

# Suicidal ideation in adolescents aged 11 to 15 years: prevalence and associated factors

## Ideação suicida em adolescentes de 11 a 15 anos: prevalência e fatores associados

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### Abstract

**Objective:** To verify the prevalence and associated factors of suicidal ideation among adolescents aged 11 to 15 years. **Method:** Cross-sectional population-based study. Adolescents completed a self-report that contained the Children's Depression Inventory. Suicidal ideation was measured according to item 9 of the Children's Depression Inventory. Multivariate logistic regression analysis was applied using a hierarchical model. **Results:** 1145 adolescents were invited to participate, and 1039 were interviewed (refusal rate: 9.26%). The prevalence of suicidal ideation was 14.1%. Factors associated to suicidal ideation: female gender, current alcohol consumption, use of illicit drugs, symptoms indicating conduct disorders and high Children's Depression Inventory scores for depressive symptoms. **Conclusion:** Prevention strategies should focus on female adolescents, especially those sexually active with probable mental health problems and substance use.

**Descriptors:** Adolescent; Suicide; Cross-sectional studies; Risk factors; Substance-related disorders

### Resumo

**Objetivo:** Verificar a prevalência e fatores associados à ideação suicida entre adolescentes de 11 a 15 anos. **Método:** Estudo transversal de base-populacional. Os adolescentes responderam a um questionário auto-aplicável que continha o Children's Depression Inventory. A ideação suicida foi mensurada de acordo com o item 9 do Children's Depression Inventory. Foi utilizada a análise de regressão logística multivariada acompanhada de um modelo hierárquico. **Resultados:** 1.145 adolescentes foram convidados a participar e 1.039 foram entrevistados (recusas: 9,26%). A prevalência de ideação suicida foi de 14,1%. Fatores associados à ideação suicida: sexo feminino, consumir álcool, uso de drogas ilícitas, apresentar sintomas indicativos de transtorno de conduta e elevada pontuação no Children's Depression Inventory para sintomas depressivos. **Conclusão:** Estratégias de prevenção devem priorizar adolescentes do sexo feminino, principalmente aquelas sexualmente ativas, com prováveis problemas de saúde mental e uso de substâncias.

**Descritores:** Adolescente; Suicídio; Estudos transversais; Fatores de risco; Transtornos relacionados ao uso de substâncias

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## Introduction

High rates of suicide, suicide attempts, and suicidal ideation became a public health problem. In adolescence, suicide is the third leading cause of death.<sup>1</sup>

Suicidal ideation is considered a predictor of suicide attempts.<sup>2</sup> In this sense, suicidal ideation could be considered a first step to increase completed suicide risk.<sup>3</sup> Therefore, it's important to consider suicidal behaviors as a continuum construct following a pattern of ideation, planning, attempts and completed suicide and to identify its beginning. Onset age of suicidality is between 10 and 15 years.<sup>4</sup>

Besides contributing to lethal outcome, suicidal ideation in early adolescence can produce negative consequences to a life time. Adolescents who reported suicidal ideation have a higher probability of presenting an axis I disorder - according to the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition; problem behaviors and poorer coping abilities, low self-esteem levels and interpersonal relations.<sup>5</sup>

To avoid these negative outcomes, prevention strategies are necessary as well as instruments to identify suicidal ideation risk factors in the early years of adolescence. There are a high number of population-based studies about this issue, although just a few of these investigations were carried out in South America. The purpose of this study was to examine the prevalence of suicidal ideation as well as its risk factors in a representative sample of adolescents aged 11 to 15 years from Pelotas, a southern Brazilian city.

## Method

A cross-sectional population-based study was carried out in a representative sample of adolescents aged 11 to 15 years old, living in the urban area of the city of Pelotas, southern Brazil. The research protocol was approved by the Ethics Research Committee of the Universidade Federal do Rio Grande do Sul.

According to the *Instituto Brasileiro de Geografia e Estatística* (IBGE, Brazilian Institute of Geography and Statistics), the city of Pelotas has a population of approximately 24,000 adolescents in the 11 to 15 year-old age group. Sample size was considered according to the lower outcome prevalence to be studied – indicative of conduct disorder (5.5%).<sup>6</sup> For this calculation, a 95% confidence level and a 1.5% worst sampling error acceptable was considered, resulting in a total of 856 individuals. However, 30% more adolescents were added to the sample (n = 1112) to take into account confounding factors, and sample loss.<sup>7</sup>

Once we knew the number of people required for the sample (1112), the average number of people per household in the city of Pelotas (3.5), and the proportion of youth in the age group of interest (7.05%), a total of 4,448 households had to be visited. Approximately 18 census tracts would be enough to find the sample number. However, a considerably greater number of census tracts had to be visited to find 1,112 youngsters aged from 11 to 15 years.

Among the 448 census tracts in the urban area of Pelotas, a total of 79 were randomly selected, and all households in these tracts were visited. All adolescents with ages ranging from 11 to 15 years old were invited to take part in the study. Those who accepted the invitation answered a confidential self-report questionnaire to obtain information on demographics (age, gender, education, and religion), tobacco smoking, alcohol consumption, use of illicit drugs and sexual intercourse.

Regarding education, the instrument contained a semi-structured question *How many years did you study? \_\_ Grade* which was categorized into 5 or fewer years of study, between 6 and 7 years

and 8 or more years of study. The questionnaire also included two items on grade retention (*Have you ever had failed year? No / Yes, and if Yes, how many times did you fail it?*).

Sexual activity was assessed by the question *Have you ever had sex?* with dichotomous response option to No / Yes. Substance use had the same form of dichotomous responses (No / Yes) obtained through the questions (*In the last month, did you drink alcohol? / In the last month, did you get drunk? / In the last month, did you smoke a cigarette?*), except for the variable illicit drug use. For this variable, the information was processed by No / Yes answers from the also dichotomous (No / Yes) answers for each substance in the question - *In the last month, Did you use any of these things? Marijuana / Cocaine / perfume-launching / Crack / Shoemaker glue / Ecstasy / "sleeping pills" or "tranquillizers" / Other.* Illicit drug use was considered if Yes was answered to at least one of those items.

The questionnaire also included items related to conduct disorder from the Mini International Neuropsychiatry Interview (MINI) which is a short structured diagnostic psychiatric interview based on DSM-IV criteria.<sup>8</sup>

The Children's Depression Inventory (CDI) was used to evaluate depressive symptoms and suicidal ideation. The CDI, developed by Kovacs from the Beck Depression Inventory, is a 27-item, self-rated, symptom-oriented scale to evaluate depressed mood that is suitable for youths aged 7 to 17 years.<sup>9</sup> The Brazilian validated version of CDI<sup>10</sup> has adequate internal consistency (Cronbach's alpha = 0.85 for the total scale). To identify depressive symptoms a CDI cut-off point  $\geq 17$  was adopted.

Suicidal ideation was measured by item 9 of CDI. The adolescents had to choose one of three statements – 0 'I do not think of killing myself', 1 'I think of killing myself but I would not do it', and 2 'I want to kill myself'. Suicidal ideation was considered present when adolescents scored 1 or 2.

The head of household also answered a questionnaire about demographic and socioeconomic characteristics of the family. Socioeconomic status was assessed using the classification proposed by the Brazilian Association of Research Institutions. This classification is based on the accumulation of material goods and the schooling of the head of the household, and it places the subjects into economic classes according to total scores obtained.<sup>11</sup> For statistical analyses, this variable was categorized into tertiles.

Multivariate logistic regression analysis was applied using a hierarchical model, whereby each group of variables of a giving level was included. A backward selection was used, and all variables with  $p < 0.20$  were kept in the model. This analysis also controlled the design effect.

In the hierarchical model, the first level included gender, age and socioeconomic status. The second level included sexual intercourse, alcohol consumption, drunkenness, tobacco use, and use of illicit drugs in the previous month as well as symptoms indicative of conduct disorders and high CDI scores for depressive symptoms.

## Results

A total of 1,145 teenagers were approached. Among these, 106 (9.26% of the total) either refused to take part in the study, or the parents had not consented their participation, resulting in a final total of 1,039 interviews. The prevalence of suicidal ideation among adolescents aged 11 to 15 years was 14.1%; other characteristics of the sample are presented in Table 1.

At first, gross analysis found female gender, being sexually active, alcohol consumption, drunkenness, tobacco use, drug use,

**Table 1 – Characteristics of adolescents aged 11-15 years (n = 1039). City of Pelotas (southern Brazil), 2005**

Variables	n	%
<b>Gender</b>		
Male	501	48.2
Female	538	51.8
<b>Age (years)</b>		
11	209	20.1
12	217	20.9
13	203	19.5
14	210	20.02
15	200	19.2
<b>Socioeconomic status</b>		
Lowest	337	32.4
Median	385	37.1
Highest	317	30.5
<b>Education (years of study)</b>		
≤ 5	357	34.4
6-7	455	43.8
≥ 8	227	21.8
<b>Grade retention</b>		
None	616	59.3
Once	236	22.7
Twice or more	187	18.0
<b>Religious practice</b>		
No	580	55.8
Yes	459	44.2
<b>Sexual activity</b>		
No	909	87.5
Yes	130	12.5
<b>Alcohol consumption in the last month</b>		
No	814	78.3
Yes	225	21.7
<b>Got drunk in the last month</b>		
No	999	96.2
Yes	40	3.8
<b>Tobacco use in the last month</b>		
No	964	92.8
Yes	75	7.2
<b>Use of illicit drugs in the last month</b>		
No	1002	96.4
Yes	37	3.6
<b>Conduct disorder</b>		
No	887	85.4
Yes	152	14.6
<b>High CDI scores for depressive symptoms</b>		
No	1015	97.7
Yes	24	2.3
<b>Suicidal ideation</b>		
No	893	85.9
Yes	146	14.1

symptoms indicative of conduct disorder and high CDI scores for depressive symptoms associated to suicidal ideation. Older age and lower socioeconomic status presented  $p < 0.20$ . For this reason these variables were included in the adjusted analysis.

After the multivariate analysis, girls were 47% more likely to report suicidal ideation than boys ( $p < 0.05$ ). Adolescents who used alcohol in the last month increased the risk of reporting suicidal ideation by 64% ( $p < 0.05$ ) and those who reported illicit drug use were almost three times more likely to express suicidal ideation (OR 2.89; 95% CI 1.33 to 6.28) ( $p < 0.05$ ). Suicidal ideation was also associated with indicative of conduct disorder (OR 1.81; 95% IC 1.13 to 2.90) ( $p < 0.05$ ). Youngsters who presented

high CDI scores for depressive symptoms were more than six times more likely to report suicidal ideation (OR 5.87; 95% IC 2.32 to 14.87) ( $p < 0.05$ ) (Table 2). Older age and being sexually active presented Pearson Coefficients between 0.05 and 0.20 related to suicidal ideation. Therefore, it is important to emphasize that it is a statistical trend to this association. However, it was not significantly associated.

### Discussion

Data from the present study presents a 14.1% prevalence of suicidal ideation in early adolescence. This rate is similar to Chinese findings - for adolescents aged 12 to 13 years (10.3%) and 14 to 15 years (15.8%),<sup>12</sup> as well as to the rates obtained among African Americans (11.5%)<sup>13</sup> and in the Latino population (15%).<sup>14</sup> However, the rate found in the present study is lower than that observed by Borges & Werlang<sup>15</sup> in adolescents from a similar region of Brazil - 34.7% and the rate reported by another Brazilian study which found 34.3% of suicidal ideation.<sup>16</sup> Both Brazilian studies included over-15-year-old adolescents, which could explain those differences. According to Rueter and Kwon, a higher mean age in a sample of adolescents may influence prevalence results since suicide ideation rates increase with age.<sup>17</sup>

Although this study has several strengths, it also has some limitations. Although Kovacs,<sup>18</sup> the original author of CDI, recommended that scores 1 and 2 of item 9 should be considered as an endorsement of suicidal ideation, and previous studies with adolescents with similar objectives have used them,<sup>19,20</sup> the measure of suicidal ideation in our study was based on just one question of a depressive scale. Differences in measures of suicidal ideation might cause incongruence among research findings. Additionally, the present investigation did not include some variables that could confound the results such as family and caregiver distress. Also, as any other cross-sectional study, cause-effect associations between examined risk factors and suicide ideation cannot be established. However, the data described in this study have a population-based design, which limits the occurrence of a biased sampling selection; thus, all adolescents aged 11 to 15 years had the same likelihood to be included in the sample according to the way it was selected. The self-report questionnaire also assured data confidentiality, minimizing a potential tendency of withholding information about health behaviors herein described.

As in many other studies, girls presented higher suicidal ideation rates in the early years of adolescence than boys.<sup>15,16,21</sup> Controversy results were found about the association of substance use and suicidal ideation. Although alcohol consumption in the last month was associated to the studied outcome, youngsters who reported drunkenness in the same period did not present a higher proportion of suicidal ideation. Despite the significant association between illicit drug use and suicidal ideation, tobacco use was not associated with suicidal ideation. These findings are supported by the literature that shows significant associations between substance use and suicidal ideation.<sup>22,23</sup> The non-significant associations found regarding drunkenness and tobacco use may be explained by the low proportion of teenagers who got drunk during the last month as well as by the large number of young people who smoked cigarettes just for experimentation without being exposed to the damages and consequences of this habit.

Similar to other studies, suicidal ideation was strongly associated with mental disorders.<sup>16,24,25</sup> As for indicative of conduct disorders, affected adolescents present a higher risk of suicidal behavior which is increased by co-morbid alcohol dependence.<sup>26,27</sup> In a representative

**Table 2 – Risk factors for suicidal ideation through logistic regression analysis (odds ratio and confidence interval of 95%). City of Pelotas (southern Brazil), 2005**

Variables	% of suicidal ideation	OR (CI 95%)	p	OR (CI 95%) adjusted for hierarchical model	p
<b>Gender*</b>					
Male	11.6	<b>Reference</b>		<b>Reference</b>	
Female	16.4	1.49 (1.05 to 2.13)	0.027	1.47 (1.02 to 2.10)	0.038
<b>Age (years)*</b>			0.058		0.064
11	10.5	<b>Reference</b>		<b>Reference</b>	
12	10.6	1.01 (0.51 to 1.87)	0.981	1.01 (0.54 to 1.87)	0.983
13	13.8	1.36 (0.75 to 2.47)	0.311	1.33 (0.73 to 2.43)	0.349
14	18.6	1.94 (1.11 to 3.40)	0.021	1.94 (1.10 to 3.11)	0.022
15	17.0	1.71 (0.98 to 3.10)	0.059	1.71 (0.96 to 3.05)	0.070
<b>Socioeconomic status*</b>			0.155		0.162
Lowest	16.9	1.30 (0.84 to 1.99)	0.235	1.29 (0.83 to 1.99)	0.254
Median	11.9	0.87 (0.55 to 1.35)	0.522	0.86 (0.55 to 1.35)	0.506
Highest	13.6	<b>Reference</b>		<b>Reference</b>	
<b>Education (years of study)</b>			0.279		
≤ 5	12.0	0.68 (0.43 to 1.09)	0.111		
6-7	14.3	0.83 (0.54 to 1.28)	0.399		
≥ 8	16.7	<b>Reference</b>			
<b>Grade retention</b>			0.259		
None	12.7	<b>Reference</b>			
Once	15.3	1.24 (0.81 to 1.90)	0.321		
Twice or more	17.1	1.42 (0.91 to 2.23)	0.122		
<b>Religious practice</b>					
No	15.2	1.24 (0.87 to 1.78)	0.243		
Yes	12.6	<b>Reference</b>			
<b>Sexual activity**</b>			< 0.001		0.081
No	12.1	<b>Reference</b>		<b>Reference</b>	
Yes	27.7	2.78 (1.81 to 4.29)		1.63 (0.94 to 2.81)	
<b>Alcohol consumption*** ****</b>			< 0.001		0.033
No	11.1	<b>Reference</b>		<b>Reference</b>	
Yes	24.9	2.67 (1.84 to 3.87)		1.64 (1.04 to 2.58)	
<b>Got drunk** ****</b>			< 0.001		0.109
No	13.0	<b>Reference</b>		<b>Reference</b>	
Yes	40.0	4.46 (2.31 to 8.61)		1.94 (0.86 to 4.36)	
<b>Tobacco use** ****</b>			< 0.001		0.800
No	13.0	<b>Reference</b>		<b>Reference</b>	
Yes	28.0	2.61 (1.52 to 4.47)		1.09 (0.56 to 2.14)	
<b>Use of illicit drugs** ****</b>			< 0.001		0.007
No	13.0	<b>Reference</b>		<b>Reference</b>	
Yes	43.2	5.11 (2.60 to 10.05)		2.89 (1.33 to 6.28)	
<b>Conduct disorder**</b>			< 0.001		0.014
No	11.7	<b>Reference</b>		<b>Reference</b>	
Yes	27.6	2.88 (1.91 to 4.33)		1.81 (1.13 to 2.90)	
<b>High CDI scores for depressive symptoms**</b>			< 0.001		< 0.001
No	12.9	<b>Reference</b>		<b>Reference</b>	
Yes	62.5	11.25 (4.82 to 26.22)		5.87 (2.32 to 14.87)	

\* First level of hierarchical model

\*\* Second level of hierarchical model

\*\*\*At last month

sample of youngsters aged 14 to 17 years, Thomposon, Kingree & Ho have found that suicidal behaviors were significantly associated to delinquency.<sup>28</sup> Depression was also related to suicidal ideation and it seems to be a strong evidence endorsed by the scientific literature about this issue.<sup>23,29</sup>

Because suicidal ideation and suicide attempts are associated with increased risk for future completed suicide, and the fact that studies suggest the presence of a possible severity gradient, beginning with suicide ideation (thoughts, ideas, planning and desire of self killing), and proceeding with suicide attempts and finally consummated suicide,<sup>30</sup> interventions must be established at

an early stage. Given the results of this study, strategies to prevent suicide behaviors in early adolescence must target mainly sexually active female teenagers that present symptoms indicative of mental health problems and substance use. According to epidemiological data, South American countries should give as much attention to the health issues as developed countries do regarding the prevention of suicidal ideation at early stages of adolescence. However, further studies are necessary to understand this phenomenon better in the early years of adolescence and to bring evidence to help the development of adequate preventive strategies for this specific population.

## Disclosures

Writing group member	Employment	Research grant <sup>1</sup>	Other research grant or medical continuous education <sup>2</sup>	Speaker's honoraria	Ownership interest	Consultant/ Advisory board	Other <sup>3</sup>
Luciano Dias de Mattos Souza	UCPEL	-	-	-	-	-	-
Ricardo Azevedo da Silva	UCPEL	-	-	-	-	-	-
Karen Jansen	UCPEL	-	-	-	-	-	-
Renata Peretti Kuhn	PUC-RS	-	-	-	-	-	-
Bernardo Lessa Horta	UFPEL	-	-	-	-	-	-
Ricardo Tavares Pinheiro	UCPEL	-	-	-	-	-	-

\* 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.

Note: UCPEL = Universidade Católica de Pelotas; PUC-RS = Pontifícia Universidade Católica do Rio Grande do Sul; UFPEL = Universidade Federal de Pelotas.

For more information, see Instructions for authors.

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