

## Negative self-perceived health associated with school violence in adolescents

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**Abstract** *Objective:* To verify the association between negative self-perception of health and school violence in adolescent students of the Municipality of Olinda (PE), Brazil. *Methods:* This is a cross-sectional, analytical and school-based study with a sample consisting of 2,614 adolescents selected through a strategy of random sampling in conglomerates. The information was obtained through the questionnaire “Youth Risk Behavior Survey” from which the issues of violence and self-perceived health were retrieved. Data were tabulated by Epi-data version 3.1 program and transcribed for SPSS version 22. The Chi-square test and the stepwise binary logistic regression model were used for data analysis. *Results:* We observed that 26.7% of adolescents had a negative self-perception of health, and this was greater among girls. Concerning school violence, negative self-perception was associated with feelings of sadness, suicidal thoughts, bullying at school, robbery at school and safety at school. Gender and age were also associated ( $p < 0.05$ ). *Conclusion:* We reinforce the need for culture and peace actions in adolescence, involving the school environment to reflect on poor health assessed by adolescents and reduce the rate of violence.

**Key words** *Diagnostic self-evaluation, Adolescent health, Violence, Adolescent*

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## Introduction

Modern society is increasingly appreciating the different facets in which the phenomenon called violence is characterized. Violence is defined as (...) “intentional use of physical force or power that is real or threatened, self-inflicted, interpersonal or collective, which results in or is highly likely to result in injury, death, psychological harm, developmental disability or deprivation, and the violent act may be of a physical, sexual, psychological or negligent nature<sup>1</sup>.” Somehow, violence is very much related to the characteristic of power over the other, personal achievements or superiority, which portrays various forms of violence<sup>2</sup>.

The World Health Organization (WHO)<sup>3</sup> states that “violence is a constant event in the lives of a large number of people throughout the world, from all generations, social and cultural groups, denouncing their presence from public to private spaces, traversing workplaces, the family core, besides various social interaction institutions, including schools”. In this regard, a school environment is a place that is in charge of educating and reporting knowledge and also tends to assist the students’ full development, promotion of values and interpersonal relationships<sup>4-6</sup>.

A cultural exchange occurs at school, resulting in interaction and acceptance of differences, where students learn to share their interests, joys and sorrows, especially in adolescence. According to Jacobson et al.<sup>7</sup>, adolescence is a stage of acquiring healthy habits, as well as being exposed to risk situations with significant repercussion in the present and the future. Currently, school violence has been the object of scientific investigations<sup>2,8,9</sup> whether by assaulting others or self-harm<sup>10,11</sup>.

Concerning the high levels of school violence, research on a specific theme travels the world, also studying school violence through the facet known as bullying<sup>12-14</sup>. In his study, Lopes Neto<sup>15</sup> aimed to alert the high prevalence of bullying, pointing to awareness for prevention, and characterized bullying as repeated acts of oppression, tyranny, (physical or verbal) abuse and domination of people<sup>15</sup>. Araújo et al.<sup>16</sup> complete this information, indicating that it is a set of aggressive, physical or psychological behavior that also takes place in schools<sup>16</sup>. Focusing again on school-related violence, suicide is also a type of violence that affects the adolescent population. It is a type of self-inflicted violence from external causes and has increased in the young population

of the Brazilian cities, causing impact in public health<sup>17</sup>, and may be influenced by the school environment.

While violence already appears as an alarming event, it is essential, in the adolescent population, to know how adolescents suffering some type of violence rate their health. Self-perceived health has been widely used in population-based studies and is itself a useful and simple tool for assessing health conditions that is also portrayed as a safe method<sup>18,19</sup> and is usually linked to some risk factors or behaviors<sup>20,21</sup>. In a study conducted in Iran with 3,827 students to evaluate the predictors of self-perceived health, it was possible to observe an association between increased exposure to violence and a negative self-perceived health<sup>7,13</sup>. Given this context, it is plausible that violence that affects Brazilian adolescents so profoundly by interfering in different social, psychological and physical aspects is a crucial determinant of self-perceived health. In this regard, this study aims to verify the association between negative health self-perception and school violence in adolescent students of the city of Olinda (PE), Brazil.

## Methods

This is a cross-sectional, descriptive, analytical and school-based study that is part of a larger project, entitled *Adolescent healthcare in the public services of Olinda*, in which health-related behaviors are evaluated among adolescents. The Human Research Ethics Committee of the University of Pernambuco approved the study, as recommended by CONEP, following Resolution of the National Health Council N° 466/2012, which addresses human research, safeguarding the ethical principles of justice, beneficence and non-maleficence. Furthermore, this research was approved by the regional education management office – Metropolitana Norte, also providing us with data about the 2016 school census.

The target population of this study was limited to the students of the public high school of the city of Olinda (PE), aged 14-19 years. The following parameters were adopted to calculate the sample: estimated population of 8,319 students; 95% confidence interval; maximum error tolerance of 4%; and sample design effect of 4.0. Because it was a study covering the analysis of multiple risk behaviors and with different frequency of occurrence, the estimated prevalence was defined as 50%. We decided to increase the

number of the sample by 20% to reduce the losses (refusals) in the application of the study, arriving at a mean sample target of 2,236 students.

As the municipality of Olinda does not have a territorial division of education, the ten political-administrative health regions were considered for geographical distribution to ensure that students represented the target population, as well as the size of the school and the shift (morning/evening). Schools were ranked according to the number of students enrolled, in small (under 200 students), medium (200-499 students) and large (500+ students) schools. All students from the randomized groups were invited to participate in the study.

We used two-stage random sampling stratified by conglomerates to select subjects, and “school” and “class” were the sample units in the first and second stages, respectively. In the first stage, school size was adopted. In the second stage, we considered the number of classes in the schools drawn by study shift (morning/afternoon) and education levels (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> year of high school).

Regarding data collection, we used an adapted version of the structured and validated questionnaire adapted for this study, built for the adolescent population, namely, the “Youth Risk Behavior Survey” (YRBS), version 2013. The questionnaire was applied in the classroom, without the presence of teachers, to all students who agreed to participate in the study present on the day of collection. The students were accompanied by two duly trained applicators who assisted in clarifying issues and completing the questionnaire. The students were informed that their participation was voluntary and that questionnaires did not contain any personal identification, as well as that they could drop out at any moment of data collection. A consent form was used to obtain parental permission for students under the age of 18 to participate in the study. Also, all the students who participated in the study signed the Informed Consent Form and indicated their agreement to participate in the research.

The dependent variable of this study was the “negative self-perception of health,” which results from the following question: “In general, how do you rate your health?” And the answer is given as follows: Extremely Unhealthy; Not Very Healthy; Healthy; Very Healthy; Extremely Healthy. For purposes of analysis, the alternatives were categorized dichotomously: Positive (Healthy / Very Healthy / Extremely Healthy) and negative (Extremely Unhealthy/Not Very Healthy).

The sociodemographic variables analyzed in this study were: Gender (male/female); (12-15/16-19) and household income (< 1 minimum wage / > 1 minimum wage). Regarding the independent variables, we obtained the categorized questions as follows: feeling of sadness (yes/no); suicidal thoughts (yes/no); lack of safety at school (yes/no); threats at school (yes/no); robbery at school (yes/no); physical fight at school (yes/no) and bullying at school (yes / no).

Data were tabulated in EpiData (version 3.1). The double entry was used to check data entry errors, which, when identified, were corrected based on the original values of the variables. The statistical analyses were performed in the Statistical Package for the Social Sciences (SPSS) version 22.0 for Windows. The differences between the category variables were assessed using Pearson’s chi-square test ( $\chi^2$ ). Binary stepwise logistic regression was performed to analyze the factors associated with self-perception of health (0: no risk, 1 risk group) that was the dependent variable, and all variables with “p-value” less than 0.25 in the Chi-square test entered the regression model as independent variables. In the final regression model (adjusted model II), gender and age were considered as covariates. Statistical significance was set at  $\alpha = 0.05$ .

## Results

The final sample of the study consisted of 2,614 adolescents. Of these, 65.6% ( $n = 1,655$ ) were aged 16-19 years, 55% ( $n = 1,390$ ) were females and 39.1% ( $n = 615$ ) had a household income less than or equal to one minimum wage. The prevalence of negative self-perceived health was 26.7% (32.9% for girls and 19.1% for boys  $p < 0.001$ ). Table 1 shows negative self-perception data associated with other independent variables analyzed in this study.

Negative self-perception of health was associated with gender ( $p < 0.001$ ), income ( $p < 0.001$ ), as well as with adolescents who felt sad ( $p < 0.001$ ); who had already thought of suicide ( $p < 0.001$ ); who suffered bullying at school ( $p < 0.001$ ); who do not feel safe at school ( $p < 0.001$ ) and who have already been robbed at school ( $p < 0.001$ ). Table 2 shows data from the binary logistic regression, performed with values associated with  $p < 0.020$ , and provides us with information from the gross logistic regression, adjusted logistic regression I (using negative self-perceived health adjusted for risk behaviors) and adjusted

logistic regression II (that besides risk behaviors used gender and age adjustment).

In the crude model, only the independent variable “robbed at school” ( $p < 0.047$ ) did not remain associated with negative self-perceived health in adolescents. In the adjusted model I, variables “lack of safety at school” and “robbed at school” ( $p < 0.59$ ) did not remain associated. In the adjusted model II, after inclusion of variables gender and age, they remained associated with variables feeling of sadness, suicidal thought and bullying at school ( $p < 0.001$ ).

## Discussion

This study analyzed the prevalence of negative self-perception of health and its association with

school violence in 2,614 adolescents enrolled in high school of public schools in the city of Olinda (PE). The prevalence of negative self-perceived health was 26.7%, and was higher than the prevalence found in national studies<sup>20-23</sup>, even in studies carried out in the Northeast, such as the study by Mendonça and Cazuzza<sup>22</sup>, which pointed that 15.8% of adolescents of João Pessoa (PB) have a negative self-perception of health.

Regarding gender, negative self-perception of health was higher for females than for males (32.9% versus 19.1% –  $p < 0.001$ ), a result that is frequently found in other studies<sup>20,23,24</sup>. One reason for this result is that girls are more sensitive to detect physiological changes and consider habits that are inappropriate for health<sup>25</sup>, and because they are more attentive to health care (for example, periodically performing routine exams)

**Table 1.** Association between independent variables and self-perception of health in adolescent high school students of the state public school system in the city of Olinda (PE), Brazil (n = 2,614).

Sociodemographic Variables	Self-perception of health N(%)		Total	P-Value
	Positive	Negative		
Gender				$p < 0.001^a$
Female	932 (67.1)	458 (32.9)	1,390 (55.0)	
Male	921 (80.9)	218 (19.1)	1,139 (45.0)	
Age group				$p < 0.047$
12-15 years	649 (75.7)	208 (24.3)	857 (34.1)	
16-19 years	1,192 (72.0)	463 (28.0)	1,655(65.9)	
Household income				$p < 0.001^a$
Under 1 minimum wage	413 (67.2)	202 (32.8)	615 (39.1)	
> 1 minimum wage	715 (74.8)	241 (25.2)	956 (60.9)	
Feeling of Sadness				$p < 0.001^a$
Yes	396 (58.8)	280 (41.4)	676 (27.0)	
No	1,435 (78.6)	390 (21.4)	1,825 (73.0)	
Suicidal Thoughts				$p < 0.001^a$
Yes	222 (53.4)	194 (46.6)	416 (18.8)	
No	1,589 (77.2)	469 (22.8)	2,058 (83.8)	
Bullying at school				$p < 0.001^a$
Yes	310 (62.9)	183 (37.1)	493 (20.2)	
No	1,479 (75.9)	470 (24.1)	1,949 (79.8)	
Lack of Safety at School				$p < 0.001^a$
Yes	278 (64.7)	152 (35.3)	430 (17.1)	
No	1,562 (74.9)	523 (25.1)	2,085 (82.9)	
Robbed at School				$p < 0.001^a$
Yes	345 (69.8)	149 (30.2)	494 (19.7)	
No	1,497 (74.3)	519 (25.7)	2,016 (80.3)	
Physical fight at School				$p < 0.207$
Yes	203 (70.5)	85 (29.5)	304 (12.1)	
No	2,626 (73.8)	577 (26.2)	2,203 (87.9)	

Note: a) Significant P-value (chi-square).

**Table 2.** Analysis of the Odds Ratio (OR), crude and adjusted I and adjusted II, in adolescent high school students of the public school system of the city of Olinda (PE), Brazil.

Variables	Crude Model		Adjusted Model I		Adjusted Model II	
	OR (CI 95%)	P	OR (CI 95%)	P	OR (CI 95%)	p
Feeling of Sadness						
Yes	2.60 (2.15-3.14)	<b>0.001</b>	1.77 (1.42-2.20)	<b>0.001</b>	1.67 (1.34-2.09)	<b>0.001</b>
No	1		1		1	
Suicidal Thoughts						
Yes	3.68 (1.50-2.29)	<b>0.001</b>	2.05 (1.60-2.63)	<b>0.001</b>	1.93 (1.50-2.50)	<b>0.001</b>
No	1		1		1	
Bullying at School						
Yes	1.85 (1.50-2.29)	<b>0.001</b>	1.48 (1.18-1.86)	<b>0.001</b>	1.51 (1.19-1.91)	<b>0.001</b>
No	1				1	
Lack of Safety at School						
Yes	1.63 (1.30-2.03)	<b>0.001</b>	1.27 (1.00-1.63)	0.047	1.25 (0.97-1.59)	0.075
No	1		1		1	
Robbed at School						
Yes	1.12 (1.03-1.54)	0.047	0.93 (0.73-1.19)	0.599	1.00 (0.78-1.28)	0.974
No	1		1		1	

Adjusted Model I = Dependent variable + independent variables / Adjusted Model II = Dependent variable + independent variables + Gender and Age Group.

and perceive health more broadly, considering physical, mental, and social aspects<sup>21</sup>.

The literature points to data that disregard the age of adolescents, reporting that older adolescents tend to have a higher percentage of negative self-perception of health when compared to younger adolescents<sup>20,22,26</sup>. In this study, this was not different. While it showed a non-significant p-value ( $p < 0.047$ ), it is important to note that adolescents aged 16-19 years had a higher rate of negative self-perception of health when compared to adolescents aged 12-15 years (28.0% vs. 24.3%). It is believed that, with age, adolescents begin to conceive health as a construct that exceeds the lack of diseases<sup>20,27</sup>.

Adolescents with low household income are more likely to rate their health negatively<sup>26,28</sup>. It is known that income is a determining component in greater access to other forms of leisure activities, education, housing and health services. Consequently, higher purchasing power tends to act as a mediator of the perceived health level<sup>21</sup>. Concerning adolescents in Olinda (PE), those with a monthly household income of up to one minimum wage were shown to be associated with adverse self-perceived health ( $p < 0.001$ ).

Regarding the behavior of school violence, the consequences of this act can be severe, with a negative reflection on health including overall health<sup>29</sup>. Violent behaviors associated with

negative self-perceived health of this study were feeling of sadness; suicidal thoughts; bullying at school; lack of safety at school and robbed at school. Adolescents who claimed to have felt sad in the last 12 months leading to discontinuation of their usual activities were 2.60 times more likely to have a negative self-perception of health than adolescents who did not feel sad in the last 12 months (95% CI 2.15-3.14). High indexes of feelings of sadness in adolescents are also described in other studies<sup>1,29</sup>.

Suicide is increasingly affecting the young population and other people when it occurs at school and has had a massive impact on public health<sup>29</sup>. In their data, Spein et al.<sup>24</sup> showed that adolescents who think about committing suicide are 4.57 times more likely to have a negative self-perception of health (95% CI 2.48-8.44). In our results, adolescents who thought about suicide in the last 12 months were 3.68 times more likely to have a negative self-perception of their health.

Current literature shows little information related to bullying in association with self-perceived health. However, essential data are available addressing the development of health problems in adolescents who suffer from bullying<sup>30</sup>, which has a direct connection with self-assessed health status and adolescent mental health<sup>1</sup>. Adolescents who experienced bullying at school

showed a prevalence of 20.2% ( $n = 493$ ) and remained associated with negative self-perception of health  $p < 0.001$  (OR = 1.85, 1.50-2.29). According to Lopes Neto<sup>15</sup>, reducing the prevalence of bullying in schools can be a highly effective public health measure for the 21<sup>st</sup> century.

According to PeNSE data, Malta *et al.*<sup>31</sup> pointed out that 6.4% of adolescents in schools in large Brazilian capitals feel insecure about going to school. School lack of safety results are also portrayed in Montes Claros, with a prevalence of 9.2%<sup>29</sup>. For adolescents from Olinda (PE), 17.1% ( $N = 430$ ) reported that they feel insecure about being in school because of its lack of safety. These data remained associated with negative self-perception of health  $p < 0.001$ . Adolescents robbed at school were 1.63 times more likely to have a negative self-perception of health  $p < 0.001$ . The prevalence of being robbed at school was 19.7% ( $N = 494$ ), which is slightly higher than the study by Pena *et al.*<sup>29</sup>, which had a prevalence of 18.7% of adolescents being robbed at schools in Montes Claros. The sense of inferiority after having been robbed may develop some psychological problems that are harmful to the mental health of adolescents.

Regarding the adjusted analysis of factors of violence associated with adverse self-perceived health in adolescents, variables feeling of sadness, suicidal thoughts and bullying remained associated with our outcome. A particular observation goes for variable "bullying at school," which showed increased risk from 1.48 to 1.51 (95% CI 1.19-1.91) after adjusting for gender and age.

This study has some limitations: because it is a school-based study, it is not possible to generalize data for all adolescents in the municipality

of Olinda (PE). Regarding the cross-sectional design, it is important to note that a causal bias may occur in the responses. It is also emphasized that self-perception of health is the way in which physical health is perceived; other aspects such as self-esteem, pessimism/optimism may interfere in the responses on that occasion. Before hand, this study shows positive points that are worth highlighting. A representative sample of high school adolescents with a wide age range (14-19 years) and different sociodemographic characteristics was used. It should be noted that all methodological procedures were applied ethically, as well as the use of previously tested and validated tools with acceptable levels of reproducibility, implemented by trained people, standing out as yet another strong point of this study.

## Conclusion

The association between negative self-perception of health and violent behaviors feeling of sadness, suicidal thoughts, bullying at school, lack of safety at school and robbed at school remained present in our findings. We expect that results of this study will contribute to the understanding of school violence, filling a gap related to the problems that it can cause *vis-à-vis* adolescents' self-perception of their health. Data shown here indicate the need for culture and peace actions in adolescence, involving the school environment, so that we may reflect on the analysis of adolescents' health, thus changing this high level of violence in adolescence, reinforcing the idea that this is not something trivial and expected for this age group.

## Collaborations

BRVS Silva worked on the design, design, data analysis and interpretation, article writing, critical revision, approval of the version to be published, MHP Passos, AO Silva and FC Soares participated in the critical review of data and results comparison. CFBF Santos, VC Amorim, VA Menezes and PAM Valença from the essay and critical review of the article.

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