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## Common mental disorders in mothers vs. infant and obstetric outcomes: a review

### Transtornos mentais comuns em mães *versus* desfechos infantis e obstétricos: uma revisão

Paula Borba,<sup>1</sup> Carla Fonseca Zambaldi,<sup>2</sup> Amaury Cantilino,<sup>3</sup> Everton Botelho Sougey<sup>4</sup>

#### Abstract

**Introduction:** Pregnancy has been shown to increase women's vulnerability to mental disorders. Common mental disorders (CMDs) have been studied both in the general population and in pregnant vs. non-pregnant women. During pregnancy, CMDs have been considered a potential predictor of obstetric and infant outcomes.

**Methods:** A search was conducted on the PubMed/MEDLINE, LILACS, and SciELO databases to find relevant articles written in English, Spanish, and Portuguese. No limit was established for year of publication, but only studies involving human beings were included.

**Results:** A total of 25 articles were selected. There was a consensus among studies that the mean prevalence of CMD during pregnancy is 20%. There was also agreement that the occurrence of CMDs during pregnancy is a predictor of postpartum depression and anxiety disorders and that the disorder remains underdiagnosed and undertreated. As for the positive association between CMDs and obstetric and infant complications, results are still conflicting. In lower-income countries, frequently there is an association between CMD and perinatal changes. It is argued that some confounding factors, such as sociodemographic and cultural differences, health and maternal conditions, and type of instruments used, probably contribute to this lack of consensus.

**Conclusion:** We believe that the conflicting results found in the literature are caused by differences in methodology and sociodemographic factors that influence the development of CMDs. Despite these differences, our findings underscore the need for depression and anxiety disorders during pregnancy to be studied and better identified by all professionals who provide antenatal care.

**Keywords:** Mental disorders, women, pregnancy, infant.

#### Resumo

**Introdução:** Estudos têm mostrado que a gravidez torna a mulher mais vulnerável a transtornos mentais. Os transtornos mentais comuns (TMCs) têm sido estudados tanto na população geral quanto em mulheres grávidas versus não grávidas. Durante a gravidez, os TMCs são considerados um potencial fator preditivo de desfechos obstétricos e perinatais.

**Métodos:** Uma pesquisa foi realizada nas bases de dados PubMed/MEDLINE, LILACS e SciELO em busca de artigos relevantes publicados em inglês, espanhol e português. Não foi estabelecido um limite para ano de publicação, mas apenas estudos envolvendo humanos foram incluídos.

**Resultados:** Um total de 25 artigos foram selecionados. Houve consenso entre os estudos de que a prevalência média de TMC durante a gravidez é de 20%. Também houve consenso de que a ocorrência de TMCs durante a gravidez é um fator preditivo de depressão pós-parto e transtornos de ansiedade, e de que o transtorno não vem sendo diagnosticado nem tratado. Com relação à associação positiva entre TMCs e desfechos obstétricos e perinatais, os resultados ainda são conflitantes. Em países de baixa renda, frequentemente se observa uma associação entre TMC e alterações perinatais. Argumenta-se que alguns fatores de confusão, tais como diferenças sociodemográficas e culturais, condições de saúde e maternas e tipo de instrumento usado, provavelmente contribuem para essa falta de consenso.

**Conclusão:** Acreditamos que os resultados conflitantes encontrados na literatura são causados por diferenças na metodologia e fatores sociodemográficos que influenciam o desenvolvimento de TMCs. Apesar dessas diferenças, nossos achados salientam a necessidade de que a depressão e os transtornos da ansiedade durante a gravidez sejam estudados e melhor identificados por todos os profissionais que prestam cuidados pré-natais.

**Descritores:** Transtornos mentais, mulheres, gravidez, lactente.

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## Introduction

The term common mental disorders (CMDs) was first used by Goldberg & Huxley to describe a distress condition characterized by diffuse somatic symptoms, anxiety, and depressive states.<sup>1</sup> In addition to these symptoms, the concept includes primary health care sector characteristics and sociodemographic features of the community in which the disorder occurs. The Self-Report Questionnaire (SRQ) and the General Health Questionnaire (GHQ) are the main research tools used in the field of CMDs. The concept of CMDs has been widely used in research into psychological distress in women, often during pregnancy.

Pregnancy and childbirth are gaining recognition as significant risk factors for the development and exacerbation of mental health problems.<sup>2</sup> They are important stressors in the biological, psychological, and social life of a woman. The intensity of psychological changes experienced during pregnancy depends on family, marital, social, cultural, and personality factors.<sup>3</sup> Studies focusing on mental illnesses during both pregnancy and postpartum usually find a higher incidence in the latter.<sup>4</sup> Notwithstanding, the diagnosis of mental disorders during the prenatal stage is believed to be neglected, and there are few scientific studies that seek to identify psychological changes during pregnancy.<sup>4</sup>

Although the results found in the literature are sometimes contradictory and still insufficient from an epidemiological point of view, there is documented evidence that psychological factors during pregnancy may lead to complications during labor and delivery, as well as newborn complications. According to some authors, these psychological changes are the result of hormonal changes that cross the placenta and alter the fetal environment, with consequences for child development.<sup>5</sup> The first changes observed in the newborn may take the form of crying, irritability, or apathy and lead to affective disorders in adulthood. The factors that typically have a negative influence on the mother-infant relationship may originate prior to conception or during prenatal care.<sup>5</sup>

CMDs during pregnancy are considered an important predictor of postpartum depression.<sup>6,7</sup> There is evidence that CMDs, particularly anxiety and depression, in mothers are a serious public health problem owing to their negative effect on child development.<sup>5</sup> Childhood is a critical stage of development directly influenced by newborn welfare, which depends on the quality and quantity of care received by the main caregiver, usually the mother. Depressed mothers show less engagement with their babies, resulting in an insecure attachment on the part of the children. Some studies have shown that children born to mothers with CMDs have poorer

motor cognitive and socioemotional development than those born to mothers in good mental health.<sup>8</sup> Other investigators have associated depression and antenatal anxiety with premature birth, low birth weight, operative delivery, and neonatal intensive care.<sup>9-11</sup>

Studies on the association between CMDs and adverse obstetric outcomes have produced conflicting evidence, probably as a result of the influence of different factors. For example, many studies conducted in low- and middle-income countries (LAMIC) have shown that symptoms may be aggravated by smoking and alcohol consumption during pregnancy.<sup>7</sup> Because these findings are still controversial, this paper aims to review the literature and provide some more precise information on the topic.

## Methods

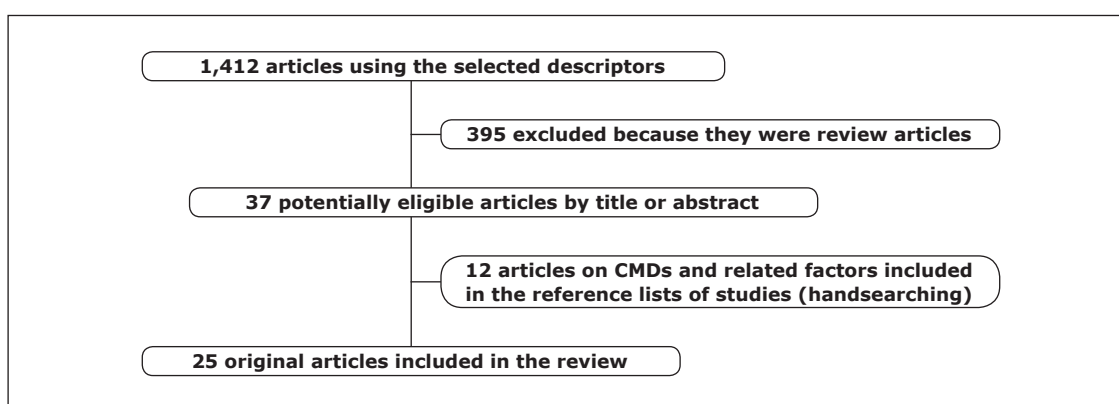
Original articles on CMDs during pregnancy and their impact on child birth and development were retrieved through an electronic search carried out on the PubMed/MEDLINE, LILACS, and SciELO databases, as well as via handsearching for references to selected articles and additional bibliographic material, e.g., dissertations, books, and magazine articles on the subject.

The following descriptors were used: mental disorders, women, pregnancy, and infant. Articles were included if they addressed CMDs during pregnancy and used appropriate questionnaires. Other mental disorders were excluded.

No limit was established for year of publication, but the research was restricted to items published in English, Portuguese, and Spanish. Only studies involving human beings were selected.

## Results

A total of 1,412 articles, published between 1975 and 2010, were initially retrieved using the descriptors and parameters outlined above. The titles and abstracts of these articles were revised, and the full article was read whenever necessary. Following this initial screening, 395 articles were excluded because they were review articles. Of the remainder, 37 articles were considered potentially eligible because they mentioned CMDs and related topics in their titles. Of these, 25 articles were obtained directly from the databases and 12 were obtained by handsearching. Finally, 25 articles were found to specifically study CMDs during pregnancy and CMDs related to infant and/or obstetric outcomes (Figure 1). The list of articles included in the review is presented in Tables 1 and 2.

**Figure 1** – Flowchart describing the selection of articles included in this review**Table 1** – Prevalence of common mental disorders during pregnancy

Authors	Setting	Prevalence (%)	Sample size	Instrument used
Araya et al., 2001 <sup>12</sup>	Chile	26.7	3,870	CIS-R
Araújo et al., 2005 <sup>3</sup>	Brazil	39.4	2,055	SRQ-20
van Bussel et al., 2006 <sup>13</sup>	England	24.7	324	GHQ-12
Harpham et al., 2005 <sup>14</sup>	India	30.0	1,823	SRQ-20
Harpham et al., 2005 <sup>14</sup>	Peru	30.0	1,949	SRQ-20
Harpham et al., 2005 <sup>14</sup>	Vietnam	21.0	1,570	SRQ-20
Harpham et al., 2005 <sup>14</sup>	Ethiopia	33.0	1,722	SRQ-20
Ferri et al., 2007 <sup>8</sup>	Brazil	24.3	930	CIDI
Faisal-Cury et al., 2009 <sup>4</sup>	Brazil	20.2	868	CIS-R
Hanlon et al., 2009 <sup>7</sup>	Ethiopia	12.0	1,065	SRQ-20
Ishida et al., 2010 <sup>15</sup>	Paraguay	33.6	6,538	SRQ-20
Ludermir et al., 2010 <sup>16</sup>	Brazil	43.1	1,121	SRQ-20
Silva et al., 2010 <sup>17</sup>	Brazil	41.4	1,340	SRQ-20
Ross et al., 2010 <sup>18</sup>	Ethiopia	13.8	1,065	SRQ-20
Servili et al., 2010 <sup>19</sup>	Ethiopia	21.9	1,065	SRQ-20

CIDI = Composite International Diagnostic Interview; CIS-R = Clinical Interview Schedule - Revised Version; GHQ-12 = General Health Questionnaire; SRQ-20 = Self-Report Questionnaire.

**Table 2** – Common mental disorders during pregnancy and infant and/or obstetric outcomes

Association of common mental disorders with						
Study	Setting	low birth	preterm	diarrhea	cognition	global
		weight	birth			development
Low- and middle-income countries						
Humphreys et al., 1996 <sup>20</sup>	Nigeria			positive		
Rahman et al., 2002 <sup>21</sup>	Pakistan	positive				
Patel et al., 2004 <sup>10</sup>	South Asia	positive				
Harpham et al., 2005 <sup>14</sup>	India/Vietnam	positive				
Patel & Prince, 2006 <sup>11</sup>	India	positive				
Hadley et al., 2008 <sup>22</sup>	Africa					positive
Ross et al., 2010 <sup>18</sup>	Ethiopia			positive		
Hanlon et al., 2009 <sup>7</sup>	Ethiopia	negative				
Medhin et al., 2010 <sup>23</sup>	Ethiopia	negative				
Servili et al., 2010 <sup>19</sup>	Ethiopia				negative	
Developing and developed countries						
Rondó et al., 2003 <sup>9</sup>	Brazil	positive	positive			
Adewuya et al., 2008 <sup>24</sup>	Chile			positive		
Larsson et al., 2004 <sup>25</sup>	Sweden	negative	negative			
Evans et al., 2007 <sup>26</sup>	England	negative				
Faisal-Cury et al., 2010 <sup>27</sup>	Brazil	negative	negative			

## CMDs during pregnancy

Although attention has been primarily focused on the postpartum period, the prevalence of mental disorders appears to be at least as high during pregnancy.<sup>28</sup> For instance, while 9% of women had a score indicating possible depression 8 weeks after delivery, 14% had a score compatible with probable depression after 32 weeks of pregnancy.<sup>2</sup>

CMDs are also frequent during pregnancy.<sup>29</sup> Up to around 3 years ago, most studies reported a prevalence of 20% for CMDs during pregnancy, similar to that found in women in general.<sup>3,30,31</sup> However, in the present literature review, we found a frequency varying from 12 to 43% for CMD during pregnancy, both in LAMIC and in high-income countries. One of the reasons for this variation may be the different instruments used to assess CMDs.

CMDs are considered to be important predictors of postpartum depression. A prospective longitudinal study carried out in a community in England analyzed the course of anxiety and mood disorders during pregnancy and in the postpartum.<sup>28</sup> That study found that anxiety during pregnancy predicted a significant increase in depression during the postnatal period. The effect was stronger for anxiety at 32 weeks of gestation than at 18 weeks, and two-thirds of the women who reported anxiety in the postnatal period had experienced anxiety during pregnancy. Again in England, a controlled cohort study compared female mental health before, during, and after pregnancy with a control group of non-pregnant women.<sup>13</sup> They found no differences in the prevalence and incidence of CMDs between the study and control groups. However, the presence of CMDs before pregnancy or in early pregnancy predicted CMDs in the postpartum period. A Swedish study found a prevalence of major maternal depression in 3.3% of patients and minor maternal depression in 6.9%. Anxiety disorders were found in 6.6%.<sup>6</sup> Women with psychiatric disorders had significantly more somatic symptoms and more pronounced fear of childbirth. Another peculiarity of CMDs during pregnancy is that only a small percentage of cases are diagnosed and treated in a timely fashion. The same study showed that, of those diagnosed, only 5.5% received some kind of treatment.<sup>6</sup> This problem of underdiagnosis and consequent undertreatment of CMDs were the warning signs that prompted Goldberg & Huxley to propose the concept.

In the model proposed by those authors, CMDs involved the entire context of the individual. Occupational status, social support, family support, socioeconomic level, and stressful events are all factors that influence the emergence of CMDs. The duration and intensity of

episodes are influenced by the biological mechanisms and the psychological and environmental conditions of each individual.<sup>1</sup> This method of researching the environmental context of CMD is present in the studies here reviewed. The reason for investigating CMDs in pregnant women is that, because pregnancy is a period of physiologic adjustment, psychological and social factors may make women more vulnerable to developing such disorders. CMDs have been studied in LAMIC, where economic conditions increase women's vulnerability; it has been found that the prevalence in LAMIC is similar to that reported for developed countries.<sup>32</sup> A prospective study in Ethiopia investigated the prevalence of CMDs during the perinatal period and its persistence during postpartum.<sup>19</sup> It found that 21.9% had CMDs at some point during perinatal period, and this persisted in 4.1% of women into the first year postpartum, while 9.3% had a CMD at some point during the postnatal period. Other Ethiopian studies have found a variation in CMD frequency during pregnancy, from 12 to 33%, all of which used the SRQ.<sup>7,14,18</sup>

Conversely, a Brazilian study assessing the prevalence of CMDs with a structured interview (Clinical Interview Schedule - Revised Version, CIS-R), found a frequency of 20.2% in pregnant women.<sup>4</sup> The most common psychiatric symptoms were worries (34.3%), followed by irritability (33.3%) and anxiety (33.3%). Co-occurrence between depression and anxiety was high, with 69% of the women with depressive symptoms also showing symptoms of anxiety, and 51% of the women testing positive for anxiety symptoms also showing symptoms of depression. Another Brazilian study, conducted with adolescents from the city of São Paulo, found a prevalence of CMDs of 24.3% in adolescents up to 12 months postpartum. This study used a non-structured interview.<sup>8</sup> The results confirmed that CMDs are highly prevalent during pregnancy, affecting at least one every five Brazilian women of lower socioeconomic status, and that it usually goes unrecognized and untreated. Other studies in Brazil using the SRQ-20 have found a prevalence of over 40% for CMDs during pregnancy and in pregnant women who tried to abort.<sup>16,17</sup> As observed in LAMIC, some studies assessing psychiatric morbidities among pregnant women in developed countries also found CMDs to be undiagnosed and left untreated in a significant number of patients.<sup>6,12,33,34</sup>

## CMDs during pregnancy and infant outcomes

Many studies have attempted to investigate the association between mental disorders during pregnancy and possible effects on infant outcomes. Notwithstanding, results are still conflicting. Low birth weight in term

pregnancies is an already known marker of intrauterine growth restriction and can result in high levels of maternal steroids during the prenatal period.<sup>5</sup> Because maternal stress results in increased levels of cortisol, this would suggest the hypothesis that psychological symptoms during pregnancy could lead to restricted intrauterine growth.

CMDs have been widely studied as a factor predicting changes in birth and child development.<sup>35</sup> However, because the concept of CMD involves the sociodemographic context, analysis of the results should probably make a distinction between LAMIC and developed countries.

### **Low- and middle-income countries (LAMIC)**

#### ***Positive results***

A cohort study in India found that maternal CMD was associated with a higher risk of low birth weight.<sup>11</sup> However, that study did not analyze some confounding factors such as maternal nutritional status and actual length of pregnancy. In 2004, one of the authors in that same study had already identified a positive association between maternal CMD and infant growth in South Asia.<sup>10</sup> In Pakistan, a population-based prospective cohort study evaluated the effect of maternal CMD during pregnancy on the nutritional status of children and also showed that it significantly affected the nutritional status of children at 6 and 12 months of age.<sup>21</sup> In Bangladesh, a study found that maternal CMD was only associated with infant malnutrition at 12 months but not at 6 months.<sup>10</sup> In another study conducted in India and Vietnam, there was a relation between high maternal CMD and poor child nutritional status after adjustment for all potential confounders.<sup>14</sup> In sub-Saharan Africa, using adjusted multivariable models, a study found that maternal symptoms of mental disorders were associated with both overall development and most development subscales, with the exception of language.<sup>22</sup> However, given that LAMIC form a heterogeneous group, this hypothesis requires further confirmation.

Conversely, authors from Ethiopia have investigated the association between CMDs and the risk of developing major diseases of early childhood, such as diarrhea, fever, and acute respiratory infections.<sup>18</sup> Persistent symptoms of perinatal CMD were associated with increased risk of infant diarrhea in a fully adjusted model, but no association was observed with acute respiratory infections or fever after adjustment for confounding factors. Other studies have found similar associations with episodes of diarrhea and other childhood diseases in Nigeria, but none of them were adjusted for confounding factors.<sup>20</sup> Possible mechanisms underlying these associations have been postulated, but not systematically investigated.

#### ***Negative results***

Various studies disagree with the results found in Ethiopia. A prospective study including 1,065 women in the third trimester of pregnancy, recruited from the rural population of Ethiopia, investigated the effects of maternal CMD on child malnutrition.<sup>23</sup> The prevalence of CMD was 12% during pregnancy and 5% 2 months postpartum. There were no other statistically significant differences in the prevalence of underweight or stunted children when comparing mothers with high levels of CMD and those with low levels. The association between CMDs and child nutritional status was not significant after adjustment for prespecified potential confounding factors. Another Ethiopian study also failed to find associations between symptoms of prenatal CMD and infant birth weight development. Furthermore, no evidence was found of any effect of antenatal CMD on cognitive or language development.<sup>19</sup> In LAMIC as whole, authors using a prospective cohort design found that no psychosocial stressors were associated with lower mean birth weight.<sup>7</sup>

### **Developing and developed countries**

#### ***Positive results***

Results are also conflicting in developing and high-income countries.<sup>36</sup> A study conducted in France with 634 pregnant women concluded that anxiety and depression symptoms, combined with specific biomedical factors, were associated with spontaneous preterm birth.<sup>37</sup> In Brazil, a longitudinal cohort study conducted in the city of Jundiaí, state of São Paulo, found an association between stress during pregnancy and the variables low birth weight and preterm birth. That study used the non-structured interview GHQ-12 to evaluate CMDs. In another large cohort study carried out in England to investigate the association between depression and anxiety symptoms during pregnancy and low birth weight found that the association with depressive symptoms was weaker after adjustment for confounders.<sup>26</sup>

#### ***Negative results***

In Brazil, the first prospective study using the structured instrument CIS-R in a large Latin American city found no associations between CMD during pregnancy and preterm birth or low birth weight, even after adjusting for possible confounders, such as number of pregnancies, smoking, and maternal age.<sup>27</sup> Even though the prevalence of CMDs during pregnancy was high (33.6%), affecting one-third of all pregnant women, no association was found between CMDs and adverse obstetric outcomes. In Sweden, another study found no differences in birth outcomes, postpartum outcomes,



and newborn health, and no significant association between maternal depression or anxiety and low birth weight or preterm birth.<sup>38</sup> A much larger study carried out in Scandinavia and involving 1,795 pregnant women also failed to find significant differences in any of the traits among the newborns of women with depressive and/or anxiety disorders vs. the newborns of women without such diagnoses.<sup>25</sup>

## Discussion

There is a consensus that CMDs are a risk factor for the development of depressive and anxiety symptoms in the postpartum period and also with regard to the prevalence of maternal CMD.<sup>2</sup> It remains unknown whether the correct identification of CMDs in pregnant women, followed by effective treatment, would help reduce the risk of postnatal depression.<sup>4</sup>

In discussing the results for the association between CMD during pregnancy and pediatric and/or obstetric outcomes, it is important to emphasize two points: 1) the inconsistency of results, owing to the use of different research methodologies; and 2) the specific features of each country studied. Differences in methodology included the use of self-response questionnaires vs. structured interviews, different cut-off points, adjustment or not for confounding factors, distinct periods of maternal CMD, and the pediatric parameters employed. Apparently, more sophisticated studies have produced more negative results regarding the effect of CMDs on infant variables. Studies that used a structured interview, adjusted results for confounding factors, and covered various stages of pregnancy found more negative results for the association between CMDs and child development.

Other disparities between studies may be explained by the range of different settings assessed, with different cultures, socioeconomic statuses, different health systems, and different profiles and standards of maternal and child health in developing and developed countries.<sup>7</sup> Studies conducted in LAMIC tend to show that the prevalence of maternal CMDs is higher during pregnancy than in the postnatal period, underlining the importance of analyzing the impact of prenatal CMDs on postnatal variables.<sup>18-20,23</sup> In developing countries, factors such as low socioeconomic status, poor social support, and inadequate medical care have a greater impact on the emergence of mental disorders in mothers and their effects on obstetric and perinatal parameters. This probably explains why more studies reporting positive results for the impact of CMDs on low preterm and birth weight were found in low-income countries.

Furthermore, in sub-Saharan Africa, the coverage of health services is poor; this means that clinic-based studies cover a restricted portion of the population and possibly leads to bias, since women who seek help because a child is malnourished and sick is more likely to be psychologically stressed.<sup>21</sup>

In higher-income countries, in turn, the negative impact of CMDs on infants was lower, which may indicate better health conditions on the part of the mother and more health care opportunities for the infant. Further investigations of the impact of chronicity of maternal CMD on child development, comparing LAMIC and high-income countries, are needed. In the case of Ethiopia, poverty, interpersonal violence, and infant malnutrition should be targeted for intervention to reduce the loss of developmental potential in children. Also, few studies have addressed the impact of ethnic differences on perinatal mental health problems.<sup>23</sup>

In sum, there is consensus that primary care professionals involved in providing prenatal health should receive training regarding the relevance and management of CMDs. Such action can have a huge impact on public health outcomes and contribute to improving the quality of life of millions of women and their children.

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