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Depression During Pregnancy: Review of Epidemiological and Clinical Aspects in Developed and Developing Countries

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1. Introduction

Contrary to general belief, gestation is not always characterized by joy and accomplishments. Many women experience sadness or anxiety in these periods of their lives. Gestation and postpartum (puerperium) are periods of woman's life which involve many physical, hormonal, psychic and social insertion changes which can have a direct effect on her mental health (Camacho et al., 2006). The changes caused by the newborn arrival are not limited to psychological and biochemical variables but also involve socioeconomic factors, especially in societies in which women are active in the labor market, contributing to the family income, and pursuing diverse professional and social interests (Maldonado, 1997).

The scientific literature indicates that in the gestational-postpartum period is the phase with the highest prevalence of mental disorders of women's life, particularly in the first and third quarters of gestation and during the first 30 days of postpartum (Botega & Dias, 2006). The intensity of these mental health alterations depend and are regulated by interaction of multiple factors, including organic, family, marital, social, cultural aspects and the pregnant woman's personality (Falcone et al., 2005). Approximately one fifth of pregnant women and women in puerperium present symptoms of depression (Limlomwongse & Liabsuetrakul, 2006). Most of these women are not diagnosed neither adequately treated (Andersson et al, 2003).

Depression is the most prevalent mental disorder during pregnancy and the puerperium period (Bennett et al., 2004) and is associated with risk factors such as a psychiatric history, financial hardships, low education level, teenage pregnancy, lack of social support, stressful events and a history of domestic violence. There is evidence that pre-natal depression is not only more common, but it constitutes the main risk factor for postpartum depression. Indeed, in many cases it is the continuation of the depression that started during pregnancy (Alami et al., 2006; Andersson et al., 2006; Da Costa et al., 2000; Heron et al., 2004; Josefsson et al., 2001; Lovisi et al., 2005; Patel et al., 2003; Rich-Edwards et al., 2006; Ryan et al., 2005).

Current studies suggest that gestational depression needs to be addressed in a more consistent manner. Although there is a consensus that the factors that affect the relationship

between mother and fetus begin in the prenatal period, there has been little research addressing this issue. Most studies focus on postpartum depression. Gestational depression needs to be considered as an important public health issue since it constitutes a strong risk factor that may lead to postpartum depression. Within this context, there is need to implement preventive interventions prior to childbirth. Some studies suggest that gestational depression is related to low birth weight, premature births and other problems in the development of the child (Patel & Prince, 2006; Rahman et al., 2004).

The belief that the pregnant woman's feelings may affect the baby's health is very old but only recently it has aroused scientific interest (Allister et al., 2001; Andersson et al., 2004; Chung et al., 2001; Dayan et al., 2006; Diego et al., 2004; Hoffman & Hatch, 2000; Patel & Prince, 2006; Patel et al., 2004; Rahman et al., 2002; Rahman et al., 2004). It is known that the mother's nutritional, hormonal, metabolic, psychological and social environment during gestation is related to the newborn's health. A woman suffering from gestational depression can be less concerned with her health in general. This can lead her to not follow through with prenatal care, to abuse alcohol, tobacco and other drugs, suffer from insomnia and diminished appetite, which results in a decrease in the quantity and quality of her nutrition. Furthermore, the literature indicates that there is also a relationship between maternal psycho-social stress and low fetal growth. Women with depression have higher cortisol rates which may lead to prematurity and low birth weight (Hobel et al., 1999; Wadhwa et al., 1996).

In developing countries, premature birth and low birth weight are the main causes of infant morbimortality. Studies suggest that depressive states that are not treated during pregnancy tend to decrease the frequency of prenatal consultations, which has been closely associated with neonatal mortality (Carvalho et al., 2007). Studies carried out in developed countries indicate that maternal depression is linked to long term emotional, cognitive and behavioral problems in children (Huot et al., 2004; Motta et al., 2005; Newport et al., 2002). In addition, the prevalence rates of depression during pregnancy have been significantly higher in developing countries than developed ones (Patel & Kleinman, 2003).

Within this context, the main objective of this chapter is to present a systematic review of epidemiological studies that investigated the prevalence and risks factors associated with depression during pregnancy in developing and developed countries.

2. Systematic review of epidemiological studies on the prevalence and factors associated with gestational depression

We carried out a literature review of epidemiological research on the prevalence of gestational depression or depression symptoms and their associated risk factors, including longitudinal research that estimated this prevalence before and after birth, in developed and low income countries.

2.1 Methods

The following bibliographical databases were consulted: PubMed/MEDLINE, ISIWEB, Scopus, LILACS, SciELO, with the last two databases used primarily to retrieve Latin American publications. The criteria for inclusion were: published articles in the last 10 years (from 2000 to April 2011) in English, Spanish or Portuguese with an observational epidemiological study design (cross-sectional, case-control, and cohort).

In searching the databases LILACS and SciELO used the following descriptors, according to their definition in DeCS (Health Descriptors): "depression" or "depressive disorder" or "mood

disorders" and "pregnancy" and "prevalence" and "risk factors". In searching the databases PubMed/MEDLINE, ISIWEB and Scopus, we used keywords defined according to their description in MeSH (Medical Subject Headings): "depression" or "depressive disorder" or "unipolar depression" or "mood disorders" and "pregnancy" and "prevalence" and "risk factors". Different keywords were used in each database according to the definition that each database proposed in the descriptors. With this process, it was possible to find a greater number of articles related to the topic of interest in each database. Also, we also reviewed the bibliographical references of the principal articles found and specialized books on the subject. The articles were evaluated and chosen according to methodological criteria proposed by Downs & Black (Downs & Black, 1998), applicable for the delineation of articles for the evaluation of their quality. These criteria evaluate the quality of information, the internal validity (bias and confounding), external validity and the ability of the study to detect a significant effect. The present article used the original version made up of 27 items, only excluding the item associated with experimental studies. Hence, in the end, 17 items were used for the cohort and case control studies, adding up to a maximum 18 points. Of these, 13 items referred to cross-sectional studies and represented at the most 14 points. These criteria were used by authors in national review articles (Araujo et al., 2010; Rossi & Vasconcelos, 2010).

The analysis of the methodological quality of the articles took the following items into consideration: clearly described hypotheses or objectives; an endpoint that was clearly described in the introduction or methodology; characteristics of the participants; distribution of main confounding variables; main results clearly described; information on estimates of the random variability of data; characteristics of losses; information on probability values of outcomes; representativeness of individuals included in the study; clear information on results that were not based on hypotheses established *a priori*; information on adjustments of the analysis for different follow-up durations in cohort studies; same amount of time allowed between intervention and the endpoint for cases and controls in case-control studies; adequacy of statistical tests; accuracy of the measures used for the main outcomes; recruitment of participants in different groups from the same population and in the same period of time; adequate inclusion of confounding factors in the analysis; and consideration of participant drop out during follow-up.

The study only included articles that obtained at least 50% of the maximum score on the Downs & Black scale (Downs & Black, 1998) - that is 9 points for cohort and case-control studies and 7 points for cross-sectional studies. Selected articles were compared on the following methodological aspects: year of publication, study location (developed or developing countries), study design, sample size, instruments used for assessment of depression, prevalence of depression during pregnancy, related factors (epidemiological and clinical aspects) and methodological assessment score (Downs & Black Scale).

2.2 Results and discussion

A total of 543 studies were identified in the database searches. However, only 51 articles met the pre-established criteria and were selected for inclusion in this comparison (Figure 1). Excluded studies were literature review and qualitative research reports and studies that had been repeated in different databases or because they were not associated with the subject. Thirty-seven studies were excluded for obtaining a score below the 50% of the maximum score on the Downs and Black methodological evaluation scale.

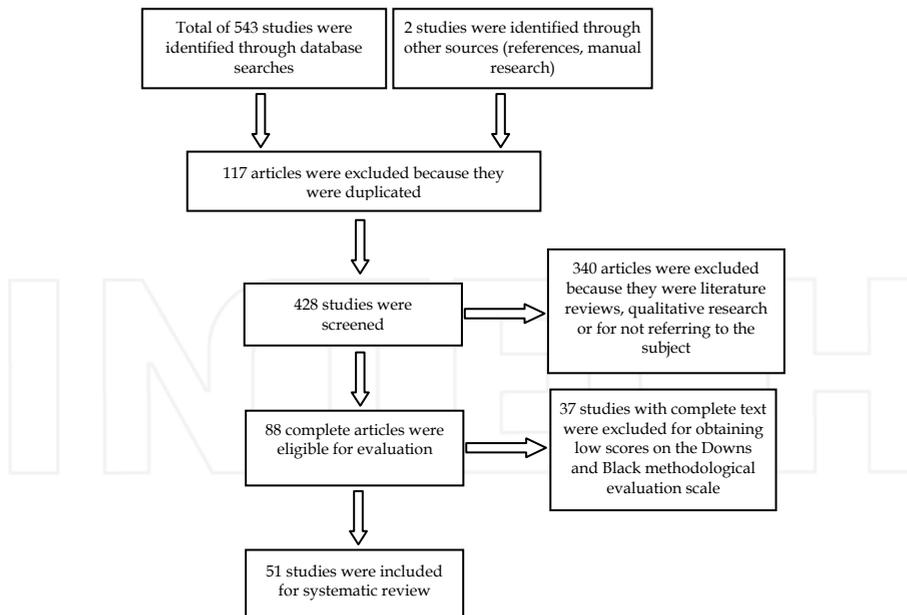


Fig. 1. Flowchart of inclusion and exclusion of original articles in the systematic review

The selected studies were divided into two categories: studies in developed countries (Chart 1) and studies in developing countries (Chart 2). This division was made with the purpose of observing possible variations in the prevalence of gestational depression and associated factors, since an unfavorable economic situation seems to be an important risk factor in the development of minor mental disorders such as depression, including depression during pregnancy (Patel & Kleinman, 2003). Together with the main methods and instruments used in collecting the comparison data in this study, this procedure allowed for the analysis of variations in depression frequency rates and associated factors reported in studies carried out in developed countries when compared to those carried out in developing countries.

2.2.1 Studies on the prevalence of gestational depression in developed countries

The prevalence of gestational depression reported in studies included in this review, originating in developed countries, showed a broad variation- oscillating from 5% to 30%. Few studies found prevalence rates above 20%. Prevalence rates were more frequently reported in the 10% to 15% range. Among the risk factors elucidated by these studies were psychiatric histories, use of substances, negative attitude towards pregnancy, lack of social support, presence of stressful events and marital conflicts (Chart 1). These factors were assessed through standardized questionnaires, including questions developed raised by the authors, and scales such as Stressful Life Event Scale (Holmes & Rahe, 1967), Intimate Bond Measure (Wilhelm & Parker, 1988), Parental Bonding Instrument (Parker et al., 1979), Index of Marital Satisfaction – IMS (Hudson, 1982), Social Desirability Scale (Crowne & Marlowe, 1960), Medical Outcome Studies Social Support Survey – SSS (Sherbourne & Stewart, 1991), Social Support Questionnaire – SSQ (Sarason et al., 1983) and TWEAK – Tolerance Worry

Eye-opener Annoyed Cut-down (Russell, 1994) - this latter scale being measures problematic alcohol use and risk of alcohol drinking during pregnancy.

Among the instruments used to evaluate gestational depression, more than half of these investigations used the Edinburgh Postnatal Depression Scale- EPDS (Cox et al., 1987), a self-administered questionnaire that evaluates the intensity of postpartum depression symptoms - which has also been validated to measure depression during pregnancy (Ortega et al., 2001; Murray & Cox, 1990). Standardized diagnostic interviews used included the Clinical Interview Schedule - CIS-R (Lewis et al., 1992), the Mini International Neuropsychiatric Interview - MINI (Sheehan et al., 1997), the Structure Clinical Interview - SCID (First et al., 1994) and the Composite International Diagnostic Interview - CIDI, based on DSM-III-R and DSM-IV diagnostic criteria (APA, 1987, 1994). Others administered instruments were The Primary Care Evaluation of Mental Disorders - PRIME-MD (Spitzer et al., 1994) and the Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff, 1977). This latter was developed by the National Institute of Mental Health to assess depression symptoms using self-administered questionnaires. Another utilized instrument was the Beck Depression Inventory - BDI (Beck et al., 1998), which is also a self-administered questionnaire and measures the severity of depression symptoms.

Most of these studies had a longitudinal design. The majority of them were carried out in the USA and in European countries like England, Switzerland, Italy and Spain. There was a considerable variation in the size of the samples included in these investigations. However, many studies reported on samples that were relatively large, over 1000 women. Only one study used a sample below 100 women. Prenatal services and maternities were the most frequently selected research sites. A few studies were carried out at the participants' homes, usually using self-administered questionnaires sent by correspondence. The average score obtained on the Downs & Black scale by these studies was 14 points but four of them obtained the scale's maximum score.

2.2.2 Studies on the prevalence of gestational depression in developing countries

Most gestational depression prevalence rates found in studies in developing countries were around 20%. Among the risk factors elucidated by these studies, most were associated with poverty such as low income, unemployment, financial hardships and poor educational backgrounds. Other reported factors associated with gestational depression were being single or divorced, having violence and psychiatry histories, stressful events and lack of social support (Chart 2). In order to evaluate these factors, most studies used structured questions and questionnaires developed by the authors. However, some scales were used such as the Krause-Markides Index (Krause & Markides, 1990) to evaluate social support received and the Paykel Life Events (Paykel, 1983) to assess stressful events during pregnancy and the puerperium period.

For the assessment of depression, half of these investigations used the Edinburgh Postnatal Depression Scale - EPDS (Cox et al., 1987). Some of these studies used standardized interviews to corroborate positive cases detected by this scale. This included the use the Mini International Neuropsychiatry Interview - MINI (Sheehan et al., 1997) that aims at reaching a diagnosis of Axis I mental disorder according to DSM-IV (APA, 1994) criteria. The Brazilian studies mainly used the Composite International Diagnostic Interview - CIDI (Wittchen et al., 1991), a standardized WHO instrument, and to a lesser extend the used

other scales such as the Beck Depression Inventory (Beck et al., 1998), the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) and the Primary Care Evaluation of Mental Disorders - PRIME-MD (Spitzer et al., 1994).

The majority of these investigations were carried out in Brazil and the rest in other low income countries such as Turkey, India, Nigeria and Mexico. Research with a cross-sectional design was more common among these studies in developing countries, particularly in the case of Brazilian studies. The sample size of these studies was mostly in the range of 100 to 500 women. There were only a few investigations with samples over 1000 women. Prenatal services and maternities were the predominant research sites and no study was carried out in residence of participants. The average score obtained through these studies on the Downs & Black scale was 12 points and few were close to the maximum score of the scale.

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Instruments	Prevalence	Risk Factors	Evaluation Score
Marcus et al	United States, 2011	Longitudinal	154	Hospital / Maternity	EPDS ¹ ; GHQ ² ; SCID (DSM IV) ³ ; BDI ⁴	8.0%	Development of the infant limbic- hypothalamic -pituitary axis (LHPA)	12
Wojcicki et al	United States, 2011	Longitudinal	201	Hospital / Maternity	EPDS; CES-D; MINI ⁵	28.9%	Reduced weight gain in the first two years of life and greater risk for failure to thrive	12
Banti et al	Italy, 2010	Longitudinal	1066	Pre-natal service	EPDS; GHQ; SCID (DSM IV); BDI	12.4%	Not mentioned	14
Dhillon & MacArthur	England, 2010	Sectional	300	Pre-natal service	EPDS	30.7%	Unplanned pregnancy; history of anxiety and depression	12

¹ Edinburgh Postpartum Depression Scale

² General Health Questionnaire

³ Structural Clinical Interview for DSM IV

⁴ Beck Depression Inventory

⁵ Mini International Neuropsychiatric Interview

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Instruments	Prevalence	Risk Factors	Evaluation Score
Gavin et al.	United States, 2010	Longitudinal	1997	Pre-natal service	PHQ ⁶	5,1%	Black or Asian poor educational backgrounds; single or separated; stress; domestic violence; health problems	16
Micali et al.	England, 2010	Longitudinal	10887	Household	EPDS	6.3%	History of anxiety and depression	15
Price & Proctor	United States, 2009	Sectional	1086	Pre-natal service	PRIME-MD ⁷ ; PHQ	13%	Low-income	13
Skouters et al.	Australia, 2009	Longitudinal	207	Pre-natal service	BDI	28.3%	Anxiety disorder	16
Spoozak et al.	United States, 2009	Sectional	783	Hospital / Maternity	CIDI ⁸	9.0%	Poor educational background; low income, over 35 years	13
Leigh & Milgrom	Australia, 2008	Longitudinal	367	Hospital / Maternity	BDI	16,9%	Anxiety disorders; stressful events; low income and sexual abuse history	15
Martínez et al.	Spain, 2008	Sectional	200	Pre-natal service	EPDS	15,0%	Low income, poor educational background; over 35 years; large number of children	14
Rodriguez et al.	United States, 2008	Sectional	210	Pre-natal service	BDI	41,0%	Domestic violence; stressful events	14

⁶ Patient Health Questionnaire

⁷ Primary Care Evaluation of Mental Disorders

⁸ Composite International Diagnostic Interview

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Instruments	Prevalence	Risk Factors	Evaluation Score
Kitamura et al	Japan, 2006	Longitudinal	290	Hospital / Maternity	SDI (DSM-III- R) ⁹	5.6%	Being young, negative attitude towards pregnancy	14
Rich- Edwards et al	USA, 2006	Longitudinal	1662	Pre-natal service	EPDS	9.0%	Psychiatric history; financial hardships; unwanted pregnancy	16
Chee et al	Singapore, 2005	Longitudinal	559	Hospital / Maternity	EPDS; SCID-IV (DSM-IV)	12.2%	Psychiatric history; unwanted pregnancy; low social support; family conflicts	18
Rubertsso n et al	Sweden, 2005	Longitudinal	2430	Pre-natal service	EPDS	13.7%	Stressful events	15
Heron et al	England, 2004	Longitudinal	8323	Househol d	EPDS	11.4%	Pre-natal anxiety	16
Lee et al	Hong Kong, 2004	Longitudinal	157	Househol d and Maternity	BDI; SCID (DSM-IV)	6.4%	Not mentioned	15
Andersson et al	Sweden, 2003	Sectional	1795	Pre-natal service	PRIME-MD	6.9%	Not mentioned	12
Felice et al	Malta, 2003	Longitudinal	239	Hospital / Maternity	EPDS; CIS-R ¹⁰	11.1%	Single; low social support; psychiatric history; unwanted pregnancy; marital conflicts	13
Marcus et al	USA, 2003	Sectional	3472	Pre-natal service	CES-D	20.4%	Psychiatric history; negative health perception ; substance abuse	12

⁹ Structure Diagnostic Interview (DSM-III-R)

¹⁰ Clinical Interview Schedule - revised edition (DSM-IV)

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Instruments	Prevalence	Risk Factors	Evaluation Score
Wu et al	USA, 2002	Longitudinal	1697	Hospital / Maternity	CES-D	15.6%	Age; race; marital status	16
Evans et al	England, 2001	Longitudinal	13.799	Household	EPDS	13.5%	Not mentioned	15
Josefsson et al	Sweden, 2001	Longitudinal	1558	Hospital / Maternity	EPDS	17.0%	Postpartum depression	15
Pajulo et al	Finland, 2001	Sectional	391	Pre-natal service	EPDS	7.7%	Substance abuse; difficulties with social relationships	14
Da Costa et al	Canada, 2000	Longitudinal	80	Pre-natal service	EPDS	25.0%	Coping strategies; anxiety; stress	15
Johanson et al	UK, 2000	Longitudinal	417	Hospital / Maternity	EPDS	9.8%	Marital conflicts; postpartum depression	16
Kurki et al	Finland, 2000	Longitudinal	623	Pre-natal service	BDI	30.0%	Not mentioned	15

Chart 1. Studies on the prevalence of gestational depression in developed countries

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Tools used	Prevalence	Associated Factors	Evaluation Score
Benute et al	Brazil, 2010	Sectional	326	Pre-natal service	PRIME-MD	9.0%	Unplanned pregnancy	11
Fisher et al	Vietnam, 2010	Sectional	364	Pre-natal service	SCID (DSM-IV)	10.0%	Rural household; violence and sexual abuse; stressful life events; poverty	12
Golbasi et al	Turkey, 2010	Sectional	258	Pre-natal service	EPDS	27.5%	Maternal age; multiparity; history of stillbirth; nuclear family; number of living children; social support	10

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Tools used	Prevalence	Associated Factors	Evaluation Score
Mohammad et al	Jordan, 2010	Sectional	353	Hospital / Maternity	EPDS	19%	Stress; anxiety; 13 financial hardships; low social support; unplanned pregnancy; low self- esteem	
Silva et al	Brazil, 2010	Sectional	1264	Pre-natal services	EPDS	21.1%	Advanced age; 11 poor educational background; not living with companion; idealize abortion; previous psychological/ psychiatric treatment; tobacco and alcohol use during pregnancy; stressful events; multiparous; having planned the pregnancy	
Karaçam & Ançel	Turkey, 2009	Sectional	1039	Hospital / Maternity	BDI	27.9%	Marital dissatisfaction; being a housewife; having an unwanted pregnancy; having a formal marriage.	12
Marcus et al	Peru, 2009	Sectional	222	Hospital / Maternity	EPDS	40.1%	Unplanned pregnancy; health problems during pregnancy	10
Mitsuhiro et al	Brazil, 2009	Sectional	1000	Hospital / Maternity	CIDI	12.9%	Psychiatric comorbidities	13

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Tools used	Prevalence	Associated Factors	Evaluation Score
Pereira et al	Brazil, 2009	Sectional	331	Pre-natal services Prenatal	CIDI	14.2%	Previous history of depression and psychiatric treatment; unplanned pregnancy; serious physical problem; formal work	12
Pottinger et al	Jamaica, 2009	Longitudinal	452	Pre-natal service	EPDS	25.0%	Previous history of depression; life style	15
Qiao et al	China, 2009	Sectional	527	Hospital / Maternity	HAD ¹¹	4.8%	Lower age; poor educational background	10
Adewuya et al	Nigeria, 2007	Sectional	180	Hospital / Maternity	EPDS	8.3%	Single, divorced or separated; low social support	13
Gulseren et al	Turkey, 2006	Longitudinal	125	Hospital / Maternity	EPDS	21.6%	Psychiatric history; stressful events	12
Alami et al	Morocco, 2006	Longitudinal	100	Pre-natal service	EPDS; MINI	19.2%	Obstetric history; unplanned pregnancy; marital problems; stressful events	14
Limlom- wongse & Liabsue- trakul	Thailand, 2006	Longitudinal	610	Hospital / Maternity	EPDS	20.5%	Single; negative attitude towards pregnancy	16
Patel et al	India, 2002	Longitudinal	270	Hospital / Maternity	EPDS	17.94%	Marital violence; psychiatric history; poor educational background; unwanted pregnancy	17

¹¹ Hospital Anxiety and Depression Scale

Authors	Country/ Publication year	Type of Study	Sample	Research Sites	Tools used	Prevalence	Associated Factors	Evaluation Score
Ortega et al	Mexico, 2001	Sectional	360	Pre-natal service	EPDS	21.7%	Not mentioned	10
Caputo & Bordin	Brazil, 2007	Sectional	207	Pre-natal service	Youth Self- Report	13%	Not mentioned	13
Ferri et al	Brazil, 2007	Sectional	930	Hospital / Maternity	CIDI	13%	physical violence	17
Faisal- Cury & Rossi Menezes	Brazil, 2007	Sectional	432	Pre-natal service	BDI	19.6%	Poor educational background; low family income, previous miscarriages	13
Mitsuhiro et al	Brazil, 2006	Sectional	1000	Hospital / Maternity	CIDI	12.9%	Dysfunctional family; unemployem t; poor educational background	11
Lovisi et al	Brazil, 2005	Sectional	230	Hospital / Maternity	CIDI	19.1%	Financial hardships; poor educational background; domestic violence; psychiatric history	13
Freitas & Botega	Brazil, 2002	Sectional	120	Pre-natal service	CIS-R; HAD	20.8%	Suicidal ideation; single; low social support	12

Chart 2. Studies on the prevalence of gestational depression in developing countries

2.2.3 Epidemiological and clinical aspects of gestational depression in different socioeconomic contexts

In general, in this review the average prevalence of gestational depression found in developing countries was about 20% while in developed countries it ranged between 10% and 15%. Only a few studies in developed countries reported prevalence similar to that of developing countries. This fact suggests that this disorder ought to be of importance for world Public Health. The prevalence between 15% and 20% is significant and this higher rate seems to be associated with factors found in disadvantaged contexts such as poverty, violence, low education (Patel & Kleinmann, 2003). On one hand, it should be noted that the prevalence above this average was only found in some studies that used non-representative and non-randomized samples (Da Costa et al., 2000; Dhillon & MacArthur, 2010; Golbasi et al., 2010; Matos et al., 2009; Skouters et al., 2009; Wojcicki et al., 2011). On the other hand,

gestational depression values a little below this prevalence average were found when standardized diagnostic interviews were used, particularly with the CID-10 (OMS, 1993) or DSM-IV (APA, 1994) diagnosis criteria, compared to studies that used inventories or symptomatology scales, such as the Beck Depression Inventory (Beck et al., 1998) and the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).

The gestational depression prevalence reported in the majority of these studies was approximately 20% (Alami et al., 2006; Bowen & Muhajarine, 2006; Faisal-Cury & Rossi Menezes, 2007; Freitas & Botega, 2002; Gulseren et al., 2006; Josefsson et al., 2001; Limlomwongse & Liabsuetrakul, 2006; Lovisi et al., 2005; Marcus et al., 2003; Mohammad et al., 2010; Ortega et al., 2001; Patel et al., 2002; Silva et al., 2010). This prevalence appears to be higher in the third gestational quarter and relatively higher in low income countries. It also tends to increase in high risk pregnancy cases (Lovisi et al., 2005). Studies have shown that depression symptoms are more common and severe during pregnancy than in the postnatal period (Andersson et al., 2006; Banti et al., 2010; Evans et al., 2001).

Depression tends to be higher among pregnant adolescents than in adult pregnant women. The same can be said of adolescent parents (Quinlivan & Condon, 2005). Depression is a frequent mental disorder in adolescence and pregnancy be an important risk factor in triggering its development in this stage of the life of woman. A study reported that anxiety and depression symptoms are more frequent in primiparous adolescents compared to non-pregnant adolescents (Caputo & Bordin, 2007). Another study carried out in Brazil reported high rates of prevalence of depression, anxiety and suicidal ideation in adolescent pregnant women: 20.8% for depression, 23.3% for anxiety and 16.7% for suicidal ideation (Freitas & Botega, 2002). It should be noted that adolescents between the ages of 10 and 19 account for approximately one quarter of the total number of childbirths that take place in developing countries such as Brazil, and constitutes the main cause of hospitalization in this population (Freitas & Botega, 2002).

In studies included in this review, investigations carried out in Eastern countries reported low rates of gestational depression. Investigations among Chinese women indicated a gestational depression rate of approximately 5% (Lee et al., 2004; Qiao et al., 2009). A Japanese study reported rates of 5.6% (Kitamura et al., 2006). These rates are lower than the average rates found in research studies carried out in Western societies. The explanation for this fact underlined in these studies consists in specific cultural aspects of these contexts whereby, among other factors, it was believed that pregnant women should refrain from having unhealthy behavior and feelings and this belief could favor the sub-notification of depressive symptoms (Lee et al., 2004).

It should be noted that there is an insufficiency of studies on the incidence of gestational depression since most studies address prevalence measures. In this review, only one incidence study was found (Kitamura et al., 2006). The importance of this kind of study lies in it enabling identification of new cases that really begin during the period being studied. In other words, that they are not pre-existing cases of depression and therefore can be rightly considered gestational depression cases. However, it is known that psychiatric incidence studies are hindered by the lack of a biological marker for mental disorders and by specific characteristics of the initiation, development and course of these disorders, which makes the exact moment of incidence almost impossible to determine.

In relation to the methodological quality of the articles, the studies carried out in developed countries did better on the Downs & Black scale than the studies carried out in developing countries, which may reflect, among other difficulties, the lack of

governmental incentives for research in these countries. As for the instrument used to assess depression, regardless of their country of origin, most authors used the Edinburgh Postnatal Depression Scale - EPDS (Cox et al., 1987) to detect the presence of depressive symptoms, both during the gestational and post-anatal periods. Some investigators used the Beck Depression Inventory - BDI (Beck et al., 1998), the Hospital Anxiety and Depression Scale - HAD (Zigmond & Snaith, 1983), among other instruments, to evaluate symptoms of depression. It should be noted that many of these instruments are self-administered and not appropriate for contexts with population with poor educational background, as it is the case in many developing countries. However, there are few standardized diagnostic interviews for assessing depression during pregnancy in the reviewed study, such as for instance, the Composite International Diagnostic Interview - CIDI (Wittchen et al., 1991), the Mini International Neuropsychiatry Interview - MINI (Sheehan et al., 1997), the Clinical Interview Schedule-Revised - CIS-R (Lewis et al., 1992) and the clinical diagnostic interview based on the DSM-IV (APA, 1994), Structured Clinical Interview - SCID (First et al., 1994).

Among the risk factors that may lead to a gestational depressive condition, the studies on this reviewed identified a prior history of depression; financial hardships; low education levels; unemployment; lack of social support; instability in relationships; stressful life events; unwanted pregnancy; alcohol, tobacco or drug abuse; and a history of violence against women. It is highlighted that these factors are inter-related in varying degrees in the development of gestational depressive episodes. In general, the majority of risk factors associated with gestational depression were the same for developed and developing countries, with the exception of factors related to unfavorable economic contexts, low education, unemployment, financial hardships and violence which were predominant in studies carried out in low income countries.

In the last decades, epidemiological studies have significantly contributed to a greater understanding of the interrelation between social environment factors and the origin and course of mental disorders. A considerable amount of academic literature addresses the role that the so-called stressful life events play as risk factors in anxiety and depression (Lopes et al., 2003). Stressful events refer to life changes that require a social and psychological readjustment, such as the death of a loved one, marital conflicts, the loss of a job, having been a victim of a mugging. Several recent studies have reported an association between stressful events and the development of gestational depression (Alami et al., 2006; Fisher et al., 2010; Gulseren et al., 2006; Leigh & Milgrom, 2008; Lovisi et al., 2005; Pereira et al., 2009; Rodriguez et al., 2008; Rubertsson et al., 2005; Silva et al., 2010). On the other hand, stress seems also to be, in part, a result of the presence of gestational depression and anxiety (Da Costa et al., 2000).

Studies suggest that social support received before and during pregnancy, particularly support offered by the spouse, seems to be crucial to the pregnant woman's mental health since its absence has been associated with the manifestation of gestational depression symptoms (Adewuya et al., 2007; Chee et al., 2005; Felice et al., 2004; Freitas & Botega, 2002; Golbasi et al., 2010; Mohammad et al., 2010). It is also suggested that the perception of low level of spouse social support perception received is related to the prevalence of depression after childbirth (Cruz et al., 2005). Furthermore, marital problems also seem to be related to the prevalence of gestational depression (Alami et al., 2006; Felice et al., 2004; Johanson et al., 2000; Karaçam & Ançel, 2009). Single or divorced women report the higher level of symptoms of depression during this period (Adewuya et al., 2007; Faisal-Cury & Rossi-

Menezes, 2007; Felice et al., 2004; Freitas & Botega, 2002; Gavin et al., 2010; Limlomwongse & Liabsuetrakul, 2006; Lovisi et al., 2005; Silva et al., 2010).

A crucial factor in the development of gestational depression symptoms, which has a direct impact on the mother and the child's health, is violence against women, whether it is carried out by the spouse, a relative or a stranger. Although it is not restricted to poor areas, it is in these environments that we find the highest rates of violence. However, poverty and violence are both independent risk factors for gestational depression, which suggests that maternal mental health prevention strategies should include policies that aim at decreasing violence and offer financial aid to women in low income countries (Lovisi et al., 2005). Domestic violence against women during pregnancy, particularly when committed by the woman's partner, has several negative impacts on the baby's intra-uterine health and the mother's mental health, particularly in the development of gestational depression (Anderson et al., 2002; Ferri et al., 2007; Fisher et al., 2010; Gavin et al., 2010; Leigh & Milgrom, 2008; Lovisi et al., 2005; Patel et al., 2002; Rodriguez et al., 2008).

Financial hardships, unemployment, and low education levels stand out as risk factors for gestational depression (Faisal-Cury & Rossi-Menezes, 2007; Fisher et al., 2010; Gavin et al., 2010; Leigh & Milgrom, 2008; Martínéz et al., 2008; Mitsuhiro et al., 2006; Mohammad et al., 2010; Patel et al., 2002; Pereira et al., 2009; Pottinger et al., 2009; Qiao et al., 2009; Rich-Edwards et al., 2006; Silva et al., 2010; Spozzak et al., 2009). It has been suggested that a higher level of education rises the level of protection against gestational depression, (Lovisi et al., 2005; Patel et al., 2002). An unwanted or unplanned pregnancy can also be a strong cause for gestational depression symptoms (Alami et al., 2006; Benute et al., 2010; Dhillom & MacArthur, 2010; Karaçam & Ançel, 2009; Kitamura et al., 2006; Matos et al., 2009; Mohammad et al., 2010; Pereira et al., 2009). Moreover, women with depression usually have low level of quality of life (Nicholson et al., 2006).

Among the risk factors frequently associated with gestational and puerperal depression in the reviewed studies, it stands out a prior psychiatric history, particularly a prior history of depression (Chee et al., 2005; Dhillom & MacArthur, 2010; Felice et al., 2004; Marcus et al., 2003; Micali et al., 2010; Patel et al., 2002; Pereira et al., 2009; Rich-Edwards et al., 2006). Most women who developed gestational depression had had prior depressive episodes (Rich-Edwards et al., 2006). Additionally, alcohol, tobacco and drug abuse problems seem to be related to a considerable number of gestational anxiety and depression symptoms (Marcus et al., 2003; Pajulo et al., 2001; Silva et al., 2010).

In order to approach predictors of depression, reviewed studies used scales like the Stressful Life Events (Holmes & Rahe, 1967) and the Paykel Life Events Inventory (Paykel, 1983) to assess stressful events; the Social Support Questionnaire - SSQ (Sarason et al., 1983) to evaluate social support; the Index of Marital Satisfaction - IMS (Hudson, 1982) and the Abuse Assessment Screen - AAS (MacFarlane et al., 1992) to measure the satisfaction and violence suffered in a marital relationship and the Substance Abuse Subtle Screening Inventory - SASSI (Miller, 1994) to assess use of alcohol and drugs. Most studies only used questions and questionnaires elaborated by the study researchers to assess risk factors associated with depression.

Several longitudinal studies reported on the prevalence of gestational as well as postpartum depression (Alami et al., 2006; Andersson et al., 2006; Banti et al., 2010; Chee et al., 2005; Da Costa et al., 2000; Evans et al., 2001; Felice et al., 2004; Gulseren et al., 2006; Heron et al., 2004; Johanson et al., 2000; Josefsson et al., 2001; Kitamura et al., 2006; Limlomwongse & Liabsuetrakul, 2006; Patel et al., 2002; Rich-Edwards et al., 2006; Rubertsson et al., 2005). All

these studies reported gestational depression rates greater than those found in postpartum depression, except one study which reported a higher rate for postpartum depression (Patel et al., 2002). According to the authors of this latter study, cultural aspects in India may have influenced the results since the birth of girls in that country is not appreciated. The birth of a girl brings about discontentment and represents a strong risk factor, raising the probability of maternal depression threefold.

The reviewed studies indicate that the prevalence of postpartum depression is usually lower than during pregnancy - below 15% (Banti et al., 2010; Chee et al., 2005; Evans et al., 2001; Felice et al., 2004; Heron et al., 2004; Johanson et al., 2000; Josefsson et al., 2001; Kitamura et al., 2006; Rich-Edwards et al., 2006; Rubertsson et al., 2005). The intensity of perinatal depression symptoms tend to decrease from the gestational period to the period after childbirth (Chee et al., 2005; Gulseren et al., 2006; Pottinger et al., 2009). Further, a study reported that out a rate of 8.7% postpartum depression prevalence only 3.9% were incidental - they had begun during this period. The other 4.8% represented cases that had started in the gestational period or before (Felice et al., 2004).

3. Diagnosis and treatment of gestational depression

The evaluation of gestational depression, particularly of mood disorders, may be confounded by the fact that some gestational period characteristics can be misinterpreted as depressive, as is the case of fatigue, changes in sleep habits, appetite and libido. Moreover, during pregnancy, a woman may present a high incidence of metabolic changes such as gestational diabetes, anemia and thyroid malfunction, all of which may suggest a secondary mental disorders (Botega & Dias, 2006; Camacho et al., 2006). Further, many women who suffer from depression do not reveal their symptoms for fear of possible stigmatization, since they perceive that society expects them to be content. They end up feeling guilty for having depressive symptoms at a time when they should be feeling happy (Epperson, 1999, as cited in Camacho, 2006).

The diagnostic criteria for gestational depression are the same as those for depressive disorders, regardless of the period of life in reference. There are no specific scales for the detection of gestational depression. However, there are symptoms which are particularly associated to gestational depression, such as depressed moods, diminished interest or pleasure, weight loss or gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, feeling of worthlessness or guilt, difficulty in concentrating and suicidal ideation. According to the DSM-IV (Diagnostic and Statistical Manual for Mental Disorders), classification of a Major Depressive Episode requires that at least five of the above symptoms be present during a period of at least two weeks. At least one of the symptoms must be depressed mood or diminished interest or pleasure (APA, 2002). The CID-10 Classification of Mental and Behavioral Disorders (International Classification of Diseases) uses the same criteria as the DSM-IV for diagnosis of a Major Depressive Episode. According to the CID-10 and the DSM-IV, the Major Depressive Episode, characterized by one or more Major Depressive Episodes, can also be classified as mild, moderate or severe (APA, 2002; WHO, 1993).

Treatment of gestational depression is a complex task. Cases need to be treated on an individual basis and taking in account the patients' autonomy and their social context, emphasizing early intervention (Coverdale et al., 1997; Marcus et al., 2001; Gold, 1999; Soares et al., 2001). The use of psychoactive medication during pregnancy and lactation

must take needs to be carefully evaluated since treating may affect the fetus' health (Bonari et al., 2004; Cohen et al., 2004; Jablensky, 2005; O'Brien et al., 2007; Paton, 2008). The possible risks in using antidepressants include fetal toxicity, intra-uterine death, physical malformations, growth impairment, behavioral teratogenicity and neonatal toxicity (Camacho et al., 2006). However, these possible associations has not been adequately proven and several current studies have reported that the use of antidepressants during pregnancy is safe, especially the use of serotonin reuptake inhibitors.

Electroconvulsive therapy (ECT) is advised in more severe cases of gestational depression or in those in which all other forms of treatment have failed. It is the last resource used in treating gestational psychiatric disorders. Recent research has suggested that the risk of its use during gestation may be very small and that it can be a safe and effective alternative method in more severe cases (Camacho et al., 2006). Psychotherapy is recommended for women who develop a mild or moderate depressive condition, especially cognitive-behavioral and interpersonal therapy (Botega & Dias, 2006; Spinelli, 1997; Spinelli & Endicott, 2003; Weissman, 2007). This may be a good choice of treatment for women who do not agree to pharmacological treatment when they find out they are pregnant and in less severe cases of depression. However, it is not adequate to discontinue pharmacological treatment in more severe or recurrent cases. Pharmacological treatment and psychotherapy during pregnancy have also proven to be efficient in preventing postpartum depression (Zinga et al., 2005).

An intervention study reported that the participation of women in multi-professional educational groups contributed to decreasing the rate of gestational affective disorders (Falcone et al., 2005). The groups included a team of nurses, nutritionists, pedagogues, physiotherapists, social workers and community workers. They complemented formal prenatal care through monitoring the pregnancy, facilitating access to care and strengthening the mother-fetus relationship to safeguard maternal mental health. This study suggests that this sort of inter-disciplinary prenatal intervention is an effective approach for preventing, detecting and treating affective disorders in pregnant women and their children.

It is quite common for mental health problems, particularly depression, to complicate pregnancy. Depression is associated with certain risk factors and not treating this disorder may increase health risks factors to the mother and the fetus. Hence, preventive strategies that aim at detecting and preventing risk factors and early diagnosis of depression during prenatal care seem to be more effective than posterior therapeutic strategies. They ought to constitute a crucial aspect of preventive policies in the area of mother and child health (Austin, 2003; Gordon et al., 2006).

4. Conclusion

In this review, most gestational depression prevalence rates reported in developing countries were about 20%. The most common risk factors associated with depression in this stage of life were a psychiatric history- particularly a history of depression; factors related to poverty such as low income, financial difficulties, low education level, informal work and unemployment; lack of social, family or marital support, instability in relationships; stressful life events; unwanted pregnancy; alcohol, tobacco and other drug abuse; and a history of domestic violence. These factors are more frequent in disadvantaged socioeconomic contexts such as those found in developing countries where, many times, prenatal care is the only

contact a woman in reproductive age will have with health services. Within this context, this prenatal period is a crucial to intervene in order to promote women's health and mental health in the long term (Neumann et al., 2003), as well as their children preventive health (Patel et al., 2004). The data reported in the reviewed studies support the need for integrating mental health and prenatal care for women in reproductive age. Postnatal depression prevention needs to be also started on the prenatal period (Patel et al, 2002). Lastly, the findings reported in these reviewed studies suggests that gestational depression is associated with poverty indicators, above all, to unemployment and low education levels, all for public policies which will address these social issues.

In sum, depression is a worldwide public health problem and tops the list of causes resulting on higher years lived with disability (YDLs) in the world (WHO, 2001). It affects approximately 154 million people all over the world and is twice as prevalent in women (5% to 9%) as it is in men (2% to 3%) (WHO, 2001). Further, since gestational depression can have negative consequences on the mother and baby's health during gestation, it needs to be addresses in development of public maternal and child health policies.

5. References

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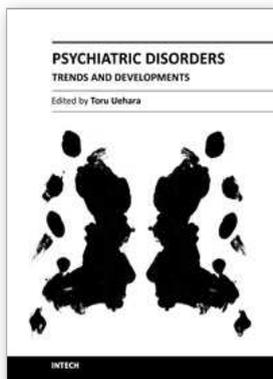
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Psychiatric Disorders - Trends and Developments

Edited by Dr. Toru Uehara

ISBN 978-953-307-745-1

Hard cover, 514 pages

Publisher InTech

Published online 26, October, 2011

Published in print edition October, 2011

Due to their prevalence, pervasiveness and burden inflicted on men and women of today, psychiatric disorders are considered as one of the most important, severe and painful illnesses. This impairment of cognitive, emotional, or behavioural functioning is in some cases tragic. Aside from knowing the physical organic factors, such as infections, endocrinal illnesses or head injuries, the aetiology of psychiatric disorders has remained a mystery. However, recent advances in psychiatry and neuroscience have been successful in discovering subsequent pathophysiology and reaching associated bio-psycho-social factors. This book consists of recent trends and developments in psychiatry from all over the world, presented in the form of multifarious and comprehensive articles. The first two sections of the book are reserved for articles on schizophrenia and depression, two major illnesses present in this field. The third section of the book is reserved for addiction psychiatry, related not only to socio-cultural but also biological alterations. The last section of the book, titled Biological Neuropsychiatry, consists of three topics - updated molecular biology, fundamental neuroscience and clinical neuropsychiatric conditions. Doubtlessly, this book will be fruitful for future developments and collaboration in world psychiatry.

How to reference

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Priscila Krauss Pereira, Giovanni Marcos Lovisi, Lúcia Abelha Lima, Leticia Fortes Legay, Jacqueline Fernandes de Cintra Santos, Simone Agadir Santos, Daianna Lima Thiengo and Elie Valencia (2011). Depression During Pregnancy: Review of Epidemiological and Clinical Aspects in Developed and Developing Countries, *Psychiatric Disorders - Trends and Developments*, Dr. Toru Uehara (Ed.), ISBN: 978-953-307-745-1, InTech, Available from: <http://www.intechopen.com/books/psychiatric-disorders-trends-and-developments/depression-during-pregnancy-review-of-epidemiological-and-clinical-aspects-in-developed-and-developing>

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