

## The pregnancy as protection for suicidal behavior: a population-based study in south Brazil

A gestação como proteção para o comportamento suicida: um estudo de base populacional no sul do Brasil

El embarazo como la protección del comportamiento del suicidio: un estudio basado en la población en el sur de Brasil

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### ABSTRACT

**Objective:** To describe the incidence of suicidal attempts and the prevalence of suicidal ideation in pregnancy; verifying the factors associated with suicidal ideation in pregnant women. **Methods:** This analysis is a section from a population-based cohort study with pregnant women between the first and second gestational trimester, identified at their homes in the urban area from a southern Brazilian. The Mini International Neuropsychiatric Interview version Plus (MINI PLUS) was used to assess suicidal ideation and behavior. Variables with a  $p < 0.20$  value in the bivariate analysis were retained in the logistic regression-adjusted analysis using SPSS (Statistical Package for the Social Sciences) Statistics software. This study was approved by the Research Ethics Committee of the Catholic University of Pelotas. **Results:** In the baseline, 974 pregnancy women completed the diagnostic interview for evaluation of psychiatric symptoms, totaling 9.5% ( $n=93$ ) woman had current suicidal ideation. In addition, 1.3% ( $n=13$ ) of pregnant women reported a suicide attempt in the last month, and 11 of them had a history of suicidal behavior throughout their lives. **Conclusion:** Despite the presence of suicidal ideas in pregnancy, suicidal behavior is not very common at this time.

**Keywords:** Suicidal ideation, Self-Injurious behavior, Pregnancy.

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### RESUMO

**Objetivo:** Descrever as taxas de incidência de tentativa de suicídio e prevalência de ideação suicida na gestação, verificando os fatores associados à ideação suicida em gestantes. **Métodos:** Esta análise é um recorte de uma coorte de base populacional com gestantes entre o primeiro e o segundo trimestre gestacional, identificadas em seus domicílios na zona urbana de uma cidade do sul do Brasil. A *Mini International Neuropsychiatric Interview versão Plus* (MINI PLUS) foi utilizada para avaliar a ideação e o comportamento suicida. Variáveis com  $p$ -valor  $< 0.20$  na análise bivariada foram levadas para análise ajustada por regressão logística utilizando o SPSS (*Statistical Package for the Social Sciences*) Statistics software. Este estudo foi aprovado pelo Comitê de Ética em Pesquisa. **Resultados:** No *baseline*, 974 gestantes completaram a entrevista diagnóstica para avaliação dos sintomas psiquiátricos, totalizando 9.5% ( $n=93$ ) mulheres com

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ideação suicida atual. Além disso, 1.3% (n=13) das gestantes relataram tentativa de suicídio no último mês, e destas 11 tinham histórico de comportamento suicida ao longo da vida. **Conclusão:** Apesar da presença de ideias suicidas durante a gestação, o comportamento suicida é pouco incidente neste momento.

**Palavras-chave:** Ideação suicida, Comportamento autodestrutivo, Gestação.

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## RESUMEN

**Objetivo:** Describir las tasas de la incidencia los intentos del suicidio y la prevalencia la ideación suicida en el embarazo, verificando los factores asociados con la ideación suicida en las mujeres embarazadas.

**Métodos:** Este análisis es una sección de una cohorte poblacional con mujeres embarazadas entre el primer y el segundo trimestre de gestación, identificado en sus hogares en el área urbana de una ciudad del sur de Brasil. Se utilizó la versión Mini International Neuropsychiatric Interview Plus (MINI PLUS) para evaluar la ideación y el comportamiento suicidas. Las variables con valor del  $p < 0,20$  en el análisis bivariado se tomaron para el análisis ajustado por la regresión logística utilizando el software SPSS (*Statistical Package for the Social Sciences*) Statistics. Este estudio fue aprobado por el Comité de Ética en Investigación. **Resultados:** Al inicio del estudio, 974 mujeres embarazadas completaron la entrevista del diagnóstico para evaluar los síntomas psiquiátricos, totalizando el 9,5% (n=93) mujeres con ideación suicida actual. Además, el 1.3% (n=13) de las mujeres embarazadas reportaron intentos del suicidio en el último mes, y de estos 11 tenían antecedentes de comportamiento suicida a lo largo de sus vidas. **Conclusión:** A pesar de la presencia de las ideas suicidas en el embarazo, el comportamiento suicida no es muy común en este momento.

**Palabra clave:** Ideación suicida, Comportamiento autodestructivo, Embarazo.

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## INTRODUCTION

According to the World Health Organization (WHO), suicide is among the three leading causes of death among adults, accounting for 1.4% of all deaths worldwide, with rates 10 to 20 times higher when considering the attempts (BOTEGA NJ, 2014). Brazil is among the ten countries with the highest number of suicides in the world, being recognized as a global public health problem (WORLD HEALTH ORGANIZATION, 2014). The term suicidality covers suicidal ideation (serious thoughts about taking one's own life), suicide plans and suicide attempts, involving self-injury with the intent to end one's life (NOCK MK, et al., 2008; LUO M, et al., 2018).

Regarding the gender differences, 2012 data showed that 10.7 men and 3.4 women by 100.000 people took their own lives (MOURA ECD, et al., 2015). In Brazil, suicidal behavior rates are three times higher among men in all regions, but the highest growth has been recorded among women, with the highest mortality in the southern region. Therefore, males have a higher prevalence of suicide, while females have a higher rate of attempts, with death being the most frequent outcome among men than women (VIEIRA RG, et al., 2017).

Some periods of the life cycle may leave the individual more vulnerable to suicide risk. Pregnancy, for example, is an event that involves numerous physiological and psychological changes and understanding and distinguishing these characteristics is important, especially among pregnant women. The hormonal changes induce rapid increased levels of estrogen and progesterone, which have been linked to symptoms of depression in pregnancy and postpartum (HENDRICK V, et al., 1998; SCHILLER CE, et al. 2014). Therefore, this period is directly associated with the onset or exacerbation of some psychological symptoms, such as suicidal ideation.

Studies examining maternal mental health have been the focus of greater attention and highlight that pregnant women are at increased risk of suicidal thoughts and behaviors compared to the general population (GENTILE S, et al. 2011; ONAH MN, et al., 2017). During pregnancy, suicidal behavior has been reported at rates ranging from 2.7% to 14.0% (PINHEIRO RT, et al., 2008; GAUSIA K, et al., 2009; GAVIN AR, et al., 2011) and a higher prevalence (33.0%) in a sample of women with a history of neuropsychiatric disease (NEWPORT DJ, et al., 2007).

With regards to suicidal ideation, studies suggest that in some cases, suicidal ideation is considered a predictor of further suicide attempt (GELAYE B, et al., 2016). Although suicidal ideation is an important factor of suffering, few studies address this issue, especially in pregnant women, where 35% of suicide ideation was found to be prevalent (NEWPORT DJ, et al., 2007). Conversely, some studies have showed that suicide risk occur at a lower rate during the pregnancy and the postpartum period than in the general population. This finding reinforces the need for further investigation regarding this particular problem (BOUCHIAT-COUCHOURON S, et al., 2009; WALLACE ME, et al., 2016).

In addition, it is also important to identify the risk factors that are more relevant to this population, since there is no consensus in the literature on the factors associated with suicidality. Benute GEG, et al. (2011) found no sociodemographic data related to these symptoms, while others studies describe that suicidality during pregnancy may be associated with some factors like not being married, low socio-economic status and low levels of education, (BENUTE GRG, et al., 2011; GELAYE B, et al., 2016), sleep quality (GELAYE B, et al., 2015), substance abuse/dependence (GUILLARD V and GRESSIER F, 2017) and history of neuropsychiatric disease (NEWPORT DJ, et al., 2007). Moreover, in the study by Onah MN, et al. (2017), aspects such as food insecurity, interpersonal violence, multiparity and previous suicide attempt were associated with suicide risk during pregnancy (ONAH MN, et al., 2017).

Current research seeks to clarify whether pregnancy is a period characterized by a greater presence of ideas and suicide attempts (because of the changes mentioned previously) when compared to other moments of the life cycle (ONAH MN, et al., 2017). Maternal mental health can affect the quality of the mother-child interaction and, consequently, the development of the child (SCHWANZ CC, 2010). Therefore, a specialized investigation for the identification and treatment of psychiatric conditions in the perinatal period should be a priority in the maternity care service.

This study aimed to describe the incidence of suicidal attempts and the prevalence of suicidal ideation in pregnancy, verifying the factors associated with suicidal ideation in pregnant women up to their second trimester of gestation.

## **METHODS**

This analysis is a section from a population-based cohort study with pregnant living in the urban area of a city in the south of Brazil. Sample was carried out in multiple stages, according to the 2010 of Brazilian Institute of Statistic (IBGE) census of 244 sectors of the city (50.0% of the total). The census sectors were randomly selected. Next, between May 2016 and August 2018, we approached women who were up to 24 weeks of pregnancy to participate in the study. These pregnant women signed the free and informed consent form and answered a questionnaire during a household interview to provide socio-demographic, behavioral and mental health information to be considered in our analysis.

The Mini International Neuropsychiatric Interview version Plus (MINI PLUS) was used to assess major depressive episode current and to evaluate suicidal ideation and behavior. To create the variable suicidal ideation (no/yes), at least one positive answer to the following questions was considered: "Did you think that you would be better off dead or wish you were dead?" or "Did you want to harm yourself?" or "Did you think about suicide?" or "Did you plan for a suicide?". The same criteria were used to assess life-long suicidal behavior with the following questions: "Over the past month, did you attempt suicide?" or "Have you ever attempted suicide in your life?" (AMORIM P, 2000).

The Beck Anxiety Inventory (BAI) was used to evaluate the presence of anxiety symptoms. The scale contains 21 descriptive items of the most common anxiety symptoms on a 4-point likert scale. The total score ranges from 0 to 63 points, with higher scores indicating greater severity of the anxiety symptoms. For this study, the cutoff 11 was used for the presence of anxiety symptoms (BECK AT, et al., 1988; CUNHA JA, 2001).

The Biological Rhythm Interview of Assessment in Neuropsychiatry (BRIAN) allows an evaluation of the biological rhythm, with indexes clinically interpretable by researchers. The 18 total items of the scale are divided into four specific areas: sleep, activities, social rhythm and food pattern, evaluated over the last 15

days. For the present study, only the sleep domain, which contains 5 items, was included in the analyzes. Scores range from 1 (no difficulty) to 4 (very difficult) to evaluate the maintenance of normal rhythm (GIGLIO LM, et al., 2009). It should be noted that sleep is a commonly altered factor in the gestational period and therefore we defined cutoff 13 points to allow the comparison of these scores in our sample.

The specifics modules of alcohol and tobacco of Alcohol Smoking and Substance Involvement Screening Test (ASSIST), was selected for this study (HENRIQUE IFS, et al. 2004). Each answer corresponds to a score ranging from 0 to 4, with the total score ranging from 0 to 20. The score range 0 to 3 indicated occasional use of alcohol and tobacco, 4 to 15 revealed abuse and  $\geq 16$  as suggestive of addiction. For this study the classification of abuse/dependence was considered.

The socio-economic status was assessed through Brazilian Association of Research Companies (ABEP), which is based on the accumulation of material assets and the education of the head of the family, among other criteria. Participants are divided into groups (A, B, C, D or E) from the scores achieved, with the letter "A" referring to the highest socioeconomic class and the lowest "E". For this study, the levels were grouped as follows: High (A+B), middle (C) and lower levels (D+E) (ABEP, 2015).

The statistical analysis was performed using the statistical software Statistical Package for Social Sciences (SPSS), version 21.0 through a univariate analysis to describe the characteristics of the sample and the prevalence of suicidal ideation and incidence of suicidal attempts. Values that present a p-value  $< 0.20$  in the bivariate analysis (age, economic class, live with a partner, major depressive episode current, anxious symptoms, sleep deregulation, abuse/dependence tobacco and alcohol and history of suicidal behavior) were retained in the analysis adjusted by logistic regression. P-values  $< 0.05$  were considered to indicate statistical significance.

All subjects gave written informed consent for the analysis and anonymous publication of research findings. In the cases of underage pregnant women, the term was signed by a responsible person. All women who reported thoughts or attempted suicide (current or past) were referred to the public health service. This research was approved by the Research Ethics Committee of the Catholic University of Pelotas under the protocol 47807915.4.0000.5339.

## RESULTS

A total of 981 pregnant women were identified in the present study. Of these, 974 completed the diagnostic interview for evaluation of mental health. The prevalence of current suicidal ideation was 9.5% (N=93).

Table 1 shows sample's distribution, bivariate and multivariate analysis. In the adjusted analysis, it was found that older pregnant women had 3.1 (95% CI [confidence interval]1.4;6.5) more ideas when compared to younger women, as well as those in middle class (C) had 2.3 times more suicide ideas in relation to those in higher classes (A or B) (95% CI 1.0;5.2).

Also, those who didn't live with their partners were 2.7 (95% CI 1.5;5.0) times more likely to have suicidal ideation compared to those who lived with their partners. Pregnant women diagnosed with a current major depressive episode exhibited 10.3 times more ideation when compared to those without this diagnosis (95% CI 5.6;8.9); women with anxious symptoms were 8.8 (95% CI 4.3;18.1) times more likely to have ideation compared to those without anxious symptoms. We also found that pregnant women with sleep alterations had a 1.9 higher probability (95% CI 1.0;3.4) of presenting suicidal ideation. Regarding a past history of suicidal behavior, these women were 4.3 times more likely to exhibit current suicidal ideation (95% CI 2.2;8.2). The variables tobacco and alcohol abuse/dependence were not associated with suicidal ideation ( $p > 0.05$ ). (**Table 1**)

Our main result was that among the 93 pregnant women who presented suicidal ideation, 13 reported suicide attempt in the last month and of these, 11 had a history of suicidal behavior throughout life (PR 4.3; 95% CI 2.2;8.2). Thus, we can consider that the incidence of suicidal behavior in our sample of pregnant women was minimal, with only two cases (2.2% of total sample) (**Figure 1**).

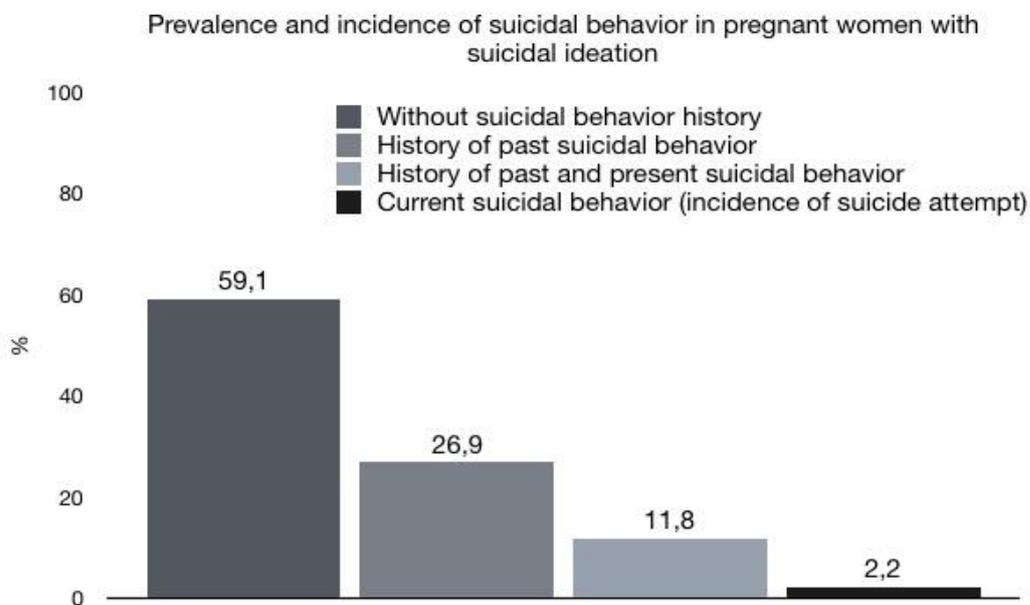
**Table 1** - Sample characteristics, bivariate and adjusted analysis of pregnant women with suicidal ideation.

Variables	Suicidal ideation*				
	N (%)	N (%)	p-value	PR (CI 95%)	p-value
<b>Age</b>			0.088		
up to 34 years	853 (87.0)	75 (8.9)		1	
35 years or more	128 (13.0)	18 (14.1)		3.1 (1.4; 6.5)	0.003
<b>Economic class*</b>			0.062		
High classes	247 (25.8)	14 (5.7)		1	
Middle class	547 (57.2)	56 (10.3)		2.3 (1.0; 5.2)	0.046
Lower classes	162 (16.9)	19 (11.8)		1.7 (0.6; 4.6)	0.312
<b>Live with partner*</b>			<0.001		
Yes	792 (80.8)	55 (7.0)		1	
No	188 (19.2)	38 (20.5)		2.7 (1.5; 5.0)	0.002
<b>Education</b>			0.398		
Up to 8 years	324 (33.0)	31 (9.7)		-	-
9 to 11	360 (36.7)	39 (10.9)		-	-
12 or more	297 (30.3)	23 (7.8)		-	-
<b>Major depressive episode current*</b>			<0.001		
No	866 (88.9)	39 (4.5)		1	
Yes	108 (11.1)	54 (50.0)		10.3 (5.6; 18.9)	<0.001
<b>Anxious symptoms*</b>			<0.001		
No	663 (67.7)	14 (2.1)		1	
Yes	317 (32.3)	79 (25.0)		8.8 (4.3; 18.1)	<0.001
<b>Sleep deregulation</b>			<0.001		
Up to 12 points	775 (79.0)	41 (5.3)		1	
13 to 20 points	206 (21.0)	52 (25.4)		1.9 (1.0; 3.4)	0.036
<b>Abuse/dependence tobacco*</b>			0.005		
No	820 (83.8)	68 (8.3)		1	
Yes	158 (16.2)	25 (15.8)		1.8 (0.9; 3.6)	0.099
<b>Abuse/dependence of alcohol*</b>			0.177		
No	894 (91.4)	81 (9.1)		1	
Yes	84 (8.6)	12 (14.3)		0.8 (0.3; 2.0)	0.629
<b>History of suicidal behavior*</b>			<0.001		
No	865 (88.8)	57 (6.6)		1	
Yes	109 (11.2)	36 (33.0)		4.3 (2.2; 8.2)	<0.001
<b>Total</b>	<b>981 (100.0)</b>	<b>93 (9.5)</b>	-	-	-

**Label:** \*variables with missing; PR: prevalence ratio.

**Source:** Trettim JP, et al., 2019.

**Figure 1** - Prevalence and incidence of suicidal behavior in pregnant women with suicidal ideation.



**Source:** Trettim JP, et al., 2019.

## DISCUSSION

This study described the incidence of suicidal attempts and the prevalence of suicidal ideation in pregnant women, verifying the factors associated with suicidal ideation. This prevalence was higher among older pregnant women, from the middle class, who didn't live with a partner, with anxious symptoms, sleep deregulation, and with history of suicide attempt. This finding regarding the prevalence of suicidal ideation is consistent with that obtained in recent studies that have showed a prevalence ranging from 6.3% to 14.0% for low and middle income countries (ONAH MN, et al., 2017).

Although pregnant women with a history of attempted suicide had 33% current ideas, the incidence of suicidal behavior (current suicide attempt) in our sample of pregnant women was minimal (only two cases), indicating that pregnancy seems to act as a protective event for suicide behavior. Some previous studies on the role of the reproductive cycle in women have also indicated that motherhood (including pregnancy and postpartum) plays an important role in reducing suicide rates, as this is a period where the mother-to-be is responsible not only for her own life but also for the life of her newborn (NEWPORT DJ, et al., 2007; ORSOLINI L, et al., 2016; WALLACE ME, et al., 2016). This data is also controversial, since studies have showed that the gestational period is a risk factor for suicidal behavior (MCLEAN J, et al., 2008). This aspect needs further investigation, and the main question remains: "Do pregnant women have a lower rate of suicide attempts when compared to the young women in the general population?"

Our finding regarding age goes against most literature data, which indicate that younger pregnant women are more likely to show suicidal ideas in the gestational period. Many studies have reported that younger pregnant women have more suicidal ideation than older women (GANDHI SG, et al., 2006; KIM JJ, et al. 2015, GELAYE B, et al. 2016), but other studies have not found this association (NEWPORT DJ, et al., 2007; BENUTE GRG, et al., 2011).

Wallace ME, et al. (2016) reported that older women were at greater risk for suicide during pregnancy. However, these authors did not discuss this finding but only referred to it as a suicide trend in the general population (WALLACE ME, et al., 2016). Therefore, this contraction deserves some further investigated, as there is no consensus in the literature regarding age as a risk factor for the presence of suicidal thoughts in pregnancy.

The analysis of the economic factors revealed that middle-class pregnant women had more suicidal ideation when compared to higher-income pregnant women. However, those women from lower classes did not maintain this association in the multivariate analysis. Some studies also found that lower economic classes are related to a higher chance of suicide during pregnancy, because of greater exposure to vulnerability, concerns and hopelessness (GELAYE B, et al., 2016; ONAH MN, et al., 2017). This result emphasizes the need for greater attention to social policies to target economically disadvantaged pregnant women.

We also found that women who did not live with their partners showed more thoughts of suicide compared to those who were living with a partner. It is understood that not living with the partner can result in a lower perception of social and emotional support. Also, this situation can directly interfere in women's mental health during pregnancy (ONAH MN, et al., 2017).

Moreover, the literature indicates that comorbidity in psychiatric disorders, mainly depression and anxiety, are the most worrying risk factors for ideation and suicidal behavior during the pregnancy (TABB KM, et al., 2013; ONAH MN, et al., 2017).

Despite this, we strongly suggest an investigation for an effective diagnosis independently of the presence of other disorders, to avoid that pregnant women without these disorders, who are at risk of suicide, are neglected. Grigoriadis S, et al. (2017) reported that the most of the women who died in perinatal had a mood or anxiety disorder (GRIGORIADIS S, et al., 2017). Thus, pregnancy and postpartum are periods when a woman is most vulnerable to the negative consequences or exacerbation of psychiatric symptoms due to of the hormonal and social changes experienced at that time.

Our findings also revealed that pregnant women with more sleep deregulation had almost twice as much suicidal ideation as those with less sleep problems. However, it is worth mentioning that sleep is one of the commonly altered aspects during pregnancy. Researchers also found a relationship between sleep quality and suicidal ideation in pregnant women; those who did not sleep well were significantly more likely to present suicidal thoughts (GELAYE B, et al., 2015).

We should be aware of potential limitations, particularly information bias. Pregnant women experience intense family and social pressure when it comes to suicidal ideation, even more so when suicidal behavior is questioned. Talking about suicidal behavior can become a reason for a defensive response. However, considering that a large number of individuals claimed to have suicidal ideation and planning, this indicates less defensiveness. In addition, the applied instrument is a gold standard for such situations, minimizing possible information bias.

It is noteworthy that the presence of suicidal thoughts is involuntary and causes much suffering, especially in pregnant women. Our findings may assist in the understanding of suicidal ideation during pregnancy. It should be emphasized that these results confirmed the high rate of suicidal ideation during pregnancy; however, suicidal attempts is not an incident. The result obtained regarding ideation has focused attention on the importance of mental health in pregnant women. However, suicidal behavior may be less frequent during pregnancy due to the fact that women are responsible not only for their own lives, but also for the life of the baby. Despite the low incidence of suicidal behavior in our sample of pregnant women, this does not diminish the suffering caused by symptoms at the level of suicidal thoughts. Consequently, these thoughts need to be identified and treated at this stage, thus avoiding a possible aggravation.

Prepartum suicidal ideation is a relatively common complication and requires greater attention given its association with many adverse maternal, fetal, of bond and infant outcomes. Mother-infant bonding and child development may be affected by these thoughts. Prevention strategies such as those advocated by the WHO should consider pregnant women as a target study population (WORLD HEALTH ORGANIZATION, 2006).

## CONCLUSIONS

Finally, we believe that services for pregnant women should focus on women with history of attempts, because they may be at risk. Also we suggest that further investigation examining other factors that contribute

to the presence of suicidal ideas in pregnancy should be carefully considered. Some prevention strategies should include the use of psychometric scales and diagnostic interviews to facilitate the identification and consequent management of this problem in prenatal care services.

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