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A Cross-Sectional Study of COVID-19 Pandemic Impact on Postpartum Women's Level of Anxiety, Depression and Breastfeeding Duration

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Abstract

Pregnancy and postpartum periods are known as sensitive periods in women's life and COVID-19 pandemic seems to be worsening their mental health with major impacts on exclusive breastfeeding duration. Therefore, the present study aims to fill the gap in the literature by assessing the links between postpartum anxiety and depression symptoms and breastfeeding duration as well as the associated factors during the COVID-19 pandemic. A longitudinal prospective observational study was conducted between November and December 2020 at the Maternity ward of Vlore Regional Hospital, Albania. A total of 321 postpartum women were invited to participate in the study, resulting in 215 participants with a response rate of 66.9%. Along with modified questions from the Infant Feeding Practices Study II (IFPS II) Neonatal Questionnaire on breastfeeding follow-up from birth to third and sixth months, the Generalized Anxiety Disorder 7-item scale (GAD-7) and the Edinburgh Postnatal Depression

Scale (EPDS) were used to measure anxiety and depression levels. The binomial logistic regression model was applied to reflect the relationship between variables with the corresponding p-value ≤ 0.05. The mean age of participants was 27.4 ± 5.32 years old. 41% of them experienced postpartum anxiety and 51% showed symptoms of depression. Unemployment (69%; OR = 3.66), COVID-19 threat to their own life (89%; OR = 2.89), and feelings of isolation (62%), were all significant predictors of postpartum anxiety and depression disorders. Both anxiety and depression were significant barriers to unsuccessful breastfeeding duration, especially among primiparous women (p = 0.001). The findings revealed high anxiety and depression among postpartum women, which was linked to COVID-19 stressors and breastfeeding outcomes. The careful follow-up of perinatal mothers during a pandemic should be the priority of healthcare professionals to reduce maternal morbidity rates and improve the health of infants.

Keywords
Postpartum women; COVID-19; GAD-7; EPDS; impact; breastfeeding duration

1. Introduction

Pregnancy and postpartum periods are known as sensitive periods in women's life characterized by unexpected changes and stressful life events [1]. The physiological changes women experience during this period, including unexpected hormonal fluctuations, can increase their vulnerability to mental disorders [2]. Additionally, inflammatory reactivity in the early postpartum period is related to postpartum moods [3]. Some authors have explored the postpartum mental disorder as a multidimensional phenomenon that also occurs within a context of situational factors, with a range of demographic, and socio-economic disadvantages like maternal low education and economic status at the time of pregnancy, intrapersonal, social and clinical obstetric factors such as fear of childbirth, poor family support, dissatisfaction in marital life, low self-esteem [4, 5], circumstances that tend to be greatly inflated across different countries during global pandemics like COVID-19 [6]. Depression and anxiety are the most common mental health problems during the perinatal period with maternal and child adverse health outcomes including infant feeding [7, 8]. This comorbidity is frequently underreported in clinical practice due to apprehension about seeking help, fear of social stigma, and concerns about the negative effects of antidepressant medications on breastfeeding [9]. Breastfeeding is widely acknowledged as the most cost-effective and healthful way to feed infants worldwide [10]. According to the World Health Organization, it should be started within an hour of birth, continued exclusively for six months, and maintained for at least two years [11]. However, some women may face difficulties, such as inadequate milk supply, breast or nipple pain, or work obligations, which can lead to feelings of stress and guilt. These emotional strains may increase the likelihood of postpartum depression and anxiety and the duration of exclusive breastfeeding [12]. It is well established that a mutual association exists between maternal mental health and exclusive breastfeeding (EBF). Breastfeeding cessation was influenced by perinatal levels of anxiety and depression [13-15]. Early identification of mothers at risk for postpartum mental disorders and EBF termination is a significant global health priority [15]. Furthermore, various studies have also

highlighted the influence of parity on increased postpartum mental health and exclusive breastfeeding cessation. Primiparous women show more symptoms related to mental health due to neuroendocrine mechanisms, primiparous incompetence and unknown experience related to childbirth and childcare with the tendency to quit breastfeeding earlier [8, 16]. However, other studies suggest no effect on this relationship. Because of the inconsistent and insufficient evidence, the nature of this association and its mechanisms remain unclear and need to be investigated further [15, 17].

Since March 11th 2020, when World Health Organization (WHO) declared the state of the COVID-19 pandemic, it has turned out to be a global health emergency [6]. Effects accompanied this on the general population's mental health, including perinatal women [6, 18, 19]. Perinatal women and neonates are more susceptible to infections due to weakened immune systems, making them particularly vulnerable [20]. The COVID-19 pandemic has further complicated matters by adding an extra stressor to an at-risk population [21]. Worldwide, including Albania, lockdowns and restrictive measures were taken to control the spread of the SARS-CoV-2 infection [22]. As a result, this was also linked to postpartum women's worsening mental health [23].

The COVID-19 pandemic has also raised concerns among mothers about breastfeeding due to the risk of vertical transmission, but the evidence is still controversial [2]. The WHO 2020 guidance recommends early breastfeeding initiation and postpartum lactation support [24]. However, hospital policies have varied due to diversity in infection rates, healthcare resources availability and continuous development of scientific data, resulting in poor lactation outcomes including timely initiation, exclusivity, and duration [11].

On average, 20% of postpartum women in low-income countries such as Albania suffer from common mental disorders, including depression and anxiety [25]. The lack of studies related to postpartum mental disorders in Albania during COVID-19 makes it difficult to clearly represent this phenomenon in our country. Best to our knowledge, most research in Albania has focused on the incidence of SARS-CoV-2 and its impact on the general population's mental health [19, 26]. However, no study has evaluated the level of anxiety and depression among postpartum mothers. In response, the present study aims to fill the gap in the literature by assessing the links between postpartum anxiety and depression symptoms and risk factors during the COVID-19 pandemic in Albania. Considering the uncertain evidence for breastfeeding outcomes during the COVID-19 pandemic mentioned above [2] as well as the relevance of breastfeeding and postpartum mental health for improved rates of infant and maternal morbidity, this study also aims to evaluate the impact of postpartum mental health during the pandemic on exclusive breastfeeding outcomes.

2. Materials and Methods

2.1 Study Design

A longitudinal prospective observational study was conducted between November and December 2020 at the Maternity ward of the Regional Hospital in the district of Vlora, located in southwestern Albania. Data collection was performed three times to evaluate the exclusive breastfeeding duration: at maternity discharge (baseline), in the 3rd month, and in the 6th month. Data were collected by interviewing postpartum women face-to-face at maternity discharge and phone interviews during the follow-up period. The study complied with established observational research guidelines (STROBE).

2.2 Sample Size

The sample size was calculated by Cochran`s formula n0 =$\frac{Z^2pq}{e^2}$. n0 = 1.96 × 1.96 × 0.16 × 0.85/0.05 × 0.05 = 208, where e = 0.05 is margin error, p = 0.16 is population proportion (we have considered an average prevalence of both postpartum depression and anxiety of 16%, based on a previous study showing that the global prevalence of mental disorders varies 13-20%), q is p-1. The z-value = 1.96 is found in a Z-table 26. 208 participants were considered the most appropriate sample size. During the study period, the Maternity of the Regional Hospital of Vlora had approximately 321 births. All pregnant women who delivered in the obstetric ward and met the inclusion criteria were invited to participate in this study. The *inclusion criteria* were postpartum women of ≥18 years old who gave birth during the study period, birth a full-term single infant, breast-or bottle feeding, who were not under treatment for psychiatric disorders at the time of recruitment, and who were not affected by COVID-19. The *exclusion criteria* were women with severe chronic illness requiring ongoing treatment, with obstetric complications, or a fetus or infant affected by a major anomaly. A non-probability convenience sampling method was used to collect data. A total of 321 postpartum women were invited to participate in the study, where 22 didn't meet the inclusion criteria, 56 didn't consent to participate, and 28 didn't fully complete the questionnaire, resulting in 215 participants with a response rate of 66.9%.

2.3 Data Collection Instruments

The Generalized Anxiety Disorder 7-item scale (GAD-7) [27] and the Edinburgh Postnatal Depression Scale (EPDS) [28] were used to measure anxiety and depression levels among breast-feeding postpartum women, along with adapted questions from the Infant Feeding Practices Study II (IFPS II) Neonatal Questionnaire on breastfeeding duration and exclusivity [29]. The (GAD-7) and (EPDS) showed good reliability and constructed validity in pregnancy and the postpartum period [30, 31]. In addition, the questionnaire included the socio-demographic section: age (18-20 years, 20-25, 25-30, >30), education (8/9 years, high school, bachelor, master), occupation (employed, unemployed), and economic status (low, moderate, high) along with obstetric history: parity (primiparous, multiparous), type of delivery (vaginal, cesarian) and newborn feeding information using the question "In the last 24 hours, how was your baby fed each food listed below?" and choosing each item about the previous 24 h: breastfeeding, infant formula feed, mixed.

To evaluate the concerns due to COVID-19, a questionnaire about COVID-19 infections and isolations and COVID-19-related life changes was used. The questions about COVID-19 stressors (Have you lost your job due to COVID-19; How has the COVID-19 pandemic affected your relationship with your partner; During the COVID-19 pandemic, I have felt more alone than usual) and worries (How much do you think your life is in danger during the COVID-19 pandemic; How much are you worried that exposure to the COVID-19 virus will harm your unborn baby; Are you concerned that you or your baby are not receiving the care you need.) were adapted based on previous research conducted by Lebel et al., 2021 [32].

The GAD-7 scale is composed of 7 items ranked using a Likert scale with a sum-score value of ≥10 indicating a positive screen GAD, which represents a clinically useful scale for the detection of risk for generalized anxiety disorder in perinatal women [30]. Using this cut-off score, postpartum mothers were categorized as either negatively screened for postpartum anxiety suggesting that the

subjects do not have postpartum anxiety (GAD scores <10) or positively screened for postpartum anxiety (GAD scores ≥10) suggesting that the subjects have this condition. The seven items assess worry, tension, restlessness, and irritability. The GAD-7 total score ranges from 0 to 21. The anxiety level is the sum score of all the items, with higher scores reflecting greater anxiety severity. The reliability coefficient of Cronbach's α for the GAD-7 scale in this study is 0.895.

The EPDS scale is composed of 10 items scored using a four-point Likert scale (0-3). The maximum score is 30, with a cut-off point of ≥12 indicating a positive screen, described in the literature as indicative of postpartum depression [33]. Using this cut-off score, postpartum mothers were categorized as either negatively screened for postpartum depression (EPDS scores <12) or positively screened for postpartum depression (EPDS scores ≥12). The Cronbach's α for this scale in this study was 0.78.

In order to answer the questions, a COVID-19 stressor rating scale of 0 to 100, where 0 stands for "not at all" and 100 for "very much so," was used [32]. A value >50 indicated more stress. Contrarily, <50 indicated strain and the values >50 indicated affinity only for the item "Strained relationship with a partner during COVID-19."

Three independent translators translated the questionnaires into the Albanian version using stand forward and backward translation. A pilot study validated the translation and reconciliation of the questionnaires from English into the local language.

2.4 Statistical Analysis

SPSS (Statistical Package for Social Sciences) version 23 was used to perform statistical analysis on the data. For categorical variables such as employment, obstetric history (parity, type of delivery) newborn feeding information (pattern and EBF duration), absolute numerical values and their respective percentages were applied, whereas for continuous variables such as age (years), education (years) GAD-7 score, EPDS score, COVID-19 stressors rating scale, means and standard deviation were utilized. The scores on group–age, education, depression (≥12), anxiety (≥10), and COVID-19 stressors (>50 and <50) scales are also reported as means or as the percentage of participants. This type of information is often easier to understand when continuous data are transformed into dichotomous data due to the regression analysis model used [34]. The associations between categorical variables were estimated using a chi-square statistical test. When the P-value was less than or equal to 0.05, it was considered statistically significant. A binomial logistic regression model was applied to identify explanatory factors associated with GAD-7 and EPDS scores and with EBF duration by parity. The odds ratio (OR) and 95% confidence interval (CI) were also established along with the analogous P-value. The Spearman correlation has been used to assess the strength of the association between mental disorders and related factors. The Ethics Committee of the Faculty of Health, the University of Vlora "Ismail Qemali," Prot approved the study. No. 174/1, date 07.10.2020; and the Regional Hospital of Vlora, Prot. No.4404, date 02.11.2020. Participation in the study was voluntary and verbal informed consent was obtained from all women at the hospital discharge. Before the enrollment, all postpartum women had been informed of the data's purpose and the privacy, guaranteeing them anonymity. The researchers did the administration of the questionnaire. Every woman had the option to leave the study at any time. The study was conducted in accordance with the ethical standards of the Declaration of Helsinki.

3. Results

3.1 Sample Characteristic

A total of 215 postpartum women agreed to participate and were interviewed. The socio-demographic characteristics of the participants are shown in Table 1. The mean age was 27.4 ± 5.32 years old. 58% of the women were reported to be unemployed. Most participants reported having a high school diploma (37.6%). According to obstetric history and baby information, it was determined that 39% of the women delivered by cesarean section and 48% of the participants were primiparous. Most women, about 73% of all participants, have breastfed their baby in the maternity ward, 61.8% have breastfed for 3 months, and only 33% of them for 6 months. The mean EPDS and GAD-7 scores during the postpartum maternity hospital stay were 12.24 ± 6.62 and 9.06 ± 4.93 respectively. 41% of participants were screened positive for postpartum anxiety (GAD scores ≥10), whereas 51% of them for postpartum depression (EPDS scores ≥12).

Table 1 Sample characteristics.

Variables	N (%)	Mean ± SD*	Range
Age (years)		27.4 ± 5.32	18-35
Education (years)	81(37.6)	13.1 ± 2.82	8-19
High school			
Unemployed	124(58)		
Cesarean Section	85(39)		
Parity (primiparous)	104(48.3)		
Anxiety			
GAD-7 (≥10)	88(41)	9.06 ± 4.93	0-21
Depression			
EPDS (≥12)	109(51)	12.24 ± 6.62	0-30
COVID-19 Stressors			
Job loss due to COVID-19	58(27)		
Threat to own life from COVID-19		71.07 ± 30.54	0-100
Threat to baby's life from COVID-19		66.60 ± 35.36	0-100
Strained relationship with partner during COVID-19		19.40 ± 27.90	0-100
Social isolation due to COVID-19		46.37 ± 35.08	0-100
Concerned not receiving necessary care due to COVID-19		38.28 ± 36.16	0-100
Breastfeeding duration			
At discharge	157(73.0)		
Third month	133(61.8)		
Sixth month	72(33.4)		
Duration, days		118.6 ± 62.12	3-180

*Standard Deviation.

3.2 Predictors of Postpartum Anxiety and Depression

Table 2 shows the associations of various predictors for postpartum anxiety and depression. In a logistic regression model, it was discovered that unemployed women were more likely than employed women to have a positive screening for both anxiety GAD and depression EPDS (GAD ≥ 10, 69% vs 31%, p = 0.004; EPDS ≥ 12, 68% vs 32%, p = 0.002). The odds of unemployed women were about 2.3 times higher than employed ones having a positive screening for postpartum anxiety (OR = 2.25) and depression (OR = 2.36) respectively (Spearman correlation coefficient r = 0.20). According to bivariate logistic regression analysis, postpartum mothers with high economic levels had odds of having a positive screening for postpartum depression that was 6 times lower (95% CI, OR = 0.17, 0.03-0.80) than those with low economic levels (r = 0.14). We found that parity was statistically associated with the GAD ≥ 10 and EPDS ≥ 12 scores (p = 0.001). The results indicated that primiparous mothers were more likely to have both postpartum anxiety and depression than multiparous mothers respectively (GAD ≥ 10, 69% vs 31%; EPDS ≥ 12, 59% vs 41%). The odds of primiparous mothers were 4 times and 2 times higher than multiparous ones to have a positive screening for postpartum anxiety (OR = 0.24, r = 0.21) and depression (OR = 0.42) during the maternity hospital stay. Anxiety and depression scores, respectively, were not significantly correlated with age, education, and type of delivery. In addition, Table 2 show the impact of postpartum anxiety and depression disorders on the reduced breastfeeding duration. There was a significant association between mental disorders and exclusive breastfeeding duration. The results showed that 100% of women with GAD ≥ 10 breastfed infants were at the maternity discharge (baseline), which was reduced by 74% at the 3-month assessment and 29.2% at the 6-month assessment. Postpartum mothers who had breastfed their infants at the 6-month assessment had 5 times (95% CI, OR = 0.14, r = 0.40) lower risk of having GAD ≥ 10 scores than those who had breastfed at the maternity discharge. Women who had breastfed infants at the 3-month assessment had three times the odds of having GAD ≥ 10 scores as those who had breastfed at the 6-month assessment (6-month/3 month OR = 2.716, r = 0.40). Also, a positive screening for postpartum depression during the maternity stay was associated with reduced breastfeeding duration during the first 6 months after childbirth (p = 0.001). According to logistic regression analysis, the odds (6 months/baseline, OR = 0.12, r = 0.34) of postpartum mothers who breastfed their infants at the 6-month assessment were 8 times lower than those who breastfed at the maternity. In addition, the odds (6 month/3 month OR = 3.48, r = 0.34) of the women who had breastfed infants at the 3-month assessment were 3,5 times higher to have GAD ≥ 10 scores, compared to those that had breastfed at the 6-month assessment.

Table 2 Predictors of postpartum anxiety and depression.

Variables	GAD < 10 (n = 127) n (%)	GAD ≥ 10 (n = 88) n (%)	P value	OR* [95%CI] ^	EPDS < 12 (n = 106) n (%)	EPDS ≥ 12 (n = 109) n (%)	P value	OR* [95%CI] ^
Age								
18-20 years	8(6.3)	4(4.5)	0.522		7(6.6)	5(4.6)	0.188	
20-25	41(32.3)	37(42.1)			31(29.3)	47(43.1)		
25-30	47(37.0)	29(32.9)			40(37.3)	36(33.0)		
>30	31(24.4)	18(20.5)			28(26.4)	21(19.3)		
Education								
8/9 years	26(20.5)	19(21.6)	0.948		20(18.9)	25(22.9)	0.583	
High school	49(38.6)	32(36.4)			40(37.7)	41(37.6)		
Bachelor	39(30.7)	26(29.5)			36(34.0)	29(26.6)		
Master	13(10.2)	11(12.5)			10(9.4)	14(12.9)		
Occupation								
Employed	64(50.4)	27(30.7)	**0.004**	**Ref**	56(52.8)	35(32.1)	**0.002**	**Ref**
Unemployed	63(49.6)	61(69.3)		**2.25** [1.23-4.12]	50(47.2)	74(67.9)		**2.36** [1.36-4.17]
Economic level								
Low	5(3.9)	8(9.1)	0.113		2(1.9)	11(10.1)	**0.040**	**Ref**
Moderate	116(91.3)	79(89.7)			100(94.3)	95(87.2)		**0.13** [0.01-1.14]
High	6(4.7)	1(1.1)			4(3.8)	3(2.7)		**0.17** [0.03-0.80]
Parity								
Primiparous	43(33.9)	61(69.3)	**0.001**	**Ref**	40(37.7)	64(58.7)	**0.001**	**Ref**
Multiparous	84(66.1)	27(30.7)		**0.24**	66(62.3)	45(41.3)		**0.42**

				[0.13-0.45]				[0.24-0.73]
Type of delivery								
Vaginal	72(56.7)	58(65.9)	0.174		58(54.7)	72(66.1)	0.089	
Cesarian	55(43.3)	30(34.1)			48(45.3)	37(33.9)		
Infant feeding pattern								
Breastfeeding	92(72.4)	65(73.9)			77(72.6)	80(73.4)		
Infant Formula	10(7. 9)	7(7.9)	0.630		6(5.7)	11(10.1)	0.263	
Mixed	25(19.7)	16(18.2)			23(21.7)	18(16.5)		
Breastfeeding duration (n = 157)								
Total	n = 92	n = 65			n = 77	n = 80		
At discharge	92(100)	65(100)		**Ref**	77(100)	80(100)		**Ref**
3^{d} month	85(92.4)	48(73.8)	**0.003**	--	72(93.5)	61(76.2)	**0.001**	**--**
6th month	53(57.6)	19(29.2)		**0.14** [0.05-0.41]	49(63.6)	23(28.7)		**0.12** [0.04-0.37]

* Odds ratio; ^ confidence interval.

3.3 COVID-19 Stressors on Postpartum Anxiety and Depression

The results presented in Table 3 show that all COVID-19 stressors and concerns were statistically associated with postpartum depression (EPDS ≥ 12). 89% of women with postpartum depression reported a threat to their own life and 79% reported a threat to their baby. The worry of not getting needed care was reported by 53% of women with PPD. While stressors such as isolation and a strained relationship with their partner during COVID-19 resulted in 62% and 28% of women with PPD, respectively. All COVID-19-related concerns and stressors increased the odds of clinically elevated depression symptoms, according to the bivariate logistic regression analysis. A statistically significant association was found between postpartum anxiety (GAD ≥ 10) and worries such as harm to the baby (p = 0.016, OR = 2.13), and failure to get needed care during the pandemic (p = 0.001, OR = 2.89). Women with postpartum anxiety (GAD ≥ 10) were 2-3 times more likely to have the above concerns, respectively. Stressors such as job loss (OR = 3.66, r = 0.31) and strained relationships with partners increased the odds of clinically elevated anxiety symptoms during COVID-19 (OR = 4.92).

Table 3 COVID-19 Stressors.

Variables	GAD < 10 (n = 127) n (%)	GAD ≥ 10 (n = 88) n (%)	P value	OR* [95%CI] ^	EPDS < 12 (n = 106) n (%)	EPDS ≥ 12 (n = 109) n (%)	P Value	OR [95%CI]
Job loss due to COVID-19	21(16.5)	37(42.1)	**0.001**	3.66 [1.94-6.88]	14(13.2)	44(40.4)	**0.001**	4.44 [2.25-8.78]
Threat to own life from COVID-19	99(77.9)	76(86.4)	0.114		78(73.6)	97(89.0)	**0.003**	2.90 [1.38-6.07]
Threat to baby's life from COVID-19	82(64.6)	70(79.5)	**0.016**	2.13 [1.13-4.01]	66(62.3)	86(78.9)	**0.007**	2.26 [1.23-4.15]
Strained relationship with partner during COVID-19*	24(18.9)	15(17.1)	**0.001**	4.92 [2.29-10.56]	8(7.5)	31(28.4)	**0.001**	4.86 [2.11-11.19]
Social isolation due to COVID-19	64(50.4)	51(58.0)	0.274		47(44.3)	68(62.4)	**0.008**	2.08 [1.20-3.59]
Concerned not receiving necessary care due to COVID-19	41(32.3)	51(58.0)	**0.001**	2.89 [1.64-5.07]	34(32.1)	58(53.2)	**0.002**	2.40 [1.38-4.19]

* Odds ratio; ^ confidence interval.

3.4 Breastfeeding Duration by Parity and the Association of Predictive Factors for Exclusive Breast-Feeding for More Than 3 Months in Primiparous Mothers

Table 4 shows that parity is another factor found to be statistically significant when associated with the duration of exclusive breastfeeding (p = 0.001). 46% of primiparous women and 54% of pluriparous ones have exclusively breastfed their infants. According to bivariate regression analysis, the odds of primiparous women delivering vaginally, who have breastfed their infants for more than 3 months were 4 times lower than those delivered by cesarean section (OR = 0.26). The results

showed that 52% of primiparous women with EPDS ≥ 12 scores had breastfed their infants for more than 3 months. The odds of primiparous women with EPDS ≥ 12 scores who breastfed their infants for more than 3 months were 3 times lower than those with EPDS ≤ 12 scores (OR = 0.39). The findings also indicated that 29% of primiparous women who worried about not receiving the necessary care during the pandemic had breastfed their infants for more than 3 months versus 71% of those who did not have this concern. Referring to bivariate analysis, OR = 0.23 showed that primiparous women who had the above worry were 4 times less likely to breastfeed their infants for more than 3 months than those who did not.

Table 4 Breastfeeding duration by parity (n = 157) and the association of predictive factors for exclusive breastfeeding for more than 3 months in primiparous mothers.

Variables	**Exclusive Breastfeeding duration***				
	At discharge	**3^{d} month**	**6th month**	**Duration, months (days)**	**P value**
	N (%)	**N (%)**	**N (%)**	**Mean ± SD**	
Parity					
Primiparous n (%) 72(46)	72(100)	54(75.0)	31(43.1)	3.6(109.4 ± 66.63)	**0.001**
Multiparous n (%) 85(54)	85(100)	79(92.9)	41(48.2)	4.2(127.4 ± 56.52)	**0.035**
Breastfeeding exclusively for more than 3 months in primiparous mothers					
Variables	**Yes = 31**	**No = 41**		**OR**	**P value**
	N (%)	**N (%)**		**[95%CI]**	
Age (years)					
18-20	2(6.5)	1(2.4)			
21-25	13(41.9)	22(53.6)			0.126
26-30	9(29.0)	14(34.2)			
>30	7(22.6)	4(9.8)			
Education					
8/9 years	6(19.4)	6(14.5)			
High school	8(25.8)	14(34.2)			0.387
Bachelor	13(41.9)	14(34.2)			
Master	4(12.9)	7(17.1)			
Type of delivery				**Ref**	
Cesarean	16(51.6)	9(21.9)		**0.264**	**0.001**
Vaginal	15(48.4)	32(78.1)		[0.09-0.73]	
Anxiety					
<10	14(45.2)	14(34.1)			0.464
≥10	17(54.8)	27(65.9)			
Depression				Ref	
<12	15(48.4)	11(26.8)		**0.391**	**0.049**
≥12	16(51.6)	30(73.2)		[0.14-1.04]	

Concerned not receiving necessary care due to COVID-19			Ref	**0.005**
No	22(71.0)	15(36.6)	**0.234**	
Yes	9(29.0)	26(63.4)	[0.08-0.64]	

*Breastfeeding practices were classified according to the World Health Organization's classifications.

4. Discussion

This is the first study in Albania that assesses the relationship between postpartum mental health, risk factors, and breastfeeding outcomes during the COVID-19 pandemic. In this study, postpartum women participants, who gave birth during the second wave of the COVID-19 pandemic in the Maternity of Vlora, reported high depression and anxiety symptoms. According to the findings, compared to a study conducted in the same population and city in 2017 prior to the pandemic, which found that postpartum women were more likely to experience probable postpartum depression in 36% of cases, the COVID-19 pandemic appears to have increased the level of PPD in the district of Vlora (51%) [35].

In contrast, Koyuncu et al., in a study carried out in an obstetric clinic in Turkey with the same study population, found that the COVID-19 pandemic did not increase the incidence of postpartum depression and anxiety. The main factor was the mother-baby attachment, which seemed to improve the mental well-being of the postpartum mother [36]. However, most of the studies in the literature, which include the largest sample of postpartum populations, support the results of our study regarding the effects of the COVID-19 pandemic on women's mental health as a challenge for emergency intervention [37, 38].

Table 2's data, similar to those from earlier studies [4, 39] revealed that unemployment was statistically significantly associated with increased anxiety symptoms. Women with low socioeconomic status were more likely to experience postpartum depression symptoms. This could result from the family's necessities not being met due to financial constraints, making anxiety and depression more prevalent [40].

Regarding obstetric variables, our study discovered a link between parity and higher GAD-7 and EPDS scores, as primiparous women were more likely to have postpartum anxiety and depression. Contrary to one study, primiparous women were less likely to have postpartum depression symptoms but were more anxious. This is because a lack of experience from a primiparous mother could aggravate anxiety during the puerperium, a time when most women experience severe mental discomfort [16].

The current analyses (Table 3) reveal that both anxiety and depression disorders are associated with COVID-19-related worries and stressors such as job loss due to the pandemic, the threats of COVID-19 to the life of the mother and baby, the worry of not getting needed care due to restricted measures, or social isolation during the pandemic. This can be explained by the fact that when postpartum mothers are anxious or worried, they barely control these feelings and have difficulty performing their daily activities. Pregnancy, childbirth, and the postpartum period make it even harder to cope with these symptoms [1].

The results also found that postpartum women with strained relationship with partner during COVID-19 were more likely to have postpartum depression and anxiety. The above results confirmed the findings of some recent research investigating the negative impact of COVID-19 factors on the mental health of perinatal women [32].

Our findings, consistent with multiple previous studies, showed that decreased breastfeeding duration in the first six months following delivery was linked to higher postpartum anxiety and depression scores during the maternity stay. Many mothers were observed breastfeeding their infants in the maternity ward. However, this number fell during the follow-up period, particularly at the 3rd month assessment [8, 13, 16].

Additionally, similar to other studies, primiparous women at any assessment had the lowest breastfeeding rate[8, 16]. Maternal depression was found to be a major risk factor for successful breastfeeding, especially among primiparous mothers. Furthermore, the study found that primiparous women who delivered vaginally were more likely to have limited breastfeeding. These results contrast those of other studies, which discovered that women who underwent cesarean sections and those who experienced postpartum anxiety were more likely to experience negative breastfeeding outcomes [8].

According to recent studies, the COVID-19 epidemic has increased postpartum women's worries about breastfeeding practices [2]. Latorre et al. claims that lockdown has reduced breastfeeding duration in newborns from 30 to 90 days [41]. According to our findings, the decrease in breastfeeding duration was caused by primiparous mothers' worries that they wouldn't get the care they needed because of COVID-19. Similarly, Brown & Shenker discovered that breastfeeding duration was statistically related to mothers' perceptions of limited healthcare professional support [42]. Our study did not examine how other COVID-19-related stresses affected breastfeeding practices, but it does emphasize the urgent need for women to get additional support from healthcare professionals.

4.1 Strengths and Limitations

This is the first study in Albania that explores the links between postpartum anxiety and depression symptoms and breastfeeding duration and the associated factors during the COVID-19 pandemic. Using standardized instruments makes the study's results comparable with other studies in the international literature. When considering these *strengths*, some important *limitations* need to be recognized. This study evaluated the participants' symptoms of anxiety and depression only during maternity stay, which may confound the results because these symptoms may change during the 6 months included in the study. Furthermore, the responses to breastfeeding practices outcomes were based on participants' self-reporting via telephone calls. This suggests that future studies should consider the follow-up in person rather than by telephone to avoid bias of over and under-reporting. Additionally, the study could not consider including a control group before the pandemic wave to compare the possible increased prevalence of postpartum anxiety and depression. However, that was based on a previous study conducted in Vlora. Despite the limitations of previous research on this issue, the current study provides important data about the impact of COVID-19 on the mental health of postpartum women and breastfeeding outcomes. It could serve as a basic reference for future studies in the field.

5. Conclusions

Observations from this study indicated that the high level of anxiety and depression among breastfeeding postpartum women is related to their socio-economic factors, the COVID-19 stressors, and the women's parity, which were significant barriers for unsuccessful exclusive breastfeeding, especially among primiparous women.

The current study adds to the growing body of evidence supporting the importance of considering breastfeeding mothers' mental health. A primary objective for healthcare professionals should be the continuous monitoring of perinatal women, taking into account breastfeeding mothers' mental health during a pandemic as a strategy to reduce maternal morbidity rates and improve the health of infants.

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Author Contributions

RL designed the study and was a major contributor to the writing of the manuscript. RL and FK contributed in acquisition of data. FK and VN did the statistical analysis and/or interpretation of data. All the authors reviewed the manuscript critically for important intellectual content. All authors accepted the final version after revisions.

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Competing Interests

The authors have declared that no competing interests exist.

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