Original Article

Risk Factors of Mental Health Problems among Pregnant Women in El - Beheira Governorate

Salma Mohamed freek [1] Abeer Abdel Aziz Madian[2] Doaa Abd Elsalam Amin [3] Amel Attia Abd Elghaffar Moustafa[4]

1. Demonstrator at Community Health Nursing, Faculty of Nursing, Damanhour University. Egypt
2. Professor of Community Health Nursing, Faculty of Nursing, Damanhour University. Egypt
3. Professor of Community Health Nursing, Faculty of Nursing, Damanhour University, BUE university. Egypt
4. Lecturer Community Health Nursing, Faculty of Nursing, Damanhour University. Egypt

*Corresponding author: Salma Mohamed freek, Demonstrator at Community Health Nursing, Faculty of Nursing, Damanhour University. Egypt, salma.abdelrahman.freek@nur.dmu.edu.eg

Abstract:

Background: Antenatal mental health problems are associated with maternal and fetal adverse outcomes. There are a wide range of factors associated with mental health problems during pregnancy. **Aim of this study to** assess risk factors of mental health problems among pregnant women in El-Beheira governorate. **Research design**: A descriptive cross-sectional design. **Settings:** This study was conducted at the governmental primary health care centers in El-Beheira governorate. **Tools:** Depression Anxiety Stress Scale (DASS-21) was used. **Results**: The prevalence of depression, anxiety and stress was 38.43%, 44.95% and 63.67% respectively. **Conclusion:** The prevalence of depression, anxiety and stress among studied pregnant women was high, early screening and intervention may have great significance for reducing these mental health problems and the family and society support should be brought into the intervention as well. **Recommendations**: Include maternal mental health problems screening and treatment as a routine part of woman, preconception, prenatal, and postpartum care.

Keywords: pregnant women**,** mental health problems, risk factors, depression, anxiety and stress.

Introduction:

Approximately 810 women die every day from pregnancy- and childbirth-related avoidable causes; 94% of these deaths take place in low- and lower-middle-income nations. Many of these preventable causes and illness are linked to emotional instability but do not have any biological etiology. [1]

Ignoring mental health affects not just the general health and well-being of mothers but also the physical and emotional development of infants. Mentally unhealthy pregnant women are more likely to have marital problems and stress, feel less emotionally and physically supported, and not take proper care of themselves. These puts women at risk of not properly bonding with their fetus, and in turn creates difficulties in establishing an optimal relationship with their babies in the postpartum.[2] Additionally, one of the main causes of maternal death is difficulties related to perinatal mental health, and 20% of pregnant women who suffer from mental disorders may either contemplate suicide or commit acts of self-harm.[3]Moreover, a 50–60% increased risk of postpartum depression symptoms may result from untreated prenatal depression.[4]

In addition to being a time of nervous anticipation, pregnancy may also be a period when preexisting mental health issues worsen or when a new diagnosis of mental health problems is made.[5, 6] There are many variables can place a pregnant woman at risk for mental health problems.[7] 50% of pregnant women are adolescent, 20 % of births in the five-

year period were unwanted at the time of conception, and nearly one third of married women have ever experienced some form of spousal violence.[8] Pregnant women are more likely to experience mental health problems in addition to the many stressors that commonly affect them, such as low income, challenging work circumstances, a heavy workload, issues in intimate relationships, pregnancy complications, and the existence of a medical or mental illness history.[9-12]

Non-pharmacological interventions in managing perinatal mental health problems include cognitive-behavioural therapy (CBT) or other psychological therapies along with behavioural activation, such as reconnecting with friends, family, and social activities, relaxation, meditation, and mindfulness, and supporting a healthy lifestyle with adequate nutrition, exercise, sleep, and psycho-education.[13, 14] A secondary mental health service should be consulted for women exhibiting severe or psychotic symptoms. The patient's thoughts and concerns should be examined to determine any possible contributing factors, such as a sense of unfulfilled expectations, issues related to the physical constraints of pregnancy and childbirth, financial worries, or social isolation. [15, 16]

The community health nurse is crucial to preserving and enhancing the physical and mental well-being of expectant mothers. [17, 18] In order to offer pregnant women with appropriate counselling and behavioural methods that can aid in promoting mental health, community health nurses assess the mental health of mothers and the health of their newborns. As a result, nurses must employ counselling techniques and active listening skills to offer pertinent instruction and information, as well as to refer patients and groups for help when necessary.[19] Additionally, The holistic nursing approach may be more effective in reducing mental health issues during the prenatal period since it offers care and health information about better pregnancy and delivery, as well as emotional support by including the pregnant woman and her family.[20]

Significance of the study:

According to World Health Organisation (WHO) 2020 [21] statistics, depression accounts for 10% of mental health issues experienced by pregnant women and 13% by postpartum women. In developing nations, this percentage rises to 15.6% during pregnancy and 19.8% after giving birth. Furthermore, study performed in China (2019) [22] reported that, the prevalence rates of early pregnancy anxiety, depression, and prenatal stress were, respectively, 91.86%, 15.04%, and 5.19%. In Egypt, study conducted at (2022) [23] reported that, 3.7% and 5.4% of women reported having mild and moderate depression during and after their pregnancies, respectively. In addition, study conducted in Egypt at (2021) [24] reported that, the examined primigravida women's overall mean scores for stress, anxiety, and depression were 26.60%, 19.70%, and 35.70%, respectively.

Aim of the study:
Assess risk factors of mental health problems among pregnant women in El-Beheira governorate.

Research Question:
What are risk factors of mental health problems among pregnant women in El-Beheira governorate?

II. Materials and Methods
Research design:
A descriptive cross-sectional design was adopted to conduct this study.
Setting:
The study was conducted at eight governmental Primary Health Care (PHC) centers in El Beheira governorate. Four directorates out of 16 directorates were selected randomly by lottery namely, Damanhour, El-Mahmoudia, ItayElbaroud

and Shubrakhite. From each directorate, one Maternal and Child Health Center and one rural health unit was randomly selected to be included in the study.

Subjects:

All pregnant women attending primary health care centers in the previously selected MCH centers or health care units in El Beheira governorate were enrolled in the study.

Sampling size:

- The sample size was estimated using Epi info 7 statistical program using the following parameters, total population 2416 of pregnant women per month in El-Beheira governorate, 50% expected frequency, 95% confidence interval with 5% maximum error. The minimum sample size estimated 394 pregnant women. The sample size was raised to 400 pregnant women.

Sampling technique:

- A multistage sampling technique was used to select the required sample. El-Beheira governorate is composed of (16) health directorates. Four out of the sixteen health directorates (constitute 25%) were randomly selected by lottery. Eight primary health care facilities were selected by using equal allocation method, one rural health unit and one urban maternal &child health care from each health directorate were randomly selected to be included in the study. A convenient sample of 400 pregnant women attending each of the previously mentioned primary health care facilities were chosen to be included in the study by equal allocation (50 pregnant women from each previously mentioned primary health care facilities)

Tool for data collection

One tool was used named **Depression Anxiety Stress Scale (DASS-21):** was a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress were developed by Lovibond, S.H. & Lovibond, P.F. (1995)[25] and the researcher used the Arabic version of tool I which translated by Miriam Taouk Moussa, Peter Lovibond and Roy Laube 2001 to assess depression, anxiety and stress among studied pregnant women. The Anxiety scale includes items evaluating somatic symptoms, situational anxiety, and the subjective experience of anxious affect. The Stress scale evaluates a condition of persistent arousal and tension, which consists of symptoms like difficulty relaxing, agitation, irritability, and impatience. The Depression scale measures symptoms like dysphoria, hopelessness, self-worthlessness, and lack of interest. Tests conducted to determine the validity of DASS-21 as a standard clinical outcome measure have revealed that the scale is sensitive to changes in clinical status following treatment. The following is a summary of the rating scale:

"0" Did not apply at all "Never".

"1" for some of the time or some degree "Sometimes".

"2" for a good part of time, or a considerable degree "Often".

"3" for most of the time, or very much "Almost Always".

Scoring system: The following table might be used to evaluate symptoms of negative mood:

Negative mood symptoms	Level	Total score		
		Depression	Anxiety	Stress
Symptomatic level	Absent	0-9	0-7	0-14
	Mild	10-13	8-9	15-18
	Moderate	14-20	10-14	19-25
Comorbid level	Severe	21-27	15-19	26-33
	Extremely severe	28+	20+	34+

In addition: two parts were developed by the researcher to complete data about pregnant women after reviewing the recent literatures. [11, 37]

Part I: The personal data consisted of socio-demographic characteristics as age, level of education, occupation, family income adequacy, age of marriage, duration of marriage, place of residence, type of family, crowding index and type of home.

Part II: Pregnant women health profile: medical history, obstetrical history and data about present pregnancy; trimester, occurrence of pregnancy, type and intake of medication, gender detected by sonar, number of antenatal visits, receiving health education, planning for current pregnancy, sleeping pattern and if stress present from infected by covid-19.

Methods

The study was implemented according to the following steps:

i.   Administrative process

- The Ministry of Health and Population in the El Beheira governorate received an official letter from the Dean of Faculty of Nursing, Damanhour University informing them of the purpose of the study and requesting their permission to perform it in the selected settings.

- Official letters from the representative of the Ministry of Health and Population were directed to the director of each MCH centres and health unit to facilitate conducting the research and support during data collection.

- To establish the purpose of the study, schedule the date and time of data collection, reassure the directors of the chosen MCH centres or healthcare units that the data would only be used for that reason, and secure their cooperation and agreement during data collection, meetings were held with them.

- **Development of study tools**

- The Arabic version of tool **I** which translated by Miriam Taouk Moussa, Peter Lovibond and Roy Laube 2001 was used. [26]

- Part **I,** part **II** related to tool **I** were developed by the researcher after reviewing of the recent literature to collect necessary data about pregnant women socio-demographic characteristics and pregnant women health profile.

- The study tool's content validity was evaluated by a jury committee made up of five community health nursing specialists. Their recommendations and opinions were taken into account when certain questions were included, and others were removed.

- Cronbach's Alpha reliability was used to assess the tool's reliability. Tool I had a reliability of calculated (α =0.953).

ii.   Pilot study

The Pilot study was done randomly on 10% of total sample (40 pregnant women), they were selected from (Elhelal MCH center and Itay Elbaroud MCH Center), these women were excluded from study sample. The pilot study was conducted to evaluate items, clarity and relevance of study tools; estimate time required for data collection and identifies the possible obstacles that may hinder the process of data collection. Analysis was done on the pilot study's data. Accordingly, necessary modifications were taken into consideration as remove questions about socio-demographic characteristic of women's husbands and adding question about travelling of husband.

iii.   Data collection process

- The data was collected individually from each pregnant woman by interviewing in waiting area at the selected MCH centers and health units at suitable time using tool I after a brief explanation of the aim and the nature of the research. Written consent was requested from pregnant women in order for them to take part in the study.

- The researcher identified herself at the start of each pregnant woman's interview. Before any data was collected, a trusting relationship with women had to be established.

- Depression Anxiety Stress Scale took time approximately from 25-45 minutes for each pregnant woman.

- Data were collected by the researcher over a period of 6 months (from March to August 2021).

iv.   Data analysis:

- Following the collecting of data, the data was coded and put into a format that was specifically created to be fed into a computer.

- Version 20 of the statistical package of social science (SPSS) was used for data entry and analysis.

- To find any errors during data input, data was verified and amended using manual revision, cross tabulation, and frequency analysis after it was entered.

- Descriptive statistics, such as percentages, frequencies, range (minimum and maximum), arithmetic mean, and standard deviation (SD), were used to analyse the variables.

- The level of significance selected for this study was $p \leq 0.05$.

- Multiple Logistic regression Model and ANOVA model were used to indicate the risk factors of mental health problems, the model was statistically significant ($p \leq 0.05$), and factor was considered as risk factors for mental health problems among pregnant women if beta was negative.

Ethical considerations:

- Permission was obtained from ethical committee in the faculty of Nursing Damanhour University. (17 November 2020, no 43)

- Permission was obtained to collect the data from the previous MCH centers.

- Each director of selected MCH centre informed about the date and the time of data collection.

- Informed consent was obtained from every participant included in the study after explanation of the aim of the study and assured them that collected data would be used only for the study purpose, and their participation in the study was voluntary and they could withdraw at any time even when they have already started to fill the scale.

- Dealing with the study subjects respectively regardless of their age, sex, religion, and their socioeconomic status.
- Confidentiality and privacy of pregnant women's response was maintained.
- Anonymity was guaranteed by using code number instead of names.

Results

Table (1) illustrates the distribution of the pregnant women according to their socio-demographic characteristics. Regarding the age of the pregnant women, it was observed from table, that less than half (43.0 %) of them aged 20 years to less than 25 years with a mean of 24.43 ± 4.034 years. Less than half (45.8%) of them had university education, followed by less than one third (32.0%) of them had secondary or technical education. Less than two thirds (63.0%) of them were housewives. While less than three quarters (70.7%) of them reported that their families' income was enough. Concerning the age of marriage, it was observed that more than two thirds (67.7%) of them were married at age above 20 years with a mean age of 21.28 ± 3.229. Moreover, more than two thirds (69.0%) of them were married since less than 5 years with a mean of 3.56 ± 3.648. In relation to place of residence, more than half (53.8%) of the pregnant women were living in rural areas in nuclear family (53.0%). while more than half (58.3%) of them had living in non-crowded house and more than three quarters (76.5%) of them living in their own home.

Table (1): **Distribution of pregnant women according to their socio-demographic characteristics:**

Socio-demographic characteristics	Total (N= 400)	
	No.	%
Age (years)		
<20	42	10.5
20-	172	43.0
25-	139	34.8
30 or more	47	11.7
Min -Max 15.0 - 40.0 Mean ± SD 24.43 ± 4.034		
Level of education		
Illiterate or read/write	27	6.8
Basic education	45	11.2
Secondary or technical education	128	32.0
University education	183	45.8
Post university education	17	4.2
Occupation		
Housewife	252	63.0
Non-technical work	70	17.5
Free work	44	11.0
Employee	34	8.5
Family income adequacy		
Enough	283	70.7
Enough & save	85	21.3
Not enough	32	8.0
Age of marriage (years)		
<18	2	0.5
-18-	127	31.8
≥20	271	67.7
Min -Max 15.0 - 30.0 Mean ± SD 21.28 ± 3.229		
Duration of marriage (years)		
<5	276	69.0
-5-	101	25.2
-10-	11	2.8
-15 or more	12	3.0

Min -Max 1.0 - 21.0 Mean ± SD 3.56 ± 3.648		
Place of residence		
Rural	215	53.8
Urban	185	46.2
Type of family		
Nuclear	212	53.0
Extended	188	47.0
Crowding index of the house		
Non crowded ≤ 2	233	58.3
Crowded >2	167	41.7
Type of house		
Owned	306	76.5
Rented	94	23.5

Table (2): Displays the distribution of the pregnant women according to their heath profile and obstetric history. It was evident from the table that, 10.7% of pregnant women were suffering from chronic diseases. Also, one tenth (10.0%) of them had reported mental problems as follows, more than half (55.0%) of them reported depression while 45% of them reported stress and anxiety. Regarding **obstetric history**, it was observed that, studied women **gravida** ranged from 1 to 5 pregnancies. More than half (52.5%) of the pregnant women were gravida one, the majority (92.6%) of pregnant women hadn't abortion before. **Women** who had been pregnant more than once (N= 190 pregnant women), as **pregnant women para** ranged from 1 to 5 deliveries, less than three quarters (71.6%) of them were para one. Moreover, (73.3%) of them delivered **caesarean section.**

Pertaining **number of children**: less than three quarters (71.6%) of pregnant women have one child and more than half (34.7%) of them had girls only. **Regarding health problems associated last pregnancy:** more than three quarters (79.5%) of the pregnant women had history of health problems associated with last pregnancy. As regard to **previous postpartum problems,** more than one third (36.4%) of them had previous postpartum problems.

Table (2): Distribution of the pregnant women according to their heath profile and obstetric history.

Items	Total (N= 400)	
	No.	%
Medical history		
Presence of chronic diseases		
No	**357**	**89.3**
Yes	**43**	**10.7**
History of perceived mental health problems		
No	**360**	**90.0**
Yes	**40**	**10.0**
▪ Depression	22	55.0
▪ Stress and anxiety	18	45.0
Obstetric History		
Gravida		
Primi	210	52.5
Multi	190	47.5
Number of pregnancies		
One	210	52.5
Two	126	31.5
Three	39	9.7
Four	15	3.8
Five	10	2.5

Min -Max 1.0 – 5		
Experience of abortion	**N= 190**	
No	**176**	**92.6**
Yes	**14**	**7.4**
▪ One	7	50.0
▪ Two	6	42.9
▪ Three	1	7.1
Min -Max 1.0 - 3.0		
Number of deliveries	**N= 176***	
One	126	71.6
Two	39	22.2
Three or more	11	6.2
Min -Max 1.0 - 5.0		
Last delivery mode	**N= 176**	
Caesarean section	129	73.3
Normal vaginal delivery	47	26.7
Number of children	**N= 176**	
One	126	71.6
Two	39	22.2
Three or more	11	6.2
Min -Max 1.0 - 5.0		
Gender of children	**N= 176**	
Girls only	61	34.7
Boys only	100	56.8
Girls and boys	15	8.5
Physical health problems associated with Previous pregnancy	**N= 190**	
No	**39**	**20.5**
Yes	**151**	**79.5**
Previous post-partum problems	**N= 176**	
No	**112**	**63.6**
Yes	**64**	**36.4**

Table (3): Illustrates distribution of the pregnant women according to their current pregnancy related data: it was observed from table that, more than half (52.2 %) of pregnant women at second trimester of pregnancy. The majority (80.7%) of women pregnancy occurred naturally. Less than three quarters (70.7%) of the pregnant women had normal pregnancy. In relation to **taking of medications for pregnancy stabilization,** more than three quarters (77.5%) of the pregnant women reported that they received medications for pregnancy stabilization. Furthermore, more than half (56.3%) of pregnant women will have a boy.

As regard to **pregnancy antenatal visits**, more than one third (39.7%) of the pregnant women had less than four antenatal visits. It was observed that more than half (57.7%) of them didn't **receive pregnancy health education**. from (42.3%) of the pregnant women who received pregnancy health education, (81.1%) **received it from** physician.

Concerning **planning for current pregnancy**, (17.0%) of   pregnant women not planned for pregnancy. Furthermore, less than half (47.4%) of pregnant women **sleep** more than 8 hours **during the night**. Also, the majority (99.0%) of them did not **sleep during the day**. The table also shows that, less than two thirds (60.0%) of pregnant women sometimes **suffered from insomnia**, followed by less than one third (29.2%) always suffered from insomnia. more than half (55.4%) of the pregnant women sometimes reported stressed from being infected by COVID-19.

Table (3): Distribution of the pregnant women according to their current pregnancy related data:

Current pregnancy related data	Total (N= 400)	
	No.	**%**
Trimester of pregnancy		
First	105	26.3
Second	209	52.2
Third	86	21.5
Occurrence of pregnancy		
Natural	323	80.7
After ovarian stimulation	59	14.8
Invitro fertilization	18	4.5
Type of pregnancy		
Normal	283	70.7
High risk	117	29.3
Intake of medications for pregnancy stabilization		
Yes	310	77.5
No	90	22.5
Gender detected by sonar		
Boys	225	56.3
Girls	151	37.7
Don't know	24	6.0
Number of antenatal visits		
<4 times	159	39.7
>4 times	137	34.3
4 times exactly	104	26.0
Receiving pregnancy health education		
No	231	57.7
Yes	169	42.3
Health education provided by	N= 169	
Physician	137	81.1
Nurse	32	18.9
Planning for current pregnancy	N= 400	
No	68	17.0
Yes	332	83.0
Sleeping hours per night		
<6 hours	29	7.3
-6-	181	45.3
-8 or more	190	47.4
Sleeping per day		
No	396	99.0
Yes	4	1.0
Presence of insomnia during pregnancy		
No	43	10.8
Sometimes	240	60.0
Always	117	29.2
Stress from infected by Covid 19		
No	79	19.8
Sometimes	222	55.4
Always	99	24.8

Table (4): displays the distribution of the women according to levels of depression, anxiety, and stress: it was noticed that 16.0% of them had mild depression and 5.8% of them had severe depression with mean percent score 38.43%. As for level of anxiety, more than one fifth (20.5%) of pregnant women had moderate anxiety and only 6.0% of them had extremely severe anxiety with mean percent score 44.95%. Regarding level of stress, less than one third (31.3%) of them had mild stress and 14.7% of them had moderate stress with mean percent score 63.67%.

Table (4): **Distribution of the women according to levels of depression, anxiety, and stress.**

Levels of depression, anxiety, and stress	Total (N= 400)		Min – Max	Mean ± SD	Mean Percent Score
	No.	%			
Levels of Depression (0 - 28+)					
Absent	259	64.7	0.0-21.0	8.07±5.641	38.43%
Mild	64	16.0			
Moderate	54	13.5			
Severe	23	5.8			
Extremely severe	0	0.0			
Levels of Anxiety (0 - 20+)					
Absent	167	41.7	0.0-21.0	9.44±5.805	44.95%
Mild	56	14.0			
Moderate	82	20.5			
Severe	71	17.8			
Extremely severe	24	6.0			
Levels of Stress (0 - 34+)					
Absent	216	54.0	0.0-21.0	13.37±4.777	63.67%
Mild	125	31.3			
Moderate	59	14.7			
Severe	0	0.0			
Extremely severe	0	0.0			

Table (5) Illustrate the logistic regression model for risk factors of mental health problems among pregnant women: Based on the findings, the model was statistically significant at (p ≤ 0.05), in case of (p > 0.05), they considered also risk factors for mental health problems, but their effects were found similar with each other that means they had low effect on occurrence of mental health problems among pregnant women but cannot be ignored because they can be risk factors if combined with other factors. According to the model, factors was considered as risk factors for mental health problems among pregnant women if beta is negative, while if beta is positive these factors play as a protective factor for mental health. The most factors affecting pregnant women depression were experience of abortion (p=0.001), women's education (p=0.004) and duration of marriage (p=0.47). As for anxiety, the most factors affecting pregnant women anxiety were age of marriage (p=0.015). The table also showed that the most factors affecting pregnant women stress were hours of sleeping per night (p=0.001), previous pregnancy health problems (p=0.002) and post- partum complication (p=0.009) then type of pregnancy (p=0.030).

Table (5) the logistic regression model for risk factors of mental health problems among pregnant women:

Risk factors of mental health problems	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Depression							
Anxiety	.234	.029	.336	7.950	.000	.176	.291
Stress	.288	.052	.227	5.577	.000	.186	.389
Family type	.305	.085	.165	3.597	.000	.138	.472
Age	.158	.050	.150	3.150	.002	.059	.257
Previous family member loss	.178	.063	.082	2.845	.005	.055	.301
Gender of baby	.080	.033	.066	2.421	.016	.015	.145
Experience of abortion	-.279	.084	-.094	-3.336	.001	-.444	-.115
Education	-.078	.027	-.113	-2.887	.004	-.132	-.025
Duration of marriage	-.108	.054	-.081	-1.996	.047	-.214	-.002
Anxiety							
Depression	.653	.082	.454	7.950	.000	.491	.815
Stress	.528	.085	.289	6.179	.000	.360	.696
Perception of previous pregnancy experience	.251	.104	.237	2.421	.016	.047	.455
Age at marriage	-.288	.118	-.108	-2.443	.015	-.520	-.056
Stress							
Anxiety	.186	.030	.339	6.179	.000	.127	.245
Depression	.283	.051	.359	5.577	.000	.183	.383
Age at marriage	.164	.070	.113	2.344	.020	.026	.302
Sleeping hours at night	-.149	.043	-.134	-3.459	.001	-.234	-.064
Health problems associated previous pregnancy.	-.258	.085	-.237	-3.053	.002	-.425	-.092
Post-partum complications	-.237	.090	-.280	-2.615	.009	-.415	-.059
Type of pregnancy	-.208	.095	-.130	-2.184	.030	-.395	-.021

Statistically significant at p ≤ 0.05   if beta is negative=risk factors   if beta is positive=protective factors

Discussion

Women go through a delicate transitional phase of recognising and accepting their own physical and mental changes throughout pregnancy. During this time, the expectant woman is more likely to experience emotional changes, lose their temper more frequently, and be more vulnerable to family conflicts and stress, which can lead to anxiety, depression, or psychological distress. [27]

There are few previous studies conducted in Egypt regarding mental health problems among pregnant women. The current study provided a clear picture of 400 pregnant women and aimed to assess emotional status (depression, anxiety, and stress) of pregnant women in El-Behira governorate, as well as identify the most important risk factors for antenatal mental health problems.

Depression is the most common mental problem that affects women during their perinatal period worldwide. Between 14% and 23% of pregnant women struggled with certain symptoms of depression, according to the American College of Obstetricians and Gynaecologists. [28] In conflict of these results the current study indicated that, the mean percent score of the studied pregnant women's depression was 38.4%. The findings of the present study were closely related to the prevalence of antenatal depression in South Africa, which ranged from 21.5–35.7% as reported by Ayano G et al., (2019),[29] Duko B et al., (2019),[30] Redinger S et al., (2018)[31] and Mossie TB et al., (2017).[32] However, the percentage of the current study is remarkably lower than that reported in study done in Jeddah, Saudi Arabia which reported that more than half of women suffering from depression during pregnancy.[33] This difference may be due to variation in the nature of study setting.

Pregnancy is one of the most sensitive times for women, and there are major physiological changes that take place during this time. Thus, worry is a common emotion among expectant mothers. Conversely, some women experience anxiety to the extent that it interferes with their daily life. Some women experience their first episode of anxiety problems during pregnancy. Anxiety during pregnancy is defined as excessive worry about the pregnancy, labor, health of the infant, and future parenting responsibilities. [34]

The current study found that, the mean percent score of antenatal anxiety among studied pregnant women in El-Beheira governorate was 44.9%. The result of the present study was higher than that reported in a study done by Dennis CL et al., (2017) [35] which included studies from 34 countries and reported that early pregnancy anxiety was 18.2%. The results vary considerably between regions because of the diversity of their economies, cultures and policies. As well, the results of the present study were higher than those reported in a lot of recent studies as Qatar (2020) [36] 26.6%, Saudi Arabia (2018) [20] 23.6%, Kuwait (2018) [37] 15% and Tanzania (2018) [38] 25%. However, the prevalence of pregnancy-related anxiety yielded by the current study was lower than that reported by a study done in India (2019) [39] which indicated that, the prevalence of anxiety among studied pregnant women was (55.7%). This may be due to differences in traditions and cultures between regions.

An even more comprehensive idea of maternal health includes stress during pregnancy. Since it is both directly and indirectly related to pregnancy troubles, it has been targeted as an exceptional condition that needs to be handled regardless of whether it is the result of personal issues, societal issues, or pregnancy issues. Preterm birth, anxiety, depression after giving birth, children's neurodevelopment, and foetal distress are all linked to stress. The result of the current study revealed that the mean percent score of studied pregnant women experiencing stress was 63.6%. This prevalence was lower than reported by a study conducted by Tang X et.al., in China (2019) [22] who indicated that, majority (91.8%) of studied pregnant women had stress. In contrast, it was higher than that reported by studies carried out in southeast Ethiopia (2019) [40] 11.9%, India (2018) [41] 33.3% and Saudi Arabia (2017) [42] 33.4%. The difference might result from a variety of study settings, levels of education and awareness, as well as modifications to the screening tool used in the current study.

Because of diverse social, economic, and physical contexts or other health disorders, pregnant women may be more susceptible to having poor mental health status. Mental health like other aspects of health, can be affected by a range of socioeconomic factors. Among all sociodemographic variables included in the current study, age, age of marriage, education, residence, and type of family were the most significant sociodemographic risk factors for pregnant women's mental health problems. [43]

Of all the variables this study examined, sociodemographic characteristic such as age, education and family type were risk factors of depression among pregnant women. These agreed with the results of studies conducted by Jones

J in USA (2019) [44], Sheeba B et al., (2019) [45] and Shidhaye P et al., (2017) [46]. Among obstetric history, the result of these study revealed that experience of abortion and gender of baby were risk factors of antenatal depression. This result of the current study supported by Seidi A et.al., (2022) [47] and Shidhaye P et al., (2017) [46]. Furthermore, the risk factors of stress which reported by this study were age of marriage, sleeping hours at night, health problems associated previous pregnancy, post-partum complications and type of pregnancy. This result was in agreement with the results of studies done by Dhaliwal S (2021) [48], Míguez M & Vázquez M (2021), [49] Sezgin A (2020) [50], Tsakiridis I (2019) [51] and Prescott J et al., (2018) [52] respectively.

To sum up, mental health of pregnant women was ignored in developing countries. Egypt was no exception, as the current study indicated there was prevalence of depression, anxiety, and stress among studied pregnant women. If pregnant women had received the proper mental health problem assessment and counselling in MCH centres, all of the mental health issues that surfaced among the study's participants may have been avoided or reduced. Therefore, in order to raise pregnant women's education and awareness and make them more aware of the risk factors for mental health problems and the conditions that are less conducive to mental health problems, all efforts must be made by governmental and nongovernmental organisations, community leaders, social workers, MCH health carers, and the general public. [53]

Conclusion

Based on the findings of the current study, it could be concluded that the prevalence of mental health problems was high among studied pregnant women in El-Beheira governorate especially depression, anxiety and stress and strongly associated with their age, duration of marriage, education, residence, crowding index of the house and sleeping hours. In addition, there is a significant relation between pregnant women mental health problems with their type of current pregnancy and obstetric history especially history of abortion, history of last pregnancy and postpartum health problems.

Recommendations

- Strengthening mental health regulations and the requirement for mental health services to be included in prenatal care in order to identify, diagnose, and treat mental health issues during pregnancy.

- Develop chatbots application via mobile or computers to assist in pregnant women care and monitor their mental health by providing precise, individualized advice in real-time, regardless of location.

- **Further future research:**

- Performing qualitative research to investigate the pregnant women's experience of maternal mental illness and stigma.

- Identify the most effective practises that may be used to high-risk pregnant women to reduce psychosocial stress and avoid maternal mental health issues throughout pregnancy.

Limitations of the study

- Difficulty in data collection process due to wave of corona virus pandemic.
- Increased interruption during the interview with the selected pregnant women.

CONFLICTS OF INTEREST

There is no conflict of interest to disclose.

References

1.Powell R, Scarffe E. Rethinking "Disease": a fresh diagnosis and a new philosophical treatment. Journal of Medical Ethics. 2019;45(9):579-88.

2.Rogers A, Obst S, Teague SJ, Rossen L, Spry EA, Macdonald JA, et al. Association between maternal perinatal depression and anxiety and child and adolescent development: a meta-analysis. JAMA pediatrics. 2020;174(11):1082-92.

3.Howard LM, Khalifeh H. Perinatal mental health: a review of progress and challenges. World Psychiatry. 2020;19(3):313-27.

4.Fathalla MM, Badran E, Fawzy M, Ahmed OI. Prevalence and risk factors of depressive symptoms in low-risk pregnancy. Journal of Current Medical Research and Practice. 2020;5(1):91.

5.Arango C, Díaz-Caneja CM, McGorry PD, Rapoport J, Sommer IE, Vorstman JA, et al. Preventive strategies for mental health. The Lancet Psychiatry. 2018;5(7):591-604.

6.Liu CH, Erdei C, Mittal L. Risk factors for depression, anxiety, and PTSD symptoms in perinatal women during the COVID-19 Pandemic. Psychiatry Research. 2021;295:113552.

7.Salehi L, Rahimzadeh M, Molaei E, Zaheri H, Esmaelzadeh-Saeieh S. The relationship among fear and anxiety of COVID-19, pregnancy experience, and mental health disorder in pregnant women: A structural equation model. Brain and behavior. 2020;10(11):e01835.

8.Egypt Family Survey (EFH). 2021.

9.Aryal KK, Alvik A, Thapa N, Mehata S, Roka T, Thapa P, et al. Anxiety and Depression among Pregnant Women and Mothers of Children Under one Year in Sindupalchowk District. Journal of Nepal Health Research Council. 2018;3(16):195-204.

10.Chuma BT, Sagaro GG, Astawesegn FH. Magnitude and predictors of antenatal depression among pregnant women attending antenatal Care in Sodo Town, southern Ethiopia: facility-based Cross-sectional study. Depression Research and Treatment. 2020;2020.

11.Hayashi A, Oguchi H, Kozawa Y, Ban Y, Shinoda J, Suganuma N. Factors associated with symptoms of depression among pregnant women with gestational diabetes mellitus in Japan. Drug Discoveries & Therapeutics. 2020.

12.Coll CdVN, da Silveira MF, Bassani DG, Netsi E, Wehrmeister FC, Barros FC, et al. Antenatal depressive symptoms among pregnant women: Evidence from a Southern Brazilian population-based cohort study. Journal of Affective Disorders. 2017;209:140-6.

13.Martínez-Paredes JF, Jácome-Pérez N. Depression in pregnancy. Revista Colombiana de Psiquiatría. 2019;48(1):58-65.

14.Ponting C, Mahrer NE, Zelcer H, Dunkel Schetter C, Chavira DA. Psychological interventions for depression and anxiety in pregnant Latina and Black women in the United States: A systematic review. Clinical psychology & psychotherapy. 2020;27(2):249-65.

15.Traylor CS, Johnson JD, Kimmel MC, Manuck TA. Effects of psychological stress on adverse pregnancy outcomes and nonpharmacologic approaches for reduction: an expert review. American Journal of Obstetrics & Gynecology MFM. 2020;2(4):100229.

16.Molenaar NM, Kamperman AM, Boyce P, Bergink V. Guidelines on treatment of perinatal depression with antidepressants: An international review. Australian & New Zealand Journal of Psychiatry. 2018;52(4):320-7.

17.Tunçalp Ö, Pena-Rosas JP, Lawrie T, Bucagu M, Oladapo OT, Portela A, et al. WHO recommendations on antenatal care for a positive pregnancy experience-going beyond survival. Bjog. 2017;124(6):860-2.

18.Mattocks KM, Baldor R, Bean-Mayberry B, Cucciare M, Gerber MR, Goldstein KM, et al. Factors impacting perceived access to early prenatal care among pregnant veterans enrolled in the Department of Veterans Affairs. Women's Health Issues. 2019;29(1):56-63.

19.Ahmed Ayed MM, Kamal FEZ, Mahmoud O, Mohamed SM, Mahmoud TM, Ahmed SI. Relation between Antenatal Maternal Depression and Anxiety during Pregnancy and Neonatal Outcomes. Egyptian Journal of Health Care. 2020;11(3):330-49.

20.Alqahtani AH, Al Khedair K, Al-Jeheiman R, Al-Turki HA, Al Qahtani NH. Anxiety and depression during pregnancy in women attending clinics in a University Hospital in Eastern province of Saudi Arabia: prevalence and associated factors. International journal of women's health. 2018;10:101.

21.child/maternal_mental_health ,World Health Organisation (WHO) 2020 http://www.who.int/mental_health/maternal

22.Tang X, Lu Z, Hu D, Zhong X. Influencing factors for prenatal stress, anxiety and depression in early pregnancy among women in Chongqing, China. Journal of affective disorders. 2019;253:292-302.

23.Elrassas H, Taha GR, Soliman AE-DM, Madbole SAEK, Mahmoud DAM. Prevalence and related factors of perinatal depression in Egyptian mothers. Middle East Current Psychiatry. 2022;29(1):35.

24.El Hoda Mostafa Mohamed N, Abdelazem Osman Ali S, Ahmed Mohamed Souilm N, Said Abdelhady Garf F, Abd Elhaleem Ebraheem Elagamy M. Effect of Instructional Guidelines Regarding Minor Discomforts on Reducing Depression, Anxiety, and Stress Level among Primigravida. Egyptian Journal of Health Care. 2021;12(1):1123-35.

25.Lovibond SH. Manual for the depression anxiety stress scales. Sydney psychology foundation. 1995.

26.Moussa MT, Lovibond P, Laube R, Megahead HA. Psychometric properties of an arabic version of the depression anxiety stress scales (DASS). Research on social work practice. 2017;27(3):375-86.

27. Thiele GA, Ryan DM, Oberlander TF, Hanley GE. Preconception mental health and the relationship between antenatal depression or anxiety and gestational diabetes mellitus: a population-based cohort study. BMC Pregnancy and Childbirth. 2022;22(1):1-11.

28. Priya A, Chaturvedi S, Bhasin SK, Bhatia MS, Radhakrishnan G. Depression, anxiety and stress among pregnant women: A community-based study. Indian journal of psychiatry. 2018;60(1):151.

29. Ayano G, Tesfaw G, Shumet S. Prevalence and determinants of antenatal depression in Ethiopia: a systematic review and meta-analysis. PloS one. 2019;14(2):e0211764.

30. Duko B, Ayano G, Bedaso A. Depression among pregnant women and associated factors in Hawassa city, Ethiopia: an institution-based cross-sectional study. Reproductive health. 2019;16(1):1-6.

31. Redinger S, Norris S, Pearson R, Richter L, Rochat T. First trimester antenatal depression and anxiety: prevalence and associated factors in an urban population in Soweto, South Africa. Journal of developmental origins of health and disease. 2018;9(1):30-40.

32. Mossie TB, Sibhatu AK, Dargie A, Ayele AD. Prevalence of antenatal depressive symptoms and associated factors among pregnant women in Maichew, North Ethiopia: an institution based study. Ethiopian journal of health sciences. 2017;27(1):59-66.

33. Bawahab JA, Alahmadi JR, Ibrahim AM. Prevalence and determinants of antenatal depression among women attending primary health care centers in Western Saudi Arabia. Saudi Medical Journal. 2017;38(12):1237.

34. Parang L, Vakili V, Aliabadi MM. Impact of Maternal Psychosomatic Empowerment during Pregnancy on the Improvement of Mental Health and Maternal and Fetal Outcomes: a Pilot Study. Patient Education and Counseling. 2023:107625.

35. Dennis C-L, Falah-Hassani K, Shiri R. Prevalence of antenatal and postnatal anxiety: systematic review and meta-analysis. The British Journal of Psychiatry. 2017;210(5):315-23.

36. Naja S, Al Kubaisi N, Singh R, Bougmiza I. Generalized and pregnancy-related anxiety prevalence and predictors among pregnant women attending primary health care in Qatar, 2018–2019. Heliyon. 2020;6(10):e05264.

37. Pampaka D, Papatheodorou SI, AlSeaidan M, Al Wotayan R, Wright RJ, Buring JE, et al. Depressive symptoms and comorbid problems in pregnancy-results from a population based study. Journal of Psychosomatic Research. 2018;112:53-8.

38. Wall V, Premji SS, Letourneau N, McCaffrey G, Nyanza EC. Factors associated with pregnancy-related anxiety in Tanzanian women: a cross sectional study. BMJ open. 2018;8(6):e020056.

39. Nath A, Venkatesh S, Balan S, Metgud CS, Krishna M, Murthy GVS. The prevalence and determinants of pregnancy-related anxiety amongst pregnant women at less than 24 weeks of pregnancy in Bangalore, Southern India. International journal of women's health. 2019;11:241.

40. Engidaw NA, Mekonnen AG, Amogne FK. Perceived stress and its associated factors among pregnant women in Bale zone Hospitals, Southeast Ethiopia: a cross-sectional study. BMC research notes. 2019;12(1):1-6.

41. Pais M, Pai MV. Stress among pregnant women: a systematic review. J Clin Diagn Res. 2018;12(5):1-4.

42. Ahmed AE, Albalawi AN, Alshehri AA, AlBlaihed RM, Alsalamah MA. Stress and its predictors in pregnant women: a study in Saudi Arabia. Psychology Research and Behavior Management. 2017;10:97.

43. Andhavarapu M, Orwa J, Temmerman M, Musana JW. Maternal sociodemographic factors and antenatal stress. International journal of environmental research and public health. 2021;18(13):6812.

44. Jones SJ. Epidemiology of Self-reported Maternal Depression During Pregnancy and Association with Adverse Birth Outcomes in New York State, 2012-2017: University at Albany. Department of Epidemiology and Biostatistics; 2019.

45. Sheeba B, Nath A, Metgud CS, Krishna M, Venkatesh S, Vindhya J, et al. Prenatal depression and its associated risk factors among pregnant women in Bangalore: a hospital based prevalence study. Frontiers in Public Health. 2019;7:108.

46. Shidhaye P, Shidhaye R, Phalke V. Association of gender disadvantage factors and gender preference with antenatal depression in women: a cross-sectional study from rural Maharashtra. Social psychiatry and psychiatric epidemiology. 2017;52(6):737-48.

47. Seidi PA, Abas NQ, Jaff D, Dunstan R, Soltan L, Brumwell A, et al. Assessment of Perinatal Depression Risk among internally displaced Yazidi Women in Iraq: a descriptive cross-sectional study. BMC pregnancy and childbirth. 2022;22(1):1-8.

48. Dhaliwal SS. The Role of Sleep Disturbance in the Onset of Perinatal Depression: The George Washington University; 2021.

49. Míguez MC, Vázquez MB. Risk factors for antenatal depression: A review. World Journal of Psychiatry. 2021;11(7):325.

50. Sezgin AU, Punamäki R-L. Impacts of early marriage and adolescent pregnancy on mental and somatic health: the role of partner violence. Archives of women's mental health. 2020;23(2):155-66.

51. Tsakiridis I, Bousi V, Dagklis T, Sardeli C, Nikolopoulou V, Papazisis G. Epidemiology of antenatal depression among women with high-risk pregnancies due to obstetric complications: a scoping review. Archives of gynecology and obstetrics. 2019;300:849-59.

52. Prescott J, Mackie L, Rathbone AL. Predictors of health anxiety during pregnancy. Mhealth. 2018;4.

53. Priyadarshini U, Rao AP, Dash S. Recommendations for maternal mental health policy in India. Journal of Public Health Policy. 2023:1-12.