Correlation Between Fear of COVID-19 and Postpartum Depression in Baghdad 2022

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Abstract:

Background: Postpartum depression is one of the major underestimated public health issues in maternal and mental health, with the emergence of the new COVID-19 pandemic which add more stress and anxiety to this vulnerable group as the virus affected all crucial aspects of daily life.

Objectives: Determine the prevalence of Postpartum depression, maternal fear of COVID-19, associated factors, and correlation between them among mothers attending the selected Primary Health Care Centers in Baghdad.

Method: A cross sectional study was conducted at ten convenient Primary Health Care Centers in Baghdad (Karkh and Rusafa) of 500 mothers within 6 months after delivery. Participants respond to questions of basic socio-demographic and obstetric variables through direct interview. Postpartum depression was measured by self-report validated Arabic EPDS scale and maternal fear of COVID-19 by the validated Arabic version FCV-19S, binary logistic regression models were used to decrease modifying factors and correlation regression test to test the correlation between fear and Postpartum depression.

Results: The prevalence of Postpartum depression in this study was 37%, associated with high maternal age, poor socioeconomic status, younger baby age, unplanned pregnancy, caesarian section delivery, hormonal contraceptive, history of COVID-19 and with maternal fear. Prevalence of maternal fear was 31%. There was significant positive correlation between maternal fear of COVID-19 scores and Postpartum depression scores (R=0.599, p value=0.001).

Conclusion: During coronavirus diseases 19 pandemic, a high level of COVID-19 related fear among this vulnerable group was associated with an increased risk of depression. Therefore, special attention must be given to the most affected groups pregnant and postpartum women.

Key words: Corona virus 2019, postpartum depression, Edinburgh Postnatal Depression Scale, Fear of COVID-19 scale.

Introduction:

Postpartum depression (PPD) considers as the leading cause of disability and global burden of disease worldwide in women with reproductive age group (15-44y) as reported by WHO [(1)]. Iraq has experienced years of challenging circumstances due to the political and social environment as well as physical barriers to health care services. Chronic stress, experiencing war, and history of abuse are associated with mental illness [(٢)], it is likely that Iraqi women experience maternal mental illness at higher rates than other women. The global average rate for mental illness in pregnancy or the postpartum period is estimated at 15-20% [(1)]. While 37.5% of Iraqi women experience anxiety and 28.5% experience depression representing a relatively high prevalence especially occurring in a critical time in the life of both the babies and their mothers [(٣)].

Since the emergence of COVID-19 infection, which is a highly infectious disease and have posed a global health threat, it has rapidly spread across China and other countries around the world [(٤)]. WHO declared a Public Health Emergency of International Concern on 30 January 2020 and a pandemic on 11 March 2020 [(٥)]. The ongoing COVID-19 pandemic is not only threatening people's physical health but also inducing fear and helplessness. The impacts of COVID-19 pandemic on mental health including depression and negative assessment have also been recorded [(6)] which found that women who were undergraduate, with previous physical disease, poor self-rated health status were associated with a higher risk of COVID-19-related post-traumatic stress symptoms [(7)].

PPD have many negative consequences on maternal and infant health that are not restricted to infancy, but can also extend into toddlerhood, school age, and even adulthood. Several studies found that depressed mothers are more likely than non-depressed mothers to engage in negative parenting behaviours, and their children are at risk for behavioural problems and cognitive emotional, developmental, sleep and verbal deficits and impaired social skills from infancy to early childhood, also affect mother–child interactions, including bonding, breastfeeding. So prompt and effective treatment of postpartum depression not only provides relief for new mothers but also reduces the likelihood of childhood behaviour problems and patterns of insecure attachment that may have lasting effects throughout the life of affected offspring [(8)]. The screening of PPD is extremely important. [(9)]

During COVID-19 Pregnant women and new mothers are classified as vulnerable groups that may be adversely affected by the pandemic. The unique challenges facing pregnant and postpartum women

include concerns about greater severity of COVID-19 disease in this population, potential vertical transmission from an infected mother to her new-born, and increased risk of adverse neonatal outcomes [10].

Few studies have been conducted to specifically examine the depression and the fear levels of new mothers about COVID-19 with no published study in Iraq. Therefore, it is important in this study to understand the prevalence of COVID-19 related fear and depression in postpartum women. In addition, understanding the modifiable factors associated with fear and depression to develop targeted interventions further to improve mental health in pregnant women and women with new-borns.

The objectives of this study are to:

1. Determine the prevalence of postpartum depression among women attending PHC center in Baghdad.
2. Measure the fear of COVID-19 among newly mothers in the Postpartum period.
3. Measure the associated factors with PPD and maternal fear.
4. Identify the correlation between postpartum depression and maternal fear of COVID-19.
5. Comparison in the prevalence of PPD among infected and non-infected mothers in the last one years.

Subjects & Methods:

A cross sectional study with an analytic element was conducted at ten convenient PHCC in Baghdad (Karkh and Rusafa) of 500 mothers within 6 months after delivery during COVID-19 pandemic period with face-to-face interview of SES and maternal variables and self-report to measure the depression and fear level from 1st of April /2022 to 31th July /2022. Verbal consent was taken from each participant after full explanation of aim of the study and ensuring her about the confidentiality of collecting data which wouldn't be used for any purpose other than current study and the collected data would be anonymous.

Inclusion Criteria:

All mothers within first six months after childbirth who was attending the chosen PHCCs and agreed to participate in this study.

Exclusion criteria:

A known cases of depression that diagnosed by specialist and physical or learning disability that has been identified.

Data were collected via especially prepared questionnaire that designed by the researcher and revised by the scientific family and community medicine department after reviewing related studies regarding use of the following:

- Socioeconomic status (SES) index for health research in Iraq by Prof. Dr. Tariq Al-Hadithi: This method is proposed based on the three main variables: education, occupation and wealth/income. Additional refinement was done based on experience and job status.

  SES = Education + Occupation + House ownership * 0.5 + Car ownership * 0.1 + (age-20)/100 – Retired/unemployed/ deceased

  The calculated SES score can be divided into equal three parts: high (more than 9), middle (more than4 - 9) and low socioeconomic from (0-4) [11].
- Medical history of the participants for chronic disease like (hypertension, diabetes, anemia, thyroid disease, heart disease)
- Obstetric history of the participants and infant related factors:
  - Obstetrical complications during last pregnancy (gestational diabetes mellitus, preeclampsia, eclampsia, anemia, hyperemesis gravidarum, threatened abortion, thyroid disease, heart diseases, antepartum hemorrhage, preterm delivery…)
  - Type of delivery: normal vaginal delivery and caesarian section.
  - Infant factor: (age, gender, child order, type of feeding, hospitalization or NICU need, preterm).
  - Unplanned or unintended pregnancy: is described as a pregnancy that is considered to have been unintended (i.e., when no further children were desired) or mistimed (that is, the pregnancy occurred earlier than desired).
  - Current hormonal contraceptive use.
- History of confirmed COVID-19 infection by PCR within one year and history of vaccination.
- Edinburgh Postnatal Depression Scale (EPDS):

EPDS is a self-report widely-used screening instrument for postnatal depression and is valid for use in postpartum depression.(EPDS) is a 10-item self-report measure assessing the severity of maternal depression. The Arabic version of the EPDS with cut-off scores ≥13 was considered as possible PPD which found to be valid, a self-rating scale with good psychometric characteristics (87% sensitivity, 90% specificity) which measures what it claims to measure [12].

- Mothers' fear of their children contracting COVID-19:

We measured mothers' fear of their children becoming infected using the validated Arabic version

of the 7-item Fear of COVID-19 scale, using a 5-point scale ranging from 0 (strongly disagree) to 5 (strongly agree). Scores on each item were added to provide a summary score of mothers' fear of their children contracting COVID-19 ranging from 0–35, with higher scores representing higher levels of fear [13]. The cut-off >17.5 considered as high fear according to the (Mohsen F et al.,2022) new study for the Arabic cut-off score fear of COVID-19 scale [14].

Analysis of data was carried out using the available statistical package of SPSS-27. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test (χ^2-test). Statistical significance was considered whenever the P value was less than 0.05. The binary logistic regression model was used to measure the most significant variables that affect PPD and fear and decrease modifying factors. Linear regression model was used to test the correlation between postpartum depression and maternal fear, using PPD as the dependent variable and maternal fear as the independent variable.

Results:

Mothers less than 35 years old were the majority of our samples which represent 85.6%. About 32.8% of mothers belong to poor, 46.2% fair and 21% good socioeconomic status. Mothers suffered from chronic diseases about 13.8%.

Regarding obstetric and baby's variables 44.6% delivered babies aged 3 months or less, 55.6% of them were males, 78.4% of last pregnancies were planned by parents, 58.0% of studied families had ≥ 3 children, 18.2% of last delivered babies need hospitalization. Majority of our sample 80.8% last pregnancies ended by c/s, 31.8% faced pregnancy or delivery complications and 6.2% had preterm deliveries. About 22%, 48.6% and 29.4% of babies had exclusive, bottle and mixed feeding respectively during their neonatal period. Most mother don't use hormonal contraceptive about 88.8% as shows in table 1.

History of COVID-19 infection before one year was by 199 (39.8%) and 129 (25.8%) had COVID19 vaccination. Postpartum mothers whom had EPDS ≥ 13 was 37% which considered as PPD and 63% had EPDS < 13 or no PPD as shown in figure 1. Mothers whom had COVID-19 fear score ≥ 17 was 31.4% which considered as high fear and 68.6% had < 17 score or no fear as shown in figure 2.

Table 1: Essential Mothers and Obstetric Characteristics			
		N	%
Mother age	<35 year	428	85.6
	≥35 year	72	14.4
SES	Poor	164	32.8
	Fair	231	46.2
	Good	105	21.0
Mother chronic disease	Yes	69	13.8
	No	431	86.2
Baby age	≤3m	223	44.6
	4-6m	277	55.4
Baby gender	Male	278	55.6
	Female	222	44.4
Planned pregnancy	Yes	392	78.4
	No	108	21.6
Child number	≤3	290	58.0
	>3	210	42.0
Hospitalized last baby	Yes	91	18.2
	No	409	81.8
Last delivery method	NVD	96	19.2
	C/S	404	80.8
Delivery or pregnancy complication	Yes	159	31.8
	No	341	68.2
Preterm last delivery	Yes	31	6.2
	No	469	93.8
Type of feeding	EBF	110	22.0
	Bottle	243	48.6
	Mixed	147	29.4
Hormonal contraceptive	Yes	56	11.2
	No	444	88.8

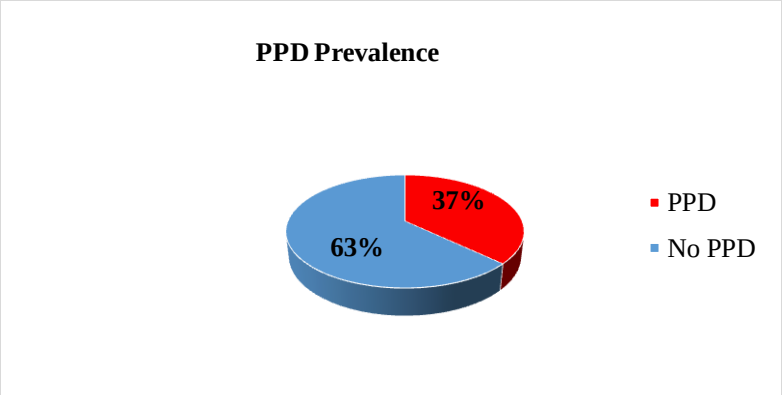

Figure 1: Prevalence of PPD among studied cases

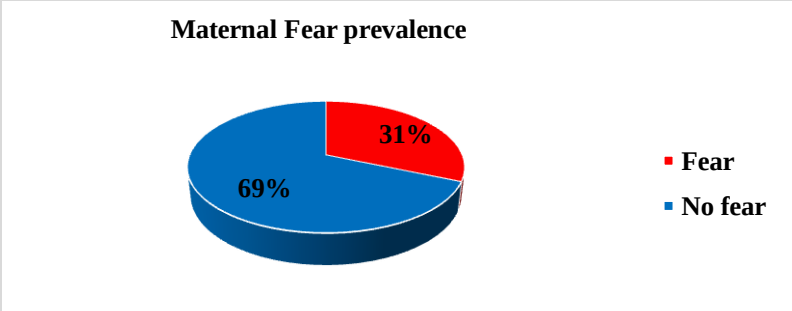

Figure 2: Prevalence of maternal fear level

Association between maternal and obstetric characteristics and depression level: Higher age group mother (≥35 year) with poor socioeconomic status and mothers with chronic diseases were significantly associated with PPD. Younger child age (3 months or less), unplanned pregnancy, mothers with delivery or pregnancy complications, and with last delivery was ended by C/S were significantly associated with PPD. Also, mothers who was use hormonal contraceptive method were associated with higher depression (P value <0.00001 in all conditions). as shown in table 2.

Associations between maternal and obstetric characteristics and maternal fear level shows: Higher age group mothers (≥35 year) with poor SES, and mother with chronic disease had significant association with maternal fear of COVID-19 level. Also shows that mothers with delivery or pregnancy complication, with last delivery was ended by c/s, were significant association with higher level of COVID-19 fear (P value <0.05), as shown in table 3.

Mothers with positive history of COVID-19 infection were associated with higher level of depression (P value <0.05), while vaccination history had no significant association with PPD as shown in table 4. Mothers with positive history of COVID-19 infection were associated with higher level of fear (P value <0.05), while vaccination history had no significant association with maternal fear as shown in table 5.

By binary logistic regression between PPD and variables shows that the most significant variables were higher mother age, poor SES, younger baby age, unplanned pregnancy, C/S delivery, hormonal contraceptive, history of COVID-19 infection and maternal COVID-19 fear were highly significant association with PPD (P value <0.05) as shown in table 6. By binary logistic regression between maternal fear score and variables shows that the most significant variables were higher mother age, poor SES and C/S delivery were highly significant association with maternal fear score (P value <0.05) as shown in table 7. Significant positive correlation was found between postpartum depression and maternal fear scores. R=0.599, p value=0.001 (Fig 3).

Table 2: Associations between Maternal and Obstetric Characteristics and Depression Level						
		PPD		No PPD		P value
		N	%	N	%	
Mother age	<35 year	126	29.4	302	70.6	0.011*
	≥35 year	32	44.4	40	55.6	
SES	Poor	75	45.7	89	54.3	0.000*
	Fair	59	25.5	172	74.5	
	Good	24	22.9	81	77.1	
Mother chronic dis	Yes	31	44.9	38	55.1	0.010*
	No	127	29.5	304	70.5	
Baby age	≤3m	85	38.1	138	61.9	0.005*
	4-6m	73	26.4	204	73.6	
Baby gender	Male	82	29.5	196	70.5	0.258
	Female	76	34.2	146	65.8	
Planned pregnancy	Yes	106	27.0	286	73.0	0.000*
	No	52	48.1	56	51.9	
Child number	≤3	90	31.0	200	69.0	0.749
	>3	68	32.4	142	67.6	
Hospitalized last baby	Yes	30	33.0	61	67.0	0.756
	No	128	31.3	281	68.7	
Last delivery method	NVD	14	14.6	82	85.4	0.000*
	C/S	144	35.6	260	64.4	
Delivery or pregnancy complication	Yes	62	39.0	97	61.0	0.015*
	No	96	28.2	245	71.8	
Preterm last delivery	Yes	11	35.5	20	64.5	0.631
	No	147	31.3	322	68.7	
Type of feeding	EBF	37	33.6	73	66.4	0.832
	Bottle	74	30.5	169	69.5	
	Mixed	47	32.0	100	68.0	
Hormonal contraceptive	Yes	32	57.1	24	42.9	0.000*
	No	126	28.4	318	71.6	

Table 3: Associations between Maternal and Obstetric Characteristics and Maternal Fear						
		Fear		No fear		P value
		N	%	N	%	
Mother age	<35 year	123	28.7	305	71.3	0.002*
	≥35 year	34	47.2	38	52.8	
SES	Poor	64	39.0	100	61.0	0.037*
	Fair	64	27.7	167	72.3	
	Good	29	27.6	76	72.4	
Mother chronic dis	Yes	31	44.9	38	55.1	0.009*
	No	126	29.2	305	70.8	
Baby age	≤3m	80	35.9	143	64.1	0.053
	4-6m	77	27.8	200	72.2	
Baby gender	Male	91	32.7	187	67.3	0.472
	Female	66	29.7	156	70.3	
Planned pregnancy	Yes	115	29.3	277	70.7	0.058
	No	42	38.9	66	61.1	
Child number	≤3	86	29.7	204	70.3	0.323
	>3	71	33.8	139	66.2	
Hospitalized last baby	Yes	28	30.8	63	69.2	0.886
	No	129	31.5	280	68.5	
Last delivery method	NVD	17	17.7	79	82.3	0.001*
	C/S	140	34.7	264	65.3	
Delivery or pregnancy Complication	Yes	60	37.7	99	62.3	0.037*
	No	97	28.4	244	71.6	
Preterm last delivery	Yes	12	38.7	19	61.3	0.365
	No	145	30.9	324	69.1	
Type of feeding	EBF	32	29.1	78	70.9	0.768
	Bottle	76	31.3	167	68.7	
	Mixed	49	33.3	98	66.7	
Hormonal contraceptive	Yes	22	39.3	34	60.7	0.177
	No	135	30.4	309	69.6	

Table 4: Association between History of COVID-19 Infection and Vaccination with PPD						
		PPD		No PPD		P value
		N	%	%	N	
COVID-19 History	**Yes**	88	44.2	111	55.8	0.000*
	No	70	23.3	231	76.7	
Vaccination	**Yes**	43	33.3	86	66.7	0.623
	No	115	31.0	256	69.0	

Table 5: Association between History of COVID-19 Infection and Vaccination with Maternal Fear						
		Fear		No fear		P value
		N	%	%	N	
COVID-19 History	**Yes**	73	36.7	126	63.3	0.038*
	No	84	27.9	217	72.1	
Vaccination	**Yes**	46	35.7	83	64.3	0.226
	No	111	29.9	260	70.1	

Table 6: Binary Logistic Regression between PPD and Variables	
Variables	**P value**
Mother age	0.029
SES	0.000
Mother chronic dis	0.150
Baby age	0.012
Planned pregnancy	0.000
Delivery or pregnancy complication	0.391
Last delivery method	0.000
Hormonal contraceptive	0.007
COVID-19 history	0.000
Maternal fear	0.000
Constant	0.003

Table 7: Binary Logistic Regression between Maternal Fear score and Variables	
Variables	**P value**
Mother age	0.004
SES	0.036
Mother chronic dis	0.298
Delivery or pregnancy complication	0.539
Last delivery method	0.003
COVID-19 history	0.070
Constant	0.152

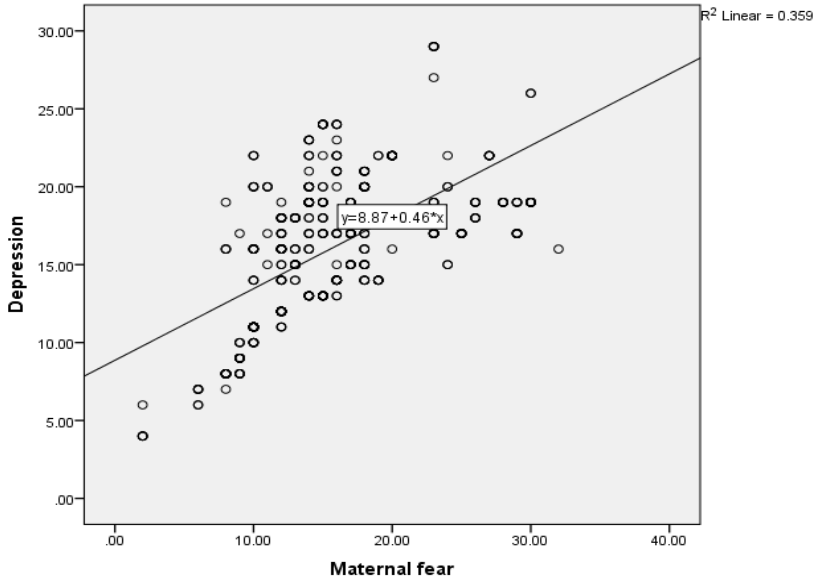

Figure 3: Correlation Regression Relationships between Maternal Fear and PPD

Discussion:

The results of this study showed that the prevalence of PPD was 37%. The rate of postpartum depression had increased when compared with other studies that were done before the pandemic as in Iraq Baghdad (2018-2019) which was 34.7% [(15)], 23.9% in Saudi Arabia (Jeddah) [(16)], 24.9% in Iran [(17)], 49.6% among Syrian mothers refugee [(18)], and 14.9% in the United States [(19)].

Our results are consistent with other studies that were done during the COVID-19, which showed 43% of PPD prevalence in the United Kingdom [(20)], 36.4% the United States [(21)], 32.8% in Saudi Arabia [(22)], and 68.2% PPD in Iran [(17)]. Suggested that women in the postpartum period had experienced higher psychological distress than before the pandemic.

These wide variations in the findings among studies may be attributed to the PPD survey's methods and timing (which may have been gathered earlier or later in each study) as well as the potential role of socioeconomic disparities between populations. Also, Iraqi mothers experience psychological sickness at pointedly higher rates than women in different nations might be because of the

challenging conditions present in this nation due to the years of war with social, political situation, and physical restrictions to health care services [2].

The prevalence of maternal fear from COVID-19 in this study was 31%. In comparison with the previous studies showed that fear score in Arabic population were 52.9% in Syria [14], 21.1% in Saudi Arabia [22]. While the cross-sectional survey in Hong Kong and China, the level of COVID-19 related fear was 23.2% of the participants in China and 25.3% among Hong Kong participants [23].

Maternal fear of COVID-19 level was higher in the age group ≥35 years. Age was found to be one of the risk factors for disease severity and mortality in viral infection investigations in a study conducted in the United States [24]. Channappanavar & Perlman, 2020 also found that in old patients SARS, MERS, and COVID-19 are all more severe [25]. While, no significant association was found between mothers' age and maternal fear of their children contracting COVID-19 on Saudi Arabia study [22].

The results of this study are consistent with previous Iraqi PPD prevalence study [15], and Canadian study which showed that higher age group mothers (≥35 years) had higher depressive symptoms than mothers who gave birth in younger age groups [26]. This increased risk has been attributed to a variety of factors, such as the perception that older women have more difficult experiences and adjustments to motherhood [27], and the lack of peer support due to deviations from social norms surrounding maternal age [28]. Others have suggested that the increase in obstetrical complications, multiple births, and increases in the use of assisted reproductive technologies may contribute to higher rates of depression [29].

Regarding socioeconomic status, higher depressive symptoms and higher maternal fear of COVID-19 were found among poor SES. This finding consistent with previous Iraqi study which found half of PPD mothers had insufficient income [15]. Also, in Saudi Arabia [22], and Turkish studies [30] showing that high socioeconomic status was associated with lower psychological distress, depression rates and maternal fear. Although, in Japan study result found that higher income was not necessarily associated with better mental health status [31]. This may be explained by having insufficient financial resources to cover household expenses; especially those related to an infant with the adverse negative economic effects of COVID-19 pandemic, this put a lot of stress for the mother and increases her risk of developing depression. Additionally, we showed that mothers with chronic disease were not significantly associated with PPD and maternal fear in binary regression, although of it's significantly in χ^2-test. This result inconsistence with previously cited Saudi Arabia [22] and Canadian study [32], which found greater fear and psychological discomfort among mothers with a previous physical and mental illness.

Mothers with younger child age were found to be associated with higher depression level comparable to Denmark previous cohort study which found that during the early three months after delivery the risk of hospital admission or outpatient visit for mental disorder was higher [33]. which represent the most sensitive times for women physically and spiritually, with the rapid hormonal decline suggested to increase vulnerability for depression with un adapted mothers to the new changes in her life pattern. Although in Turkish study found the reverse that the prevalence was lowest at first postpartum months and increased with time [34]. As well, unplanned pregnancy had an adverse effect on maternal depression, an unintended pregnancy can significantly alter one's life, cause stress and marital conflict due to social and economic upheaval, and exacerbate the challenges of motherhood. These findings were also, consistence with previous Iraq study [15], Saudi Arabia study [22] and longitudinal follow-up data from a national sample of an Asian population [35].

Also, C/S was linked to more depressive symptoms. This finding is in line with past Iranian research which demonstrated that mental and physical health was much better 4 months after vaginal delivery than C/S; efforts should be taken to lessen C/S as there were significant differences in the social function and emotional health subscales [36]. Furthermore, mothers who were use hormonal contraceptive method were associated with higher depression. Unfavorable hormonal effects could be a possible explanation for PPD brought on by contraceptives. Sex steroids' effects on the central nervous system have been extensively studied by Pluchino et al., 2009) [37]. Serotonin, dopamine, and noradrenaline are just a few of the neurotransmitter systems that are known to be regulated by estrogens, whereas serotonergic, opioidergic, and cholinergic systems are regulated by progestins. Because of this, it's probable that using contraceptives has an impact on one's neuropsychology [38].

A positive previous history of COVID-19 infection among mothers was associated with higher level of depression. This result is consistence with previous meta-analysis aims to estimate the pooled prevalence of mental disorders among COVID-19 survivors which found that survivors from the previous infection with COVID-19 virus had a high prevalence of psychiatric emergent sequelae, PTSD, major depression, anxiety, and sleep disorders all conditions associated with years of disability with

high-burden non-communicable disease [39]. Immunological response to the virus itself, as well as psychological stressors like social isolation, stigma, severe illness, and worries about spreading the infection to others especially to their baby and families, can all have an impact on the way the COVID-19 infection affects an individual's mental health [40].

High maternal fear of COVID-19 was significantly associated with high level of depression and their significant positive correlation between them (R=0.599, P value=0.001). Our findings are in line with the data showing that a high level of COVID-19 related fear among this vulnerable group was associated with an increased risk of depression as shown in Saudi Arabia [22] and in a cross-sectional survey was done in Hong Kong and Mainland China, found each one-point increase in the COVID-19 related fear level was associated with a 12% increase in the odds of having depression [23].

Conclusion:

1. More than one third of newly delivered mothers were complaining of PPD.
2. There was high fear of COVID-19 (31%) among newly delivered mothers.
3. The most susceptible mothers to PPD were higher in age, poor SES, younger baby age or short time after delivery, unplanned pregnancy, C/S delivery, hormonal contraceptive, history of COVID-19 and high maternal fear.
4. Factors associated with high maternal fear were higher maternal age, poor SES, and C/S delivery.
5. There was significant positive correlation between PPD scores and maternal fear of COVID-19 scores. R=0.599, p value=0.001.
6. The comparison between level of depression between mothers who had previous history of COVID-19 infection and those didn't have showed that mothers with positive history of COVID-19 infection were associated with higher level of depression.

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