generated from the database for all participants in order to protect personally identifiable information.

Data collection was carried out using a structured questionnaire designed by the research team according to the needs of the research. The choice of variables included in the three sections was based on studies that had investigated similar research topics [3,10,11], as well as the intention to further explore similar parameters in Greece. The questionnaire was firstly evaluated by five experts and then pilot studied in 50 mothers (who did not participate in this study). After the necessary modifications, open-ended and closed-ended questions were included in the final version of the questionnaire.

The first part of the questionnaire included information on the demographic and socio-economic characteristics of the women. The second part covered obstetric and lactation-related history. Finally, the third part included information on perinatal maternal alcohol consumption.

Qualitative variables are presented as absolute and relative frequencies (%), while quantitative variables are presented using appropriate descriptive statistics [median (maximum, minimum), mean \pm SD (Standard Deviation: Standard Deviation)]. Wilcoxon-signed rank test and McNemar's test were used to compare participants' alcohol consumption between different time points. Mann-Whitney test was used to investigate the correlation between two quantitative variables. Multiple linear regression models were used to investigate variables associated with breastfeeding duration and results are presented as adjusted regression coefficients (β) and standard errors (SE). Multiple logistic regression analysis was used to investigate independent factors associated with breastfeeding cessation at six months postpartum and results are presented as adjusted odds ratios (AOR) with 95% confidence intervals (95% CI). Statistical analysis was performed using the IBM SPSS v.28 statistical package (IBM Corp. Released 2021; IBM SPSS Statistics for Windows, Version 28.0; Armonk, NY, USA: IBM Corp.) at a significance level of $p \leq 0.05$.

3. Results

Regarding the basic socio-demographic characteristics of the sample of 847 mothers, 91.4% of them were Greek, 94.7% were married and their mean age was 33.7 years (33.7 ± 4.7). The majority of the population (47.2%) held a university degree and only 36.1% were employed in the 6th month after childbirth. A rate of 22% of mothers resided in the provinces and about half of the participants had given birth in a private hospital (54.8%) and were primipara (52.3%). The mean duration of gestation for all women was 38.3 weeks (38.3 ± 1.5) and the mean duration of breastfeeding was 123 days (123.88 ± 70.08). Regarding the baseline characteristics of the neonates ($N = 859$), lots of them were born by cesarean section (66.8%), while the majority were full-term (90.3%) and with an appropriate for gestational age birth weight (92.5%).

Information on perinatal maternal alcohol intake is presented in detail in Table 1. Alcohol intake was significantly lower during pregnancy (3.4%), lactation (3.1%) and after cessation of breastfeeding (5.1%) compared to the pre-pregnancy period (22.4%, $p < 0.001$ for all correlations). Furthermore, alcohol intake rates were not significantly different among pregnancy, lactation and after breastfeeding discontinuation ($p = 0.848$).

Table 1 Perinatal maternal alcohol intake habits. Athens/Greece, 2020 ($N = 847$)

Variable	N (%)	Mean (SD)	Median (IQR)
Alcohol consumption before pregnancy	190 (22.4)		
Weekly alcohol units ¹		2 (1.7)	1 (1 – 2)
Alcohol consumption during pregnancy	29 (3.4)		
Weekly alcohol units ¹		1.2 (0.5)	1 (1 – 1)
Alcohol consumption during lactation	26 (3.1)		
Weekly alcohol units ¹		1.5 (1.3)	1 (1 – 1)
Alcohol consumption after breastfeeding discontinuation	43 (5.1)		
Weekly alcohol units ¹		1.5 (0.8)	1 (1 – 2)

¹ refers to women who consumed alcohol

Initially, the Mann-Whitney test was used to correlate weekly units of alcohol with breastfeeding at 6 months postpartum, comparing women who were breastfeeding at 6 months with those who had discontinued breastfeeding at any time during the 6-month follow-up. Results showed that mothers who ceased breastfeeding at any time during the six-month follow-up had significantly less alcohol consumption during breastfeeding ($p = 0.008$) than those who continued to breastfeed at six months (Table 2).

Table 2 Association of weekly units of alcohol with breastfeeding at 6 months postpartum. Athens/Greece, 2020 ($N = 847$)

Breastfeeding status at 6 months postpartum					
	Continuation of breastfeeding		Breastfeeding cessation		P*
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	
Weekly alcohol units					
Before pregnancy	0.44 (1.01)	0 (0 – 0)	0.43 (1.18)	0 (0 – 0)	0.686
During pregnancy	0.05 (0.42)	0 (0 – 0)	0.03 (0.20)	0 (0 – 0)	0.194
During lactation	0.07 (0.35)	0 (0 – 0)	0.02 (0.19)	0 (0 – 0)	0.008
After breastfeeding cessation	—	—	0.16 (0.52)	(0 – 0)	—

*Mann-Whitney test

Applying a multiple regression model with alcohol intake during the perinatal period as the independent variable and duration and breastfeeding cessation as dependent variables, the following interesting results were obtained (Table 3). Women who consumed more alcohol after discontinuation of breastfeeding (AOR = 11.51; 95% CI: 2.80 – 47.32, $p < 0.001$) were significantly more likely to discontinue breastfeeding. In addition, less weekly alcohol consumption after breastfeeding cessation ($\beta = -31.81$, SE: 6.47, $p < 0.001$) was associated with longer duration of breastfeeding.

Table 3 Associations of maternal alcohol consumption with duration and cessation of breastfeeding. Athens/Greece, 2020 (N=847)

Dependent variable	Independent variable		
		AOR (95% CI)+	P
Breastfeeding cessation	Weekly alcohol units after breastfeeding cessation (yes vs no)	11.51 (2.80 – 47.32)	<0.001
		β (SE)++	P
Breastfeeding duration (days)	Weekly alcohol units after breastfeeding cessation (yes vs no)	-31.81 (6.47)	<0.001

+AOR: adjusted odds ratio (95% Confidence Interval) ++ regression coefficient (Standard Error). Notes: Logistic regression was applied for breastfeeding cessation and linear regression for breastfeeding duration.

4. Discussion

In recent years there has been an increasing interest in the use of addictive substances during the COVID-19 pandemic. In prior studies, researchers examined the link between alcohol intake and COVID-19 morbidity in the general population [12,13]. However, there is little evidence regarding maternal alcohol intake during the COVID-19 pandemic [14,15]. Based on a thorough literature review, this is the first study to be conducted in Greece in relation to perinatal maternal alcohol intake during the pandemic that demonstrates correlations with breastfeeding duration and discontinuation. Furthermore, this is the first study documenting alcohol use during lactation in the Greek context.

Our investigations into this area seem unlikely to confirm the original hypothesis that maternal alcohol intake would have increased because of COVID-19 constraints. Findings of previous surveys have strengthened this hypothesis by reporting an increase in alcohol consumption in the general population during the social exclusion brought about by the pandemic, probably an alternative coping strategy used to deal with emotions such as stress and anxiety [16-18].

The findings of the present study showed that perinatal maternal alcohol consumption was significantly reduced compared to the pre-pregnancy period, but there were no significant differences in the rates during pregnancy, lactation and after cessation of breastfeeding (3.1 - 5.1%). Only small changes in alcohol consumption habits were observed, which may be attributable to light alcohol consumption, evidence provided also by other authors [19]. However, this finding contradicts the results of Kim [20] who reported significantly higher rates of alcohol consumption during pregnancy compared to breastfeeding, presumably because women were not aware of their condition throughout the first months of pregnancy. The correlations conducted in the present study regarding breastfeeding duration and discontinuation showed that women who consumed more weekly units of alcohol after weaning had an increased likelihood of breastfeeding discontinuation, while those who consumed fewer weekly units of alcohol after weaning had a longer duration of breastfeeding. It is important to note that this finding does not prove a cause-and-effect relationship and alcohol consumption may be associated with individual factors that may influence breastfeeding duration and discontinuation, such as psychological factors or even dietary habits. However, studies indicate that alcohol consumption disrupts the hormonal balance responsible for milk production and consequently reduces the supply of breast milk to the newborn/infant [2,6].

The results of the present study were compared with previously published Greek studies conducted before the COVID-19 pandemic and lower rates of alcohol intake during pregnancy were observed. Specifically, the rate of alcohol consumption in this study reached 3.4%, which is significantly lower compared to the 11% and 9.3% reported by other Greek studies [3,4]. The reduction in alcohol consumption reported by other research teams among pregnant women [14,15] may be attributable to COVID-related limitations [14]. After a thorough literature review, there are no previous Greek studies related to alcohol consumption during breastfeeding, thus it is not possible to compare the results of the present study and draw possible conclusions about how the pandemic affected alcohol consumption.

This survey contributed to a further understanding of maternal alcohol intake in the Greek setting during the COVID-19 era. The strengths of our study include the prospective design and the high rates of response obtained. Additionally, data were retrieved from five tertiary maternity hospitals which serve as referral centers making the sample more representative. Nevertheless, the nationwide generalization of the findings is restricted because the sample included mothers from only one large city. An additional limitation of the study is the fact that certain time constraints due to COVID-19 limitations may have affected the final sample size. Ultimately, the data were collected through self-reporting by the mothers and this could have resulted in an under- or overestimation of both the prevalence and volume of alcohol intake.

Finally, research on improving early intervention programs needs to be conducted to enhance their effectiveness. Community health education projects in schools as well as family planning centers need to highlight the value of primary prevention of alcohol intake. It is crucial to implement global screening protocols focused on women of childbearing age. Eventually, more research is needed on the effects of alcohol use on the initiation, duration and discontinuation of breastfeeding.

5. Conclusion

In conclusion, there was a reduction of perinatal maternal alcohol intake in comparison to the pre-pregnancy period. The tendency for alcohol use decline, compared to earlier Greek studies carried out before the COVID-19 pandemic, indicates that this novel period may well have been a factor in reducing addictive substance use possibly due to fear of disease during the vulnerable perinatal period. Partner and family involvement in alcohol rehabilitation and cessation programs would enhance the positive impact of these programs and therefore contribute to overall public health.

Compliance with ethical standards

Disclosure of conflict of interest

All authors declare that they have no conflicts of interest.

Statement of ethical approval

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the Ethics Committees of the following hospitals: General and Maternity Hospital “HELENA VENIZELOU” (24285/29 October 2019), General University Hospital “ATTIKON” (570/1 October 2019), General Hospital “ALEXANDRA” (511/20 July 2020), General Maternity and Gynecology Clinic “IASO” (30 May 2019) and General, Maternity and Gynecology Clinic “LETO” (174a/5 June 2019).

Statement of informed consent

Written informed consent was obtained from all participants of the study.

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