School Environment and Mental Health State in Brazilian Adolescents – Evaluating Public Policy Opportunities

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INTRODUCTION

School – the second most influence social institution on children's and adolescent's development – is a priority environment to promote and prevent mental health disorders. What can representative data tell us about the association between Brazilian school environment and adolescent's mental health?

Objective: To evaluate the relationship between school environment characteristics and risk of poor mental health state in representative sample of Brazilian students aged 13 to 17.

METHODS

Sample: 2019 National Survey of School Health (NSSH), from Brazilian Statistics Institute. NSSH is a cross sectional school-based survey which uses a self-administered questionnaire in 13-17 year old students to obtain data on health behaviors (risk and protective factors related to the leading causes of morbidity and mortality). It also investigate topics about the school environment (structural, characteristics and policies). Sample size: 121,258 students and 4,182 schools.

Mental Health Variable (Y_{ij}): A binary variable for a high-risk state of poor mental health was defined for those students who reported in the previous 30 days a high frequency (always or most of the time) of at least 4 between 5 feelings/states:

- sad;
- very worried with daily things;
- that no one cares about himself/herself;
- irritable/nervous/moody about anything;
- feeling that life is not worth living.

Econometric model: Logistic Multilevel Model

$$Y_{ij} \sim Binominal\ (1, \pi_{ij})$$

π_{ij} – Probability of Y_{ij} for *i* student at *j* school.

$$F^{-1}(\pi_{ij}) = b_{0j} + \boldsymbol{u_{0j}} + b_{1j}X_{ij} + \gamma_{11}G_j$$

F^{-1} – link function (logit).
X_{ij} – student level independent variables
G_j – school level independent variables
b_{0j} – fixed component of the intercept
u_{0j} – random component of the intercept

Dependent Variable
Y_{ij} : High-risk state for poor mental health of *i* student at *j* school

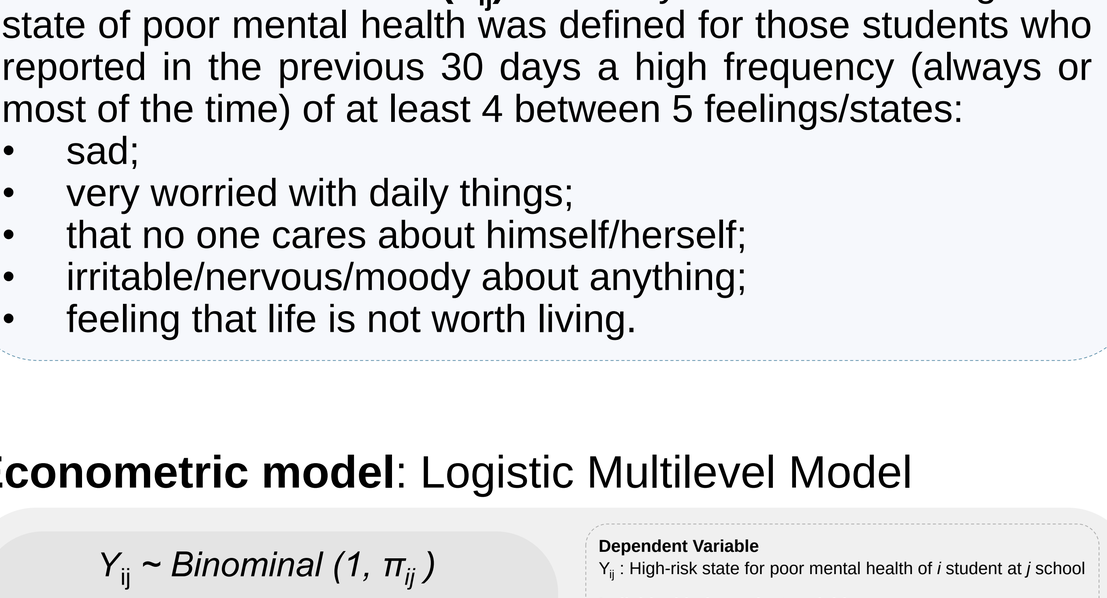
Individual independent variables
X_{ij} : Gender, age, family environment variables, traumas (aggression, by peers, sexual), socioeconomic condition proxies

*The student level variables was selected according to the Mental Health Capital Model (Menegotto, 2023) that presents the lifecycle dynamic formation of the mental health capital based on the main risk factors for the development of internalizing disorders in childhood and adolescence.

School independent variables
G_j – public school, urban area, Brazilian region, capital city, goods inequality index, presence of Health at School Program.

Intraclass Correlation Coeficient (ICC) $\dfrac{var(u_{0j})}{var(u_{0j}) + \frac{\pi^2}{3}}$

Figure 1 – Graphic representation of multilevel logistic regression (random intercept)

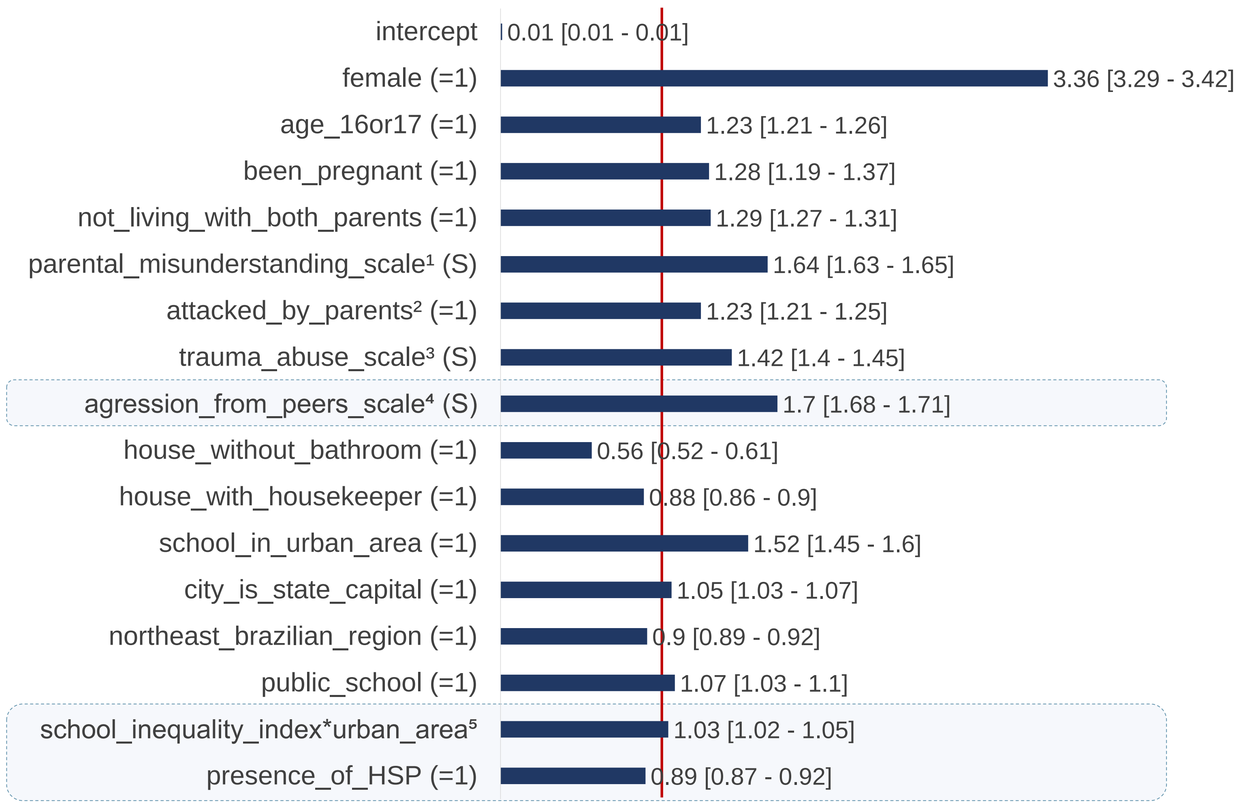


Description: The red line, the fixed intercept b_0, corresponds to the overall mean log-odds of having a high-risk state for poor mental health. The vertical arrows represent the deviation of the mean log-odds for each sample school from the overall sample mean log-odds. The random intercept variance, var (u_{0j}), captures the variance of those deviations. The higher this variance is, the larger the variation of the log-odds of having a high-risk state for poor mental health from a school to another, indicating that students have more chances of having a high-risk state for poor mental health in some schools than in others. The ICC represents the proportion of the between school variation, var (u_{0j}), in the total variation.
Notes: Data are fictitious – do not correspond to the study sample.
Source: Adaptation from Sommet e Morselli (2017).

RESULTS

The ICC – that represents the proportion of the between school variation in the total variation of the high-risk state of poor mental health – went from 3,9% in the null model (without variables) to 2,2% in the final model. The adjusted McFadden Pseudo R^2 for the final model was 19,2%. The estimated Odds-Ratio (OR) for the final model are presented in the graphic 1.

Graphic 1 – Multilevel logistic regression – variables' Odds-Ratio (OR)



Notes: [1]**Parental_misunderstanding_scale**: Frequency scale for the level of parents/guardians' incomprehension about the student's problems and concerns in a 30 days period before the interview. Scale: always understood = 0, in most cases sometimes = 1, sometimes = 2, rarely = 3, never = 4. [2]**Attacked_by_parents:** In the 12 months period before the interview the student has been physically attacked at least once time, by mother, father or guardian. [3]**Trauma_abuse_scale**: Scale for trauma events about sexual Issues that ever happened in the student's life. Increasing scale according to cumulative occurrence: never = 0, abuse or coerced act = 1, abuse and coerced act = 2. Definitions: abuse - was touched, handled, kissed or exposed parts of the body against the student's will; coerced act - was threatened, intimidated or forced to have sexual intercourse or any other sexual act against the student's will. [4]**Agression_from_peers_scale**: Scale of aggression by peers, in a 30 days period before the interview. Increasing values as cumulativeness and intensity of occurrence: never = 0, suffered offense in general OR on social media = 1, suffered offense in general and also on social media OR suffered offense in general two or more times = 2; suffered offense in general two or more times AND was also offended on social media = 3; Definitions: to be offended in general - to have been insulted/teased/intimidated/made fun of to the point of being hurt/bothered/annoyed/offended/humiliated; offense on social media - having felt threatened/offended/humiliated on social media or cell phone apps. [5]**School_Inequality_Index*urban_area**: an interaction between the school_in_urban_area variable and a constructed school Gini index for goods and services variable. The index measures the students' goods and services distribution inequality of each school. The variable, calculated for the school level, is presented in deviation of all schools mean, interacted with the urban area variable.
HSP = Health in School Program – a decentralized Brazilian health prevention and promotion intersectoral (Heath and Education) policy for students based in the interaction between the basic education's public schools and the primary health care to promote health and educational actions.
*The graphic representation corresponds to the final logistic multilevel (12^{th}) model, best fit model (deviance, AIC, BIC for the variable's step-by-step sequence inclusion).
Source: 2019 National Survey of School Health, from Brazilian Statistics Institute. Elaborated by the authors.

DISCUSSION

Despite the main contribution to a increased risk for poor mental health from individual and familiar's variables – as expected – the results point to the potential influence that school aspects has on adolescent's mental health in Brazil, identifying associations with aggression from peers (bullying), inequality in urban area and the school presence of Health in School Program. Meanwhile bullying is a known risk factor for internalizing disorders, the results for the school inequality index (based on student's goods and services distributions) signalize an aspect to be considered in further studies with more complete income data (not available at NSSH). The presence of the Health in School Program, identified as a protective factor but not with casual link by the study limitations (cross sectional dataset, lack of important variables, multifactorial and complex problem), should be evaluated for its impact on adolescent mental health in Brazil.

CONCLUSIONS

The study detects important Brazilian school environment aspects for adolescent mental health, identifying protector and risk school factors that should me more investigated. As a already existing public policy and for its potential impact on mental health, the Health in School Program must be evaluated.

References
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