



Personal, relational and school factors associated with involvement in fights with weapons among school-age youth in Brazil: a multilevel ecological approach

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Abstract

Objectives To investigate the association between personal, relational and school factors with involvement in fights with weapon among Brazilian school-age youth.

Methods Using data from the Adolescent School-Based Health Survey 2015 ($n = 102,072$), we conducted multilevel logistic regression models.

Results IFW was associated with female sex ($OR = 0.45$), and with older age ($OR = 1.15$), previous involvement in physical violence ($OR = 2.05$), history of peer verbal ($OR = 1.14$) and domestic victimization ($OR = 2.11$), alcohol use ($OR = 2.42$) and drug use ($OR = 3.23$). The relational variables (e.g., parent's supervision) were mostly negatively associated with IFW. At the school level, attending public school and attending schools in violent surroundings were both positively associated with IFW. The intraclass correlation coefficient estimated in the empty model showed that 5.77% of the variance of IFW was at school level. When all individual- and school-level variables were included in the model, the proportional changes in variance were 61.7 and 71.55%, respectively.

Conclusions IFW is associated with personal, relational and school factors. Part of the variance in IFW by school is explained by characteristics of the school context.

Keywords Violence · Youth violence · Multilevel models · Violence prevention · Risk factors · Ecological model

Introduction

Youth violence has been considered a major social and public health problem in the world since the 1990s. In 2012, there were 200,000 homicides of adolescents and youths aged between 10 and 29 worldwide (WHO 2014). Of these, 25,620 were reported in Brazil (Datasus 2012) representing almost 13% of total homicides worldwide, greatly exceeding Brazil's share of the world population (2.8%) (Vlasev et al. s.d.). In Brazil, interpersonal violence

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was the first cause of years of life lost (YLL) in 2010. According to the World Health Organization (WHO), violent death represents only the apex of the pyramid that represents the magnitude of youth violence in the world, and most part of the cases may never be reported (WHO 2016), including acts of bullying and physical fights. School-based surveys are, though, an important source of information to document prevalence, consequences and risk factors for youth violence worldwide.

According to the School-based Student Health Survey (GSHS), the prevalence of involvement in physical fights (both as victims and perpetrator) in the previous 12 months from the interview varied from 21% in Myanmar to 73% in Samoa youth (13–15-year-old) male population and from 8% in Myanmar to 62% in the Samoa female population. The figures reported for the male youth group in Latin American countries ranged from 36% in Honduras and 48% in Dominica (21% in Honduras and 39% in Jamaica, for the female youth) (WHO 2016). In Brazil, according to the Brazilian National Surveys of School Health, a cross-sectional school-based survey with a nationally representative sample of 9th grade students (14–16-year-old), the prevalence of involvement in physical fights in the previous year was 12.9% in 2009 (Malta et al. 2010) and 20.7% in 2012 (Malta et al. 2014). Male figures are consistently higher. According to Malta et al. (2010), in 2009, 6.1% of the Brazilian students reported being involved in a fight using cold weapons, and 4% reported involvement in fights using a firearm. These prevalences increased to 7.3% for fight using cold weapons and 6.4% for fights using a firearm in 2012 (Malta et al. 2014). The global prevalence of involvement in fights with weapon was 10.36% in the same year (Melo and Garcia 2016). In a community survey carried on in Colombia in the middle nineties, Brook et al. (2003) reported that 6.1% of 12–17-year-old adolescents hit someone with a weapon or shoot someone, and 6.7% cut someone with a knife.

Comprehensive approaches to youth violence consider the interconnections between individual characteristics, the school environment and family relationships, from a multilevel ecological perspective. According to this approach, youth behaviors are influenced by multiple social contexts simultaneously interacting with one another (Krug et al. 2002; Henrich et al. 2005; Brookmeyer et al. 2006; Ribeaud and Eisner 2010; Foster and Brooks-Gunn 2013).

However, most of the evidence on youth violence risk and protective factors, especially that based on multilevel ecological approaches, comes from high-income countries, which have lower violence rates than low and middle-income countries (LMICs). Therefore, it is not clear what risk and protective factors are more relevant in different settings with distinct cultural norms, social organization and violence levels. Given the magnitude and

consequences of the problem, it is necessary to examine risk factors for crime and violence in Brazil and other LMICs to advance violence prevention efforts globally (Murray et al. 2013).

The purpose of this study is to investigate the association between personal, relational and school factors with involvement in fights with weapon (IFW) among Brazilian youth.

Methods

Study population, sampling and data collection

We analyzed data from the Brazilian National Surveys of School Health (Pesquisa Nacional de Saúde do Escolar—PeNSE) carried out in 2015. PeNSE is a nationally representative survey of students from the final (9th) year of elementary education in public and private schools in Brazil. The students were selected based on a complex sampling strategy. Sample size was calculated to allow the estimation of population prevalence with a maximum sampling error of approximately 3% and a confidence level of 95%. For purpose of sample size calculation, a prevalence of 50% was assumed. A conglomerate sampling plan was used. Sample size calculation formula and sampling strategy used at PeNSE were described in detail in previous publications (IBGE 2016; Oliveira et al. 2017). Of 3160 selected schools, 120 were not assessed due to lack of ninth-year classrooms, strikes at the time of data collection or the school board's refusal to participate. On the data collection days, 96.7% (120,122) of the students attended school, 18,050 refused to participate or did not report their gender or age and were excluded from the analysis (response rate of 82.2%, $n = 102,072$) (IBGE 2016; Oliveira et al. 2017).

Students completed a self-administered electronic questionnaire (on a smartphone) in their school classrooms during regular school hours. The questionnaire was based on the Global School-Based Student Health Survey (WHO 2009), and the Youth Risk Behaviour Surveillance System (Brener et al. 2013), with cultural/technical adaptations to the Brazilian setting. School principals or coordinators answered a questionnaire concerning contextual characteristics of their school. Further details of the survey are described elsewhere (IBGE 2016; Oliveira et al. 2017).

Study variables

Involvement in fights with weapon (IFW)

Adolescent IFW was identified by a positive answer to either of the two questions: “Have you been in a fight

where a gun was involved in the last 30 days?”; “Have you been in a fight where a knife, stone, stick or glass bottle was involved in the last 30 days?”

Individual-level personal characteristics

We gathered data from the following socio-demographic variables: sex, age (in years), mother’s educational level (incomplete middle school, complete middle school, complete high-school, complete higher education), self-reported skin color/race (white, black or brown/mixed, Asian, native Brazilian Indian), city of residence (state capital, non-capital), and geographical region (North, Northeast, South, Southeast and Mid-West).

We assessed students’ past involvement in physical violence in the last 12 months, verbal violence victimization by schoolmates (mocked, teased, called names or intimidated) and domestic violence against the adolescent in the past 30 days. We also assessed whether students had drunk alcohol (no or yes) or used drugs in the past 30 days (no or yes).

Individual-level relational characteristics

We assessed parental supervision by a summing indicator based on three items: “Parents verify adolescent’s homework,” “Parents know what the adolescent does in his/her spare time” and “truancy without parent knowledge.” This indicator was classified as “none” (if student have answered “no” to all the items), “one,” or “two or three” items. In addition, we assessed student-parent relationship by analyzing the answers to the following questions: “Do you usually have meals with your parents? (no or yes),” “Do you think your parents understand your problems? (no or yes), and “Do your parents snoop through your things? (no or yes).” Living arrangement was categorized into three groups: “living with two parents,” “living with one parent (mother or father)” or “other arrangements.” There was no differentiation between biological or adoptive parents.

We also assessed the number of friends (“none,” “1 friend,” “2 friends” and “3 or more friends”).

School-level variables

The school-level variables were retrieved from two sources: the student questionnaire and the principal/coordinator questionnaire. From the student questionnaire, we used the answers to the individual question “In the last 30 days, have you missed classes because you did not feel safe in your school?” to calculate the proportion of students feeling unsafe in the school.

From the principal/coordinator questionnaire, we classified schools as public or private, and the school status regarding violence in its surroundings as “not violent,” “rarely/sometimes violent,” “always violent.” The frequency of school council meetings was classified as: “do not have a council or the council does not meet,” “once or less than once a year,” “between more than once in six months and once every two months,” and “once a month or more frequently.” We also assessed the school’s provision of extracurricular sports activities (yes or no) and the school infrastructure through a score, which assessed the availability of library, computer laboratory, multimedia laboratory and physical activity facilities (sports courts, running/athletics track or swimming pool). The infrastructure score ranged from zero to four, the higher the score, the better the school infrastructure. The number of students enrolled in the school was also included as a school-level covariate. The description and categorization of all study variables are presented as supplementary table.

Statistical analysis

First, we estimated the relative frequency of IFW and all independent variables. Multiple imputation by chained equations was used to attribute numerical values to the mother’s educational level, which had 25% missing values ($n = 25,434$), as described elsewhere (Azeredo et al. 2015). The imputed data exhibited satisfactory statistical reproducibility according to the Monte Carlo error analysis (Royston and White 2011).

We performed multilevel logistic regression models with random-intercept to evaluate the association between IFW and variables at student and school level. Multilevel logistic regression models were developed in sequential steps. An empty model was initially used to determine the clustering of IFW by school. Through this model, we obtained the variance of IFW across schools. The “latent variable method” was used to obtain the intraclass correlation coefficient (ICC). Once in multilevel logistic regression individual-level variance (V_i) and area level variance (V_a) are not directly comparable we assumed, as proposed by Merlo et al. (2005), that $V_i = 3.29$ and ICC was calculated as $ICC = V_a / (V_a + 3.29)$.

We then performed an unadjusted model of the association between IFW and each of individual- and school-level variables. In the sequential steps we first included all the individual variables (Model 1), then the school-level variables (Model 2—full model). During the modeling process, we verified the proportional change in variance (PCV) of IFW across schools in models 1 and 2 (Merlo et al. 2006).

The analyses were performed using Stata, taking into account the sampling design of the survey in the descriptive analysis.

Results

Personal, relational and school characteristics are described in Table 1. Almost half of the sample was female, the mean age was 14.29 years and skin color was predominantly black or brown/mixed. Around 10.2% of the students reported IFW in the last 30 days. Additionally, 18.4% had been involved in physical violence in the last 12 months, 46.6% were victims of peer verbal violence, and 14.5% of domestic violence (Table 1).

Most of the schools were public. The majority had council meetings between once and nine times a year. The surroundings of 18.7% of the schools were considered “always violent,” and more than 40% were considered at least “rarely violent.” On average, 10.8% of students felt unsafe on school property (Table 1).

Table 2 shows the association between personal, relational, and school variables and IFW. The fully adjusted model (model 2) showed that female gender was inversely associated with IFW. Older adolescents, black or brown/mixed and native Brazilian Indians were positively associated with IFW. Involvement in physical violence in the last 12 months, victims of verbal peer violence and domestic violence, and alcohol or drugs use were positively associated with IFW.

Students with intrusive parents (parents who “snoop through their things”) presented higher odds of IFW. On the other hand, students who received parental supervision (two or three indicators) felt that parents understood their problems and had meals with parents presented lower odds of IFW. Students with a higher number of friends had lower odds of IFW. Regarding the school-level variables, public schools, schools in violent surroundings and those where students feel unsafe were positively associated with student IFW. The ICC estimated in the empty model demonstrated that 5.8% of the variance of student IFW is at school level. In the individual-level model (Model 1) and full model (Model 2) the PCV was 61.7 and 71.6%, respectively (Table 2).

Discussion

Our findings show that around 10% of the school-age youth reported being involved in fights with weapon in the previous 30 days. We identified several personal, relational and school contextual factors associated with IFW. At the personal level, we found positive association with older

age, black or brown/mixed or native Brazilian Indian ethnicity, previous involvement in physical violence, verbal and domestic violence, previous victimization, alcohol use and drug use. An inverse negative association was found with female sex. At the relational level, having friends, parental supervision and family connectedness were all negatively associated with IFW. Having intrusive parents was positively associated with IFW. Among the school-level variables, only studying in a public school, attending school in violent surroundings and feeling unsafe at school were positively associated with IFW. School context explained part of the variance in IFW between schools, even bearing in mind that most of our school-level variables were not associated with IFW.

Our study supports research findings that show youth violence involves multiple level determinants including personal characteristics, family and friend relationships and school context. Most of the variables included in our study are known risk or protective factors for youth violence. The individual risk factors for violent behavior among adolescents and youth include being male, having previous history of violent victimization and being part of a social minority more prone to social stigmatization. Studies also show that a previous history of violence or aggressive behavior, alcohol abuse and drug abuse are risk factors for violence during adolescence (Melo and Garcia 2016; Krug et al. 2002; Henrich et al. 2005; Ribeaud and Eisner 2010; Foster and Brooks-Gunn 2013; Blum et al. 2000).

Peer influence is well recognized as an important component of the framework of risk factors for youth violence (Krug et al. 2002; WHO 2016). In our study, having friends was inversely associated with IFW. A similar result was reported by Melo and Garcia (2016) using data from PeNSE 2012, where having no close friends was associated with a higher prevalence of IFW (prevalence ratio = 1.36). Having close friends may protect against the IFW, possibly through a social support pathway. This could be better understood with information about peer characteristics, which was not measured in PeNSE.

Based on the ecological model, the family environment is also a crucial component of child and adolescent socialization and, as a consequence, contributes to the development of violent behavior (Krug et al. 2002). Family structure and connectedness, as well as parenting skills, are among the family predictors of violence during adolescence (Krug et al. 2002; Henrich et al. 2005; Ribeaud and Eisner 2010). Poor monitoring, low parental supervision, harsh discipline and family violence are among the family risk factors for adolescent and youth violence (WHO 2016; Kellermann et al. 1998). In our study, parental supervision and a positive relationship with parents were inversely associated with IFW, whereas parental intrusive behavior was positively associated with IFW.

Table 1 Description of personal, relational and school characteristics among Brazilian school-age youth in the Brazilian National Surveys of School Health (Brazil, 2015)

Variable	% (95% CI)
<i>Individual-level</i>	
<i>Personal characteristics</i>	
Sex (female)	
Female	51.28 (50.66–51.91)
Male	48.72 (48.09–49.34)
Age in years—mean	14.29 (14.26–14.31)
Skin color/race	
White	36.14 (35.11–37.18)
Black or Brown/Mixed-race	56.44 (55.41–57.47)
Asian	4.11 (3.87–4.36)
Native Brazilian Indian	3.29 (3.07–3.52)
Involvement in fights with weapon*	10.21 (9.79–10.63)
Involvement in physical violence (last 12 months)	18.36 (17.83–18.88)
Victim of verbal peer violence	46.62 (45.94–47.31)
Victim of domestic violence	14.50 (14.04–14.97)
Alcohol use (last 30 days)	23.77 (23.15–24.39)
Drug use (last 30 days)	4.15 (3.87–4.43)
<i>Relational characteristics</i>	
Number of friends	
None	4.29 (4.05–4.54)
1 friend	6.23 (5.95–6.51)
2 friends	12.61 (12.16–13.05)
3 or more friends	76.86 (76.29–77.43)
Familiar arrangement	
Both parents	59.30 (58.55–60.06)
One parent	35.00 (34.32–35.68)
None	5.69 (5.43–5.96)
Parents supervision**	
None	8.78 (8.33–9.24)
1 indicator	28.47 (27.97–28.98)
2 or 3 indicators	62.73 (62.06–63.41)
Parents understand your problems	82.85 (82.39–83.32)
Usually have meals with parents	80.82 (80.28–81.37)
Parents snoop through your things	52.75 (52.17–53.34)
<i>School-level</i>	
School type	
Private	16.58 (14.30–18.87)
Public	83.41 (81.12–85.69)
Frequency of school council's meetings per year	
No meetings/doesn't have school council	13.2 (11.25–15.16)
Less than once	2.75 (2.01–3.50)

Table 1 (continued)

Variable	% (95% CI)
Between once and nine times	66.98 (64.17–69.80)
More than ten times	17.04 (14.79–19.30)
Violent surroundings	
No	35.53 (32.62–38.45)
Rarely/sometimes	45.73 (42.59–48.87)
Always	18.72 (16.39–21.07)
Extracurricular activities provided (%)	53.97 (50.83–57.12)
Student feeling not safety in schools (%)	10.79 (10.49–11.10)
Infrastructure score*** (mean)	2.79 (2.75–2.84)

*Outcome: included involvement in fights using guns, knife, stone, stick or a glass bottle in the last 30 days

**Included: Parents verify homework, Parents know what you do in your spare time and truancy without your parents know

***Library, computer lab, multimedia lab and physical activity facilities (sports courts, running/athletics tracks or swimming pools)

School environment also plays an important role in the socialization of children, adolescents and youth, and therefore might be an important setting for violence prevention programs (Mytton et al. 2002; Hahn et al. 2007). In our study, school characteristics such as sport infrastructure, frequency of school council meetings and provision of extracurricular activities were not associated with IFW. The only school-level variables positively associated with IFW were attending public school, attending schools in violent surroundings and feeling unsafe at school. Public schools in Brazil should receive more attention (i.e., finance, training and student direct assessment) in order to be able to cope with IFW internally and in their relationship with surrounding violent communities. Around 6% of the variance in student IFW was related to school contextual characteristics and our full model explained more of the variance in IFW than the partial model with only individual-level variables.

There is substantial recognition that social and physical school environment can positively affect students' behaviors and reduce violence levels. The social environment at school comprises student interactions with peers and school staff, potentially changing student's individual behavior through the reinforcement of social cohesion and social capital (Johnson 2009) and the changing of school culture and norms (Ozer 2006). The effect of school physical environment on youth violence is based on the idea that space design, use, patterns of circulation and territorial features reduce violent behavior by limiting interactions,

Table 2 Association between personal, relational and school factors with involvement in fights with weapon (IFW) among Brazilian school-age youth in the Brazilian National Surveys of School Health (Brazil, 2015)

Covariates	Unadjusted model	Model 1* OR (95% CI)	Model 2* (full) OR (95% CI)
<i>Individual level</i>			
<i>Personal characteristics</i>			
Sex (reference: male)	0.48 (0.47–0.51)	0.45 (0.43–0.47)	0.45 (0.43–0.47)
Age (in years)	1.36 (1.34–1.39)	1.16 (1.14–1.19)	1.15 (1.12–1.17)
Skin colour/race (reference: white)			
Black or Brown/mixed-race	1.19 (1.13–1.25)	1.13 (1.07–1.20)	1.1 (1.04–1.16)
Asian	1.12 (1.00–1.24)	1.05 (0.93–1.18)	1.03 (0.92–1.16)
Native Brazilian Indian	1.37 (1.23–1.53)	1.15 (1.02–1.30)	1.11 (0.98–1.25)
Involvement in physical violence (last 12 months)	3.85 (3.68–4.02)	2.04 (1.93–2.15)	2.05 (1.94–2.17)
Victim of verbal peer violence*	1.45 (1.38–1.51)	1.14 (1.08–1.19)	1.14 (1.08–1.19)
Victim of domestic violence*	4.25 (4.06–4.45)	2.14 (2.02–2.27)	2.11 (1.99–2.24)
Alcohol use (last 30 days)*	4.00 (3.83–4.18)	2.42 (2.30–2.54)	2.42 (2.30–2.55)
Drug use (last 30 days)*	8.32 (7.76–8.92)	3.26 (3.01–3.54)	3.23 (2.98–3.50)
<i>Relational characteristics</i>			
Number of friends*			
1 friend	0.78 (0.70–0.88)	0.81 (0.71–0.92)	0.81 (0.72–0.92)
2 friends	0.64 (0.58–0.71)	0.71 (0.63–0.79)	0.71 (0.64–0.80)
3 or more friends	0.61 (0.56–0.67)	0.76 (0.68–0.83)	0.77 (0.69–0.85)
Familiar arrangement (reference = both parents)			
One parent	1.26 (1.21–1.32)	1.03 (0.99–1.09)	1.02 (0.97–1.07)
None	1.48 (1.37–1.60)	1.08 (0.99–1.18)	1.06 (0.97–1.16)
Parents supervision*			
1 indicator	0.51 (0.47–0.54)	0.74 (0.69–0.80)	0.76 (0.71–0.82)
2 or 3 indicators	0.23 (0.22–0.24)	0.51 (0.47–0.55)	0.52 (0.49–0.56)
Parents understand your problems*	0.57 (0.55–0.60)	0.83 (0.79–0.88)	0.83 (0.78–0.88)
Usually have meals with parents*	0.65 (0.62–0.68)	0.88 (0.83–0.93)	0.88 (0.83–0.93)
Parents snoop through your things*	1.40 (1.34–1.45)	1.12 (1.07–1.18)	1.13 (1.07–1.18)
<i>School-level</i>			
Public school (reference = private)	1.69 (1.58–1.82)		1.29 (1.19–1.40)
Frequency of school council's meetings*			
Less than once	1.02 (0.87–1.19)		0.94 (0.81–1.09)
Between once and nine times	1.16 (1.08–1.25)		1.02 (0.94–1.10)
More than ten times	1.19 (1.08–1.31)		1.00 (0.91–1.09)
Violent surroundings*			
Rarely/sometimes	1.11 (1.04–1.19)		1.09 (1.03–1.17)
Always	1.33 (1.23–1.43)		1.13 (1.05–1.22)
Extracurricular activity*	0.89 (0.84–0.94)		1.01 (0.95–1.06)
Student feeling not safety in schools*	1.03 (1.02–1.03)		1.01 (1.01–1.01)
Infrastructure score*	0.99 (0.97–1.01)		1.01 (0.98–1.03)

Logistic regression models: models 1 and 2 were adjusted for maternal educational level, number of students per school, geographical area, county type (capital or non-capital)

PeNSE, Pesquisa Nacional de Saúde do Escolar (National Adolescent School-based Health Survey)

*Reference group = no/none

reducing anonymity and reinforcing positive norms and social behavior (Johnson 2009).

The role of schools in preventing youth violence is being reinforced by the Task Force on Community Preventive Services, the Center for Disease Control (Hahn et al. 2007) and WHO (2010). Evidence supports the positive effects of programs for children and adolescents at risk of violent behavior as well as universal based programs, such as the Positive Behavioral Intervention and Supports (PBIS) program (www.pbis.org) (Bradshaw 2013; Vazsonyi et al. 2004). School-based programs are effective in preventing different forms of violent behavior, inside and outside school. Additional positive effects were also observed in the reduction of drug use and delinquency (Hahn et al. 2007).

Our study has some potential limitations. First, PeNSE is a school-based survey, which means that only adolescents and youth attending school and present on data collection days were included. However, PeNSE involved a representative sample of Brazilian students. Brazil has a high coverage rate for elementary education: 88% of adolescents aged 15–19 years attend school, ensuring external validity, and our overall response rate can be regarded as good. Second, we should also consider selection bias due to schools and students non-participation. Unfortunately, we do not have information about the non-participating schools or students. However, as the loss of schools was negligible ($n = 120$, 3.7%), it is possible to suppose that there was no compromise of representativeness of the sample. Regarding the students, the response rate was also high (82.2%). Since our objective was to estimate the association between individual, relational and contextual characteristics in the IFW, we did not find reasons to suppose that non-participation biased the measures of association reported. Third, the cross-sectional design does not allow us to be conclusive about temporality in the relationship of independent variables with IFW. The time frame for some of the variables such as verbal and family victimization, drug and alcohol use was the same as that used as the reference for IFW (i.e., 30 days). Other variables did not have a limited time frame such as number of friends and family relations.

Another possible limitation refers to the use of missing-data imputation (MICE). To perform MICE, we assumed that the missing data were at random and our imputations could be biased if another missing-data mechanism has happened, causing selection bias. We compared the results of our model using the complete dataset with the imputed dataset. Although the proportion of missing values in the mother's educational level was 25%, the use of multiple imputation analysis resulted in effect estimates that were essentially the same as those without imputation (data not

shown), which provides some assurance against substantial selection bias (Royston & White 2011).

Additionally, our data are self-reported, what could result in underreporting of IFW and also some of the independent covariates. According to Brown et al. (2009) misreporting of violence exposure tends to be non-differential, which could result in underestimation of the magnitude of associations.

More important for us are the limitations in our measures of IFW and of school contextual features. Our measure of IFW does not differentiate between situations in which the student was a victim or a perpetrator of violence. It is also possible that some of the students who reported IFW in the previous 30 days and also reported involvement in a physical violence in the previous 12 months were referring the same episode.

School contextual variables included in PeNSE do not allow us to explore qualitative and social dimensions of school environment, limiting our understanding of the association between school context and IFW. For example, we had information about the frequency of council meetings but not about the actual participation and real involvement of families with school activities. Similarly, we used information about the provision of extracurricular activities but we were not able to measure the type and quality of the activities or who actually participates in such activities. School infrastructure tells us about the quantity of equipment but not about its use. In addition, we do not have any information about the existence and type of activities that have been developed aimed at preventing youth violence.

Ours results have important practical implications: they corroborate, in a different cultural and social context, in a very violent country, that social friendship support, positive family relationships and school contexts protect against IFW, thus providing better evidence for the development of violence prevention programs (VPP) in LMICs. These include parenting and school-based VPPs. Further research, however, is necessary to better understand which school contextual features are associated with IFW, requiring the inclusion of more comprehensive and standardized measures of school environment and school connectedness.

Violence prevention is a complex task. Traditionally, social responses to violence have been guided by the criminal justice approach. Characteristically reactive, this approach is based on the identification of aggressors and their motives, and on actions aimed at deterring, incapacitating and rehabilitating them (Moore 1995). The preventive dimension of these actions is present in the idea that the attribution of a sanction has general and special deterrent effect, thus avoiding the occurrence of new crimes (Zimring and Hawkins 1973; Grasmick and Bursik

1990; Nagin and Pogarski 2001). The focus on the aggressor implies placing the primary cause of the violent act in the cognitive and personality characteristics of the agents, without disregarding the role of contextual and situational characteristics, as well as the importance of the spheres of socialization in which moral values and social norms are shared (Wikström and Treiber 2009, Akers 2000; Gottfredson and Hirschi 1990).

Since the end of the 1980s, the Public Health field defines violence as a public health problem that should be addressed following a systematic approach, with a focus on the identification of risk factors that could be targeted in interventions aimed at preventing new cases to occur (Mercy et al. 1993; Krug et al. 2002). The Public Health field also recognizes, considering the multi-causal nature of violence, the importance of distinct fields and disciplines to a better understanding of the problem and to design intersectoral approaches to reduce its magnitude and pervasive effects (Carnochan et al. 2011).

In 1960, in his article entitled “Epidemiology and Individual Conduct: a case from criminology,” Cressey (1960) argues for the importance of a closer approximation between the two disciplines for a better understanding of crime and, consequently, violence, capable of explaining the distribution population rates and the individual processes on the basis of deviant behavior. Despite the differences between the two fields, the incorporation of theoretical approaches from criminology and criminal justice by epidemiology and Public Health would result in the development of more comprehensive theoretical-explanatory models, with a clear focus on understanding the causal mechanisms of aggressive behaviors. This incorporation would result in the development of theory-driven evidence-based violence prevention, with a greater potential to effectively prevent violence behavior to occur (Embry et al. 1996; Alexander et al. 2004).

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Ethical statement CPeNSE 2015 was approved by the National Commission of Research Ethics of the Brazilian Ministry of Health (record no. 1.006.467). The participation was voluntary after giving free and informed consent. The PeNSE 2015 database is publicly available on the *Instituto Brasileiro de Geografia e Estatística* (IBGE) website with no information which could identify subjects or schools, *securing anonymity of participants*.

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