

Research Article: Covid-19 pandemic and postnatal depression, risk factors for postnatal depression



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ABSTRACT

Objective: To evaluate the effects of Covid-19 pandemic on mental health of women in the perinatal period, with an accent on the intensity of depressive symptomatology, and explore the relationship between the specific aspects of Covid-19 pandemic and the registered risk factors for perinatal depression in women.

Methods: The study sample consisted of 54 patients, with heterogeneous demographic characteristics (age, marital status, educational background, socio-economic status and religious affiliation) selected from the Cabinet for women with perinatal mental health issues at the University Clinic for Psychiatry in Skopje, where they were treated in the period from January 2020 until December 2021. The included patients met the criteria for the diagnosis F.32 during pregnancy, or F32.01/F32.02 postpartum depression in compliance to the ICD 10, and were treated accordingly with a combined approach using psychological interventions and psychopharmaceutic treatment encompassing antidepressant, anxiolytic, antipsychotic, mood stabilizing drugs or a combination of the above mentioned. The inclusion criteria mandated that they were pregnant or had a child in the past two years. The participants could have been subjected to inpatient, or outpatient treatment, or a combination of both modalities during this time. In order to minimize the risk of infection during pandemic times, and protect the health of participants and researchers, the interviews were conducted via telephone beginning with obtaining an informed consent for participation in the study from the patients who were primarily informed in detail about the aims of the study, their rights and protection of their data and anonymity. We used the following methodology: - A structured, non-standardized socio-demographic questionnaire including 11 items regarding age, parity, realized pregnancies, course of pregnancy and delivery, type of treatment, pharmacological therapy, marital status, socio-economic status, educational background, religious affiliation and presence of previously established risk factors in the world literature; - A structured, non-standardized questionnaire regarding the effects of Covid-19 pandemic consisting of 11 questions; - Edinburgh Depression Perinatal Scale (EDPS)

This is a 10-questions self-reported scale, which proved to be a valuable and efficient tool for screening perinatal depression. Namely, a presence of clinical depression was registered in 17.2% of the included participants using the EDPS, the percentage of perinatal depression before the COVID-19 pandemic ranged between 10-14% and has been presented in the literature. Of these, 37.8% were registered in Spain, and 40.7% in Canada^[3].

Results: The statistical analysis of data from the structured non-standardized questionnaire for the effects of Covid-19 pandemic showed no statistical significance in the subjectively reported effects from the pandemic on participants' mental health based on the question from the structured non-standardized Covid-19 questionnaire "Do you feel that the Covid-19 pandemic had an effect on your mental health prior or after the childbirth?" where 55.6% answered with "Yes" and 44.4% with "No". In spite of this, we gained a perspective of the prevailing risk factors in this population and the correlational analysis of data from the questionnaires granted us insights into further investigation of the relationship between the co-variables.

Risk factors for perinatal depression were registered in 68.5% of participants, out of which 48.1% reported a posttraumatic stress condition, 42.6% had a history of mental health issues and 13% reported intimate partner violence. The prevalence of registered risk factors corresponded to a study conducted in North Macedonia in 2020^[2], where the largest percentage of reported risk factors (42%) were previous episodes of mental health issues, and posttraumatic stress condition was reported as a risk factor by 40.6% of the participants. Among the other risk factors with high percentages presented in that study were unintended pregnancy and family violence.

Conclusion: Covid-19 pandemic has a serious impact on mental health of the entire population, especially on vulnerable groups like women in perinatal period in interplay with other risk factors for perinatal depression like PTSD, previous episodes of depression, violence, unplanned pregnancy.

Key words: Covid-19, postnatal depression

Introduction

The outbreak of the infection with the respiratory virus SarsCoV-2, with first emerging cases in November 2019 in the Chinese province Wuhan, and the fast uncontrollable escalation of diagnosed positive cases worldwide reaching a state of a global pandemic declared by the World Health Organization on March 11, 2020 has marked an unprecedented paradigm shift in the world's functioning as we knew it. With numbers surpassing 494 million positive cases, and over 6 million deaths since the beginning^[29], the consequences of the pandemic stretch far beyond medical. In attempt to adapt and respond to the demanding conditions, protect the health of citizens and prevent the spread of the virus, governments all around the world responded with reinforcement of restrictive measures such as social isolation, travel prohibitions, lockdowns, closing of educational facilities and other public services, as well as restructuring and redirecting the response of the medical capacities. All this inevitably caused detrimental changes in each realm of the social and individual functioning. Furthermore, the prolonged exposure to these stressful conditions of social isolation, loneliness, fear of infection, suffering and death for oneself and for loved ones, grief after bereavement and financial worries reflected in a substantial increase of the registered mental health disorders in the population, and just in the first year of the COVID-19 pandemic, global prevalence of anxiety and depression increased by a massive 25%, according to a scientific brief released by the World Health Organization.^[29]

In North Macedonia the first case of a Covid-19 positive patient was registered on February 26, 2020 and this event triggered a series of changes in tune with the recommendations from the world health authorities such as sets of restrictive measures, the quotidian curfew from April 23, 2020⁽³⁰⁾ as well as weekend lockdowns in the period that followed. Much like everywhere in the world, the changes imposed by these measures, the fear, isolation, numerous deaths and financial repercussions affected the mental health of the population especially of the vulnerable groups such as the target population of this study, pregnant women and women in the perinatal period.

The postnatal period is well established as a time of increased risk for the development of serious mood disorders. There are three common forms of postpartum affective illness: the blues (baby blues, maternity blues), postpartum (or postnatal) depression and puerperal (postpartum or postnatal) psychosis, each of which differs in its prevalence, clinical presentation, and management. Postpartum non-psychotic depression is the most common complication of childbearing affecting approximately 10-15% of women and as such represents a considerable public

health problem affecting women and their families. The effects of postnatal depression on the mother, her marital relationship, and her children make it an important condition to diagnose, treat and prevent. Untreated postpartum depression can have adverse long-term effects. For the mother, the episode can be the precursor of chronic recurrent depression. For her children, a mother's ongoing depression can contribute to emotional, behavioural, cognitive and interpersonal problems in later life^[25]

The accentuated vulnerability for mental health disorders in this period is attributed to the interconnected physical, metabolic, hormonal and psychological factors and their interplay in the context of the socio-cultural field. Some of the established risk factors for perinatal depression include: previous history of depression or family history of depression, stressful life events, low social support (perceived or received), marital relationship, intimate partner violence, unplanned pregnancy, hormonal changes, obstetric complications, ethnicity, maternal age, etc. When the vulnerabilities of the postnatal period are combined with the impact of the COVID-19 pandemic, psychosocial outcomes are likely to be affected further.^[10]

This extraordinary situation of isolation, loss of freedom, concern about the impact of Covid-19 on pregnancy or the possible vertical transmission of infection, and unfavourable obstetric outcomes may be challenging for maternal psychological health. Recent literature regarding the Covid-19 outbreak has largely focused on mental health and psychological needs during pregnancy. Key psychosocial stressors include an inconsistent organisational response to COVID-19 in postnatal care and reduced in-person access to health and support services; reduced social support from wider family and friends; absence of birth partners and visitors after birth and restrictions to mother-infant contact and infant feeding care.^[22]

During the pandemic there is an expected and noted increase in the percentages of perinatal depression due to the challenging conditions which put a strain on day-to-day functioning, especially during pregnancy and puerperium, by intensifying the negative effects of some of the risk factors listed above, and perhaps acting as a risk factor itself. Some researches show that 30% of the mothers who gave birth during the Covid-19 pandemic had a global EPDS score > 12 compared to 11.9% in an antecedent matched group of postpartum women, and an EPDS score > 13 was self-identified by another online survey in 15% of women before and in 40.7% during the outbreak for the same cohort of women who were pregnant or within the first year after birth.^[22] In attempt to estimate the gravity of the situation in North Macedonia and compare it to the global

trends which indicated an increase, we conducted a study with an aim to determine the presence of depression in women in the perinatal period in Skopje during the Covid-19 pandemic period. The study was realized from 25.01-22.02.2021, including 494 female participants - patients from the University Clinic for Gynaecology and Special Hospital for Gynaecology and Obstetrics – Chair in Skopje. The results from the Edinburgh Postnatal Depression Scale showed that depression was present in 17.2% of patients, which signified an increase in comparison to the percentage in pre-pandemic times which varied between 10-14%.^[6] Having registered an increase in the prevalence of depression in the perinatal period in pandemic times compared to a research conducted prior to the onset of Covid-19 pandemic, we are currently motivated to further explore the effects of the pandemic on the mental health of pregnant women and women in the perinatal period as a risk factor itself and in relationship with already established risk factors.

Aim of the study: The aim of the study was to evaluate the effects of the Covid-19 pandemic on the mental health of women in the perinatal period, with an accent on the intensity of depressive symptomatology, and explore the relationship between the specific aspects of Covid-19 pandemic and the registered risk factors for perinatal depression in women.

Material and Methods: The study sample consisted of 54 patients, with heterogeneous demographic characteristics (age, marital status, educational background, socio-economic status and religious affiliation) selected from the Cabinet for women with perinatal mental health issues at the University Clinic for Psychiatry in Skopje, where they were treated in the period from January 2020 until December 2021. The included patients met the criteria for the diagnosis F.32 during pregnancy, or F32.01/F32.02 postpartum depression in compliance with the ICD 10, and were treated accordingly with a combined approach using psychological interventions and psychopharmaceutic treatment encompassing antidepressant, anxiolytic, antipsychotic, mood stabilizing drugs or a combination of the above mentioned. The inclusion criteria mandated that they were pregnant or had a child in the past two years. The participants could have been subjected to inpatient, or outpatient treatment, or a combination of both modalities during this time.

In order to minimize the risk of infection during pandemic times, and protect the health of participants and researchers, the interviews were conducted via telephone beginning with obtaining an informed consent for participation in the study from the patients who were primarily informed in detail about the aims of the study, their rights and protection of their data and anonymity.

For the purpose of testing our hypothesis, we used the following methodology:

- A structured, non-standardized socio-demographic questionnaire including 11 items regarding age, parity, realized pregnancies, course of pregnancy and delivery, type of treatment, pharmacological therapy, marital status, socio-economic status, educational background, religious affiliation and presence of previously established risk-factors in world literature;

- A structured, non-standardized questionnaire regarding the effects of Covid-19 pandemic consisting of 11 questions;

- The Edinburgh Perinatal Depression Scale.

This is a 10-questions self-reported scale, which proved to be a valuable and efficient tool for screening perinatal depression. The scale indicates how the mother has felt during the previous week. Mothers who score above 13 are likely to be suffering from depressive illness of varying severity. In case of dubious score, the questionnaire could be administered again in two weeks. This is an accompanying and assisting tool, and could never override clinical judgement, hence all of the participants included in our study were diagnosed by a psychiatrist in accordance to the criteria in the ICD10.

Results

This was a cross-sectional study that included 54 patients, of whom 77.8% were over 30 years of age and 2.2% aged 20 – 30 years. A high percent of 61.1% had university degree, 25.9% have completed high and 13.0% primary school. The largest number of patients (90.7%) were married. 66.7% were of Christian religious affiliation, 24.1% were Muslims and 7.4% atheists. 87.0% had sustainable economic status (Table 1).

81.5% of included patients were taking antidepressants (sertraline, escitalopram or venlafaxine), 24.6% received antipsychotic drugs (olanzapine, risperidone) or anxiolytics (alprazolam, diazepam) alone or in combination. The largest percentage were treated on an outpatient basis, and 9.3% were inpatients (Table 1).

The number of pregnancies in patients ranged from one to four, average 1.52 ± 0.9 , and in 40.7% one pregnancy was registered. 75.9% of patients had normal/uneventful pregnancy, 27.8% had a vaginal term delivery, and 31.5% preterm delivery/Cesarean section (Table 1).

A small number of patients (7.4%) did not receive therapy. A large number or 31.5% of patients received antidepressants and anxiolytics, followed by 22.2% who used only antidepressants, 18.5% a combination of antidepressants, anxiolytics and antipsychotics, etc. (Table 1).

Table 1. Demographic and socio-economic characteristics of patients

Age	Count	Percent	
20-30	12	22.2	
>30	42	77.8	
Level of education			
University	33	61.1	
High school	14	25.9	
Primary school	7	13.0	
Marital status			
Married	49	90.7	
Common-law partners/ Cohabitation	1	1.8	
Single	1	1.8	
Widow	1	1.8	
Divorced	2	3.7	
Religious affiliation			
Christians	36	66.7	
Muslims	13	24.1	
Other	1	1.8	
Non-religious	4	7.4	
Socio-economic status			
Sustainable	47	87.0	
Non-sustainable	7	13.0	
Treatment			
Outpatient	54	100.0	
Inpatient	5	9.3	
Therapy			
Without	4	7.4	
Antidepressants	12	22.2	
Anxiolytics	1	1.8	
Antipsychotics	2	7.4	
Antidepressants, anxiolytics	17	31.5	
Antidepressants, antipsychotics	4	7.4	
Anxiolytics, antipsychotics	1	1.8	
Antidepressants, anxiolytics, antipsychotics	10	18.5	
Mood stabilizing drugs	5	9.3	
Number of pregnancies			
1	22	40.7	
2	14	25.9	
3	15	27.8	
4	3	5.6	
MeanMe Minimum Maximum Std.Dev.			
2.02	2.0	4.0	0.961342
Completed pregnancy			
Ongoing pregnancy	11	20.4	
1	26	48.1	
2	8	14.8	
≥3	8	14.8	
Spontaneous abortion	3	5.6	
Unsuccessful in vitro fertilization	3	5.6	

Age	Count	Percent
Pregnancy course		
Normal pregnancy	41	75.9
Abnormal pregnancy	8	14.8
Uneventful delivery	15	27.8
Preterm delivery/Cesarean section	17	31.5
Missing data	5	9.2

The following risk factors were registered: the highest percent of 48.1% posttraumatic stress conditions, followed by 42.6% past episodes, 13.0% intimate partner violence, etc. No risk factors were registered in 31.5%, while 68.5% of patients had risk factors, hence, there was a significant percentage difference for $p < 0.05$ (Difference test, $p = .0001$) (Table 2).

Table 2. Risk factors registered in patients

Risk factors	бpoj	%
None	17	31.5
Family violence	5	9.3
Post-traumatic stress condition	26	48.1
Unintended pregnancy	4	7.4
Past episodes	23	42.6
Intimate partner violence	7	13.0

Effects of Covid-19 pandemic on mental health of pregnant women

Table 3. Answers to the questions

Q1	Count	Percent
Yes	30	55.6
No	24	44.4
Q2		
Yes	21	38.9
No	33	61.1
Q3		
Yes	9	16.7
No	45	83.3
Q4		
Yes	19	51.4
No	18	48.6
Q5		
Yes	36	97.3
No	1	2.7
Q6		
Yes	24	44.4
No	30	55.6
Q7		
Yes	25	46.3
No	29	53.7
Q8		
Yes	17	31.5
No	37	68.5

Q1	Count	Percent
Q9		
Yes	1	16.7
No	5	83.3
Q10		
Yes	28	51.9
No	26	48.1
Q11		
Mental health problems stopped, and I feel completely well	19	35.2
Sometimes I experience mental health disorders	32	59.2
I do not feel improvement in psychological health	3	5.6
Q12 Interpretation of Edinburgh scale scores		
Possible depression (9-11)	32	59.3
High probability (12-13)	10	18.5
Depression (≥ 14)	12	22.2

With reference to the first question (Q1) *Do you feel that Covid-19 pandemic has had influence on your mental condition prior to or after delivery?* 55.6% of patients gave a positive answer and 44.4% a negative one, showing a non-significant percentage difference for $p > 0.05$ (Table 3).

Thus, regarding answers to Q1 (*Yes-No*), no correlation was registered among age, number of pregnancies, course of the pregnancy, taking medicines, marital status, socioeconomic status, education, religious affiliation, and risk factors ($p > 0.05$).

With reference to the second question (Q2) *Have you been infected with Covid-19?* 38.9% of patients gave a positive answer and 61.1% a negative one, which was a significant percentage difference for $p < 0.05$ (Difference test, $p = 0.0210$) (Table 3).

Thus, regarding answers to Q2 (*Yes-No*), no significant correlation was registered among age, number of pregnancies, course of the pregnancy, taking medicines, marital status, socioeconomic status, education, religious affiliation, and risk factors ($p > 0.05$).

With reference to the third question (Q3) *Have you experienced the death of a close relative from Covid-19?* 16.7% of patients gave a positive answer, and 83.3% a negative one, which was a significant percentage difference for $p < 0.05$ (Difference test, $p = 0.0000$) (Table 3).

With reference to the fourth question (Q4) *Did you feel worried for your fetus/baby of being infected with Covid-19?* 51.4% of patients gave a positive answer, and 48.6% a negative one, which was a non-significant percentage difference for $p > 0.05$ (Difference test, $p = 0.8097$) (Table 3).

With reference to the fifth question (Q5) *Did you have your regular gynaecological check-ups during pregnancy?* 97.3% of patients gave a positive answer, and 2.7% a negative one, which was a significant percentage difference for $p < 0.05$ (Difference test, $p = 0.0000$) (Table 3).

With reference to the sixth question (Q6) *Did you feel that restrictive measures during Covid-19 pandemic caused limited access to healthcare services?* 44.4% of patients gave a positive answer, and 55.6% a negative one, which was a non-significant percentage difference for $p > 0.05$ (Difference test, $p = 0.2444$) (Table 3).

With reference to the seventh question (Q7) *Did you feel that restrictive measures during Covid-19 pandemic period had an impact on the quality of your pregnancy – limited time and possibilities for sport and recreational activities and outdoor social activities?* 46.3% of patients gave a positive answer, and 53.7% a negative one, which was a non-significant percentage difference for $p > 0.05$ (Difference test, $p = 0.4419$) (Table 3).

With reference to the eight question (Q8) *Have you or a family member experienced a job loss or a decrease in household income during Covid-19 pandemic period?* 31.5% of patients gave a positive answer, and 68.5% a negative one, which was a significant percentage difference for $p > 0.05$ (Difference test, $p = 0.001$) (Table 3).

With reference to the ninth question (Q9) *Do you feel that during the pandemic period the intimate partner/family violence intensified?* 16.7% of patients gave a positive answer, and 83.3% a negative one, which was a non-significant percentage difference for $p > 0.05$ (Difference test, $p = 0.0696$) (Table 3).

With reference to the tenth question (Q10) *Did you have fears from Covid-19 vaccines during your pregnancy?* 51.9% of patients gave a positive answer, and 48.1% a negative one, which was a non-significant percentage difference for $p > 0.05$ (Difference test, $p = 0.0629$) (Table 3).

With reference to the eleventh question (Q11) *Since I have started the treatment until today, 35.2% of patients answered that their mental health problems have stopped and they felt completely well, 59.2% experienced mental disorders from time to time and 5.6% felt no improvement in coping with their psychiatric disorders. Hence, the percentage difference was significant for $p < 0.05$ (Difference test, $p = 0.01$) (Table 3).*

According to the interpretation of the Edinburgh scale that uses scores for assessment, in 59.3% of patients a possible depression was registered, with 18.5% of high probability of depression and with 22.2% for depression (Table 3). The percentage difference between possible depression versus high probability of depression and depression was significant for $p < 0.05$ (Difference test, $p = 0.0000$, $p = 0.0001$).

An association between Covid-19 infection versus Edinburgh scale scores was found, for $p < 0.05$ (Chi-square: 5.4859, $df = 1$, $p = 0.019170$).

Patients infected with Covid-19 showed 8.2 times (OR= 8.235395% CI: 1.10366-52.4688) higher chances of high probability to develop depression compared to possible depression.

An association was registered between the loss of a loved one/ close relative from Covid-19 versus scores at the Edinburgh scale for $p < 0.05$ (Chi-square: 4.6183, $df = 1$, $p = 0.031633$).

In patients who did not experience the death of a close relative from Covid-19 (OR= 0.115495% CI: 0.0140-0.9529), there is 88% smaller chance of high probability to develop depression in comparison with patients who lost a close relative.

An association was registered between loss of a loved one/family member or job loss, or a decrease in household income during Covid-19 pandemic period versus Edinburgh scale (three degrees) for $p < 0.05$ (Chi-square: 9,64960, $df=2$, $p=.008028$).

An association was registered between personal loss or loss of a loved one/family member, or a decrease in household income during Covid-19 pandemic period versus development of depression according to the Edinburgh scale for $p < 0.05$ (Chi-square: 6.5476, $df=1$, $p=.010502$).

In patients who did not experience the death of a loved one/family member or employment loss, or a decrease in household income during Covid-19 pandemic period (OR= 0.166795% CI: 0.0394-0.7052), there was 83% smaller chance of high probability to develop depression versus patients who did not experience such issues.

Discussion

The results from the study “Recognizing Perinatal Depression During COVID-19 Pandemic” conducted in 2021 in Skopje, North Macedonia with collaborative effort of the University Clinic for Psychiatry and University Clinic for Gynaecology, as well as the Special Hospital for Gynaecology and Obstetrics - Chair showed an increase in the rates of perinatal depression in comparison to data from pre-pandemic times. Namely, a presence of depressive symptomatology was registered in 17.2% of the included participants using the EDPS, whereas in studies performed in the pre-pandemic period the percentage of perinatal depression ranged between 10-14%. These results are in concordance with the global trends of increased percentage of registered perinatal depression during the pandemic, even to more drastic extends such as a rise of 37.8% in Spain, and 40.7% in Canada. [6] Based on the obtained quantitative data, we conducted this study with an aim to get a more in-depth perspective of the effects of the Covid-19 pandemic on the mental health of women in the perinatal period, with an accent on the intensity of depressive symptomatology, as well as to monitor the dynamic interplay of the pandemic with Covid-19 as a risk factor and the previously established risk factors for perinatal depression.

The design of the study was a cross-sectional one, and the sample was constituted of 54 participants, patients from the Cabinet for perinatal mental health issues in the University Clinic for Psychiatry in Skopje, with heterogeneous socio-demographic characteristics, diagnosed with F32 mild, F32.01 moderate or F32.02 severe depressive episodes based on the criteria of ICD10. Hence, although the statistical analysis of data from the structured non-standardized questionnaire for the effects of Covid-19 pandemic showed no statistical significance in the subjectively reported effects from the pandemic on participants' mental health based on the question from the structured non-standardized Covid-19 questionnaire “Do you feel that the Covid-19 pandemic had an effect on your mental health prior or after the childbirth?” where 55.6% answered with “Yes” and 44.4% “No”, we gained a perspective of the prevailing risk factors in this population. Moreover, the correlational analysis of data from the administered questionnaires granted us insights into further investigation of the relationship between the co-variables.

Risk factors for perinatal depression were registered in 68.5% of the participants, of whom 48.1% reported a posttraumatic stress condition, 42.6% had a history of mental health issues and 13%

reported intimate partner violence. The prevalence of registered risk factors corresponded to a study conducted in North Macedonia in 2020 [5] where the largest percentage of reported risk factors (42%) was previous episodes of mental health issues, while posttraumatic stress condition was reported as a risk factor by 40.6% of the participants. Among the other risk factors with high percentages noted in that study were unplanned pregnancy and family violence.

Posttraumatic stress condition was the dominant risk factor registered in the study, constituting 48.1% of all risk factors reported by the participants.

The relationship between life events and the onset of depression is well established. Experiences such as the death of a loved one, relationship breakdowns or divorce, losing a job or moving home are known to cause stress and can trigger depressive episodes in individuals with no previous history of affective disturbance.

O'Hara, Rehm and Campbell found that high levels of life events from the beginning of pregnancy until about 11 weeks postpartum were associated with higher levels of depressive symptomatology and a greater likelihood of being diagnosed with postpartum depression. [25]

Based on these findings, regarding the psychological effect of traumatic experiences and the increased likelihood of perinatal depression in such cases, we might relate it to the nature of the pandemic which could be classified as a traumatic experience. In many ways, this Covid-19 pandemic similar with situations like war or natural catastrophe, alongside with past traumatic experiences has contributed to the elevated percentages of mental health disorders in pregnancy and puerperium.

Past episodes of mental health issues were reported by 42.6% of patients.

Previous history of depression and anxiety is among the factors that are associated with a higher risk of postpartum depression. The relationship between postpartum depression and prior onset of depression has been reported in many studies, which has been referred to as a powerful factor in postpartum depression. There is evidence in explaining these relationships suggesting that women with a positive history of depression are more susceptible to hormonal changes. In support of this finding, it has been reported that a history of moderate to severe premenstrual syndrome (PMS) is a factor affecting the onset of postpartum depression. In women with severe PMS, the serotonin transport system will change while the serotonin transporter polymorphism area is associated with major depression. High serotonin polymorphism may lead to tryptophan depletion and induction of postpartum major depression. [20] O'Hara and Swain's (1996) meta-analysis included 14 studies of approximately 3,000 subjects which examined the mother's previous psychiatric history and postpartum depression. Beck's (2001) meta-analysis included 11 studies which examined approximately 1,000 subjects.

The results of both meta-analyses found that a previous history of depression was a moderate to strong predictor of subsequent postpartum depression. Subsequent studies consistently reported that women with a previous history of postpartum depression were at an increased risk of developing postpartum depression [25]

Intimate partner violence was reported as a present risk factor in 13% of the interviewed participants in our study. Intimate partner violence (IPV) during pregnancy is a serious public health issue with significant negative health consequences for women and children. The majority of studies have found

that between 3% and 9% of women experience abuse during pregnancy, though there are well established risk factors that are associated with higher rates of abuse, including young age, single relationship status, minority race/ethnicity, and poverty. Experiencing IPV during pregnancy is associated with a multitude of pregnancy-specific behaviours. Research has shown that women abused during pregnancy are twice as likely to miss prenatal care appointments or initiate prenatal care later than recommended. Women experiencing IPV are also twice as likely to not initiate prenatal care until the third trimester and are significantly more likely to miss three or more prenatal visits than their non-abused counterparts (45% vs. 28%).

Of great importance for the study are the findings that IPV is associated with depression, both during pregnancy and in the postpartum period. Indeed, women experiencing abuse during pregnancy are 2.5 times more likely to report depressive symptomatology than their non-abused counterparts.^[3]

Violence against pregnant women has several severe adverse effects not only on women's health but also might harm the fetus. Several studies reported adverse outcomes including increase in foetal injury, perinatal death (prenatal death and early neonatal death), preterm birth, low birth weight, miscarriage, placental abruption, premature rupture of membranes, rupture of urethra, bleeding, prenatal hospitalization and infection.^[26]

Moreover, by administering the non-standardized Covid-19 questionnaire and performing a correlational analysis of the data from these items and scores from the Edinburgh scale, we observed a relationship between some of the characteristics of the pandemic and the severity of depressive symptomatology in patients. Namely, the results obtained in our study showed that **patients who were infected with Covid-19 had 82 times higher chance of presenting with symptoms of moderate depression.**

Pregnant women and mothers were not found to be at higher risk of COVID-19 infection than women who were not pregnant. However, pregnant women with symptomatic COVID-19 may experience more adverse outcomes compared to non-pregnant women and seem to face disproportionate adverse socio-economic consequences. Intrauterine and breastmilk transmission, and the passage of the virus from mother to baby during delivery are unlikely. The guidelines for labour, delivery, and breastfeeding for COVID-19 positive patients vary, and this variability could create uncertainty and unnecessary harm. Prenatal care visits decreased, healthcare infrastructure was strained, and potentially harmful policies have been implemented with little evidence in high and low/middle income countries.^[17]

During COVID-19, women didn't have any companion due to the fear of spread of infection but babies were roomed in with them for breast feeding. This could have led to more psychological stress due to exhaustion and isolation.^[7]

The loss of a close person as a consequence of a Covid-19 infection also showed to be one of the strongest pandemic-imposed risk factors. Patients who didn't lose someone close as a consequence of this viral infection had 88% less chance/probability to develop symptoms of moderate depression compared to those who lost a close person.

Bereavement presents a risk to mental health. In *Keyes et al.* (2014) a relationship between the unexpected death of a loved one and the onset of several mental disorders was observed. In

this sense, those deaths directly caused by SARS-COV2 seem to have a higher impact on mental health than those by natural causes. A high risk of mental disorders is expected or an increase of symptoms of separation distress, dysfunctional grief and posttraumatic stress disorder. The study conducted by Joaquim *et al.* demonstrated a significant increase in psychopathological symptoms in comparison with no history of mental disorder and no loss of family/friends and the group with no history of mental disorder, but with some important loss, which suggests that the death of a family/friend by Covid-19 tends to elevate symptoms of psychological illness. These differences tend to be accentuated when comparing healthy individuals to individuals with a history of psychological disorder, but who did not go through the bereavement experience and become dramatically accentuated when comparing a group with a history of mental disorder and those who had a significant loss during the pandemic. In our results, this is illustrated by the high levels of somatization and internalizing symptoms as anxiety, depression, interpersonal sensitivity, phobic anxiety, seen even higher in the group of people who lost close ones due to SARS-COV-2 in comparison to those without a loss of the loved ones. As pointed by Gruber *et al.* (2020) pandemics imposes a risk for internalizing symptoms, and this finding was already reported by recent empirical studies about COVID-19 and its impact on mental health.^[15]

Another valuable relationship between the effects of the pandemic and the psychological health registered in our study was the correlation between the **individual or family financial loss or the employment loss and the severity of depressive symptomatology.** Patients who have not faced an individual or family financial loss or employment loss were less likely to suffer from moderate depression (83%) in comparison to those who experienced such loss.

In a study conducted by Thayer and Gildner, over 40% of the subjects reported that the COVID-19 crisis had caused them to worry about their financial situation. Financial stress caused by the COVID-19 pandemic was significantly associated with twice the likelihood of having clinically significant depression. These effects were independent of other common predictors of depression in pregnancy, including household income. Living with parents or in-laws, which was significantly more common among lower-income participants, was also associated with an increased likelihood of depression. While COVID-19 financial stress was more common among lower-income participants, the fact that this variable was associated with depression even after adjusting for income suggests that even higher-income individuals who experience COVID-19-associated financial stress are at risk of developing depression.

High childcare costs, a lack of federally mandated paid maternity leave, and high maternity care costs exert an economic toll on American families. During the COVID-19 pandemic these financial stressors have only increased, with record unemployment. Moreover, shifts to telehealth and associated barriers to effective patient-provider communication can increase the chance that maternal depression may go undetected and untreated. Maternal depression as a result of financial stress could potentially impact perinatal birth outcomes, thereby having long-term impacts on offspring health.^[27]

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