

Prevalence of childhood stress and associated factors: a study of schoolchildren in a city in Rio Grande do Sul State, Brazil

Prevalência de estresse infantil e fatores associados: um estudo com escolares em uma cidade do Estado do Rio Grande do Sul, Brasil

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Abstract

This was a cross-sectional school-based study of 883 fourth-grade elementary schoolchildren at private (5), municipal (18), and State (11) schools in a city in Rio Grande do Sul State, Brazil. The objective was to identify the prevalence of childhood stress and its associated factors. The assessment used the Lipp & Lucarelli Childhood Stress Scale (2005) and a parental questionnaire. The results showed 18.2% stress prevalence in the schoolchildren. Factors associated with stress according to bivariate analysis were: gender (female), age (> 10 years), type of school (public), parents' marital status (not married), family relationship (fair/bad), social interaction (fair/bad), child's autonomous activities (lack of), and parents schooling' (elementary). After Cox regression, gender and social interaction remained in the final model as the factors associated with stress, demonstrating that girls and children with fair or bad social interaction had an increased likelihood of stress. The results point to the importance of early detection of childhood stress and the need for preventive measures to relieve the suffering caused by stress in so many children.

Stress; Child; Child Health

Introduction

The number of persons with symptoms of stress is increasing significantly worldwide. Some researchers have classified Brazil as the second most stressed country in the world ¹.

Stress is defined as a set of the body's reactions to stimuli (good or bad) that threaten its equilibrium. Environmental situations can trigger stress and can be either event-dependent or independent. When dependent, the subject participates, i.e., the events depend on how the subject relates to the environment, and his behavior can provoke unpleasant situations for himself. In independent events, the situations escape the individual's control and occur inevitably, like death of loved ones, sudden changes in routine, and traumatic situations ^{2,3}.

Stress has always been characterized as symptoms that manifests predominantly in adults, but some studies have shown a large number of children with stress. Heavy stress can lead to lower learning capacity in schoolchildren and difficulty in social interaction ^{4,5,6}.

In Brazil, studies on childhood stress began in the 1970s in São Paulo, and showed that many characteristics of adult stress are similar in childhood stress ⁴. Some studies in schoolchildren, especially in the State of São Paulo, have shown a high prevalence of stress, from 30% ⁷ to 60% ^{8,9,10}. The majority of these studies evaluated mainly public schoolchildren, using such instruments as

the *Childhood Stress Scale* (ESI)¹¹ and the *Stress Symptoms Inventory* (ISS-I)¹², both developed in Brazil.

Research is still not conclusive as to the relationship between stress and gender. Studies in public and private schools show that both girls and boys can develop stress symptoms^{7,13}, although girls tend to be more stressed^{1,10}.

Studies show that stress can affect all children, regardless of social class. Some studies point to a high prevalence of stress in public schools and a lower rate in private schools¹³, while others indicate equal stress levels in all schools^{7,8,9}. Stress is multi-factorial, and in children one of its sources is death of a family member⁴. Other situations, like spousal fights, marital separation, excess activity, hospitalization, loss, constant changes in routine, and maternal or paternal abandonment, can also cause stress^{7,14,15,16}.

Stress involves several phases: first, the body shows an alarm reaction, attempting to protect itself from the danger; next comes a resistance phase, together with accumulated tension; finally comes the exhaustion phase, in which the organism becomes totally depleted, and a series of physical symptoms and diseases appear^{5,17,18}.

Stress thus leads to a disturbance in the organism's internal equilibrium, and when it is excessive it can cause damage, like the appearance of organic and behavioral responses⁶. When the child remains under the influence of stressful events for a long period of time, he or she can develop symptoms of stress, causing imbalance. If the stressful event is not eliminated and the symptoms are not treated adequately, they can persist in adulthood, leading to a series of illnesses, like depression, hypertension, skin diseases, and leukemia^{16,19}.

Some studies, especially in Sweden, indicate that psychosomatic symptoms are common in children with stress, the most frequent being: tiredness, stomach ache, headache, and psychological problems that can be triggered by different day-to-day situations in the child's life, like school demands and administration of time for homework²⁰. One study showed that 23% of children from 6 to 13 years of age presented psychosomatic symptoms, especially headache. Psychosomatic complaints are common in younger children, but the prevalence increases with years of schooling²¹. A prospective, population-based study in England showed that children with psychosomatic complaints, especially headache, have an increased risk of presenting physical and psychological complaints in adulthood²².

Brazilian and international epidemiological studies on childhood stress are still incipient, providing inconclusive results as to prevalence,

gender differences, and the influence of socio-economic status, family situation, and associated factors. Identification of these factors can contribute to the promotion of early interventions in stress-related disorders in schoolchildren.

Material and methods

This was a school-based study with a cross-sectional design, evaluating all fourth-grade elementary schoolchildren in private, municipal, and State schools in a city in the interior of Rio Grande do Sul, the southernmost State of Brazil.

The city is situated 116km from the State capital of Porto Alegre, in the central-eastern part of Rio Grande do Sul, with a population of some 66 thousand. The city has 34 schools: five private (129 pupils), 18 municipal (566 pupils), and 11 State (368 pupils). In this study the municipal and State schools were pooled and analyzed jointly as public schools.

Sample size calculation (prevalence of 30%, sampling error of 2%, and loss of 30%) totaled 800 students. Considering that the sample calculation was close to the total enrolment, it was decided to include all the students in the target population and conduct a census.

The instruments used were the ESI, developed by Lipp & Lucarelli¹¹, and a questionnaire targeting the parents. The ESI was developed and validated in Brazil and includes 35 items, evaluated in a five-point Likert scale, subdivided into 4 factors related to stress reactions: physical, psychological, psychological with depressive components, and psychological with psycho-physiological components. The scale's cutoff for classifying stress involves at least one of the following items: total points greater than 86; seven or more items meeting the five points; 22 points in the physical and psychological reactions; and 21 points in the psychological reactions with depressive components and psycho-physiological reactions.

The parents' questionnaire, based on the Mondardo questionnaire¹⁵, investigates items on family relations, social contact, extracurricular activities, losses, and changes in the child's routine, in addition to socio-demographic data for the child and family.

The instruments were applied to each shift of students, in the classroom, after parents' authorization. Two visits were made to each class in order to pick up students who may have been absent from school during the first visit.

The study was approved by the Ethics Committee for Research in Humans and Animals at

the Lutheran University of Brazil (CEP-ULBRA 2005-406H) and complies with the prevailing norms and standards of Ruling 196/96 of the National Health Council/Ministry of Health and related legislation on research in humans.

Variables

The outcome used in the data analysis was childhood stress. The independent variables were selected according to the theoretical reference and included gender, child's age, type of school, parents' marital situation and schooling, family relations, social contact, child's autonomous activities and work activity, losses, and changes. The latter consisted of categories and were comprised in composite fashion by grouping items from the questionnaire as follows: *family relations* – relationship with mother, relationship with father, and relationship between father and mother; *social contact* – child has friends in school, child has other friends, child visits friends at their homes, child receives friends at home; *autonomous activity* – cleans up places where he/she normally plays, chooses what to do during free time, and performs own personal hygiene; *work activity* – watches siblings, does household chores, and works to help support the house; *losses and changes* – illness in some family member or close relative, death of some family member or close relative in the last six months, change of residence in the last six months.

Statistical analysis

A bivariate analysis was performed initially to verify the association between the independent and outcome variables, calculating the crude prevalence ratios and confidence intervals. For ordinal variables with more than two levels, the linear trend test was used with the objective of identifying possible differences between the strata. Cox regression was then performed, including the variables in the model with variables of up to 0.20 in the bivariate analysis. A Cox regression followed a two-tiered hierarchical model, based on the proximal or distal relationship to the outcome. The first level included the socio-demographic variables: gender, age, type of school, only-child status, parents' marital situation, and maternal and paternal schooling. The second level included the variables related to external sources of stress: family relations, social contact, autonomous activity, losses, and changes. The significance level for all the analyses was set at < 5%.

Results

A census was performed to assess stress in fourth-grade primary schoolchildren in a city in Rio Grande do Sul. Of the 1,063 enrolled children, 883 were evaluated. A total of 18% of the children did not participate, either because they were absent on the day the scale was applied or on the subsequent visits, or because their parents had not given authorization. Mean age of the children who participated in the study was 10.04, ranging from 8 to 14 years. Of the children evaluated, 18.2% presented stress.

Table 1 shows the results. According to the bivariate analysis, the variables that reached statistical significance were: gender (female), age (> 10 years), type of school (public), parents' marital status (not married), family relations (fair, bad), social contact (fair, bad), autonomous activities (none), and paternal and maternal schooling (primary).

Prevalence of stress according to gender was higher for girls (20.9%) than for boys (15.4%). Bivariate analysis showed that girls had 1.35 times the prevalence of stress as compared to boys. Children over 10 years showed a significantly higher prevalence of stress (27.2%) than younger children, with 1.67 times the prevalence of stress.

In this study, the majority of children with stress studied in public schools (where prevalence was 19.2%, as compared to 10.3% in private schools). Public schoolchildren showed 1.85 times the prevalence of stress as compared to private schoolchildren.

In relation to parental schooling, there was a linear trend towards increasing stress as the parents' level of schooling decreased. Children of fathers and mothers with schooling less than or equal to complete elementary showed 2.76 and 1.72 the prevalence of stress, respectively, as compared to those whose fathers and mothers had at least a university education.

Children of unmarried parents (separated, divorced, widowed, or single) presented 1.50 times the prevalence of stress, compared to children of married parents.

Family relations showed a particularly high rate of blank answers to questions related to the father (7.1% of questions referring to relations between the child and father and 7.4% of those referring to relations between father and mother), thus decreasing the number of subjects evaluated on these items. Children with fair/bad family relations (with the father or mother, between sibs, or between parents) had 1.49 times the prevalence of stress as compared to children with excellent/good family relations.

Table 1

Bivariate analysis and Cox regression for childhood stress, socio-demographic variables, and variables related to external sources of stress.

Variable	With stress		Without stress		Crude PR (95%CI)	p value	Adjusted PR * (95%CI)	p value
	n	%	n	%				
Gender								
Female	95	20.9	359	79.1	1.00	0.041	1.00	0.033
Male	66	15.4	363	84.6	1.35 (1.02-1.81)		1.44 (1.03-2.02)	
Age (years)								
≤ 10	118	16.3	607	83.7	1.00	0.002	1.00	0.210
> 10	43	27.2	115	72.8	1.67 (1.23-2.27)		1.30 (0.86-1.96)	
Type of school								
Private	10	10.3	87	89.7	1.00	0.045	-	-
Public	151	19.2	635	80.8	1.85 (1.02-3.45)			
Only child								
Yes	23	14.6	135	85.4	1.00	0.217	1.00	0.818
No	138	19.1	583	80.9	1.32 (0.88-1.96)		0.95 (0.60-1.50)	
Marital status								
Married	97	15.8	515	84.2	1.00	0.008	1.00	0.105
Not married	64	23.6	207	76.4	1.50 (1.12-1.96)		1.34 (0.94-1.91)	
Maternal schooling								
≥ University	10	11.8	75	88.2	1.00	0.015 **	-	-
Secondary	34	14.4	202	85.6	1.23 (0.61-2.48)			
Elementary	110	20.2	435	79.8	1.72 (0.90-2.48)			
Paternal schooling								
≥ University	5	7.4	63	92.6	1.00	0.003 **	1.00	
Secondary	28	14.4	167	85.6	1.95 (0.75-5.06)		1.82 (0.70-4.71)	0.220
Elementary	113	20.3	444	79.7	2.76 (1.13-6.76)		2.12 (0.85-5.25)	0.106
Family relations								
Excellent/Good	95	15.8	507	84.2	1.00	0.013	-	-
Fair/Bad	51	23.6	165	76.4	1.49 (1.09-2.04)			
Social contact								
Excellent/Good	87	14.3	521	85.7	1.00	0.000	1.00	0.001
Fair/Bad	68	26.5	189	73.5	1.85 (1.41-2.44)		1.76 (1.25-2.47)	
Autonomous activity								
Yes	40	13.2	263	86.8	1.00	0.011	1.00	0.097
No	117	20.4	456	79.6	1.55 (1.11-2.15)		1.39 (0.94-2.07)	
Work activity								
No	110	18.0	502	82.0	1.00	1.000		
Yes	47	17.9	216	82.1	1.00 (0.73-1.35)			
Losses and changes								
No	83	16.4	423	83.6	1.00	0.195	-	-
Yes	73	20.1	291	79.9	1.22 (0.92-1.61)			

* Variables that remained in the final Cox regression model;

** Linear trend test.

Children with fair/bad social contact showed 1.85 times the prevalence of stress as compared to those who enjoyed excellent/good social contact. Meanwhile, those who failed to perform autonomous activities like caring for their own personal hygiene or making their own choices had 1.55 times the prevalence of stress as compared to children with personal autonomy.

In terms of presenting stress, no differences were observed in the bivariate analysis for the following variables: only-child status, having work activities, losses, and changes.

In the Cox regression, the independent variables that remained in the final model are shown in Table 1. Those significantly associated with stress were gender and social contact.

Girls showed 1.44 the prevalence of stress as compared to boys. Children with fair/bad social contact presented 1.76 the prevalence of stress as compared to those with excellent/good social contact.

Discussion

In this study, 18.2% of the children evaluated presented signs of stress. In relation to studies performed in the State of São Paulo^{8,9,10}, showing a prevalence of 30 to 60%, the rate found here cannot be considered high.

According to this study, the majority of the independent variables studied were associated with childhood stress in the bivariate analysis.

For gender, prevalence of stress was higher in girls than in boys, which agrees with other studies in similar populations^{9,13}. The girls in this study may have been more prone to developing stress symptoms for various reasons. Their mean age is around 10 years, and many of them may be at the beginning of puberty, which occurs two years before boys, on average. During this phase, many physiological and emotional changes begin to occur that can generate stress²³. In addition to these issues, other demands on girls can cause stress, since girls often have to help with the housework and even watch their sibs. This was also found in other studies in schoolchildren from other age brackets, like that of Mondardo¹³, who evaluated 295 students from 15 to 28 years of age, showing a significant presence of stress symptoms (79.3% in females and 51.72% in males).

In the current study, children over 10 showed a higher prevalence of stress (27.2%) than younger children. Since the normal age for fourth grade is 10 years, many of the older fourth-graders are those who have repeated at least one year. Repetition can place a heavier demand on these children, since both families and the school can associate repetition with scholastic failure. In the relationship between stress and scholastic failure, there may be a reverse causality, since there is no temporal relationship between the two factors (repetition can lead to stress, and stress can also lead to repetition).

Parental schooling and type of school may also be related to the family's socioeconomic characteristics. Most public schoolchildren have parents with low schooling. Contrary to Vilella⁸, who observed a high prevalence of childhood stress in both public and private schoolchildren, our study showed that public schoolchildren were more prone to stress. As reported by Lemes⁷, private schools are often more capable of providing emotional and pedagogical support for

pupils, since there is a specialized staff for this purpose, in addition to a higher teacher/pupil ratio.

Economic difficulties, family breakdown, and family problems can serve as factors that increase the risk of childhood stress. According to Lipp⁴, the family's emotional stability and the quality of family relations are important for the child's adequate development and dealing with stress-triggering events. Children learn from role models and thus end up reproducing the way their parents deal with stressful events. Vulnerable families that have the possibility to adapt to new and stressful situations are more capable of dealing with stress. The same is true for children. In the current study, children with fair/bad family relations had 1.49 the prevalence of stress as compared to those with excellent/good family relations.

Children of unmarried parents (separated, divorced, widowed, or single) had 1.50 times the prevalence of stress as compared to children of married parents. Interestingly, many fathers were missing from contact with the child (blank answers), and the mother was the sole party responsible for raising the child. According to the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatística. Social indicators. <http://www.ibge.gov.br>, accessed on 11/Jan/2006), there was an increase of 30.7% in separations and 55.9% in divorces in Brazil. The mean divorce rate according to the 2002 census was 7 per 100 inhabitants. This result was due to women's entry into the labor market, guaranteeing them greater independence from the male spouse and revealing a strong characteristic of many Brazilian families, in which the woman assumed the sole responsibility for supporting and raising the children. According to Gomes et al.²⁴, fathers have been losing a substantial share of their role, with numerous families headed exclusively by mothers.

The current study showed an association between stress and quality of social contact. Children with fair/bad social contact showed 1.76 time the prevalence of stress as compared to those with excellent/good social contact. Cia et al.²⁵ highlight the importance of interaction between the individual and the social environment, whereby socially skilled individuals are capable of promoting more satisfactory social interactions. The family setting and parents' involvement and performance are crucial for establishing educational relations that foster the child's social development. A balanced upbringing at home can prepare individuals who know how to deal better with problems, thereby spawning better social relations²⁶.

Parents play an important role in the development of children's autonomy by creating the conditions for them to live their own experiences²⁷. In this study, children that lacked autonomous activities, like caring for their own hygiene, or those who did not make their own choices, showed 1.55 times more stress than children with personal autonomy.

In the Cox regression, only gender and social contact remained associated with stress in the final model. The results show that girls are more prone to stress than boys. Children with fair/bad social contact are also more prone to stress; these are children who have few friends over to their own home, tend not to visit their friends' homes,

and have no friends at school. This suggests that improvements in social contact could result in less stress.

This study's findings point to the need for more detailed research in children, allowing for a better understanding of the childhood stress problem as well as factors associated with it. Awareness-raising is needed for parents and professionals in order for them to take joint action to relieve the suffering caused by stress in many of these children. Both the families and schools participating in the current study display evidence that helps detect children prone to developing stress, especially seeking to identify girls who display social isolation.

Resumo

Trata-se de estudo de base escolar, com delineamento transversal, que avaliou 883 crianças que estudavam na 4ª série do Ensino Fundamental das escolas particulares (5), municipais (18) e estaduais (11) de uma cidade do Estado do Rio Grande do Sul, Brasil. O objetivo foi identificar prevalência e fatores associados ao estresse infantil. Os instrumentos utilizados foram: Escala de Estresse Infantil e questionário dirigido aos pais. Os resultados mostraram prevalência de estresse em 18,2% dos escolares. Os fatores associados ao desfecho na análise bivariada foram: sexo (feminino), idade (mais de dez anos), tipo de escola (pública), situação conjugal dos pais (não casados), relacionamento familiar (regular/ruim), convívio social (regular/ruim), atividades de autonomia (não possui) e escolaridade da mãe e do pai (1º grau). Na regressão de Cox, permaneceram, no modelo final associados ao estresse, sexo e convívio social, mostrando que meninas e crianças com convívio social regular/ruim possuem maior probabilidade de apresentar estresse. Esses resultados apontam para a importância da detecção precoce do estresse infantil e de ações preventivas a fim de aliviar o sofrimento causado pelo estresse em muitas crianças.

Estresse; Criança; Saúde da Criança

Contributors

C. R. Sbaraini and L. B. Schermann jointly designed the project, analyzed the data, and wrote the article. C. R. Sbaraini collected and keyed in the data.

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