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Review Article

Systematic Review of Prevalence of Antepartum Depression during the Trimesters of Pregnancy

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Abstract

BACKGROUND: Depression is prevalent during antenatal and postnatal stages of pregnancy. The effect of depression can be seen in complications during and after pregnancy, fetal growth retardation, abortions and preterm births. The literature abounds on postpartum depression (PD) while few studies are on antepartum depression (AD).

AIM: The systematic review aims to compute the prevalence of AD from published articles.

MATERIAL AND METHODS: The published articles (26) used in this review were obtained from the search of the search keywords "Depressive conditions in pregnancy AND trimesters". All the articles were considered irrespective of language and their citation status as of the time of the query. Only articles that presented the prevalence mean and sample size were included. Articles on questionnaires filled by nonpregnant women and men were excluded. Articles that presented the prevalence of depression for the postpartum period only were excluded but were included if they addressed depression at both postpartum and trimester(s) of pregnancy. P-value of less than or equal to 0.05 was considered significant.

RESULTS: Analysis of the 26 articles showed that 4,303 subjects tested positive for depression in a sample of 28,248 pregnant mothers, giving the prevalence rate as 15%. Confounding was removed, and the sample size was adjusted to be 25,771 and 4,223 were screened to have depressive symptoms, thereby giving a new prevalence rate as 16.4%. It was also revealed that AD is most prevalent in the last trimester of pregnancy and least in the second trimester. Pregnancy duration and PD are not correlated with AD. This implies that AD can be observed in any period of the pregnancy and cannot predict the incidence of PD.

CONCLUSION: Efforts must be intensified to monitor pregnant women during the third trimester to reduce the incidence of maternal depression during pregnancy, thereby reducing the prevalence.

Introduction

The onset of pregnancy can temporarily alter the hormonal balance in women which predispose them to a different form of affective disorders such as depression [1]. Depression is one of the medical and psychological conditions in pregnancy [2]. Maternal depression is often considered to be a predictor of increased incidence of preterm births, miscarriages, retarded fetal growth which can manifest as low birthweight and so on. Depression can occur in the first, second and third trimesters of pregnancy and can be measured using different scientific instruments. Furthermore, antidepressant medications [2] and psychotherapeutic interventions [3] are the available treatments for depressive disorders in pre-natal and post-natal stages of pregnancy. However, it has been found that the use of antidepressant is linked to cardiac malfunctions [4] and affects treatment response especially in the cases of severe depression [5].

It appears that most available research done on depression is focused on postpartum depression

which is prevalent among pregnant women [6], [7]. This review is to present evidence of the prevalence of depression during trimesters of pregnancy and its implications to healthcare management, although, the second trimester is the period of intense depression which also is subject of debate [8].

Depression occurs in varying degrees for a different form of child delivery such as vaginal delivery, Cesarean Section Delivery and assisted vaginal delivery [9]. Some psychiatric, physiological and socioeconomic variables have been attributed as risk factors or predictors of antepartum depression. They are listed as: sleep deprivation [10], [11], sexual function during pregnancy [12], weak social structure [13], lack of support from family and loved ones [14], obesity [15], trauma, anxiety and violence [16] and unplanned pregnancies [17]. Summary of some factors associated with the prevalence of depressive symptoms in pregnant women is given in Table 1.

Table 1: Major Factors Associated with Antepartum Depression

Authors		Authors	
[18]	Socioeconomic problems such as financial problems, lack of family support and inadequate housing contribute to depressive disorders.	[31]	Prevalence of antepartum depression in Eastern Europe.
[19]	Negative psychosocial factors contribute to depression.	[32]	The link between cognitive behaviour and depression during pregnancy.
[20]	Psychological factors observed during pregnancy can predict postpartum depression.	[33]	Depression is associated with the economic status of pregnant women.
[21]	Depression is associated with poverty.	[34]	Immigrant pregnant women are at high risk of depressive disorders.
[22]	Antenatal/ antepartum depression and anxiety are prevalent in pregnant women.	[35]	Prevalence of anxiety and depression in the antepartum stage of pregnancy.
[23]	Antepartum depression is prevalent among Latinas in the U.S. and Mexico.	[36]	Pathophysiology of depression
[24]	Unintended or unplanned pregnancy is associated with depression.	[37]	Gestational diabetes is positively correlated with depression.
[25]	Psychiatric disorders are associated with depression.	[38]	Depression is associated with the previous history of nausea, abortions and poor housing conditions.
[26]	Lower socioeconomic status is associated with depression.	[39]	Lack of social support in the workplace is associated with depression.
[27]	Antepartum depression is a predictor of perceived disability in women.	[40]	Co-morbidity of antepartum depression with other mental illness were studied.
[28]	The reliability of the self-reported version of the Inventory of Depressive Symptomatology (IDS-SR), as a tool for measuring depression, was investigated.	[41]	Smoking cessation is associated with antepartum depression.
[29]	The prevalence of depressive symptoms in teenage pregnancies was investigated.	[42]	Some psychosocial risks associated with depression were stated.
[30]	Supplementary selenium intake is associated with depression.	[43]	Prevalence of antepartum and postpartum depression in Portuguese women.

Material and Methods

Data Collection

A search of the articles was done on the Scopus database using the search keywords; “Depressive conditions in pregnancy AND trimesters”. Four hundred and seventy (470) articles were initially obtained from the keyword “Depressive conditions in pregnancy”, and the search results were narrowed down to one hundred and thirteen (113) articles using the keyword “trimesters”. All the articles were considered irrespective of language and their citation status as of the time of query which is 14th February 2019.

Inclusion and Exclusion Criteria

Only articles that presented the prevalence mean and sample size were included. Articles on questionnaires filled by nonpregnant women and men were excluded. Articles that presented prevalence of depression for postpartum period only were excluded but are included if they addressed depression at both postpartum and trimester(s) of pregnancy. A total of twenty-six (26) articles [18], [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [31], [32], [33], [34], [35], [36], [37], [38], [39], [40], [41], [42], [43] were selected and included in the review. The main findings are presented in Table 1.

Survey of the Data Collection Instruments

Scaled questionnaires are the widely form of data collection for investigating both antepartum and postpartum depression. The questionnaires are designed to identify depressive symptoms which are assessed using the final score. The questionnaires are of different variants and are designed to achieve the aim of a screening tool for depression. Prominent among them is the Edinburgh Postnatal Depressive Scale (EPDS). The list of all the sixteen (16) tools used in the 26 articles for data collection is presented in Table 2.

Table 2: Data Collection Tools Used in the Screening of depression in Pregnant Women

Instrument	Acronym		Acronym
Beck Depression Inventory	BDI	Center for Epidemiological Studies Depression Scale	CES-D
Beck Depression Inventory II	BDI-II	Alcohol Use Disorder and Associated Disabilities Interview Schedule - DSM-IV version.	AUDADIS
Questionnaire	Q	Patient Health Questionnaire depression module	PHQ-9
The anticipation of Childbirth Questionnaire	ACQ	General Anxiety Scale	GAD-7
Edinburgh Depression Scale	EDS	Inventory of Depressive Symptomatology	IDS-SR
Edinburgh Postnatal Depression Scale	EPDS	International Neuropsychiatric Interview	INI
Schedule for Clinical Assessment in Neuro-psychiatry	SCAN	National Institute of Child Health and Human Development Fetal Growth Studies-Singleton cohort (2009–2013),	NICH
Hospital Anxiety and Depression Scale	HADS	Postpartum Depression Predictors Inventory-Revised	PDPI-R

Statistical Analysis

The prevalence of antepartum depression was presented using exploratory and inferential statistics. Correlation, regression and logistic regression were applied to obtain the result. Similar

applications of the tools can be found in [44], [45], [46], [47], [48], [49], [50].

Results

The data obtained from the 26 articles are presented in Table 3. The data is the summary of the trimesters, postpartum considered, the instrument used in data collection (questionnaire types), sample sizes, varying mean prevalence and the subjects observed to be depressed (assessed using the questionnaires). The trimester can be first, second or third or the depression may be observed throughout the antenatal period. Postpartum depression may be studied alongside antepartum depression. Often, the later is used to predict the former.

Table 3: The Summary of the Data Collected from the 26 Articles

Author	Trimester	Postpartum	Data Inst	Sample size	Prevalence	+ve depression
[18]	3	No	BDI	98	47%	46
[18]	3	No	BDI	46	20%	9
[19]	All	No	Q	396	41%	162
[20]	2	Yes	ACQ & EPDS	197	12.4%	24
[21]	3	Yes	SCAN	791	20.2%	160
[22]	All	Yes	HADS	357	54%	193
[23]	All	No	CES-D	108	32.4%	35
[23]	All	No	CES-D	117	36.8%	43
[24]	All	Yes	BDI-II	215	10.2%	22
[25]	All	Yes	AUDADIS	14549	12.4%	1804
[26]	3	Yes	EPDS	600	24.3%	146
[27]	3	Yes	PHQ-9 & GAD-7	1030	29%	299
[28]	3	NO	IDS-SR	543	11%	60
[29]	All	NO	INI	828	17.8%	147
[30]	All	Yes	EPDS	475	12%	57
[31]	All	No	BDI	503	19.9%	100
[32]	All	Yes	EPDS	74	28.4%	21
[33]	2	No	EPDS	74	86.5%	64
[34]	3	No	EPDS	228	37%	84
[35]	3	No	CES-D	207	73.5%	152
[36]	1	Yes	PHQ-9	944	27.6%	260
[37]	1	Yes	NICH	2477	3.78%	94
[37]	2	Yes	NICH	2477	3.23%	80
[38]	3	Yes	PHQ-9	225	31.1%	70
[39]	3	No	EPDS	153	13.7%	21
[40]	All	Yes	EDS	99	13%	13
[41]	All	Yes	BDI	253	41.5%	105
[42]	All	Yes	EPDS	44	22.3%	10
[43]	2	Yes	PDPI-R	140	15.4%	22

Estimation of Prevalence of Antepartum Depression

The prevalence of depression is computed using the data in Table 3. The prevalence in percentage is the ratio of the numbers of those screened to be depressed using the various questionnaires to the total number of subjects available for the respective researches. The prevalence of antepartum depression is:

$$\%\ \text{Prevalence} = \frac{4303}{28248} = 0.1523 \times 100 = 15\%$$

Out of 28,248 pregnant women screened for depression, 4303 were diagnosed to have depression.

The result is further refined to remove confounding contributed by [37]. The new prevalence of antepartum depression is:

$$\%\ \text{Prevalence} = \frac{4223}{25771} = 0.1639 \times 100 = 16.4\%$$

Generally, out of 25,771 pregnant women screened for depressive symptoms, 4223 (16.4%) were found to be positive for depression.

Distribution of Antepartum Prevalence across the Trimesters

The prevalence of antepartum depression was computed to determine how depression is observed in the 3 trimesters and when it is observed throughout the gestation period.

Table 4: Distribution of Antepartum Depression across the Pregnancy Trimesters

Number of articles	Trimester	Sample size	+ve depression	% prevalence
2	1	3421	354	10.35
4	2	2888	190	6.58
10	3	3921	1047	26.70
13	All	18018	2712	15.05

It can be seen from Table 4, that AD is most prevalent in the last trimester of pregnancy and least in the second trimester. The prevalent throughout the gestation is quite close to the mean prevalent obtained without confounding. Confounding is not an issue here because the authors considered more than a trimester. This increased the number of articles to 29 as shown in Table 4.

Ante-Postpartum Depression

The prevalence is obtained when postpartum depression is studied along with the antepartum. It is always important to show if the antepartum depression is a predictor of postpartum depression. This is presented in Table 5.

Table 5: Antepartum and Postpartum Depress across the trimesters

Trimester	Postpartum	Sample size	+ve depression
1	No	0	0
1	Yes	3421	354
2	No	74	64
2	Yes	2617	102
3	No	1177	326
3	Yes	2646	675
All	No	1952	487
All	Yes	16066	2225

The prevalence for each case was not computed because of the small sample sizes. However, it can be seen from Table 5 that antepartum depression is usually studied with postpartum depression.

Distribution of Prevalence as Measured with Various Data Instruments

Sixteen (16) different questionnaires were used as an instrument of data collection by the articles. The instruments were divided into three (EDPS, BDI and others) and their corresponding AD prevalence was obtained. The frequencies of the use of EDPS, BDI and other questionnaires in the 26 articles are 8, 5 and 16 respectively, assuming that confounding remains constant. This is shown in Table 6, and it can be seen that the use of other data instruments shown in Table 2 presents lower AD prevalence (14.2%) than the duo of EDPS (23.8%) and BDI (25.3%).

Table 6: Prevalence, as Measured with Various Data Instruments, Grouped into Three

Data instrument	N	Sample size	+ve depression	% prevalence
EDPS	8	1747	416	23.8
BDI	5	1115	282	25.3
OTHERS	16	25386	3605	14.2

Correlation between Pregnancy Duration and the Antepartum Depression

The correlation between the pregnancy duration (trimesters) and AD was obtained using three (3) correlation coefficients. The result is presented in Table 7, where it is observed that there is no correlation between pregnancy duration and antepartum depression at 0.05 level of significance.

Table 7: Correlation coefficient for the Relationship between Pregnancy Duration and AD

Correlation Coefficient	Value	P value
Pearson (Product moment)	0.126	0.515
Spearman's rank	-0.065	0.739
Kendall's tau	-0.054	0.715

Correlation between Data Instrument and the Antepartum Depression

The correlation between the data collection instrument used in the articles and AD was obtained using three (3) correlation coefficients, and the result is presented in Table 8. It is observed that there is a significant intermediate positive correlation between data collection instrument and antepartum depression at 0.05 level of significance. However, Pearson correlation showed a weak positive correlation and no association.

Table 8: Correlation coefficient for the Relationship between Data Instrument and AD

Correlation Coefficient	Value	P value
Pearson (Product moment)	0.248	0.195
Spearman's rank	0.492	0.007
Kendall's tau	0.389	0.010

Correlation between Postpartum and the Antepartum Depression

There was no correlation at 0.05 level of significance between the Postpartum and AD. This is presented in Table 9 where it can be seen that the near-zero value of the three (3) correlation coefficients connotes no association.

Table 9: Correlation coefficient for the Relationship between PD and AD

Correlation Coefficient	Value	P value
Pearson (Product moment)	0.187	0.332
Spearman's rank	0.096	0.619
Kendall's tau	0.080	0.611

Discussion

The review has systematically identified 26 articles that investigated the prevalence of antepartum depression. Nonpregnant women were excluded. Furthermore, sixteen [16] data collection tools used in the screening of depression in pregnant mothers were identified. These are variants of questionnaires constructed to detect depressive symptoms in pregnant women.

Analysis of the 26 articles showed that 4,303 subjects tested positive for depression in a sample of 28,248 pregnant mothers, giving the prevalence rate as 15%. Confounding was removed, and the sample size was adjusted to be 25,771 and 4,223 were screened to have depressive symptoms, thereby giving a new prevalence rate as 16.4%. The prevalent rate is higher than 10% obtained by [2].

It was also revealed that AD is most prevalent in the last trimester of pregnancy and least in the second trimester. The prevalent throughout the gestation is quite close to the mean prevalent obtained without confounding. This may be connected with the advanced hormonal changes in the perinatal stages and anxiety over the delivery process, psychosocial, socioeconomic and psychological variables. Efforts must be intensified to monitor pregnant women at the third semester to reduce the trio of depression, anxiety and suicide ideation. Moreover, the intervention which can come in a different form can prove decisive in ensuring unhindered fetal development and prevention of postpartum depression.

Pregnancy duration is not correlated with antepartum depression at 0.05 level of significance. This implies that a pattern that showed how the two variables are related cannot be obtained. Technically, AD can occur at any trimesters or throughout the pregnancy. Depression can occur at any duration of pregnancy based on the unfortunate combinations of some psychosocial, socioeconomic and psychological factors.

Finally, the presence of AD is not correlated with PD, which means that depression can occur at any trimesters of pregnancy and also in the postpartum period. The prevalence is not domiciled in

any period but can manifest in the three (3) trimesters, throughout the antepartum and postpartum periods.

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