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Self-inflicted injuries among adolescents: Prevalence and associated factors, Espírito Santo, Brazil*

Theme: Promotion and prevention.

Contribution to the discipline: Given self-inflicted injuries in adolescence, this research presents a relevant contribution to Nursing and Public Health in general, since this problem has serious implications for the health of individuals and is a predictor of suicide. The results evidence the high frequency of the problem, report data about the factors associated with the notification of this phenomenon, and contribute to its identification, confrontation, and prevention. In addition, the study evidences the importance of mandatory notification.

ABSTRACT

Objective: To identify the prevalence of notified self-inflicted injuries among adolescents in Espírito Santo and to analyze the associated factors. **Materials and methods:** A cross-sectional and analytical study, with the notified data of self-inflicted violence among adolescents in Espírito Santo registered in the Notifiable Diseases Information System from 2011 to 2018. The bivariate analyses considered the Chi-square (χ^2) and Fisher's Exact tests. The multivariate analysis considered the log-binomial model, and the adjustment results were presented as prevalence ratio. **Results:** The prevalence of notified self-inflicted injuries was 33 % and, of this total, 79.8 % occurred among female adolescents. Prevalence was higher among adolescents aged from 13 to 17 years old (female gender) and from 18 to 19 years old (male gender), as well as among those with some disability or disorder. Higher prevalence values were found in the residence

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and in collective housing, as well as among those who did not consume alcohol at the event in question. In the female gender, there was also an association with the urban area ($p < 0.05$). **Conclusions:** High prevalence of notified self-inflicted injuries is perceived among adolescents in Espírito Santo, as well as of the factors associated to this phenomenon. The importance of adopting promotion, prevention and recovery measures for the problem is verified.

KEYWORDS (SOURCE: DECS)

Adolescent; attempted suicide; self-injurious behavior; epidemiology; health information systems.

*Lesión autoprovocada entre adolescentes: prevalencia y factores asociados, Espírito Santo, Brasil**

RESUMEN

Objetivo: identificar la prevalencia de lesiones autoprovocadas notificadas entre adolescentes en Espírito Santo, Brasil, y analizar los factores asociados. **Materiales y métodos:** estudio analítico de tipo transversal, a partir de datos notificados de violencia autoprovocada entre adolescentes en Espírito Santo registrados en el Sistema de Información de Problemas de Salud y Notificación entre 2011 y 2018. En los análisis bivariados se consideraron las pruebas de chi-cuadrado (χ^2) y exacta de Fisher. El análisis multivariado adoptó el modelo log-binomial, y los resultados del ajuste se presentaron a partir de la razón de prevalencia. **Resultados:** la prevalencia de lesiones autoprovocadas notificadas fue del 33 % y, de este total, el 79,8 % ocurrió entre adolescentes del género femenino. La prevalencia fue mayor en adolescentes de 13 a 17 años (sexo femenino) y de 18 y 19 años (sexo masculino), y entre aquellos con alguna discapacidad o trastorno. Se encontraron valores de prevalencia más elevados en la vivienda y en alojamiento compartido, y entre aquellos que no consumieron alcohol en el evento en cuestión. En el sexo femenino, también se registró una asociación con el área urbana ($p < 0,05$). **Conclusiones:** se percibe la elevada prevalencia de lesiones autoprovocadas notificadas entre los adolescentes en Espírito Santo y los factores asociados a este fenómeno. Se evidencia la importancia de adoptar medidas de promoción, prevención y recuperación del problema.

PALABRAS CLAVE (FUENTE: DECS)

Adolescente; intento de suicidio; conducta autodestructiva; epidemiología; sistemas de información en salud.

* Este artículo deriva de la tesis "Violencia autoprovocada entre adolescentes en Espírito Santo: análisis de los casos notificados de 2011 a 2018", presentada al Programa de Postgrado en Salud Colectiva del Cuerpo Docente, *Universidade Federal do Espírito Santo*, Brasil. La investigación fue patrocinada por la Fundación de Apoyo a la Investigación de Espírito Santo (convocatoria Fapes/CNPq/Decit-SCTIE-MS/Sesa n.º 3/2018-PPSUS).

*Lesão autoprovocada entre adolescentes: prevalência e fatores associados, Espírito Santo, Brasil**

RESUMO

Objetivo: identificar a prevalência de lesão autoprovocada notificada entre adolescentes no Espírito Santo e analisar os fatores associados. **Materiais e métodos:** estudo analítico do tipo transversal, com os dados notificados de violência autoprovocada entre adolescentes no Espírito Santo registrados no Sistema de Informação de Agravos e Notificação de 2011 a 2018. Análises bivariadas consideraram o teste Qui-Quadrado (χ^2) e o exato de Fisher. A análise multivariada considerou o modelo log-binomial, e os resultados do ajuste foram apresentados em razão de prevalência. **Resultados:** a prevalência de lesão autoprovocada notificada foi 33 % e, desse total, 79,8 % ocorreram entre adolescentes do sexo feminino. Houve maior prevalência em adolescentes com idade de 13 a 17 anos (sexo feminino) e de 18 a 19 anos (sexo masculino), e entre aqueles com deficiência ou transtorno. Maiores prevalências foram encontradas na residência e na habitação coletiva, e entre aqueles que não consumiram álcool no evento. No sexo feminino, também houve associação com a zona urbana ($p < 0,05$). **Conclusões:** percebe-se a alta prevalência de lesão autoprovocada notificada entre os adolescentes no Espírito Santo e os fatores associados a esse fenômeno. Constata-se a importância da adoção de medidas de promoção, prevenção e recuperação contra o agravo.

PALAVRAS-CHAVES (FONTE: DECS)

Adolescente; tentativa de suicídio; lesão autoinfligida não suicida; epidemiologia; sistema de informação em saúde.

* Este artigo é derivado da dissertação intitulada "Violência autoprovocada entre adolescentes no Espírito Santo: uma análise dos casos notificados de 2011 a 2018", apresentada ao Programa de Pós-Graduação em Saúde Coletiva do Corpo Docente, da Universidade Federal do Espírito Santo, Brasil. Esta pesquisa foi financiada pela Fundação de Amparo à Pesquisa do Espírito Santo (edital Fapes/CNPq/Decit-SCTIE-MS/Sesa n.º 3/2018-PPSUS).

Introduction

Adolescence can be considered as a stressful event for the individual due to the multiple and intense physiological and physical changes that occur during this period (1). In this phase, where the person is vulnerable, there may be reactions with suicidal attitudes in response to conflicts, either internal or external (2). In this context, self-inflicted injuries among adolescents became a public health problem and drew attention due to the severity of their impacts (3, 4).

There can be self-inflicted injuries with or without suicidal ideation. Self-inflicted injuries with suicidal ideation are called “attempted suicide” and occur when the individuals try to put an end to their own life, although without consummation (5). In turn, self-inflicted injuries are defined as the direct and deliberate destruction of one’s own body tissue in the absence of lethal intent and for reasons not socially established (6).

Although they are commonly classified as similar acts — since, generally, non-suicidal injuries are treated as attempted suicide (7, 8) — the literature (7) points out relevant differences between them, such as: the intention to die present only in attempted suicide while, in non-suicidal injuries, the intention is to achieve relief of unwanted feelings (7, 9); the difference between the most commonly used means of aggression since, in suicide attempts, they are more aggressive (6); the psychological consequences, which are generally of relief after the act of self-inflicted injury without suicidal intention and of failure after attempted suicide (7); and the number of times the individuals attack themselves, with the frequency of self-inflicted injuries without the suicidal intention being higher (7).

Although these differences exist, these practices are related to each other and, according to some studies, adolescents involved in non-suicidal injury practices are more likely to attempt suicide at some point in their lives (10, 11).

According to some studies (12, 13), the incidence of self-inflicted injuries in adolescents can be conceptualized from a three-level iceberg model. At the first level is a suicide, which is the fatal and less common outcome; at the second level are injuries, which result in health care services; and, finally, self-inflicted injuries, which occur in the community, being the most common, but hidden for the most part.

In a meta-analysis conducted with studies produced in 41 countries, the prevalence of self-inflicted injuries throughout life was 16.5 % (14). A systematic review that aimed at estimating the prevalence of suicidal behavior, deliberate self-injury and non-suicidal self-injury in children, and adolescents worldwide, indicated that the lifetime prevalence of attempted suicide was 6 %, while injury without suicidal intent presented a prevalence of 22.1 % (15). Between 2011 and 2014, in Espírito Santo, the notification rate of self-inflicted injuries was 22.8 cases among female adolescents in the age group from 15 to 19 years old for every 100,000 adolescents (16).

In the literature, many factors have been associated with the practice of self-inflicted injuries in adolescence, such as: gender; age; the presence of mental disorders; having feelings of guilt, rejection and loneliness; family and peer conflicts; being a victim of bullying; having been a victim of domestic violence, and consumption of alcoholic beverages (17-21).

In Brazil, Ministry of Health Ordinance 1,271 of 2014 incorporated self-inflicted violence to the national list of immediate and mandatory notification health problems, to ensure intervention in cases through the health sector (22). Therefore, a mandatory notification is an institutional duty, and it is up to the health professionals to report the cases in full compliance with the current legislation (23).

Given the above, the objective of this study is to analyze the factors associated with the occurrence of self-inflicted injuries and the characteristics of both the victims and the aggressions among adolescents in Espírito Santo.

Materials and method

This is an epidemiological, analytical and cross-sectional study, carried out with the notified data of self-inflicted and interpersonal violence against adolescents, aged between 10 and 19 years old, produced by the epidemiological surveillance system and registered in the Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação*, SINAN).

The SINAN is one of the health information systems fed by the notification and investigation of cases of mandatory notification diseases and health problems, such as interpersonal and self-

inflicted violence. Its objective is to collect, transmit and disseminate data generated by the Epidemiological Surveillance System to support the investigation process and provide subsidies for the analysis of the epidemiological surveillance information regarding the mandatory notification problems (24). For this research, the data used were those from the notifications of self-inflicted injuries among adolescents from 2011 to 2018 produced by the State Health Secretariat of Espírito Santo.

Espírito Santo is a state located in the Brazilian Southeast region, with a territorial extension of 46,074.444 km². According to the last demographic census conducted in 2010 by the Brazilian Institute of Geography and Statistics, it had nearly 3.5 million inhabitants, with an estimated population of 603,835 adolescents at the time, a demographic density of 76.25 inhabitants/km², and a human development index of 0.740 (25).

Initially, a descriptive exploratory analysis was performed to qualify the variables of interest and correct the inconsistencies in the database, following the guidelines of the Tutorial for the Notification of Interpersonal and Self-Inflicted Violence. Immediately after that, the duplicate cases were verified and later excluded. It is worth noting that duplicates were analyzed by organizing the records by notification date, comparing occurrence date, name of the victim, and of the mother, and date of birth.

The dependent variable of the study was "self-inflicted injuries". According to the tutorial for filling out the interpersonal/self-inflicted violence notification forms, self-inflicted injuries are considered as those cases in which the individuals assisted/victims provoked aggression against themselves or attempted suicide; as well as attempted suicide and the act trying to put an end to one's life, although without consummation (23).

The following were chosen as independent variables for this study: age (from 10 to 12 years old, from 13 to 17 years old, from 18 to 19 years old), race/skin color (white/non-white), disability/disorder (no/yes), area of residence (urban/rural, peri-urban), place of occurrence (residence/school/collective housing/others), other occurrences (no/yes), means of aggression (poisoning, intoxication/sharps/others), and suspected alcohol consumption (no/yes).

As the objective is to adjust a regression model, the database used in all analyses of this study considered only those forms that

had all the independent variables filled in according to the categorization of the variable considered. From 2011 to 2018, a total of 3,410 forms with this characteristic were obtained, of which 1,131 corresponded to the notifications of self-inflicted violence.

The data were analyzed through descriptive statistics in absolute and relative frequencies, with 95 % confidence intervals. The bivariate analyses were performed using the Chi-square (χ^2) and Fisher's Exact tests according to the assumption, with a 95 % significance level. The association between the independent variables and the outcome under study was assessed based on the non-adjusted and adjusted prevalence ratios. To obtain the adjusted measures, the log-binomial regression model was considered, as the response variable is dichotomous and there is interest in knowing if the prevalence ratios are obtained.

In the initial analysis of the model, all the dependent variables proposed in this study were considered. However, it was verified that the "means of aggression" variable in the modeling is acting as a confounding variable due to its almost perfect association with the response variable. For example: for the female adolescents, the polychoric correlation between the outcome and the "means of aggression" variable is 0.97. In addition to that, 93.44 % of the cases of self-inflicted injuries among adolescents were with sharps or by poisoning/intoxication. These means were used by only 7 % of the aggressors against the female adolescents who suffered types of violence other than self-inflicted. Such phenomenon also occurs among male adolescents. If this variable is retained in the model fit, negative impacts on the results range from non-significance of notably relevant variables, such as age group, to drastic underestimation of the prevalence ratios. Another negative impact concerns the modeling technique, in which, with the presence of the "means of aggression" variable, only the Poisson regression model with robust variance can be considered, a method that is often used as an approximation of the log-binomial model. A permanence of the variables in the model was considered for $p < 0.05$. The bivariate analyses were performed in the STATA 13.0 program, and the log-binomial modeling was conducted by using the *logbin* package from the R software, version 4.0.0.

The study was approved by the Research Ethics Committee of *Universidade Federal do Espírito Santo*, under Opinion No 2,819,597, and all rules and guidelines outlined in Resolution 499/2012 were respected.

Results

Between 2011 and 2018, the prevalence of self-inflicted injuries among the notified cases of violence was 33.2 % (N = 1,131; 95 % CI = 31.60-34.76) among adolescents in Espírito Santo, of the total violence notification forms filled out in this period. Among the cases of self-inflicted violence, 79.8 % of the adolescents were female, 69.9 % were aged between 13 and 17 years old, 68.7 % were of non-white race/skin color, nearly 25.3 % presented some disability/disorder, and 90.7 % lived in the urban area. As for the characteristics of the self-aggressions, most of them occurred in the residence (88.4 %), were recurrent (52.8 %), the most prevalent means of self-inflicted aggression was poisoning/intoxication (65.1 %) and, in 9.1 % of the cases, there was suspicion of alcoholic beverage consumption at the event in question.

In the bivariate analyses described in Table 2, it is verified that self-inflicted injuries in both genders were related to age, race/skin color, disability/disorder, place of occurrence, means of aggression, and suspected alcohol consumption ($p < 0.05$). In the female gender, the "area of residence" variable was also associated, as well as "other occurrences" ($p < 0.05$).

The non-adjusted and adjusted analyses of the cases of self-inflicted violence in the male gender are presented in Table 3. It is observed that the prevalence of self-inflicted injuries among boys is 4.03 times higher in those aged 18 and 19 years old when compared to the younger group (10-12 years old) and 1.47 times more prevalent among those who presented some type of disability or disorder. As for the characteristics of the self-aggressions, it is noted that, among boys, this type of violence is more frequent in the residence and in collective housing when compared to other possible locations (PR = 10.22; 95 % CI = 5.96-17.54; PR = 10.20; 95 % CI = 5.06-20.59). Regarding suspected alcohol consumption, a higher prevalence of self-inflicted injuries was observed among adolescents who were not suspected of having consumed alcohol (PR = 1.82; 95 % CI = 1.34-2.48) ($p < 0.05$).

Table 4 presents the adjusted analyses of the self-inflicted injuries in the female gender. The prevalence of self-inflicted injuries was 73 % higher in girls aged from 13 to 17 years old and among the female adolescents who had some type of disability or disorder. A 19 % increase in the prevalence of the problem is observed among the adolescents who lived in the urban area. In addition, in the female group there was a higher occurrence of the problem in

Table 1. Characteristics of the notified cases of self-inflicted violence among adolescents aged from 10 to 19 years old. Espírito Santo, 2011-2018 (N = 1,131)

Variables	N	(%)	CI (95 %)
Gender			
Male	228	20.2	17.91-22.60
Female	903	79.8	77.39-82.08
Age			
10-12 years old	100	8.9	7.31-10.64
13-17 years old	791	69.9	67.19-72.54
18-19 years old	240	21.2	18.93-23.70
Race/Skin color			
White	354	31.3	28.65-34.06
Non-white	777	68.7	65.93-71.34
Disability/Disorder			
No	845	74.7	72.09-77.16
Yes	286	25.3	22.83-27.90
Area of residence			
Urban	1,026	90.7	88.87-92.27
Rural/Peri-urban	105	9.3	7.72-11.12
Place of occurrence			
Residence	1,000	88.4	86.41-90.15
School	68	6.0	4.76-7.55
Collective housing	14	1.3	0.73-2.08
Others	49	4.3	3.28-5.68
Other occurrences			
No	534	47.2	44.31-50.13
Yes	597	52.8	49.86-55.68
Means of aggression			
Poisoning/Intoxication	737	65.1	62.33-67.89
Sharps	280	24.8	22.32-27.36
Others	114	10.1	8.45-11.97
Suspected use of alcohol			
No	1,028	90.9	89.06-92.43
Yes	103	9.1	7.56-10.93

Source: Elaborated by the authors.

Table 2. Distribution of the characteristics of the notifications of self-inflicted violence among adolescents, by gender.
Espírito Santo, 2011-2018

Variables	Female (N = 903)				Male (N = 228)			
	N	(%)	CI (95 %)	p-value	N	(%)	CI (95 %)	p-value
Age group								
10-12 years old	84	21.9	18.06-26.36	0.000	16	10.2	6.32-16.01	0.000
13-17 years old	654	41.2	38.85-43.70		137	25.6	22.03-29.43	
18-19 years old	165	29.1	25.50-32.98		75	41.2	34.26-48.52	
Race/Skin color								
White	276	39.6	36.02-43.28	0.010	78	30.9	25.53-36.94	0.036
Non-white	627	34.1	31.97-36.31		150	24.1	20.87-27.59	
Disability/ Disorder								
No	678	30.5	28.65-32.49	0.000	167	22.5	19.66-25.69	0.000
Yes	225	71.4	66.18-76.15		61	45.5	37.25-54.04	
Area of residence								
Urban	826	36.4	32.35-34.85	0.014	200	26.4	23.39-29.68	0.536
Rural/Peri-urban	77	28.8	21.41-28.66		28	23.7	16.88-32.27	
Place of occurrence								
Residence	804	43.0	40.76-45.25		196	41.7	37.31-46.22	
School	57	41.0	33.11-49.39	0.000	11	16.2	9.14-27.01	0.000
Collective housing	6	35.3	16.35-60.34		8	47.1	24.95-70.37	
Others	36	7.1	5.14-9.65		13	4.1	2.36-6.87	
Other occurrences								
No	405	32.6	30.05-35.26	0.002	129	23.9	20.47-27.67	0.064
Yes	498	38.5	35.89-41.20		99	29.5	24.89-34.67	
Means of aggression								
Poisoning/ Intoxication	608	96.2	94.39-97.44		129	97.0	92.22-98.87	
Sharps	226	73.1	67.90-77.79	0.000	54	50.0	40.62-59.37	0.000
Others	69	4.33	3.43-5.44		45	7.1	5.33-9.38	
Suspected use of alcohol								
No	832	42.9	40.69-45.10	0.000	196	29.2	25.88-32.77	0.000
Yes	71	11.9	9.59-14.79		32	15.7	11.29-21.36	

Source: Elaborated by the authors.

Table 3. Non-adjusted and adjusted analyses of the effects of the characteristics of the self-inflicted violence cases among male adolescents (N = 228). Espírito Santo, 2011-2018

Variables	Non-adjusted analysis			Adjusted analysis		
	PR	CI (95 %)	p-value	PR	CI (95 %)	p-value
Age						
10-12 years old	1.0	--	0.000	1.0	--	0.000
13-17 years old	2.50	1.54-4.07		2.75	1.73-4.37	
18-19 years old	4.04	2.46-6.64		4.03	2.53-6.41	
Race/Skin color						
White	1.28	1.02-1.62	0.033	1.09	0.95-1.25	0.216
Non-white	1.0	--		1.0	--	
Disability/Disorder						
Yes	2.01	1.60-2.53		1.47	1.25-1.73	
No	1.0	--	0.000	1.0	--	0.000
Area of residence						
Urban	1.11	0.78-1.57	0.541	1.09	0.83-1.42	
Rural/Peri-urban	1.0	--		1.0	--	0.533
Place of occurrence						
Residence	10.26	5.96-17.67		10.22	5.96-17.54	
School	3.98	1.86-8.51		4.27	2.00-9.11	
Collective housing	11.58	5.56-24.12		10.20	5.06-20.59	
Others	1.0	--	0.000*	1.0	--	0.000
Other occurrences						
Yes	1.23	0.98-1.54		0.94	0.81-1.09	
No	1.0	--	0.062	1.0	--	0.397
Suspected use of alcohol						
No	1.86	1.32-2.61		1.82	1.34-2.48	
Yes	1.0	--	0.000	1.0	--	0.000

* Obtained by means of Fisher's Exact test.

Source: Elaborated by the authors.

Table 4. Non-adjusted and adjusted analyses of the effects of the characteristics of the self-inflicted violence cases among female adolescents (N = 903). Espírito Santo, 2011-2018

Variables	Non-adjusted analysis			Adjusted analysis		
	PR	CI (95 %)	p-value	PR	CI (95 %)	p-value
Age						
10-12 years old	1.0	--	0.000	1.0	--	0.000
13-17 years old	1.88	1.54-2.29		1.73	1.44-2.08	
18-19 years old	1.32	1.05-1.66		1.46	1.19-1.80	
Race/Skin color						
White	1.16	1.03-1.29		1.04	0.95-1.13	0.407
Non-white	1.0	--	0.009	1.0	--	
Disability/Disorder						
Yes	2.33	2.12-2.56		1.73	1.59-1.87	
No	1.0	--	0.000	1.0	--	0.000
Area of residence						
Urban	1.26	1.03-1.53		1.19	1.01-1.39	
Rural/Peri-urban	1.0	--	0.020	1.0	--	0.036
Place of occurrence						
Residence	6.07	4.41-8.36		5.17	3.78-7.09	
School	5.79	3.99-8.41		4.48	3.11-6.47	
Collective housing	4.99	2.43-10.21		3.65	1.91-6.97	
Others	1.0	--	0.000	1.0	--	0.000
Other occurrences						
Yes	1.18	1.06-1.31		0.946	0.87-1.03	
No	1.0	--	0.002	1.0	--	0.196
Suspected use of alcohol						
No	3.59	2.87-4.49	0.000	2.96	2.38-3.68	0.000
Yes	1.0	--		1.0	--	

Source: Elaborated by the authors.

the residence ($PR = 5.17$; $95\% \text{ CI} = 3.78-7.09$), being 2.96 times higher among those who did not consume alcohol ($p < 0.05$).

Discussion

From 2011 to 2018, a 33.2 % prevalence of notifications of self-inflicted violence among adolescents was identified in Espírito Santo. The Surveillance of Violence and Accidents in Urgency and Emergency Sentinel Services Survey (Viva Survey) indicated that, in 2017, Brazil presented a 28.8 % prevalence of self-inflicted violence among adolescents (26); whereas a study conducted in an emergency hospital from Alagoas evidenced 26 % occurrence of self-inflicted injuries among the adolescents (27).

It is important to note the higher proportion in the notifications of self-inflicted violence among female victims (79.8 %). Such findings align with the results presented by other studies (16, 28-31). These findings are similar because they evidence the self-inflicted injuries that were mostly recorded in girls (18). In England, the prevalence of self-inflicted injuries was also higher in the girls when compared to the boys (12). Added to this fact, a research study conducted in Mexico highlights higher chances of attempted suicide in female adolescents, when compared to their male counterparts (28).

The difference between the genders can be justified as a consequence of the countries' social and cultural context where the girls' status in each society is defined. In societies dominated by men, it is observed that girls can attempt suicide more frequently, taking into account the problems faced regarding the female gender (29). In addition, women present more internalizing disorders, such as depression and anxiety, which reflects in higher frequency values of suicidal ideation and attempted suicide (32).

Regarding the associated factors, in this study, it is verified that male adolescents aged between 18 and 19 years old, as well as female adolescents between the ages of 13 and 17, presented a higher prevalence of self-inflicted injuries. The prevalence values found in this study corroborate the findings from a survey (33), in which suicidal behavior in female adolescents was found to occur with higher prevalence in mid-adolescence. In turn, in the male adolescents, the highest prevalence values were found at the end of the adolescence period, at the ages of 18 and 19 years old. This finding suggests that younger girls may

be more likely to seek help to express their emotional problems and, therefore, suicidal behavior is interrupted earlier among them than among male adolescents (34).

Self-inflicted violence among adolescents with some type of disability or disorder was more prevalent when compared to those without these problems, which is in line with another study conducted with data from the SINAN (16). Mental disorders are at least 10 times more prevalent among individuals who already attempted or consummated suicide than in the general population (35). Adolescents with bipolar disorder, eating disorders, melancholic depression or anxiety present higher prevalence values of self-inflicted injuries (19). Corroborating these findings, a research study conducted in the United States shows that the depressive, or bipolar disorders increase the chances of suicidal behavior among adolescents (20). Many suicide attempts can occur impulsively in crisis moments due to a collapse in the ability to deal with life's acute or chronic stress (3). In addition to that, mental disorders such as depression can cause major distress and interfere in the individuals' quality of life (36).

Regarding the area of residence, the outcome prevalence was higher among female adolescents who lived in the urban area. This finding is in line with a study conducted in the United States, where the highest prevalence of non-fatal self-inflicted injuries was found in the urban area (37). In a study conducted in Australia, adolescents living in rural areas felt less lonely when compared to those from urban areas, suggesting greater social support, which is an important protective factor for suicidal behavior (38). It is frequently postulated that cities exert an adverse effect on people's health, since some problems such as mental disorders, exposure to risk behaviors and psychological stressors, may be more present in this area (39).

Concerning the place of occurrence, it is noted that, for girls, the prevalence of self-inflicted injuries was higher in the residence; and, for boys, in addition to the high prevalence in the residence, prevalence was also significant in collective housing spaces. A study conducted with institutionalized adolescents showed a higher prevalence of suicidal behavior in this group when compared to those who were not institutionalized (40). This can be related to the occurrence of adversities before and during the time of institutionalization, which can lead to depressive symptoms, mainly due to the disruption of bonds (41, 42). Regarding self-inflicted injuries that occurred in residences, other stud-

ies corroborate this research (21, 43). Such occurrence can be higher in these places because of the isolated environment and the feeling of loneliness, which can lead them to self-aggression without being interrupted by others (21).

Regarding the main means of self-aggression used by the adolescents, the highest number of cases of poisoning and/or intoxication and sharps (*cutting*) is observed, corroborating a research study that used national data from the SINAN (16). Data from a research study conducted by Beckman *et al.* (10) are in line with these findings as they evidence higher prevalence values of self-intoxication and cutting. Self-intoxication was also the most prevalent method in a study conducted in Ireland (44). Data from a research study conducted in England also corroborate this study by evidencing that self-inflicted injuries among adolescents through self-intoxication were the main causes of hospital care after the occurrences. In the same research, self-aggressions with sharps were the most prevalent in the general population (12). The means of aggression pointed out deserve attention, as they can be associated with repeated violence and with consummated suicides. According to studies conducted in Ireland (44, 45), adolescents who injured themselves with sharps present higher risks of repeated self-aggressions when compared to those who used other methods.

The highest prevalence of self-inflicted injuries was among adolescents who were not suspected of having used alcohol before the self-aggressions. This association can suggest more premeditation and planning in the aggression attempts since they occur without resorting to alcoholic beverages. However, the occurrence of self-aggression has been associated in the literature with acute alcohol intoxication, as suggested by the data from a meta-analysis article in which acute alcohol consumption increased by up to 37 times the chances of suicide attempts (46).

As of Ordinance 1,271 of the Brazilian Ministry of Health, dated June 6th, 2014, notification of self-inflicted injuries in the health services became of compulsory registration within 24 hours of knowledge of its occurrence (22). In this context, notification is one of the care line dimensions, where it is up to the health team to incorporate the adolescents into a comprehensive protection network for the sake of their own health. Therefore, in addition to the notification, it is important to continue monitoring these young individuals by referring them to appointments with multidisciplinary teams capable of recognizing and resolutely intervening in suicidal behavior (47).

The study has some limitations, such as selection bias, since it is probable that only the most severe cases that depend on care in health services are notified, which excludes the cases that occur in the community in general; therefore, it is not possible to make inferences regarding the prevalence of the problem in the state. Another limitation refers to the notification instrument, which does not discriminate if the violent event was an attempted suicide or a self-inflicted injury without suicidal ideation. Taking this instrument into consideration, it is also noted as a limitation the fact that it was not possible to analyze other factors associated with the occurrence of self-inflicted injuries among adolescents described in the literature.

Conclusions

This study presents the prevalence of the notified cases of self-inflicted violence in adolescents, a fact until then not explored in Espírito Santo. In addition to that, it also evidences factors such as characteristics of the victim and of the occurrence, associated with the higher prevalence in the notification of this problem.

Identifying the associated factors is crucial for prevention measures to be implemented assertively. It is worth pointing out the need to address and work on this issue to welcome the adolescents and dialog with them, as well as to provide opportunities for their needs to be addressed in the health services; thus, training the professionals is an important strategy to prevent self-inflicted violence behaviors from continuing into adulthood and to avoid negative outcomes of this practice.

It is also to be noted the importance of mandatory notification by the health professionals within 24 hours, to ensure timely intervention. Although registration of self-inflicted injuries is a challenge for collective health due to its underreporting, this instrument is fundamental for feeding and strengthening the SINAN as an important tool for epidemiological surveillance and as a signpost for necessary changes by the government, as it allows managers to know the situation of the problem as well as to provide subsidies for decision-making and for the implementation of public policies focused on the theme, which aim at strengthening health care for these individuals within the Brazilian Unified Health System.

Finally, it is suggested that research studies with this population be carried out in the community in general to evidence the

reasons, distribution, and impacts of this problem, as well as for promotion, prevention, and recovery measures to be adopted.

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