THE PSYCHOLOGICAL CONDITIONS OF PREGNANT WOMEN DURING THE COVID-19 OUTBREAK IN LEBANON

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Abstract

In Lebanon, the psychological conditions of pregnant women during the COVID-19 pandemic have not been reported, which creates the need to conduct this study that aims to evaluate the psychological conditions of pregnant women during the COVID-19 pandemic. A cross-sectional design was adopted to reach the aim of this study. The study sample was reached through OBS/GYN clinics to be able to contact the pregnant women in the community, where a convenient sampling technique was followed. The total number of participants was 360 pregnant women: 101 (27.77%) first trimester, 140 (38.88%) second trimester, and 119 (33.33%) third trimester. There is significant evidence indicating that pregnant women may experience various psychological changes such as depression, anxiety, insomnia, and symptoms of PTSD. These four conditions were evaluated using four scales known to be valid and reliable. The ratings of first- and third-trimester pregnant women for four measures were substantially higher than those of second-trimester pregnant women (P

Keywords

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1. INTRODUCTION

The pandemic of SARS-CoV-2 was discovered in Wuhan, China in January 2020 (Ciotti et al., 2020). By February 2020 Covid-19 get defined by the WHO as a global pandemic by March 2020 (Lone & Ahmad, 2020). Where the incidence of COVID-19 reached about 4,806,299 people at the time of the pandemic (Ciotti et al., 2020). This pandemic was a health crisis in Lebanon as it was an international crisis, but the case in Lebanon was accompanied by an economic crisis since October 2019 (El Othman et al., 2021). The first case in Lebanon with this virus was on February 21, 2020 (El Othman et al., 2021). Lebanon Is known to be a country with a high population (6.9 million residents), this made dealing with the crisis more complicated especially since Lebanon doesn't have a local manufacturer that is supposed to provide the essential equipment to protect the people against the mysterious virus that causes the pandemic (Khoury et al., 2020).

Consequently, under these intense circumstances, all citizens have experienced tremendous psychological distress, particularly pregnant women (Lai et al., 2020; Walton et al., 2020). Pregnancy consists of three trimesters it is known to have changes with each trimester due to the fetus's development. The challenges to mental well-being either psychologically or physiologically will adversely affect the fetus's development and would increase the risk of developing neurological disorders or psychological disorders (Short et al., 2010). The third trimester is considered to be the advanced stage of pregnancy that will affect the women psychologically the most (Nayak et al., 2015). This was shown by the fact that almost 20% of women suffer from mood/anxiety disorders during the gestation and postpartum periods (Nayak et al., 2015). A previous study showed the association between the increase of glucocorticoids and progesterone that would increase the severity of infectious agents (Raj et al., 2014). Influenza infections during pregnancy are a risk factor for neuropsychiatric diseases, such as schizophrenia, in offspring (Raj et al., 2014).

As the covid-19 is a new emerging health issue the World Health Organization (WHO), said that there is no data to conclude that pregnant women are at greater risk of experiencing extreme symptoms of COVID-19 than the general public is (WHO, 2020a). Moreover, it was known that COVID-19 is transmitted human-to-human, and adopted lockdown was applied to avoid the virus transmission (Zhou et al., 2021), due to the strict lockdown precautions and the lack of social interaction it was expected to increase the chance of developing maternal depressive symptoms (Zhou et al., 2021).

In addition, women are usually more susceptible to sexual violence during gestation than at any other point in their life and since the COVID-19 embargos have started, Women's Refuge has now recorded a rise in people requesting their assistance (WHO, 2020b). The transmission of the infection in the current pandemic has implied that pregnant women should avoid wide exposure to COVID-19-infected people, anxiety and sadness due to the loss of loved ones will lead to illness among this population. Nevertheless, the quarantine and financial recession will affect their economic and social life of them will have other effects including continued risk of economic difficulties. Research suggests that more emphasis is needed for the psychological well-being of pregnant women, especially for depressed pregnant women (Saccone et al., 2020). That being said, this study aims to examine the psychological conditions of pregnant women during the times of the pandemic in Lebanon. This study is the first to shed light on the psychological status of pregnant women during the COVID-19 pandemic in Lebanon, thus providing valuable data on the health of pregnant women in the country.

2. METHODOLOGY

2.1 Research Design

This research paper has adopted a quantitative cross-sectional research design, to evaluate the psychological conditions of pregnant women during the COVID-19 pandemic.

2.2. Sampling and study subjects

A convenient sampling technique was employed in order to reach out to the maximum number of participants possible, especially during times of quarantine where communication has been more challenging. The sample of this study was set to be pregnant women residing in Lebanon despite their gestational age.

2.3.Inclusion and exclusion criteria

The pregnant women included in this study were of all gestational ages, where the researchers have opted to compare third-trimester pregnant women with other gestational ages as according to evidence this phase of the pregnancy usually entails very high levels of psychological challenges to a woman in comparison to earlier phases (Okagbue et al., 2019). This research has excluded any individual that already been diagnosed with any mental disorder.

2.4.Recruitment, data collection, and procedure

A digital survey was developed and sent to the participants through a Google Forms link via social media platforms and with the assistance of the local OBS/GYN clinics to have access to the participants in order to be

filled by pregnant women in different areas across Lebanon. It was received by 403 respondents who have qualified to take part in the study. The response rate was 89.23%., and the final study sample was comprised of 360 respondents, 101 of whom were in the first trimester, 140 second trimester, and 119 third trimester pregnant women. The candidates who have not responded to the invitation might have been not able to participate due to lack of time. The researchers sent the survey to the potential participants through the social media portals, on two separate occasions namely on the 15th of January 2021, and the 22nd of January 2021, where written informed consent was asked to be provided by the willing respondents. After agreeing to take part in the study, the pregnant women have been provided with an explanation of the research purpose in addition to the anonymity and confidentiality terms, noting that no one is coerced to participate in the study.

2.5. Research Instruments

The questionnaire included a socio-demographic survey at first, which gathered data about marital status, educational level, and age. The second section was intended to evaluate the psychological status of pregnant women through using four tools targeting depression, anxiety, insomnia, and PTSD (Post Traumatic Stress Disorder):

Generalized Anxiety Disorder Questionnaire (GAD-7): GAD-7 generalized anxiety (Spitzer et al., 2006; Swinson, 2006) GAD-7 has already been proven in the English language and a study showed a high reliability of the GAD-7 but low sensitivity and specificity compared to clinicians diagnosis (Sawaya et al., 2016). The level of anxiety severity was determined by total score if it is 0 to 4 points it's categorized as minimal anxiety, 5 to 9 points is categorized as mild anxiety, ten to fourteen points are moderate, and fifteen to twenty-one points are severe (Matsumoto et al., 2022).

Patient Health Questionnaire (PHQ-9): it is one of the depression rating scales that consists of nine items, in which the validity and reliability of the PHQ-9 depression English version already have been approved (Cameron et al., 2008; Löwe et al., 2004). While the Arabic version showed the best balance between sensitivity and specificity at a cutoff of 10 (Sawaya et al., 2016). The PHQ-9 Arabic version covers all the diagnostic criteria of the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) where the tool targets experiences such as anhedonia, feeling sad or depressed, sleeping problems, feeling tired, eating disorders, worthlessness, concentration problems, agitation, and suicidal ideation (Summaka et al., 2019). The nine-element PHQ-9 includes a 3 Likert scale were scored from 0 ("almost never") to 3 ("almost always"). The magnitude of anxiety or depression for participants 84 was categorized into normal (0-4), mild (5-9), moderate (10-14), and severe (> 15), based on scale score.

Insomnia Severity Index (ISI): The ISI (Morin et al., 2011) is a seven-element insomnia appraisal tool on a 5-point Likert scale (0-4, not to severe at all). The level of insomnia was divided into no sleep disorders (0-7), mild (8-14), moderate (15-21), and extreme insomnia (22-28). A cutoff 10 score is recommended to be used in order to categorize insomnia in the community sample (Al Maqbali et al., 2022).

Impact of Scale-Revised Events (IES-R): The IES-R scale (Creamer et al., 2003) was measured based on DSM-IV guidelines for the manifestations of Posttraumatic Stress Disorder (PTSD). Consists of 22 elements, and every element is scored using a Likert scale of five points varying from 0 (not at all) to 4 (very much), with a total score from 0 to 88. The respondent with more than 34 scores was described as a PTSD.

The psychological status of the pregnant women was evaluated using four different scales. The GAD-7 was employed where a threshold score of 10 was used to indicate whether the respondents had any level of anxiety, where any value above 10 is considered abnormal. A cut-off point of 24 was used for the revised version of the Impact of Event Scale (IES-r), where values above 24 are very meaningful and need further investigation, thus considered abnormal. As for the Insomnia Severity Index (ISI) a cut-off point of 10 was used and for the Patient health questionnaire (PHQ-9) a cut-off point of 10 was used to indicate the presence of depression symptoms.

2.6. Data Analysis

For univariate analysis, numerical data was presented as means and standard deviation. Categorical data was presented as frequencies and percentages. For Bivariate analysis, Chi-Square was used when data was categorical. A bi-variate correlational analysis was carried out to determine if there is a relationship between the personal characteristics of the pregnant women and their psychological conditions. A linear regression analysis was carried out to determine the predicting factors of psychological affliction among the pregnant women. P-value was set to less than 0.05 for significance and Statistical Package for the Social Sciences (SPSS) version 25 was used for analysis.

2.8. Ethical review

Institutional Review Board approval was issued after proving that the study stands by the ethical guidelines of research (IRB number: ECO-R-30). The study participation was voluntary with no disadvantages to the respondents either agreeing to participate or not. The participants were assured that any information shared with the researcher through the process of the study was confidential.

3. RESULTS
3.1 Socio-demographic Data

A total of 360 pregnant women were included in this cross-sectional study consisting of 101 (27.77%) first trimester, 140 (38.88%) second trimester, and 119 (33.33%) third-trimester pregnant women from various geographic areas in Lebanon. The descriptive analysis showed that the majority of women were in the age category between 26 and 35 years, by which 56 (55.4%) of them were in the first trimester, 74 (52.9%) of them were in the second trimester, and 86 (72.3%) of them were in the third trimester. Of those who are in their third trimester 98 (82.3%) were married while 21 (17.7%) were divorced, 121 (86.4%) of the second trimester pregnant women were married while 19 (13.6%) were divorced, and 90 (89.1%) of the first trimester pregnant women were married while 11 (10.9%) were divorced. The results showed that 80 (67.2%) of the third-trimester pregnant women attained high school education while 20 (16.81%) of them have attained a university education. In addition, 41 (29.3%) of second-trimester and 33 (32.7%) of first-trimester pregnant women attained a bachelor's degree. The results also showed that 92 (77.31%), 101 (72.41%), and 89 (88.11%) of third, second, and first-trimester pregnant women belonged to lower socioeconomic status, where also 21(17.64%), 14 (11.76%), and 33 (32.67%) respectively did not know where they are going to deliver (Table 1).

Table 1. Characteristics of pregnant women

Category		Third trimester (n=119)		Second trimester (n=140)		First trimester (n=101)	
		N	%	N	%	N	%
Age	18-25	21	17.6	34	24.2	23	22.8
	26-35	86	72.3	74	52.9	56	55.4
	36-40	12	10.1	32	22.9	22	21.8
Marital Status	Divorced	21	17.7	19	13.6	11	10.9
	Married	98	82.3	121	86.4	90	89.1
Educational Level	Middle School	19	15.9	23	16.4	11	10.9
	High School	80	67.2	76	54.3	51	50.5
	BS	20	16.81	41	29.3	33	32.7
	MS/PHD	0	0	0	0	6	5.9
Socioeconomic level	Higher-income >2,500,000 LBP/month	6	5.04	5	35.71	0	0
	Average Income 1,200,000-1,800,000 LBP/month	21	17.64	34	24.3	12	11.89
	Low Income 800,000-1,100,000LBP/month	92	77.31	101	72.14	89	88.11
Planned delivery location during COVID-19	Hospital	69	57.98	71	59.67	58	57.43
	Out-patient center	22	18.49	23	19.33	8	7.92
	Home	7	36.84	11	9.24	2	1.2
	Don't know	21	17.64	14	11.76	33	32.67

3.2. The psychological condition pregnant women
Upon carrying out descriptive analysis, the results showed that 119 (100%) pregnant women in the third trimester and 101 (100%) pregnant women in the first trimester reported abnormal scores on the four psychological scales, while the second trimester pregnant women reported high abnormal scores yet considerably more normal scores where 48 (34.3%) reported normal scores on the level of PHQ-9, GAD-7, ISI, and IER-S. In addition, a Chi-square test was carried out and it has shown that first and third-trimester pregnant women had a higher percentage of psychological distress with a statistically significant difference (P=0.001*) (Table 2).

Table 2. Difference in psychological conditions in first, second, and third-trimester pregnant women

Category		Third Trimester (n=119)		Second Trimester (n=140)		First trimester (n=101)		
		N	%	N	%	N	%	P-value

PHQ-9	Normal	0	0	48	34.3	0	0	0.001*
	Abnormal	119	100	92	65.7	101	100	
GAD-7	Normal	0	0	48	34.3	0	0	0.001*
	Abnormal	119	100	92	65.7	101	100	
ISI	Normal	0	0	48	34.3	0	0	0.001*
	Abnormal	119	100	92	65.7	101	100	
IER-S	Normal	0	0	48	34.3	0	0	0.001 *
	Abnormal	119	100	92	65.7	101	100	

* P-value significant at ≤ 0.05

3.3. Relationship between psychological conditions and socio-demographic data

A bi-variate correlational analysis was carried out to determine if there is a relationship between the personal characteristics of the pregnant women and their psychological conditions. The results showed highly significant correlations on various levels where p values <0.05 were recorded (Table 3). However, the age of pregnant women did not have any significant relationship with most psychological disturbances except the insomnia scale. Moreover, the IES-R was not significantly affected by the age, education level, and socioeconomic status of the pregnant women.

Table 3. Correlation between psychological measures and socio-demographic data						
		Age	Marital Status	Level of Education	Socioeconomic level	Planned delivery
PHQ-9	R-value	0.03	0.19	0.18	-0.48	-0.14
	P-value	0.24	**0.01***	**0.02***	**0.00***	**0.07***
GAD-7	R-value	0.08	-0.27	-0.30	-0.17	0.38
	P-value	0.53	**0.00***	**0.00***	**0.03***	**0.00***
ISI	R-value	0.24	-0.15	0.24	-0.21	0.24
	P-value	**0.00***	**0.05***	**0.00***	**0.00***	**0.00***
IER-S	R-value	0.11	0.17	0.07	0.28	0.11
	P-value	0.15	**0.02***	0.34	**0.00***	0.15

* P-value significant at ≤ 0.05

3.4. Predictors of psychological conditions

A linear regression analysis was carried out to determine the predicting factors of psychological affliction among the pregnant women. The results showed that socioeconomic level (P=0.00) and educational level (P=0.00) significantly predicted depressive symptoms measured by the Patient Health Questionnaire (PHQ-9). In addition, Educational Level (P=0.00) predicted anxiety measured by the Generalized Anxiety Disorder Questionnaire (GAD-7). Moreover, Age (P=0.03) predicted insomnia measured by the Insomnia Severity Index (ISI). Furthermore, socioeconomic level (P=0.00) and educational level (P=0.00) significantly predicted PTSD symptomatology measured by the Impact of Scale-Revised Events (IES-R) (Table 4).

Table 4. Regression analysis among characteristics and psychological conditions				
	Unstandardized coefficients		Standardized coefficients	P-value
PHQ-9	B	Std. Error	Beta	
Marital Status				
Married	-	-	-	-
Divorced	0.00	0.00	-0.04	0.73
Age	0.00	0.01	-0.10	0.40
Socioeconomic level	-0.43	0.12	-0.75	**0.00***
Educational Level	0.34	0.08	0.32	**0.00***
GAD-7				
Marital Status				
Married	-	-	-	-
Divorced	0.00	0.00	-0.04	0.73
Age				
Socioeconomic level	-0.10	0.11	-0.10	0.38
Educational Level	-0.18	0.08	-0.19	**0.02***
ISI				

Marital Status				
Married	-	-	-	-
Divorced	0.00	0.01	-0.08	0.46
Age	0.01	0.01	0.25	**0.03***
Socioeconomic level	0.02	0.01	0.20	0.08
Educational Level	0.00	0.00	0.04	0.75
PHQ-9				
Marital Status				
Married	-	-	-	-
Divorced	0.00	0.00	-0.04	0.73
Age	0.00	0.01	-0.10	0.40
Socioeconomic level	-0.43	0.12	-0.75	**0.00***
Educational Level	0.34	0.08	0.32	**0.00***

* P-value significant at ≤ 0.05

4. DISCUSSION

Upon the peak outbreak of COVID-19 in Lebanon, the government, under the leadership of the Ministry of Health, has enforced efficient preventive strategies in order to avoid a vast propagation of the virus among the Lebanese communities, which threatens the stability and even the survival of the national healthcare system. However, in the rising economic and political climate, stress and psychological challenges have been on the rise among Lebanese citizens, particularly healthcare providers dealing with COVID-19 patients as well as high-risk groups needing special medical attention (Fawaz & Samaha, 2020). Yet, pregnant women have not been addressed during this health crisis; thus, this paper has examined their psychological status and explored associated factors.

The results of this study have shown that pregnant women from various gestational age stages during COVID-19 reported psychological distress from anxiety, depression, and PTSD symptomatology, in addition to insomnia. The results showed that high psychological challenges were reported comparably between first-trimester and third-trimester pregnant women, with levels higher than those of second-trimester women. These findings are consistent with a previous study, which has indicated the importance of monitoring the psychological well-being of pregnant women during the COVID-19 pandemic, especially for those who are inclined to develop depression (Saccone et al., 2020). These findings also reported that during the peak of the pandemic, pregnant women were obliged to delay their prenatal follow-up appointments due to fear of contracting COVID-19 in health institutions (Saccone et al., 2020). Our results are also in line with previous research studies, which have proven the vast prevalence of psychological concerns among pregnant women (Uguz et al., 2019; Usuda et al., 2016). Other studies have also shown that more than a third of the pregnant women who responded to the surveys have reported depression, anxiety, insomnia (Mongan et al., 2019), and even PTSD symptomatology (Yonkers et al., 2014). Comparable to the results of (Saccone et al., 2020) in Italy, these results suggest that the disease outbreak of COVID-19 has a significant effect on anxiety linked to gestation. Previous research has demonstrated that pregnant women's anxiety is more harmful to mother and infant conditions than general anxiety or depression. Gestational anxiety has been associated with higher prematurity rates as well as low-birthweight infants (Bayrampour et al., 2016). In Turkey, similar phenomena regarding insomnia were seen, showing that 70% of pregnant women had reported that their sleeping habits had changed and 51.2% reported that they had developed insomnia (Kızılırmak et al., 2012). A study was done about anxiety in Wuhan China, to evaluate the anxiety among pregnant women during COVID-19 it shows that the highest level of anxiety was present among the second trimester pregnant women by 21.7% (Ding et al., 2021). Two major factors contributing to gestational anxiety have been shown: actual or expected danger or consequences of pregnancy and poor control beliefs. The COVID-19 pandemic amplifies all of these considerations.

Nevertheless, our findings found that pregnant women, at the onset of the COVID-19 pandemic in Lebanon, were under considerable psychological strain, especially among first- and third-trimester women, in the context of a spiraling economic and political recession that is increasing tension. This is the first research study with concrete evidence regarding psychological experiences among pregnant women during the outbreak. This suggested that greater consideration would be given to the psychological issues of pregnant women as well and that some significant interventions would be implemented during the outbreak to alleviate such afflictions. A longitudinal study of long-term follow-up for respondents revealed that reinforcement from the family was correlated with low depression rates and substantial depression recovery (Bodaghi et al., 2017). As for pregnant women, reports have indicated that family support has been shown to aid in reducing the prevalence of anxiety and depression (Friedman et al., 2020) as well as alleviating insomnia ((Kalmbach et al., 2020; Mourady et al., 2017). Furthermore, earlier research found that family help in the Chinese community could eliminate or mitigate certain mood disorders for pregnant women ((Li et al., 2019; Yasuma et al., 2019). Therefore, health promotion

shall focus on informing and reinforcing the value of family support for pregnant women, especially during the time of the pandemic.

5. LIMITATIONS

In our research paper, we recognize certain limitations. Firstly, our research is a cross-sectional analysis, extracting evidence from a specific period in time. Secondly, convenient sampling was another limitation because it only gave the chance to those who responded to the online survey. Thus, variations in pregnant women's mental health should be examined at various times of the pandemic. In addition, the small sample of pregnant women in the study might have limited the findings of the study.

6. IMPLICATIONS FOR PRACTICE

The results of this research paper incentivize Lebanese leaders and public health officers to take proper action to safeguard the health of pregnant women during these difficult times by offering the needed psychosocial support services. This data can be guided to further studies in Lebanon that explore those experiences, especially through qualitative research. Moreover, this data can be replicated through wider sample sizes in Lebanon and the region to get a broader understanding and generalizable conclusions that lead to the reinstatement of structured interventional policies and preventive measures.

7. CONCLUSION

In summary, this study has proven that pregnant women in Lebanon have experienced great psychological burdens, especially women in their first and third trimesters, where socioeconomic, and educational level uncertainty have predicted their psychological affliction. This entails a proper and serious call for action from families and health leadership to take care of pregnant women and their offspring during the pandemic.

REFERENCES

- Al Maqbali, M., Madkhali, N., & Dickens, G. L. (2022). Psychometric properties of the insomnia severity index among Arabic chronic diseases patients. SAGE Open Nursing, 8, 23779608221107278.
- Bayrampour, H., Ali, E., McNeil, D. A., Benzies, K., MacQueen, G., & Tough, S. (2016). Pregnancy-related anxiety: A concept analysis. International journal of nursing studies, 55, 115-130.
- Bodaghi, E., Alipour, F., Bodaghi, M., Nori, R., Peiman, N., & Saeidpour, S. (2017). The role of spirituality and social support in pregnant women's anxiety, depression and stress symptoms. Community Health Journal, 10(2), 72-82.
- Cameron, I. M., Crawford, J. R., Lawton, K., & Reid, I. C. (2008). Psychometric comparison of PHQ-9 and HADS for measuring depression severity in primary care. British Journal of General Practice, 58(546), 32-36.
- Ciotti, M., Ciccozzi, M., Terrinoni, A., Jiang, W.-C., Wang, C.-B., & Bernardini, S. (2020). The COVID-19 pandemic. Critical reviews in clinical laboratory sciences, 57(6), 365-388.
- Creamer, M., Bell, R., & Failla, S. (2003). Psychometric properties of the impact of event scale—revised. Behaviour research and therapy, 41(12), 1489-1496.
- Ding, W., Lu, J., Zhou, Y., Wei, W., Zhou, Z., & Chen, M. (2021). Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in Wuhan during the outbreak of COVID-19: a cross-sectional study. BMC pregnancy and childbirth, 21(1), 1-9.
- El Othman, R., Touma, E., El Othman, R., Haddad, C., Hallit, R., Obeid, S., Salameh, P., & Hallit, S. (2021). COVID-19 pandemic and mental health in Lebanon: a cross-sectional study. International Journal of Psychiatry in Clinical Practice, 25(2), 152-163.
- Fawaz, M., & Samaha, A. (2020). <? covid19?> The psychosocial effects of being quarantined following exposure to COVID-19: A qualitative study of Lebanese health care workers. International Journal of Social Psychiatry, 66(6), 560-565.
- Friedman, L. E., Gelaye, B., Sanchez, S. E., & Williams, M. A. (2020). Association of social support and antepartum depression among pregnant women. Journal of affective disorders, 264, 201-205.
- Kalmbach, D. A., Cheng, P., O'Brien, L. M., Swanson, L. M., Sangha, R., Sen, S., Guille, C., Cuamatzi-Castelan, A., Henry, A. L., & Roth, T. (2020). A randomized controlled trial of digital cognitive behavioral therapy for insomnia in pregnant women. Sleep medicine, 72, 82-92.
- Khoury, P., Azar, E., & Hitti, E. (2020). COVID-19 response in Lebanon: current experience and challenges in a low-resource setting. Jama, 324(6), 548-549.
- Kızılırmak, A., Timur, S., & Kartal, B. (2012). Insomnia in pregnancy and factors related to insomnia. The Scientific World Journal, 2012.
- Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., & Li, R. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open, 3(3), e203976-e203976.

- Li, T., Guo, N., Jiang, H., Eldadah, M., & Zhuang, W. (2019). Social support and second trimester depression. Midwifery, 69, 158-162.
- Lone, S. A., & Ahmad, A. (2020). COVID-19 pandemic–an African perspective. Emerging microbes & infections, 9(1), 1300-1308.
- Löwe, B., Kroenke, K., Herzog, W., & Gräfe, K. (2004). Measuring depression outcome with a brief self-report instrument: sensitivity to change of the Patient Health Questionnaire (PHQ-9). Journal of affective disorders, 81(1), 61-66.
- Matsumoto, K., Hamatani, S., Shimizu, E., Käll, A., & Andersson, G. (2022). Impact of post-COVID conditions on mental health: a cross-sectional study in Japan and Sweden. BMC psychiatry, 22(1), 1-13.
- Mongan, D., Lynch, J., Hanna, D., Shannon, C., Hamilton, S., Potter, C., Gorman, C., McCambridge, O., Morrow, R., & Mulholland, C. (2019). Prevalence of self-reported mental disorders in pregnancy and associations with adverse neonatal outcomes: a population-based cross-sectional study. BMC pregnancy and childbirth, 19(1), 1-10.
- Morin, C. M., Belleville, G., Bélanger, L., & Ivers, H. (2011). The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep, 34(5), 601-608.
- Mourady, D., Richa, S., Karam, R., Papazian, T., Hajj Moussa, F., El Osta, N., Kesrouani, A., Azouri, J., Jabbour, H., & Hajj, A. (2017). Associations between quality of life, physical activity, worry, depression and insomnia: A cross-sectional designed study in healthy pregnant women. PloS one, 12(5), e0178181.
- Nayak, S. K., Poddar, R., & Jahan, M. (2015). Psychological problems during advance stage of pregnancy. The International Journal of Indian Psychology, 2(2), 103-113.
- Okagbue, H. I., Adamu, P. I., Bishop, S. A., Oguntunde, P. E., Opanuga, A. A., & Akhmetshin, E. M. (2019). Systematic review of prevalence of antepartum depression during the trimesters of pregnancy. Open access Macedonian journal of medical sciences, 7(9), 1555.
- Raj, R. S., Bonney, E. A., & Phillippe, M. (2014). Influenza, immune system, and pregnancy. Reproductive sciences, 21(12), 1434-1451.
- Saccone, G., Florio, A., Aiello, F., Venturella, R., De Angelis, M. C., Locci, M., Bifulco, G., Zullo, F., & Sardo, A. D. S. (2020). Psychological impact of coronavirus disease 2019 in pregnant women. American Journal of Obstetrics & Gynecology, 223(2), 293-295.
- Sawaya, H., Atoui, M., Hamadeh, A., Zeinoun, P., & Nahas, Z. (2016). Adaptation and initial validation of the Patient Health Questionnaire–9 (PHQ-9) and the Generalized Anxiety Disorder–7 Questionnaire (GAD-7) in an Arabic speaking Lebanese psychiatric outpatient sample. Psychiatry research, 239, 245-252.
- Short, S. J., Lubach, G. R., Karasin, A. I., Olsen, C. W., Styner, M., Knickmeyer, R. C., Gilmore, J. H., & Coe, C. L. (2010). Maternal influenza infection during pregnancy impacts postnatal brain development in the rhesus monkey. Biological psychiatry, 67(10), 965-973.
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: the GAD-7. Archives of internal medicine, 166(10), 1092-1097.
- Summaka, M., Zein, H., Abou Abbas, L., Elias, C., Elias, E., Fares, Y., Naim, I., & Nasser, Z. (2019). Validity and Reliability of the Arabic Patient Health Questionnaire-9 in Patients with Spinal Cord Injury in Lebanon. World neurosurgery, 125, e1016-e1022.
- Swinson, R. P. (2006). The GAD-7 scale was accurate for diagnosing generalised anxiety disorder. Evidence-based medicine, 11(6), 184-184.
- Uguz, F., Yakut, E., Aydogan, S., Bayman, M. G., & Gezginc, K. (2019). The impact of maternal major depression, anxiety disorders and their comorbidities on gestational age, birth weight, preterm birth and low birth weight in newborns. Journal of affective disorders, 259, 382-385.
- Usuda, K., Nishi, D., Makino, M., Tachimori, H., Matsuoka, Y., Sano, Y., Konishi, T., & Takeshima, T. (2016). Prevalence and related factors of common mental disorders during pregnancy in Japan: a cross-sectional study. BioPsychoSocial medicine, 10, 1-7.
- Walton, M., Murray, E., & Christian, M. D. (2020). Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. European Heart Journal: Acute Cardiovascular Care, 9(3), 241-247.
- Yasuma, N., Narita, Z., Sasaki, N., Obikane, E., Sekiya, J., Inagawa, T., Nakajima, A., Yamada, Y., Yamazaki, R., & Matsunaga, A. (2019). Psychological intervention for universal prevention of antenatal and postnatal depression among pregnant women: protocol for a systematic review and meta-analysis. Systematic reviews, 8, 1-4.
- Yonkers, K. A., Smith, M. V., Forray, A., Epperson, C. N., Costello, D., Lin, H., & Belanger, K. (2014). Pregnant women with posttraumatic stress disorder and risk of preterm birth. JAMA psychiatry, 71(8), 897-904.
- Zhou, Y., Wang, R., Liu, L., Ding, T., Huo, L., Qi, L., Xiong, J., Yan, J., Zeng, L., & Yang, J. (2021). The impact of lockdown policy on depressive symptoms among pregnant women in China: mediating effects of internet use and family support. Global Health Research and Policy, 6(1), 1-12.