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**ORIGINAL ARTICLE** 

# Suicide risk associated with bullying and depression in high school

Riesgo suicida asociado a bullying y depresión en escolares de secundaria

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# **Abstract**

**Introduction:** Suicide risk is increasingly common among children and adolescents. There are no current and local studies of this reality in northern Peru. The objective was to determine whether suicide risk was associated with bullying and depression in high school students. **Patients and Method:** An analytical cross-sectional study was carried out in a city in northern Peru, using validated surveys to measure suicide risk, bullying and depression. Statical association data were obtained using generalized linear models. **Results:** Out of 289 schoolchildren, 20% was at suicide risk and had some type of depression. Among those on the upper tertile of the bullying scale, 38% had suicidal ideation, while those who were depressed, 63% had suicidal ideation. The frequency of suicide risk increased as a result of bullying score (aPR: 1.83, 95% CI: 1.13-2.99, p value = 0.015), being depressed (aPR: 3.32, 95% CI: 1.69-6.51, p value < 0.001), family history of suicide (aPR: 1.99, 95% CI: 1.55-2.56, p value < 0.001), the passive desire to die (aPR: 2.20, 95% CI: 1.86-2.61, p value < 0.001), have planned suicide at some point (aPR: 2.05, 95% CI: 1.60-2.64; p value < 0.001) and study in a private school (aPR: 1.16, 95% CI: 1.14-1.18, p value < 0.001); adjusted by gender and school location. **Conclusion:** Mental health of schoolchildren was involved in many aspects, several of them associated with a higher frequency of suicide risk.

Keywords: Bullying; suicide risk; depression; children; Perú

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### Introduction

Suicide in early ages has become a major public health problem, which mainly affects developing countries, as well as family disintegration and dysfunction<sup>1,2</sup>. According to WHO estimates, one of the most worrying findings worldwide is the increase in suicide rates among adolescents, which is one of the three most frequent causes of death in this age group<sup>3</sup>. In countries such as Cuba -between 2014-2015- 523 cases of suicide attempt have been reported, of which four adolescents committed suicide; this gives an overview of the importance of the problem<sup>4</sup>. It is known that the suicide attempt is the first cause of admission in the Adolescent Mental Health Service of the province in the last ten years in this country<sup>5</sup>.

In Peru, some studies have been conducted within health institutions and others of an epidemiological nature, including some districts of the Lima Metropolitan area and Callao. In these districts, significant prevalence of suicidal behavior was found, between 16 and 24% of adolescents had the desire to die at some point in their lives, and 3% of them tried to commit suicide at some time in their lives<sup>6,7</sup>. A large number of factors that could contribute to the occurrence of suicidal behavior have been identified, among which, bullying is an important risk factor<sup>8</sup>.

Studies conducted in Lima show that family, school, and peer abuse in the same classroom are also triggers in this pathology<sup>9,10</sup>. It should be noted that the most important predictor of suicidal behavior is a previous suicide attempt<sup>11</sup>, which is why it is important to study these phenomena that affect the mental health of adolescents. No scientific evidence of this phenomenon was found in the city of Piura and in Latin America it is limited. Therefore, the objective was to determine the risk of suicidal behavior in adolescents exposed to bullying and, likewise, to study the phenomenon of victimization or aggression and its association with depressive symptomatology, in school-age adolescents of mixed educational institutions.

#### **Patientes and Method**

# Design and study population

An analytical cross-sectional study was conducted in a stratified convenience sample of 296 adolescents, who were in the 1st, 3rd and 5th grade of high school of three co-ed schools in the city of Piura, Peru, out of a population universe of 31,432 students distributed in 111 schools with an accuracy of 4% and an expected suicide risk factor of 12.8% according to the Plutchik scale<sup>12</sup>. The research was conducted during October to December 2016. Students enrolled in the study period were included, with prior consent signed by the

parents and verbal assent by the adolescents, where they agreed to participate in the study (refusal rate = 1.9%). Those students who did not respond adequately to the test (unanswered questions and/or incomplete answers) were excluded, thus achieving a total of 289 assessed adolescents.

It is worth noting that the city of Piura is one of the five largest of Peru, located on the north coast, which has great similarity to other coastal cities of subtropical countries of South America.

#### Tools and variables

**Suicidal behavior.** A survey was applied, which consisted of five questions extracted from the mental health questionnaire validated and adapted for both the adolescent and adult population in Peru by the National Institute of Mental Health Honorio Delgado. The questionnaire evaluates situations such as passive desires to die, suicidal ideation, and suicide planning at some point in the last month, year or some time in the life of the respondent<sup>13</sup>.

Suicide risk. The Plutchik scale was used; it consists of 15 yes/no questions. The scale score ranges from 0 to 15, each affirmative answer adds one point<sup>12</sup>. This survey was validated in Piura-Peru, with a total of 189 adolescents, obtaining a Cronbach's alpha of 0.82<sup>14</sup>.

**Bullying detection.** The Spanish version of the European Bullying Intervention Project Questionnaire (EBIPQ) was used, with 22 Likert-type items of five response options, with a score between 0 and 4, where 0 means never and 4 means always. It comprises two dimensions: cyber victimization and cyber aggression, with good reliability indexes (total alpha = 0.87, alpha victimization = 0.80, alpha aggression = 0.88).<sup>15</sup> It was validated in Piura-Peru, with a total of 189 adolescents, obtaining a Cronbach's alpha of 0.766<sup>14</sup>.

*Cyberbullying Detection.* The Spanish version of the European Cyberbullying Intervention Project Questionnaire (ECIPQ) was used, which consists of 14 items, seven items describe aspects related to victimization and seven items about aggression. With good reliability indexes (total alpha = 0.87, alpha victimization = 0.80, alpha aggression = 0.88)<sup>16</sup>. Validated for Piura-Peru, with a total of 189 adolescents, obtaining a Cronbach's alpha of  $0.762^{14}$ .

**Depression Detection.** The Beck Depression Inventory was used, which comprises 21 items with four response options ranging from 0 (absence of depression) to 3 (maximum depression); the test scores range from 0 to 63. Its internal consistency level is 0.9. Validated for Peru in 2015<sup>17</sup>.

# Procedure

Data were collected from all high school students, belonging to the 1st, 3rd, and 5th-year sections, in

three educational institutions of the city of Piura of which two are public and one private. The approach was carried out through an anonymous and self-applied questionnaire technique, which lasted one hour. A facilitator/pollster per classroom was always available to solve doubts related to the questionnaire. The study was conducted with the respective permission of the educational institutions, as well as the consent of the parents and/or guardian. Once the results were obtained, the detected cases of depression were referred to the specialist psychologist of each educational institution, and parents were also informed in due course.

### Statistical analysis

The collected data were typed twice for greater and better control. The surveys were typed in the Microsoft Excel software (2015 version), then a first filter was performed to verify the data. This was followed by the processing of the data tabulated in the Stata 11.1 statistical software, with which association statistics were obtained. For descriptive statistics, we worked with the frequencies/percentages for the descriptive variables and with the medians/interquartile ranges for the quantitative variables. The regression for generalized linear models was used to obtain the bivariate and multivariate analysis, resulting in cPR (crude prevalence ratio), aPR (adjusted prevalence ratio), 95% CI (95% confidence interval) and p-value; all this was obtained with the Poisson distribution, the log link function, robust models and using the hosting school as a cluster group. Values of p < 0.05 were considered as statistically significant.

# Terminology

Human Settlement: place where a person or a community is established; initial process of colonization of lands or communities; it can be divided into formal and informal human settlements. Informal Human Settlements are outside the urban planning scheme<sup>18</sup>. Urbanization: Place that has at least 100 houses grouped contiguously, forming blocks and streets<sup>19</sup>.

## **Ethical considerations**

The confidentiality of the respondents was respected all the time, in addition, once the tabulation of the data was concluded and the results generated, the reports were sent to the participating educational institutions. The ethical standards on human experimentation of the Declaration of Helsinki of 1975 were considered. Likewise, it was approved by the Ethics Committee of the San Bartolomé Mother-Child National Teaching Hospital.

#### Results

Out of the 289 schoolchildren, 56.8% (164) were male, the average age was 14 years (interquartile range: 13-16 years). The average of respondents was  $14.4 \pm 1.8$  years, in men it was  $14.4 \pm 1.8$  years and in women  $14.5 \pm 1.8$  years. The respondents belonged to two public schools and one private school, all were co-ed schools. The 75.4% (218) resided in a human settlement (Table 1).

20.1% (58) was at suicide risk, 15.2% (44) had family history of suicide, 35.3% (102) had passive desire to die, and 13.2% (38) had planned suicide at some point. Most of them did not have depression (60.6%) or a mild mood disturbance (19.0%), however, there were cases of severe depression (4.5%) and extreme depression (0.7%). When grouping all the categories of depression, 20.4% (59) had some depressive state (Table 2).

Table 1. Socio-educational characteristics of schoolchildren secondary school of three schools in the city of Piura

Variable	n	%
Sex		
Female	125	43.2
Male	164	56.8
Age (years) *	14	13-16
School		
Public 1	97	33.6
Public 2	99	34.3
Private 1	93	32.1
Vive en		
Asentamiento humano	218	75.4
Urbanización	71	24.6
*Median and interquartile rar	nge.	

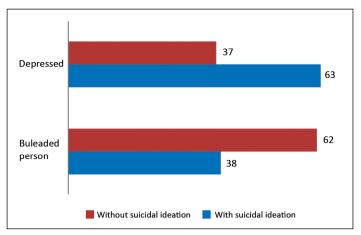
Table 2. Characteristics of suicide and depression among high school students from three schools in the city of Piura

Variable	n	%
Suicidal risk	58	20.1
Family background	44	15.2
Passive desire to die	102	35.3
Suicidal planning	38	13.2
Depression		
Normal	175	60.6
Mild disturbance of mood	55	19.0
Intermittent depression	17	5.9
Moderate depression	27	9.3
Severe depression	13	4.5
Extreme depression	2	0.7

From those who were in the upper tertile of the bullying scale, 38% of them had suicidal ideation, while those who were depressed, 63% had suicidal ideation (Figure 1).

The bivariate analysis showed that gender (p=0.010), type of school (p<0.001), to have depression (p<0.001), to have an upper tertile of the bullying score (p<0.001), family history of suicide (p=0.012), to have a passive desire to die (p<0.001), and to have planned suicide at some point (p<0.001) were associated with suicide risk (Table 3).

The multivariate analysis showed that the frequency of suicide risk increased as a result of having an upper tertile of the bullying score (aPR: 1.83, 95% CI: 1.13-2.99, p value = 0.015), being depressed (aPR: 3.32, 95% CI: 1.69-6.51, p value < 0.001), family history of suicide (RPa: 1.99, 95% CI: 1.55-2.56, p value < 0.001), the passive desire to die (aPR: 2.20, 95% CI: 1.86-2.61, p value < 0.001), have planned suicide at some point (aPR: 2.05, 95% CI: 1.60-2.64, p value < 0.001), and study in a private school (aPR: 1.16, 95% CI: 1.14-1.18, p value < 0.001). All these variables were adjusted by gender and school location (Table 4).



**Figure 1.** Suicidal ideation according to being depressed or with a high score of bullying among high school students from three schools in the city of Piura.

#### Discussion

This research is important because it shows a really poorly studied in schoolchildren in urban cities, which can provide the basis for the generation of strategies for an early and effective detection in adolescents with

Variable	Suicidal risk N (%)		RPc (IC95%)	Value p
	Yes	No	_	
Sex				
Male	24 (41.4)	140 (60.6)	0.54 (0.34-0.86)	0.010
Female	34 (58.6)	91 (39.4)		
Age (years) *	14 (13-16)	14 (13-16)	0.96 (0.71-1.31)	0.804
Lives in				
Urbanization	14 (24.1)	57 (24.7)	0.98 (0.82-1.17)	0.797
Human settlement	44 (75.9)	174 (75.3)		
Type of school				
Private	20 (34.5)	73 (31.6)	1.11 (1.09-1.13)	< 0.001
Public	38 (65.5)	158 (68.4)		
Depression				
Yes	37 (63.8)	22 (9.5)	0.87 (3.76-12.5)	< 0.001
No	21 (36.2)	209 (90.5)		
Superior tertiary bullying				
Yes	37 (63.8)	60 (26.0)	3.49 (2.26-5.38)	< 0.001
No	21 (36.2)	171 (74.0)		
Others regarding suicide				
Family background	17 (29.3)	27 (11.7)	2.31 (1.20-4.44)	0.012
Passive desire to die	45 (77.6)	57 (24.7)	6.35 (4.74-8.51)	< 0.001
Suicidal planning	27 (46.6)	11 (4.8)	5.75 (4.44-7.44)	< 0.001

Table 3. Bivariate analysis of the mental and socio-educational factors associated with suicidal risk among high

RPc (Raw prevalence ratio), 95% CI (95% confidence interval) and p-value obtained with generalized linear models, with Poisson family, log link function, robust models and using the school as a cluster group. \*The descriptive values are shown in median (interquartile ranges).

Table 4. Multivariate analysis of the mental and socio-educational factors associated with suicidal risk among high school students from three schools in the city of Piura

Variable	RPa (IC95%)	Value p
Superior tertiary bullying	1.83 (1.13-2.99)	0.015
Depressed	3.32 (1.69-6.51)	< 0.001
Family history of suicide	1.99 (1.55-2.56)	< 0.001
Passive desire to die	2.20 (1.86-2.61)	< 0.001
Suicidal planning	2.05 (1.60-2.64)	< 0.001
Study in private school	1.16 (1.14-1.18)	< 0.001
Male sex	0.91 (0.61-1.36)	0.650

RPa (adjusted prevalence ratio), 95% CI (95% confidence interval) and p-value obtained with generalized linear models, with Poisson family, log link function, robust models and using the school as a cluster group.

this condition. It can also be useful to adopt appropriate approach models, as some countries are already doing such as Colombia, Chile, and European countries such as Spain<sup>11,20</sup>, since in Peru we are still using only studies of prevalence reports which only indicate the percentage of bullying victims (40%)<sup>21</sup>, and intimidation in schools in Lima (54.7%)<sup>22</sup>.

It was found that one out of five schoolchildren was at suicide risk or depression, this, compared to what was found in the literature, is similar to what is reported in developing countries, such as Mexico<sup>23</sup>, as well as in other countries of South America where 2.5-3 out of ten schoolchildren present depression and suicidal behaviors8,24. Likewise, a study conducted in the province of Callao (which is next to the capital) found very similar data to those reported in our research<sup>25</sup>. These two variables were associated in the multivariate model, since being depressed increased the suicide risk among schoolchildren by 232%, this has been reported by other studies, mainly in countries such as the United States, where immediate interventions are carried out according to the first behaviors shown by the adolescent<sup>26,27</sup>. A recent study of rural inhabitants of our country shows that depression is associated with other mental health problems, such as alcoholism and smoking28, although our results are in schoolchildren and urban areas, many of them have parents and relatives who come from rural areas, which could be an important factor. It is recommended that the institutions in charge generate detection and support programs of symptoms that affect the mental health of schoolchildren since it is the only way this situation and its consequences can be improved in the short, medium and long-term. In the same way, it is also recommended that parents are also incorporated in this type of programs since it is home where the adolescent can find his or her first help mechanism<sup>29</sup>.

It was also found that those who were in the upper tertile of bullying score had a higher frequency of suicide risk, this has been reported especially in situations of dysfunctional families or those with low socioeconomic status. Aguila Calero et al reported that this increases as more economic limitations are counted at home and as long as adolescents have less attention from their parents since forms of compensation are generated by the adolescent30. The economic factor has been reported as an associated factor for the increase in the frequency of alcoholism among rural inhabitants of our country<sup>28</sup> which reinforces the hypothesis that the family and the environment could be influencing this relation. This has been shown in part by a research in a similar population, where it was found that the quality of life of schoolchildren is associated with the relationship/game they have with their family members<sup>31</sup>, therefore, research must be carried out to study the family environment as a factor in the generation chain of mental problems among minors.

Studying in a private school increased the suicide risk among schoolchildren, this has been reported in research by Martins<sup>32</sup> and also in that by Leyva<sup>33</sup>, where they show that this is possibly due to the fact that students from private institutions may be more neglected by parents, which is expressed in negative feelings such as frustration, anger, depression and other behaviors linked to these problems<sup>31</sup>. In the case of Peru, one of the most current results is the one generated by Díaz Rodríguez (2014), which also shows higher risks in this type of population under the conditions described above<sup>9</sup>.

Finally, we highlight the relation between suicide risk and some measurable characteristics of this problem, such as the passive desire to die, suicide planning, and family history of suicide. These characteristics have been widely measured in developed countries, as reported by Joe<sup>34</sup> and Lofthouse<sup>35</sup>, where one of the most important variables is the family history of suicide, which increases the suicide risk by 21%. Another important variable is the passive desire to die, which reaches 13%. In our sphere, this type of research has not been conducted in minors, but it has been reported that university students have the influence of social, academic and cultural habits on the presentation of depression<sup>36</sup> and burnout<sup>37</sup>. This should be investigated in specific studies, since knowing these characteristics and/or forms of presentation, specific strategies can be developed for the detection of these behaviors. This would help the educational and health system for timely detection and treatment, considering that the instruments and strategies that we have date from 2008<sup>38</sup> and are already outdated in the health sector and for current needs.

The main limitation of the study was the information bias since some respondents had behaviors of disobedience and indiscipline during the questionnaire application, while others were excluded due to the refusal of the parents to participate in the investigation. It is believed that all this is part of the manifestations of an environment/behavior that shows problematic patterns and mental disorders. Another limitation may be the tests used, since they are not the gold standard (psychiatric consultation), however, they are tests that have been generated for studies in large populations and have good statistics of internal validity. Finally, the results only applied to assessed schools, due to the characteristics of the sampling, however, the results may be considered as preliminary, since the surveyed schools share characteristics with many others in the region and similar cities. Despite these limitations, the results are important, since they can show a reality of several educational institutions in an important city in northern Peru, which suggests the important mental health problem that schoolchildren have since a young age, which could significantly affect their current and future environment.

The conclusion is that the mental health of schoolchildren was involved in multiple aspects, with high percentages of suicidal ideation, depression, and bullying. In addition, the frequency of suicide risk increased as a result of having an upper tertile of the bullying score, being depressed, family history of suicide, passive desire to die, having planned suicide at some point, and studying in a private school.

# **Ethical Responsibilities**

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

**Data confidentiality:** The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

**Rights to privacy and informed consent:** The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

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Authors state that no economic support has been associated with the present study.

# **Conflicts of Interest**

Authors declare no conflict of interest regarding the present study.

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