



# Revista Brasileira de Psiquiatria

## RBPPsychiatry

Official Journal of the Brazilian Psychiatric Association  
Volume 35 • Number 1 • February/2013



### ORIGINAL ARTICLE

## Major depressive disorder during teenage pregnancy: socio-demographic, obstetric and psychosocial correlates

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Received on May 24, 2011; accepted on November 10, 2011

#### DESCRIPTORS:

Antenatal depression;  
Epidemiology;  
Major Depressive Disorder;  
Social support;  
Teenage pregnancy.

#### Abstract

**Objectives:** To describe the prevalence of Major Depressive Disorder (MDD) during pregnancy in teenage mothers and to assess its association with socio-demographic characteristics, obstetric history and psychosocial variables. **Methods:** A cross-sectional study was conducted with a sample of pregnant teenagers enrolled in the national public health system in the urban area of Pelotas, southern Brazil. MDD was assessed with the Mini International Neuropsychiatric Interview, the Abuse Assessment Screen was used to identify physical abuse within the last 12 months and during pregnancy, and social support was assessed with the Medical Outcomes Survey Social Support Scale. **Results:** Forty-three (4.94%) potential subjects refused to participate, resulting in 828 total participants. The prevalence of MDD was 17.8%, 9.2% reported they had been subjected to violence within the last 12 months, while 5.8% had suffered violence during pregnancy, and the mean (SD) overall social support score was 87.40 (11.75). After adjustment, we found the highest incidence of MDD in adolescents with less than 8 years of education, followed by those with previous episodes of MDD and those with lower overall social support. **Conclusions:** MDD is a relatively common condition in pregnant teenagers and appears to be more prevalent in young mothers who are both socioeconomically and psychosocially underprivileged.

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doi: 10.1016/j.rbp.2012.03.006

## Introduction

Teenage pregnancy has been widely recognized as a public health issue due to its high prevalence<sup>1</sup> and significant morbidity.<sup>2</sup> Adolescent mothers are reported to have a higher overall mortality rate later in life, independent of socioeconomic background.<sup>3</sup> Moreover, adverse infant outcomes, such as low birth weight,<sup>4</sup> premature birth<sup>5</sup> and infant death,<sup>6</sup> appear to be more common among children whose mothers are 15-19 years old. Additionally, when pregnancy occurs in adolescence, it is frequently related to academic failure,<sup>7</sup> unemployment<sup>8</sup> and socioeconomic deprivation.<sup>9</sup> Teenage pregnancy appears to be a stressful life event that also increases the risk of psychiatric disorders.<sup>10,11</sup>

Major Depressive Disorder (MDD) in teenagers during pregnancy has been documented as a common, albeit frequently under-detected, feature in this population,<sup>12</sup> with prevalence rates ranging between 13% and 30%,<sup>10,13-16</sup> depending on the sample characteristics and the instrument used to assess depressive symptoms, as well as the threshold for case identification. Adverse consequences of depression in pregnant adolescents include threats to the mothers' welfare, such as suicidal behavior;<sup>10</sup> harmful outcomes to the baby, such as low birth weight<sup>13</sup> and preterm birth;<sup>17</sup> and detrimental consequences for the mother-child interactions.<sup>18</sup> Thus, the understanding of risk factors for depression during pregnancy should be helpful in guiding the choice of strategies used to prevent these negative outcomes.<sup>19</sup>

Several recent studies have assessed the risk factors for depression during pregnancy, including socio-demographic characteristics, such as less education,<sup>13</sup> lower socioeconomic status<sup>20</sup> and the lack of a supportive partner;<sup>14</sup> obstetric variables, such as prior pregnancies,<sup>21</sup> unintended pregnancy<sup>22</sup> and obstetric complications;<sup>16</sup> and psychosocial conditions, such as previous depressive episodes,<sup>23</sup> stressful life events,<sup>20</sup> intimate violence<sup>24,25</sup> and lack of social support.<sup>18,20,26</sup> Among these, prior episodes of depression, the experience of intimate violence and the level of perceived social support appear to be the most relevant risk factors.<sup>23</sup>

Nevertheless, most studies of depression in pregnant teenagers have focused on the postpartum period.<sup>27</sup> Because antenatal depression is strongly related to postpartum depression,<sup>28</sup> it seems imperative to identify the factors that are associated with MDD during pregnancy in teenage mothers. Moreover, to the best of our knowledge, no prior work has assessed all of the associated factors in a single study that includes the use of a validated diagnostic interview instead of screening instruments to evaluate adolescent mothers for MDD.

Thus, the aim of our study was to describe the prevalence of MDD during pregnancy in teenage mothers, as well as to evaluate its association with aspects of socio-demographic characteristics, obstetric variables and psychosocial attributes, such as a history of violence and social support.

## Methods

### *Study type and sampling*

We conducted a cross-sectional study with a consecutive sample of pregnant teenagers (13-19 years old) who were recipients of prenatal medical assistance through the national public health

system in the urban area of Pelotas, a city in southern Brazil. Subjects were recruited between October 2009 and March 2011 in 47 primary healthcare units and in 3 public obstetric ambulatory care units. Weekly surveys of the SIS - pre-natal program of the municipal health department - were taken to identify all pregnant women enrolled in the prenatal medical assistance by the national public health system. After the identification of a potential participant, both the teenager and her parents were asked to participate in the study. If a written informed consent was obtained, a home interview was scheduled to collect data regarding psychiatric disorders, socioeconomic status, obstetric history, social support and physical abuse during pregnancy and in the last 12 months.

## Measures

### *Major Depressive Disorder*

We used a validated Portuguese version of the Mini Neuropsychiatric Interview (MINI), a short structured interview with adequate validity and reliability,<sup>29</sup> to assess current MDD. Additionally, data about any past history of major depressive episodes were collected. The interviews were conducted by psychologists who were previously trained in MINI using identical video case records.

### *Socio-demographic data*

A self-report questionnaire was used to obtain socio-demographic information: age, marital status, education, family income and occupation. The socioeconomic status was measured according to the Economic Classification for Brazil of the Brazilian Association of Population Survey Companies<sup>30</sup> in which the highest-income level is "A" and the lowest is "E".

### *Obstetric history*

We collected information regarding the gestational age of the fetus from clinical medical records. Other data, such as abortion intention ("Did you intend to abort the current pregnancy?") or abortion attempt ("Did you attempt to abort the current pregnancy?") in the current pregnancy and a history of previous pregnancies and previous abortions, were obtained through maternal self-report. Additionally, we asked if the pregnancy was planned ("Did you plan the current pregnancy, or did it just happen?") and if it was desired ("Was the current pregnancy desired?").

### *Stressful life events*

The occurrence of 24 potential stressful life events (SLE) was assessed using an adapted version of the Life Events Scale,<sup>31</sup> covering a wide range of SLE, such as divorce, death of a relative, loss of a job, health problems and school change. These data were treated both as a continuous measure and as a dichotomous variable, with a cutoff point of 5 SLE, based on the median of the sample distribution.

### *Social support*

A validated version of the Medical Outcomes Survey Social Support Scale<sup>32</sup> was employed to obtain scores regarding three dimensions of social support: positive social interaction/

affective support, emotional/information support and material support. An additional variable was created from the overall scores of social support, with missing values replaced with the median for each dimension. The scores were treated both as a continuous measure and as a dichotomous variable, with the median value for each dimension as a cut-off point. The dichotomous overall social support variable was included in the regression analysis.

### Physical and sexual abuse

A validated Portuguese version<sup>33</sup> of the Abuse Assessment Screen was used to screen for cases of physical abuse during the pregnancy and in the past 12 months. The data were collected through a self-report questionnaire that was completed in a private room.

### Statistical analysis

Data entry was accomplished using Epi-Info software, with dual keying-in and subsequent consistency checks. If any inconsistencies were identified, the questionnaires were revised, and finally, if doubt persisted, interviewees were contacted by telephone.

Univariate analysis was employed to verify sample characteristics. Associations between MDD and the others variables were verified with the Pearson chi-squared test. To estimate the individual effects of the assessed variables in MDD prevalence, we used a backward stepwise logistic regression analysis, according to a previously established hierarchical model, with the following disposition: socio-demographic variables in the first level, obstetric variables in the second, psychosocial variables (prior episodes of MDD, overall social support, physical/sexual abuse and stressful life events) in the third, and MDD as the outcome. Only variables showing  $p < .2$  remained in the model. Statistical analyses were performed with SPSS 10.0 for Windows. The results of the multiple logistic regression analysis were given with odds ratios (OR) and 95% confidence intervals (95%CI). The distribution of the continuous measures was presented as mean and standard deviation (SD).

### Ethics

The present study was approved by the committee for ethics in research of the Universidade Católica de Pelotas. The teenagers could refuse to participate, and informed consent was obtained from both the participant and her parents for those who agreed to participate. Confidentiality of the data and care with information management was assured. The participants whose screening indicated a psychiatric disorder were referred to the psychiatric clinic of the Universidade Católica de Pelotas.

### Results

Of the initial 871 pregnant adolescents identified for study inclusion, 43 (4.94%) refused to participate, resulting in 828 participants. The mean age was 17.3 (SD = 1.6) years, and the mean family income was R\$ 834.79 (SD = 685.81). The mean gestational age of the fetus was 23.1 (SD = 6.0) weeks. The majority of the subjects (78.6%,  $n = 651$ ) did not have a prior pregnancy. Most participants were living with a partner (62.9%;  $n = 521$ ), and 27.4% ( $n = 227$ ) were students. Violence

**Table 1** Sample distribution according socio-demographic characteristics, obstetric variables and psychosocial factors.

	%	n		
<b>Age</b>				
Up to 15 years old	12.0	99		
16-17 years old	36.5	302		
Above 17 years old	51.5	427		
<b>Living with partner</b>				
Yes	62.9	521		
No	37.1	307		
<b>Occupation</b>				
Work or school	40.7	337		
No occupation	59.3	491		
<b>Socioeconomic status</b>				
A + B	22.9	190		
C	60.2	498		
D + E	16.9	140		
<b>Education</b>				
Less than 5 years	15.9	132		
Between 5 and 8 years	43.1	357		
Between 8 and 11 years	31.9	264		
Between 11 and 14 years	9.1	75		
<b>Parity</b>				
Primiparae	78.6	651		
Multiparae	21.4	177		
<b>Previous abortion</b>				
No	89.5	741		
Yes	10.5	87		
<b>Planned pregnancy</b>				
No	67.8	603		
Yes	27.2	225		
<b>Desired pregnancy</b>				
No	3.1	26		
Yes	96.9	802		
<b>Abortion intention</b>				
No	86.1	713		
Yes	13.9	115		
<b>Abortion attempt</b>				
No	97.8	810		
Yes	2.2	18		
<b>Stressful life events (SLE)</b>				
Up to 5 SLE	47.6	394		
Above 5 SLE	52.4	287		
<b>Prior episode of MDD*</b>				
No	97.5	807		
Yes	2.5	21		
<b>Violence in the last 12 months</b>				
No	90.8	752		
Yes	9.2	76		
<b>Violence during pregnancy</b>				
No	94.2	780		
Yes	5.8	48		
<b>Social support</b>				
Positive social interaction/affective	42.1	57.9	349	479
Emotional/information	47.0	53.0	389	439
Material	37.0	63.0	306	522
Overall	46.1	53.9	381	447
<b>MDD</b>				
No	82.2	681		
Yes	17.8	147		

\* MDD: major depressive disorder.

in the last 12 months was reported by 9.2% (n = 76), while 5.8% (n = 48) had suffered violence during pregnancy. The mean overall social support score was 87.40 (SD = 11.75). The prevalence of MDD was 17.8% (n = 147). Table 1 shows the sample distribution according to socio-demographic characteristics, obstetric variables and psychosocial factors.

In the bivariate analysis, the socio-demographic variables significantly associated with MDD were low education (p = .001) and unemployment (p = .017). Regarding obstetric history, significant associations were found between MDD and multiparity (p = .004), undesired pregnancy (p = .001), abortion intention (p < .001) and abortion attempt (p = .027). The psychosocial conditions associated with MDD were the occurrence of 6 or more SLE (p < .001), the experience of violence in the previous 12 months (p < .001), the experience of violence during pregnancy (p < .001), a prior episode of MDD (p < .001) and low levels of social support (p < .001).

In the multiple logistic regression hierarchical approach, after adjusting for potential confounding variables, we found the highest OR of MDD in adolescents with less than 8 years of education (less than 5 years, OR: 4.06, 95%CI: 1.35 - 12.18;

between 5 and 8 years, OR 4.85, 95%CI 1.71 - 13.72), followed by those with previous episodes of MDD (OR 3.52; 95% CI 1.23 - 10.10) and in those with lower overall social support (OR 3.49; 95%CI 2.26 - 5.41). The final model coefficient was statistically significant ( $\chi^2 = 147.45$ , df = 12, n = 828, p < .001). Table 2 contains the complete data.

## Discussion

In this study, we found that the prevalence of MDD in pregnant teenagers was 17.8%. This rate is within the range found in studies with similar populations,<sup>11-14,16,34,35</sup> but is considerably lower than those found in studies with different populations.<sup>10,15,26,36</sup> This difference in prevalence may be explained by the dissimilarities in sample characteristics, as well as in the instruments used to assess depressive symptoms. The percentages of adolescents that reported suffering violence within the last 12 months (9.2%) and during pregnancy (5.8%) are somewhat lower than reported in other studies with pregnant teenagers.<sup>13,16,37,38</sup> Because

**Table 2** Logistic regression analysis with adjusted prevalence ratios (PR) and 95% confidence intervals (95%CI) for major depressive disorder (MDD) during teenage pregnancy, according to socio-demographic, obstetric and psychosocial characteristics.

	PR*	95% CI	p-value
<b>Education</b>			.006
Less than 5 years	4.06	1.35 - 12.18	
Between 5 and 8 years	4.85	1.71 - 13.72	
Between 8 and 11 years	2.89	.99 - 8.44	
Between 11 and 14 years	Reference	-	
<b>Occupation</b>			.017
Work or school	Reference	-	
No occupation	1.61	1.09 - 2.39	
<b>Parity</b>			.018
Primiparae	Reference	-	
Multiparae	1.67	1.09 - 2.55	
<b>Planned pregnancy</b>			.172
No	1.37	.87 - 2.15	
Yes	Reference	-	
<b>Desired pregnancy</b>			.007
No	3.33	1.40 - 7.94	
Yes	Reference	-	
<b>Abortion intention</b>			.006
No	Reference	-	
Yes	1.97	1.22 - 3.19	
<b>Stressful life events</b>			< .001
Up to 5 SLE	Reference	-	
Above 5 SLE	2.90	1.88 - 4.46	
<b>Prior episode of MDD</b>			.019
No	Reference	-	
Yes	3.52	1.23 - 10.10	
<b>Violence in the last 12 months</b>			.001
No	Reference	-	
Yes	2.57	1.46 - 4.52	
<b>Overall social support</b>			< .001
High	Reference	-	
Low	3.49	2.26 - 5.41	

\* Adjusted prevalence ratios: socio-demographic variables (education and occupation) were adjusted for each other; obstetric variables (parity, planned pregnancy, desired pregnancy and abortion intention) were adjusted for each other and for the socio-demographics; psychosocial variables (stressful life events, prior episode of MDD, violence in the last 12 months and overall social support) were adjusted for each other and for the other variables.

the data regarding physical abuse were collected through a self-report questionnaire that was completed in a private room, it is unlikely that this information was underreported.

Regarding socio-demographic characteristics, after adjustment for potential confounding variables, we found that adolescents with no job and a low amount of education had a significantly higher potential for MDD during pregnancy. These associations are supported in the literature<sup>10,36</sup> and suggest that depressed adolescent mothers are largely from a socioeconomically unprivileged background.

Some of the obstetric variables were significantly associated with MDD in teenage mothers, including multiparity, undesired pregnancy and the intent to abort the current pregnancy. Because our study had a cross-sectional design, we are unable to make causal inferences. However, it is possible that obstetric variables and MDD are related in two ways. First, mothers with a depressive episode could be more prone to interpret the advent of a pregnancy in a mood-congruent pessimistic way and, therefore, to perceive the birth of a child as an undesirable event. Another explanation is that an undesired pregnancy is a stressful life event, which increases the risk of depression.<sup>22</sup> Multiparity, on the one hand, could pose an additional burden to the adolescent mother who needs to care for other children while expecting another. On the other hand, it is also reported that depression could be a risk factor for repeated pregnancy in young mothers,<sup>39</sup> leading, ultimately, to multiple pregnancies. The results reported here indicate that teenagers who did not welcome the pregnancy were more likely to be depressed; this suggests that the pregnancy itself could be counted as a stressful life event.

In the logistic regression hierarchical approach, after adjustment for socio-demographic and obstetric variables, the psychosocial characteristics such as the experience of stressful life events, prior episodes of MDD, the experience of violence within the last month and a low level of social support were significantly associated with MDD during pregnancy in this sample of adolescents. These associations are extensively supported by the literature not only in teenage mothers<sup>16</sup> but also in adult mothers.<sup>23</sup> Nevertheless, studies show a complex interrelation between these factors. Data from a longitudinal investigation support the theory that the presence of depressive symptoms in young females predicts the exposure to later intimate partner violence.<sup>40</sup> Experience of violence, in turn, increases the risk of subsequent depression<sup>25</sup> and of continuing exposure to intimate partner violence,<sup>24</sup> with consequent detrimental effects on mental health. Additionally, low social support seems to predict both depressive symptoms<sup>20</sup> and the experience of violence.<sup>41</sup> In sum, the role of psychosocial risk factors still needs to be clarified in the population of pregnant teenagers.

The findings of our study should be interpreted in light of its limitations. Because our study design was cross-sectional, we were not able to make causal inferences regarding the interrelation of physical violence, social support and other variables with MDD. This issue should be further assessed with longitudinal surveys. Nevertheless, identification of the factors that are significantly associated with MDD in pregnant adolescents should help to improve recognition of this disorder. Finally, the structured interview we used had some limitations, particularly the inability to detect

sub-threshold symptoms of depression that can be prevalent in this population. However, our objective was to identify factors that are associated with Major Depressive Disorder, a condition that requires adequate treatment.

Because antenatal depression is a strong predictor of postpartum depression,<sup>28</sup> understanding the associated factors could help health providers design programs for early diagnosis and appropriate treatment. These efforts should be made to prevent or at least to minimize the impact of postpartum depression. In these sense, our study identified particular characteristics of pregnant teenagers, including low socioeconomic status, an undesired pregnancy, multiparity, low social support, stressful life events, and physical abuse, that may lead to MDD and, thus, suggest referral for psychological assessment.

## Conclusions

Our study supports the view that Major Depressive Disorder in pregnant teenagers is a relatively common condition. Moreover, MDD seems to be more frequent in young mothers who are both socioeconomically and psychosocially deprived.

## Acknowledgements

This work was supported by Brazilian research grants from CNPq, CAPES, PRONEX (CNPq/ FAPERGS - Project IVAPSA).

## Disclosures

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CNPq= Conselho Nacional de Desenvolvimento Científico e Tecnológico;

FAPERGS= Fundação de Amparo à Pesquisa do Estado do Rio Grande do Sul.

\* Modest

\*\* Significant

\*\*\* Significant. Amounts given to the author's institution or to a colleague for research in which the author has participation, not directly to the author.

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