International Journal of Public Health (2020) 65:197–205
https://doi.org/10.1007/s00038-019-01311-3

ORIGINAL ARTICLE

Childhood trauma and depressive symptoms in pregnant adolescents in Southern Brazil

Renata Aver Bretanha Ribeiro[1] · Bárbara Borges Rubin[1] · Rochele Dias Castelli[1] · Mariana Bonati de Matos[1] · Fernanda Teixeira Coelho[1] · Fábio Monteiro da Cunha Coelho[1] · Karen Amaral Tavares Pinheiro[1] · Ricardo Azevedo da Silva[1] · Luciana de Avila Quevedo[1] · Ricardo Tavares Pinheiro[1]

Received: 31 October 2018 / Revised: 24 October 2019 / Accepted: 29 October 2019 / Published online: 19 November 2019

Abstract

Objectives This study aimed to investigate the association between child maltreatment and depressive symptomatology during gestation in adolescents.

Methods This was a cross-sectional study with pregnant adolescents aged 12 to 19 years. Data were collected with the Beck Depression Inventory, Childhood Trauma Questionnaire, and Mini International Neuropsychiatric Interview.

Results Compared to adolescents who did not experience each type of neglect or abuse, experiencing them was associated with a higher proportion of depressive symptoms: emotional neglect PR = 1.4 (95% CI 1.1; 1.8); physical neglect PR = 1.7 (95% CI 1.3; 1.7); emotional abuse PR = 1.8 (95% CI 1.4; 2.2); and physical abuse PR = 1.3 (95% CI 1.1; 1.7).

Conclusions This study demonstrates the association between childhood experiences and mental health in adolescence, especially in vulnerable samples, such as pregnant adolescents. This finding reveals the importance of studying early trauma in life and enabling preventive help, especially in adolescents. High-quality evidence of perinatal mental health problems should be generated to make pregnancy safer for women in low- and middle-income countries.

Keywords Childhood trauma · Depression · Pregnancy · Pregnancy adolescents · Adolescence · Depressive symptoms · Trauma · Abuse · Pregnant

Introduction

According to the United Nations Population Fund (UNFPA) report, Brazil ranks seventh in the world among countries with a high number of adolescents and ranks fourth among the 10 countries with the largest number of women who had a child before the age of 18. These data demonstrate the need for greater attention to Brazilian teenage girls given their high risk of becoming pregnant (Loaiza and Liang 2013).

Pregnancy and the postpartum period are considered periods of increased risk of mental disorders, with depression being the most prevalent disorder (Figueiredo et al. 2007). A study conducted in southern Brazil showed a prevalence of depression among pregnant women of 20.5% (Silva et al. 2012), similar to the prevalence of the disorder in the USA (20%) (Leung and Kaplan 2009). When pregnancy occurs in adolescence, the prevalence of depression increases to 28% (Hodgkinson et al. 2010). In addition, adolescents who are both pregnant and depressed are at increased risk for preterm deliveries, low-birth-weight infants, and other obstetric complications that may lead to hospitalization (Brown et al. 1991; Ferri et al. 2007; Fraser et al. 1995; Hodgkinson et al. 2010; Pereira et al. 2010).

Depression is associated with several risk factors previously reported in the literature, such as low socioeconomic status, low education, previous history of depression, smoking, stressful events, suicide risk, violence, and childhood trauma (Abujilban et al. 2014; Lara et al. 2015; Silva et al. 2012). Childhood trauma can be understood as a child's exposure to any psychological or physical event that promotes a breakdown in the child's perception of safety and integrity. This breakdown results

✉ Luciana de Avila Quevedo
lu.quevedo@bol.com.br

[1] Postgraduate Programme in Health and Behavior, Catolic University of Pelotas-UCPel, Pelotas, RS, Brazil

in high levels of anxiety, exposure to threats, and feelings of helplessness, which can cause serious changes in the child's psyche. Such exposure may be in the form of physical, psychological, or sexual trauma and/or neglect (World Health Organization & International Society for Prevention of Child Abuse and Neglect 2006).

A recent meta-analysis showed that psychological abuse and neglect suffered in childhood had a greater association with depressive symptoms in adulthood than did sexual abuse (Infurna et al. 2016). However, another meta-analysis indicated that physical and/or sexual abuse was more strongly associated with anxiety and depressive disorders throughout life (Lindert et al. 2014). Both studies showed that all types of traumas were significantly associated with depression. Therefore, it is important to note that one type of abuse is not worse than another, and every type of abuse requires attention given the known consequences of childhood abuse over a lifetime.

According to Infurna et al. (2016), although several studies have investigated the association between trauma in childhood and depression, most have not assessed the influence of different types of traumas, which, according to the author, limits their findings. In addition, little is known about this association in populations considered at risk, such as pregnant adolescents. Adolescent pregnancy is considered a critical period characterized by the highest vulnerability to the occurrence of depression (Hodgkinson et al. 2010). However, it is important to identify factors that may be associated with the disease, such as childhood trauma, to minimize the risks of the disorder and particularly to contribute to its prevention. In this sense, this study intends to deepen the understanding of the association between childhood trauma and depression in this population because the current literature remains controversial.

Thus, the objective of this study was to investigate the association between child maltreatment and depressive symptomatology during gestation in adolescents living in urban areas of a city in southern Brazil.

Methods

We conducted a cross-sectional study with a sample of pregnant adolescents aged 12 to 19 years who were receiving prenatal care in the national public health system in the urban area of Pelotas. The city is medium-sized, with approximately 330,000 inhabitants. Between October 2009 and March 2011, adolescents were invited to participate in the study during visits to 47 primary healthcare units and three public obstetric clinics across the city. Home interviews were conducted through printed questionnaires administered by trained interviewers. Pregnant adolescents who were unable to respond to and/or understand the research tools due to physical and/or cognitive problems were excluded from the study. The refusal rate was 4%.

To evaluate depressive symptoms during gestation, we used the Beck Depression Inventory (BDI). This inventory is a self-administered instrument composed of 21 items that investigate depressive symptoms, each with four alternative responses ranging from 0 to 3 points. The sum of the scores ranges from 0 to 63 points. The results were dichotomized (indication of depression/no indication of depression), and pregnant women who scored 13 points or more had an indication of depression (Beck et al. 1996; Cunha 2001).

Childhood trauma was evaluated using the Childhood Trauma Questionnaire (CTQ), which is a self-report scale that investigates the history of childhood neglect and/or abuse in five trauma domains: physical abuse (e.g., "Somebody in my family hit me so much that it left me with marks or bruises"), emotional abuse (e.g., "I thought that my parents wished I had never been born"), sexual abuse (e.g., "Someone tried to make me do or watch sexual things"), emotional neglect (e.g., "My family was a source of strength and support"), and physical neglect (e.g., "I had to wear dirty clothes"). The Brazilian translated and adjusted version is appropriate for evaluating people older than 12 years of age. The CTQ is a self-report questionnaire consisting of 28 items, and the result of the instrument is given through the sum of the items, with an inverted score for the domain "Emotional Neglect." In this study, the following cutoff points were used: physical abuse (15), emotional abuse (15), sexual abuse (8), emotional neglect (15), and physical neglect (10), indicating the presence or absence of trauma in each domain (Grassi-Oliveira et al. 2006).

To investigate the past depressive episodes, we used the Mini International Neuropsychiatric Interview (MINI PLUS), which is a semistructured diagnostic interview based on the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) and International Classification of Diseases-10 (ICD-10) criteria. The MINI comprises 19 modules that explore 17 DSM-IV axis I disorders, the risk of suicide, and antisocial personality disorder. In this study, we used only the "A" module, which investigates the presence or absence of a depressive episode. For the statistical analyses, we considered the presence of a past depressive episode, which was evaluated by the identification of depressive symptoms in the past based on the filter questions, "Have you ever felt sad, discouraged, depressed: most of the day, almost every day, for at least 2 weeks?" and/or "Have you ever had the feeling of not liking anything or have you lost interest and pleasure in the things you usually enjoy most of the time for at least 2 weeks?" (Amorim 2000). The results of the MINI and BDI were not compared. The diagnoses were made by

interviewers trained and supervised by an experienced psychologist.

We assessed socioeconomic class using the Brazilian Economic Classification Criteria of the Brazilian Association of Research Companies (2013). This classification is based on the accumulated material assets of the family and the education of the head of the family. Subjects are categorized into five classes from A (highest socioeconomic status) to E (lowest socioeconomic status). For this study, the classes were grouped as follows: high classes (A + B), middle class (C), and lower classes (D + E).

We used a self-report questionnaire to obtain sociodemographic and health data. Age (up to 15 years/16 to 19 years), education in years of study (up to 3 years/4 to 7 years/8 to 10 years/11 years or more), socioeconomic and marital status (lives with partner: no/yes), information on tobacco use (no/yes), and history of family psychiatric illness (no/yes) were also collected. All the instruments were applied during the gestational period.

Statistical analyses

The descriptive analysis was obtained by absolute and relative frequency, and the bivariate analysis was performed through the chi-square test to compare the proportions. In the multiple regressions, the raw and adjusted analyses were performed using the Poisson regression with robust variance adjustment. This model is indicated in cross-sectional studies with binary outcomes because it produces estimates of the prevalence ratio (PR) with its respective 95% confidence intervals, which avoids overestimation of the results (Barros and Hirakata 2003). The variables that presented $p \leq 0.20$ in the crude analysis were included in the adjusted analysis (Victora et al. 1997).

The adjusted analysis was performed with the objective of controlling possible confounding factors and followed a conceptual hierarchical model. This model is divided into levels and assumes that variables located at the hierarchically higher level are determinants of the lower levels (Victora et al. 1997). The model proposed for this analysis had three levels: socioeconomic class, age, education, living with partner (1° level); smoking, family psychiatric history, past depressive episode (2° level); and emotional neglect, physical neglect, emotional abuse, physical abuse, sexual abuse (3° level). In this regression model, the variables were controlled using the same or previous levels, and it was decided a priori that the variables that presented statistically significant associations ($p \leq 0.05$) would be maintained in the model. However, the variables of the last level (types of traumas) were included separately in the model due to their collinearity.

Thus, the selection of the variables occurred as follows: The model began with only the variables of the 1st level (socioeconomic class, age, education, living with partner), and all the variables that presented statistically significant associations ($p \leq 0.05$) were maintained in the model. Then, the variables of the second level (smoking, family psychiatric history, and past depressive episode) were included, and all the variables that presented statistically significant associations ($p \leq 0.05$) were maintained in the model along with those that remained at the first level (education, family psychiatric history, and past depressive episode). Finally, each third-level variable (emotional neglect, physical neglect, emotional abuse, physical abuse, and sexual abuse) was included separately with the remaining variables from the first and second levels (education, family psychiatric history, and past depressive episode). Table 3 shows the comparison between depression and the number of traumas in childhood using ANOVA. All statistical analyses were conducted in the STATA program version 12.0 (2011).

The present study was approved by the Ethics Committee of the Catholic University of Pelotas (protocol 2007/95). Informed consent was obtained from all participants included in the study or their parents. All participants whose screening indicated the presence of depression at the time of evaluation (during gestation) were referred to the psychiatric clinic of the Catholic University of Pelotas.

Results

The sample consisted of 869 pregnant adolescents. The prevalence of depressive symptoms was 29.2%. In terms of the characteristics of the sample, 62.4% of the participants were classified as belonging to the middle socioeconomic class (C), 88.1% were 16 to 19 years old, 43.1% had between 4 and 7 years of education, and 62.7% lived with a partner. Regarding smoking and mental health characteristics, 18.7% were smokers, 43.8% had a family psychiatric history, and 9.9% had a depressive episode in the past. Regarding childhood trauma, 14.3% had suffered emotional neglect, 12.6% had suffered physical neglect, 13.9% had suffered emotional abuse, 10.4% had suffered physical abuse, and 7.1% had suffered sexual abuse (Table 1). Bivariate analysis showed that the pregnant adolescents of the lower socioeconomic classes ($p = 0.038$), those who had less education ($p < 0.001$), those who smoked ($p = 0.018$), those who had psychiatric history in the family ($p < 0.001$), and those who had a past depressive episode ($p < 0.001$) had significantly more depressive symptoms. For childhood trauma, all types of traumas were positively associated with depressive symptomatology ($p < 0.05$) (Table 1).

In the adjusted analysis, we verified that adolescents with up to 3 years of education presented 3.3 (CI 95% 1.7;

Table 1 Demographic, socioeconomic, behavioral, and childhood trauma characteristics of pregnant adolescents, Pelotas, state of Rio Grande do Sul, Brazil (2009–2011)

Variables		Depressive symptoms (BDI)		*p* value
		No *N* (%)	Yes *N* (%)	
Socioeconomic class (*N* = 850)				0.038
High classes (A + B)	106 (12.5)	72 (75.0)	24 (25.0)	
Middle class (C)	530 (62.4)	366 (72.2)	141 (27.8)	
Lower classes (D + E)	214 (25.2)	131 (64.9)	71 (35.1)	
Age (years)				0.062
Until 15 years	103 (11.9)	61 (62.2)	37 (37.8)	
16 to 19 years	766 (88.1)	521 (72.0)	203 (28.0)	
Education (years de estudo) (*N* = 868)				< 0.001
Until 3 years	142 (16.4)	77 (55.8)	61 (44.2)	
4 to 7 yeans	374 (43.1)	234 (67.8)	111 (32.2)	
8 to 10 years	276 (31.8)	209 (78.0)	59 (22.0)	
11 years or more	76 (8.8)	61 (87.1)	09 (12.9)	
Lives with partner (*N* = 868)				0.180
No	324 (37.3)	209 (67.9)	99 (32.1)	
Yes	544 (62.7)	372 (72.5)	141 (27.5)	
Smoking (*N* = 867)				0.018
No	705 (81.3)	485 (72.6)	183 (27.4)	
Yes	162 (18.7)	95 (62.5)	57 (37.5)	
Family psychiatric history (*N* = 860)				< 0.001
No	483 (56.2)	353 (78.1)	99 (21.9)	
Yes	377 (43.8)	226 (62.4)	136 (37.6)	
Past depressive episode (*N* = 865)				< 0.001
No	779 (90.1)	555 (74.9)	186 (25.1)	
Yes	86 (9.9)	25 (31.6)	54 (68.4)	
Emotional neglect (*N* = 854)				< 0.001
No	732 (85.7)	510 (73.2)	187 (26.8)	
Yes	122 (14.3)	61 (54.0)	52 (46.0)	
Physical neglect (*N* = 857)				< 0.001
No	749 (87.4)	524 (73.2)	191 (26.8)	
Yes	108 (12.6)	53 (54.1)	45 (45.9)	
Emotional abuse (*N* = 858)				< 0.001
No	739 (86.1)	526 (74.7)	178 (25.3)	
Yes	119 (13.9)	48 (44.0)	61 (56.0)	
Physical abuse (*N* = 853)				< 0.001
No	764 (89.6)	532 (73.0)	197 (27.0)	
Yes	89 (10.4)	39 (48.1)	42 (51.9)	
Sexual abuse (*N* = 833)				0.036
No	774 (92.9)	532 (71.7)	210 (28.3)	
Yes	59 (7.1)	29 (56.9)	22 (43.1)	
Total	869 (100.0)	583 (70.8)	240 (29.2)	–

BDI Beck Depression Inventory

6.5) times more depressive symptomatology than those with 11 or more years of education. Similarly, the women who had 4 to 7 years of education presented 2.4 (CI 95% 1.3; 4.6) times more depressive symptoms than those with 11 or more years of education.

The pregnant adolescents who had a family psychiatric history had 1.6 (CI 95% 1.3; 1.9) times more depressive

symptomatology than those who did not have a family psychiatric history. Pregnant adolescents who had a past depressive episode had 2.4 (CI % 2.0; 3.0) times more depressive symptoms than those who had not had a past depressive episode.

Pregnant adolescents who had suffered emotional neglect presented 1.4 (CI 95% 1.1; 1.8) times more depressive symptoms than those who had not. Adolescents who had suffered physical neglect had 1.3 (CI 95% 1.0; 1.7) times more depressive symptoms than those who had not. Moreover, the proportion of depressive symptoms was 1.8 (CI 95 1.4; 2.2) times higher in women who had suffered emotional abuse in childhood and 1.3 (CI 95% 1.1; 1.7) times higher in those who suffered physical abuse than in those who had not (Table 2).

Table 3 compares the means of depression with the number of traumas accumulated in childhood. As the number of accumulated traumas increases, the mean of depressive symptoms increases ($p \leq 0.000$) (Table 3).

Discussion

The present study verified the association between child maltreatment and depressive symptomatology in pregnant adolescents. The high prevalence of depressive symptoms found is in agreement with other studies with similar samples. This high prevalence can be explained by the fact that adolescence is usually marked by conflicts characteristic of the phase itself, in which the adolescent is more vulnerable to stressful events and experiences them with greater intensity (Gilbert and Irons 2008). In addition, pregnancy is considered a period of great vulnerability to the occurrence of mental disorders, with depression being the most prevalent disorder. Geronimus (2004) also notes that there are other factors, especially unfavorable socioeconomic and cultural factors that typically characterize girls who become pregnant during adolescence and that may also contribute to the occurrence of depression. The traumas assessed in this study included physical neglect, emotional neglect, physical abuse, emotional abuse, and sexual abuse. We found that childhood trauma was associated with depressive symptoms in all domains except sexual abuse. Emotional abuse was the type of trauma that showed the greatest association with depressive symptomatology. This type of trauma generally includes experiences of rejection, provocation, fear, and isolation (Hart et al. 1987), which, according to Kaplan et al. (1999), can lead to internalization symptoms, leading to depression. Our results were in agreement with Shapero et al. (2014), who indicated that the greater the severity of emotional abuse in childhood, the greater the depressive symptoms, especially in adverse situations, such as adolescent pregnancy.

Physical abuse was also associated with depressive symptomatology. A meta-analysis conducted by Lindert et al. (2014) found that all studies demonstrated an increase in depression in those individuals who reported physical abuse in childhood. The *National Epidemiologic Survey on Alcohol and Related Conditions* (NESARC) study, performed in the USA, found that individuals who had experienced physical abuse in childhood had a significantly increased risk of various psychiatric disorders and suicide attempts. According to the study, the presence of physical abuse is related to a hostile environment and is often concomitant with other forms of abuse, thereby increasing the risk of the development of depression (Bolger and Patterson 2001; Sugaya et al. 2012).

We also verified that both emotional and physical neglects were associated with depressive symptoms. Neglect can be defined as the degree to which the caregiver does not provide the emotional conditions and/or materials necessary for the healthy development of the child. According to Infurna et al. (2016), psychological abuse and neglect represent two extreme polarities of child maltreatment. Whereas psychological abuse is a relevant form of maltreatment in which the caregiver voluntarily degrades, humiliates, and terrorizes the child, neglect is an important form of maltreatment by omission in which the child is deprived of basic needs such as food, care, protection, and affection. This deprivation can cause feelings of impotence in the child as well as reduced self-esteem, which can subsequently lead to depressive symptoms.

The sexual abuse domain was not associated with depressive symptoms. Our findings were contrary to the literature, which demonstrates significant associations between past experiences of sexual abuse with depression. A meta-analysis indicated a significant increase in depression in individuals who had suffered sexual abuse in childhood; however, the authors did not investigate emotional abuse or neglect, which may have influenced the outcomes (Lindert et al. 2014). A more recent meta-analysis indicated a lower (though still significant) impact of sexual abuse on individuals' mental health when compared to neglect and emotional abuse (Infurna et al. 2016). One possible explanation for our findings is that people who have suffered some types of traumas, such as sexual abuse, may not report or even remember them due to the threat of psychological imbalance resulting from the trauma, thus making it difficult to investigate the topic (Barbosa et al. 2014; Moreno and Coelho Junior 2012). In addition, our finding should be interpreted with caution because our sample (i.e., pregnant adolescents) was not comparable to the large and diverse samples in the studies included in the Lindert et al. (2014) and Infurna et al. (2016) meta-

Table 2 Raw and adjusted prevalence ratio (PR) and 95% confidence intervals (CIs) from Poisson regressions examining the relationship between childhood trauma and depressive symptoms in pregnant adolescents, Pelotas, state of Rio Grande do Sul, Brazil (2009–2011)

Variables	Depressive symptoms (BDI)			
	Raw analysis PR (CI 95%)	*p* value	Adjusted analysis PR (CI 95%)	*p* value
1° level				
Socioeconomic class		0.087		
A and B	1.0	–	1.0	–
C	1.1 (0.8; 1.6)	0.577	0.9 (0.6; 1.4)	0.759
D and E	1.4 (0.9; 2.1)	0.090	1.1 (0.7; 1.6)	0.723
Age (years)		0.037		0.591
Until 15 years	1.3 (1.0; 1.8)		1.1 (0.8; 1.4)	
16 to 19 years	1.0		1.0	
Education (years)		< 0.001		
Until 3 years	3.4 (1.8; 6.5)	< 0.001	3.3 (1.7; 6.5)	< 0.001
4 to 7 years	2.5 (1.3; 4.7)	0.004	2.4 (1.3; 4.6)	0.008
8 to 10 years	1.7 (0.9; 3.3)	0.105	1.7 (0.9; 3.2)	0.124
11 years or more	1.0	–	1,0	–
Lives with partner		0.153		0.135
No	1.2 (0.9; 1.4)		1.2 (0.9; 1.5)	
Yes	1.0		1.0	
2° level				
Smoking		0.010		0.472
No	1.0		1.0	
Yes	1.4 (1.2; 1.7)		1.1 (0.9; 1.4)	
Family psychiatric history		< 0.001		< 0.001
No	1.0		1.00	
Yes	1.7 (1.4; 2.1)		1.6 (1.3; 1.9)	
Past depressive episode		< 0.001		< 0.001
No	1.0		1.0	
Yes	2.7 (2.2; 3.3)		2.4 (2.0; 3.0)	
3° level				
Emotional neglect		< 0.001		0.004
No	1.0		1.0	
Yes	1.7 (1.3; 2.2)		1.4 (1.1; 1.8)	
Physical neglect		< 0.001		0.037
No	1.0		1.0	
Yes	1.7 (1.3; 2.2)		1.3 (1.0; 1.7)	
Emotional abuse		< 0.001		< 0.001
No	1.0		1.0	
Yes	2.2 (1.8; 2.7)		1.8 (1.4; 2.2)	
Physical abuse		< 0.001		0.017
No	1.0		1.0	
Yes	1.9 (1.5; 2.4)		1.3 (1.1; 1.7)	
Sexual abuse		0.014		0.104
No	1.0		1.0	
Yes	1.5 (1.1; 2.1)		1.3 (0.9; 1.8)	

BDI Beck Depression Inventor

Table 3 Comparison between Beck Inventory Depression means with accumulation of number of traumas in childhood, Pelotas, state of Rio Grande do Sul, Brazil (2009–2011)

Accumulation number of childhood trauma	*N*	BDI Mean (SD)*	CI (95%)	*p* value
0	528	8.4 (7.5)	7.7; 9.0	≤ 0.000
1	125	13.1 (10.0)	11.2; 14.8	
2	59	14.8 (12.4)	11.8; 18.3	
3 or more	53	15.8 (12.2)	12.5; 19.4	
Total	765	10.1 (9.2)	9.5; 10.8	

Beck Inventory Depression

*ANOVA

analyses. It should also be noted that the confidence interval was close to unity.

The sociodemographic characteristics associated with depressive symptoms in pregnant adolescents were less education, family psychiatric history, and the presence of a past depressive episode. Regarding the relationship between low education and depressive episodes, one study suggested that adolescents and depressed mothers are mostly of nonprivileged socioeconomic origin, which includes low education (Coelho et al. 2013). Our results also showed that adolescents with a history of psychiatric disorders in the family had greater depressive symptomatology during pregnancy. This finding is consistent with the findings of a study conducted in the same city; however, that study found such an association only in the postpartum period (Silva et al. 2012). Regarding the presence of a past depressive episode, studies have shown that having previous depressive symptoms significantly increases the risk of perinatal depression, which corroborates our findings (Coelho et al. 2013; Meltzer-Brody et al. 2013). In addition, it is well reported in the literature that the rate of recurrence of depressive symptoms is high at any time during life (Hammen and Brennan 2003; Joormann and Gotlib 2007; Kendler et al. 1999). However, our findings highlight the importance of attention to pregnant women who have already presented depressive symptoms because the risk is even greater during pregnancy, which is considered a phase of greater vulnerability.

We also found that the accumulation of traumas was related to depressive symptoms. Some studies have demonstrated a relationship between trauma accumulation and posttraumatic stress disorder and negative emotions (Kronenberg et al. 2010). The findings of these studies suggest that the extent of exposure prior to trauma, including variations in type and time, may be related to a particular form of coping that has been associated with an increased risk of mental health problems (Vaughn-Coaxum et al. 2018). In the present study, it was not possible to verify the moment of trauma, which would be an important factor to evaluate in human development.

The limitation of this study is the fact that data related to childhood trauma were obtained through a self-report instrument. Some people may not respond accurately to the instrument or even remember the experiences about which the instrument inquires. In addition, depressed individuals tend to remember and report trauma more easily than nondepressed individuals because of the rumination characteristic of depressive disorders (Lara et al. 2015). However, the instrument used in this study to investigate childhood trauma is widely used in research worldwide (Barbosa et al. 2014; Negele et al. 2015; Tekin et al. 2016) and has the advantage of evaluating the contribution of each type of trauma separately, which reduces the likelihood of overestimating the effect of some trauma (Infurna et al. 2016).

This study was able to demonstrate the association between childhood traumatic experiences and mental health in adolescence, especially in vulnerable samples, such as pregnant adolescents. It should be noted that this study was conducted in a developing country, where until a short time ago, studies on maternal health prioritized the prevention of pregnancy-related deaths. Thus, high-quality evidence on perinatal mental health problems should be generated, especially at the local level, to make pregnancy safer for women in low- and middle-income countries (Fisher et al. 2012). In addition, it is important to note that the meta-analysis in 2018 found that parental trauma can influence how parents interact with their children, decreasing the quality of interaction with their children. This finding demonstrates the importance of studying trauma early in an individual's life, which can have a preventive effect, especially in adolescents (Montgomery et al. 2019).

To our knowledge, this study is the first to be performed in Brazil with a sample of these characteristics. There is a need for more studies with population samples, especially in Brazil, considering the importance of devising new strategies to prevent and intervene in childhood trauma as well as to promote the health of this population.

The present study was approved by the research ethics committee of the Catholic University of Pelotas (protocol 2007/95). All participants provided informed consent. The authors report no conflicts of interest.

Funding National Council of Scientific and Technological Development (CNPq).

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all participants included in the study or their parents.

References

Abujilban SK, Abuidhail J, Al-Modallal H, Hamaideh S, Mosemli O (2014) Predictors of antenatal depression among Jordanian pregnant women in their third trimester. Health Care Women Int 35:200–215. https://doi.org/10.1080/07399332.2013.817411

Amorim P (2000) Mini International Neuropsychiatric Interview (MINI): validation of a short structured diagnostic psychiatric interview. Braz J Psychiatry 22:106–115. https://doi.org/10.1590/S1516-44462000000300003

Barbosa LP, Quevedo L, Silva GDGD, Jansen K, Magalhães P, Pinheiro RT, Silva RA (2014) Relationship between maternal depression as a risk factor for childhood trauma and mood disorders in young adults. Arch Clin Psychiatry (Sao Paulo) 41:72–76. https://doi.org/10.1590/0101-60830000000014

Barros AJ, Hirakata VN (2003) Alternatives for logistic regression in cross-sectional studies: an empirical comparison of models that directly estimate the prevalence ratio. BMC Med Res Methodol 3:21. https://doi.org/10.1186/1471-2288-3-21

Beck AT, Steer RA, Brown GK (1996) Manual for the Beck depression inventory II. Psychological Corporation, San Antonio

Bolger KE, Patterson CJ (2001) Developmental pathways from child maltreatment to peer rejection. Child Dev 72:549–568. https://doi.org/10.1111/1467-8624.00296

Brazilian Association of Research Companies (2013) Brazilian Economic Classification Criteria. http://www.abep.org/. Accessed 31 May 2019

Brown HL, Fan YD, Gonsoulin WJ (1991) Obstetric complications in young teenagers. South Med J 84:46–48. https://doi.org/10.1097/00007611-199101000-00012

Coelho FMC, Pinheiro RT, Silva RA, Quevedo LA, Souza LDM, Castelli RD, Matos MB, Pinheiro KAT (2013) Major depressive disorder during teenage pregnancy: socio-demographic, obstetric and psychosocial correlates. Braz J Psychiatry 35:051–056. https://doi.org/10.1016/j.rbp.2012.03.006

Cunha JÁ (2001) Manual of the Portuguese version of the Beck scales. Casa do Psicólogo, São Paulo

Ferri CP, Mitsuhiro SS, Barros MC, Chalem E, Guisburg R, Patel V, Prince M, Laranjeira R (2007) The impact of maternal experience of violence and common mental disorders on neonatal outcomes: a survey of adolescent mothers in Sao Paulo, Brazil. BMC Public Health 7:209. https://doi.org/10.1186/1471-2458-7-209

Figueiredo B, Pacheco A, Costa R (2007) Depression during pregnancy and the postpartum period in adolescent and adult Portuguese mothers. Arch Womens Ment Health 10:103–109. https://doi.org/10.1007/s00737-007-0178-8

Fisher J, Cabral de Mello M, Patel V, Rahman A, Tran T, Holton S, Holmes W (2012) Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: a systematic review. Bull World Health Organ 90:139–149H. https://doi.org/10.2471/blt.11.091850

Fraser AM, Brockert JE, Ward RH (1995) Association of young maternal age with adverse reproductive outcomes. N Engl J Med 332:1113–1118. https://doi.org/10.1056/nejm199504273321701

Geronimus AT (2004) Teenage childbearing as cultural prism. Br Med Bull 69:155–166. https://doi.org/10.1093/bmb/ldh019

Gilbert P, Irons C (2008) Shame, self-criticism, and self-compassion in adolescence. Adolesc Emot Dev Emerg Depress Disord. https://doi.org/10.1017/CBO9780511551963.011

Grassi-Oliveira R, Stein LM, Pezzi JC (2006) Translation and content validation of the Childhood Trauma Questionnaire into Portuguese language. Rev Saúde Públ 40:249–255. https://doi.org/10.1590/S0034-89102006000200010

Hammen C, Brennan PA (2003) Severity, chronicity, and timing of maternal depression and risk for adolescent offspring diagnoses in a community sample. Arch Gen Psychiatry 60:253–258. https://doi.org/10.1001/archpsyc.60.3.253

Hart S, Germain R, Brassard M (1987) The challenge: to better understand and combat psychological maltreatment of children and young. In: Brassard M, Germain R, Hart S (eds) Psychological maltreatment of children and youth. Pergamon, New York, pp 3–24

Hodgkinson SC, Colantuoni E, Roberts D, Berg-Cross L, Belcher HM (2010) Depressive symptoms and birth outcomes among pregnant teenagers. J Pediatr Adolesc Gynecol 23:16–22. https://doi.org/10.1016/j.jpag.2009.04.006

Infurna MR, Reichl C, Parzer P, Schimmenti A, Bifulco A, Kaess M (2016) Associations between depression and specific childhood experiences of abuse and neglect: a meta-analysis. J Affect Disord 190:47–55. https://doi.org/10.1016/j.jad.2015.09.006

Joormann J, Gotlib IH (2007) Selective attention to emotional faces following recovery from depression. J Abnorm Psychol 116:80–85. https://doi.org/10.1037/0021-843X.116.1.80

Kaplan SJ, Pelcovitz D, Labruna V (1999) Child and adolescent abuse and neglect research: a review of the past 10 years. Part I: physical and emotional abuse and neglect. J Am Acad Child Adolesc Psychiatry 38:1214–1222. https://doi.org/10.1097/00004583-199910000-00009

Kendler KS, Karkowski LM, Prescott CA (1999) Casual relationship between stressful life events and the onset of major depression. Am J Psychiatry 156:837–841. https://doi.org/10.1176/ajp.156.6.837

Kronenberg ME, Hansel TC, Brennan AM, Osofsky HJ, Osofsky JD, Lawrason B (2010) Children of Katrina: lessons learned about postdisaster symptoms and recovery patterns. Child Dev 81:1241–1259. https://doi.org/10.1111/j.1467-8624.2010.01465.x

Lara MA, Navarrete L, Nieto L, Le HN (2015) Childhood abuse increases the risk of depressive and anxiety symptoms and history of suicidal behavior in Mexican pregnant women. Braz J Psychiatry 37:203–210. https://doi.org/10.1590/1516-4446-2014-1479

Leung BM, Kaplan BJ (2009) Perinatal depression: prevalence, risks, and the nutrition link—a review of the literature. J Am Diet Assoc 109:1566–1575. https://doi.org/10.1016/j.jada.2009.06.368

Lindert J, von Ehrenstein OS, Grashow R, Gal G, Braehler E, Weisskopf MG (2014) Sexual and physical abuse in childhood is associated with depression and anxiety over the life course:

systematic review and meta-analysis. Int J Public Health 59:359–372. https://doi.org/10.1007/s00038-013-0519-5

Loaiza E, Liang M (2013) Adolescent pregnancy: a review of the Evidence. UNFPA. https://www.unfpa.org/sites/default/files/pub-pdf/ADOLESCENT%20PREGNANCY_UNFPA.pdf. Accessed 31 May 2019

Meltzer-Brody S, Boschloo L, Jones I, Sullivan PF, Penninx BW (2013) The EPDS-Lifetime: assessment of lifetime prevalence and risk factors for perinatal depression in a large cohort of depressed women. Arch Womens Ment Health 16:465–473. https://doi.org/10.1007/s00737-013-0372-9

Montgomery E, Just-Østergaard E, Jervelund SS (2019) Transmitting trauma: a systematic review of the risk of child abuse perpetrated by parents exposed to traumatic events. Int J Public Health 64:241–251. https://doi.org/10.1007/s00038-018-1185-4

Moreno MMA, Coelho Junior NE (2012) Trauma: the reverse of memory. Ágora (Rio J) 15:47–61. https://doi.org/10.1590/S1516-14982012000100004

Negele A, Kaufhold J, Kallenbach L, Leuzinger-Bohleber M (2015) Childhood trauma and its relation to chronic depression in adulthood. Depress Res Treat 2015:1–11. https://doi.org/10.1155/2015/650804

Pereira PK, Lovisi GM, Lima LA, Legay LF (2010) Obstetric complications, stressful life events, violence and depression during pregnancy in adolescents at primary care setting. Arch Clin Psychiatry (Sao Paulo) 37:216–222. https://doi.org/10.1590/S0101-60832010000500006

Shapero BG, Black SK, Liu RT, Klugman J, Bender RE, Abramson LY, Alloy LB (2014) Stressful life events and depression symptoms: the effect of childhood emotional abuse on stress reactivity. J Clin Psychol 70:209–223. https://doi.org/10.1002/jclp.22011

Silva R, Jansen K, Souza L, Quevedo L, Barbosa L, Moraes I, Horta B, Pinheiro R (2012) Sociodemographic risk factors of perinatal depression: a cohort study in the public health care system. Braz J Psychiatry 34:143–148. https://doi.org/10.1590/S1516-44462012000200005

Sugaya L, Hasin DS, Olfson M, Lin KH, Grant BF, Blanco C (2012) Child physical abuse and adult mental health: a national study. J Trauma Stress 25:384–392. https://doi.org/10.1002/jts.21719

Tekin A, Meriç C, Sağbilge E, Kenar J, Yayla S, Özer ÖA, Karamustafalioğlu O (2016) The relationship between childhood sexual/physical abuse and sexual dysfunction in patients with social anxiety disorder. Nord J Psychiatry 70:88–92. https://doi.org/10.3109/08039488.2015.1053097

Vaughn-Coaxum RA, Wang Y, Kiely J, Weisz JR, Dunn EC (2018) Associations between trauma type, timing, and accumulation on current coping behaviors in adolescents: results from a large, population-based sample. J Youth Adolesc 47:842–858. https://doi.org/10.1007/s10964-017-0693-5

Victora CG, Huttly SR, Fuchs SC, Olinto MT (1997) The role of conceptual frameworks in epidemiological analysis: a hierarchical approach. Int J Epidemiol 26:224–227. https://doi.org/10.1093/ije/26.1.224

World Health Organization & International Society for Prevention of Child Abuse and Neglect (2006) Preventing Child Maltreatment: a guide to taking action and generating evidence. https://apps.who.int/iris/bitstream/handle/10665/43499/9241594365_eng.pdf;jsessionid=7A892AB098B539E74A5C413AD8A949AA?sequence=1. Accessed 31 May 2019