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Characteristics associated to a poor self-rated health in Brazilian adolescents, National Adolescent School-based Health Survey, 2015

Características associadas à autoavaliação ruim do estado de saúde em adolescentes brasileiros, Pesquisa Nacional de Saúde do Escolar, 2015

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ABSTRACT: *Introduction*: Health self-assessment (HSA) is a widely studied indicator among adults and the elderly, but not often explored in adolescents. This study aimed to estimate the prevalence of poor self-rated health in Brazilian schoolchildren and associated factors. *Methods*: Data from the 2015 National Adolescent School-based Health Survey (PeNSE) were analyzed; prevalences and their 95% confidence intervals (95%CI) were estimated for poor self-rated health and associated factors. Multiple logistic regression analysis was performed. *Results*: A total of 7.1% (95%CI 7.0 – 7.3) of the schoolchildren reported a poor self-assessed health status. Sociodemographic characteristics, such as female gender, 15 years of age or older, yellow, brown and indigenous race/skin color; risk behaviors such as regular alcohol consumption and drug experimentation, and issues related to physical and emotional health remained positively associated with the outcome studied. Protective factors identified were maternal schooling and demand for health services. *Conclusion*: The impact of risky behaviors on physical and emotional health need to be addressed among students. The school presents itself as a safe and opportune space for promoting a healthy lifestyle.

Keywords: Adolescent. Self-Assessment. Health status. Health surveys.

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RESUMO: *Introdução*: A autoavaliação de saúde (AAS) é um indicador muito estudado entre adultos e idosos, mas pouco explorado em adolescentes. O objetivo deste estudo foi estimar a prevalência e os fatores associados à autoavaliação ruim do estado de saúde em escolares brasileiros. *Métodos*: Foram analisados dados da Pesquisa Nacional de Saúde do Escolar (PeNSE), realizada em 2015; as prevalências e os respectivos valores do intervalo de confiança de 95% (IC95%) do indicador autoavaliação ruim do estado de saúde e dos fatores associados foram estimados. Foi realizada a análise de regressão logística múltipla. *Resultados*: Entre os escolares, 7,1% (IC95% 7,0 – 7,3) relataram autoavaliação ruim do estado de saúde. As características sociodemográficas, como sexo feminino, idade de 15 anos ou mais e raça/cor da pele amarela, parda e indígena; os comportamentos de risco de consumo regular de álcool e experimentação de drogas; e as questões relacionadas à saúde física e emocional mantiveram-se positivamente associadas ao desfecho estudado. Escolaridade materna e procurar serviços de saúde foram protetores. *Conclusão*: O impacto dos comportamentos de risco à saúde física e emocional necessitam ser abordados entre os estudantes. A escola apresenta-se como espaço seguro e oportuno para a promoção do estilo de vida saudável.

Palavras-chave: Adolescente. Autoavaliação. Nível de saúde. Inquéritos epidemiológicos.

INTRODUCTION

Health self-assessment (HSA) objectively summarizes individuals' expectations for their health and includes biological, psychological, and social dimensions[1]. It is a simple indicator measured by a question that expresses the individual's perception of their health, mensurable by a five-point scale: very good, good, regular, poor, and very poor[2]. Used since the 1970s[3,4], HSA is useful in diagnosing the health status of populations, as well as being a low-cost medium for application in health services and surveys[5-8].

Several studies indicate a high agreement between this indicator and health status[5,6], as well as outcomes related to morbidity[9] and mortality[3,4]. The literature shows several factors that influence health self-assessment. Among them are: sociodemographic factors, such as gender, age, schooling and income[10,11], behavioral and lifestyle factors[5,7], as well as those related to mental health[5] and the presence of morbidity[12].

In Brazil, there are several studies on HSA which are representative of the adult and elderly population, such as those that used data from the National Household Sample Survey (PNAD)[13], the Surveillance System for Risk and Protection Factors for Chronic Diseases by Telephone Survey (VIGITEL)[5] and the National Health Survey (PNS)[14].

International analyzes on HSA in adolescents have been carried out[15,16]. However, in Brazil, such studies are still scarce and lack national coverage[17]. Previous publications on the subject have found results similar to those found among adults, pointing out that HSA is a good tool for health monitoring in this public, especially when the evaluation is negative or poor[15-17]. Studies in adolescents have identified the association between poor HSA and lower income families[15], the use of alcoholic beverages[18], tobacco[16], and illicit drugs[19], low physical activity[20] and the negative self-perception of stress[21].

In 2015, the National Adolescent School-based Health Survey (PeNSE) included the theme of HSA, allowing the exploration of aspects not yet studied nationally, with the purpose of supporting public policies aimed at adolescents. Thus, this study aimed to estimate the prevalence and factors associated with poor health self-assessment in Brazilian schoolchildren.

METHODOLOGY

This is a cross-sectional study using data from PeNSE 2015, carried out by the Brazilian Institute of Geography and Statistics (IBGE), in partnership with the Ministry of Health. The sample of 9th grade students was calculated in order to estimate population parameters in several geographical areas: each of the 26 Federative Units, the 26 Federative Unit capitals and the Federal District, the 5 geographic macroregions and the total of Brazil[22].

A total of 102,301 students enrolled in the 9th year of elementary school participated in the survey, distributed in 3,040 schools and 4,159 classes throughout the country. Considering the students enrolled and the non-respondents, the sample loss was approximately 8.5%. All the students present in the classes drawn on the day of collection were invited to participate in the research[22].

PeNSE constitutes the most extensive research on schoolchildren in the country, and addresses various aspects of adolescent health, such as eating habits, physical activity, substance use, family behavior, self-reported morbidity, and demand for health services. More details can be found in other publications[22].

For the present analysis, the outcome investigated was an evaluation of the health status, through the question included in the 2015 questionnaire: "How would you rate your health status?", with the following response options: very good, good, regular, poor, and very poor. For the construction of the investigated variable, the poor and very poor responses were aggregated.

The choice of independent variables was based on data from the literature that indicate that poorer assessment of health status is associated with sociodemographic factors, habits and behaviors, factors related to mental health, situations involving family members, morbidity, and demand for health services[5,7,12,15,16].

The independent variables were distributed in five themes, as described below. Associations with the model variables were tested:

1. sociodemographic characteristics:
   - gender (male and female);
   - age in years (≤ 13, 13, 14, 15 and 16 or more);
   - self-declared skin color/race (white, black, brown, yellow and indigenous);
   - school type (public or private); currently working (yes or no); no schooling, incomplete/complete primary education, incomplete/complete secondary education and incomplete/complete higher education;

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2. family characteristics:
   - living with mother and/or father (yes, no);
   - has meals with their guardian (no, 2 times a week or less, 3 to 4 times a week, 5 or more times in the week);
3. behaviors and habits:
   - use of tobacco in the last 30 days (yes or no);
   - use of alcohol in the last 30 days (yes or no);
   - drug experimentation in life (yes, no);
   - having sexual intercourse (yes or no);
   - frequent fruit consumption (> 5 times a week);
   - frequent consumption of soft drinks (> 5 times a week);
   - eating breakfast regularly (yes or no);
   - daily physical activity (yes or no);
4. mental health:
   - feeling alone (no [never, sometimes in the last 12 months] or yes [most of the time, always in the last 12 months]);
   - report of insomnia (no [never, sometimes in the last 12 months] or yes [most of the time, always in the last 12 months]);
   - having friends (no [none] or yes [1, 2, 3 or more friends]);
5. morbidity and demand for health services:
   - report of asthma (yes or no),
   - body image (lean, normal or fat);
   - sought a health service (yes or no);
   - missed class for health reasons (no, from 1 to 3 days, 4 days or more).

The variables that characterize behavior in relation to the poor health evaluation were described, and the prevalences and their respective 95% confidence intervals (95%CI) were calculated, according to the independent variables described. To explore factors associated with the outcome examined (poor self-rated health), bivariate analysis was initially performed by logistic regression, unadjusted odds ratios (OR) with their respective 95%CI values. Subsequently, the multivariate logistic regression model was used, considering the variables of interest that presented $p < 0.20$, and based on the literature. In the adjusted final model (ORa), the statistically significant variables remained at $p < 0.05$.

In these analyzes, the sample structure and the weights to obtain population estimates were considered[22]. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.

The students were informed about the research, about their free participation and that they could cease their involvement if they did not feel comfortable answering the questions. If they agreed to participate in the survey, students had to answer an individual questionnaire, on a smartphone, under the supervision of IBGE interviewers. PeNSE is in agreement with the Guidelines and Norms Regulating Research Involving Human Beings and

was approved by the National Commission of Ethics in Research of the Ministry of Health (CONEP/MS) under a Certificate of Presentation for Ethical Appreciation (CAAE).

RESULTS

Poor self-rated health was reported by 7.1% (95%CI 7.0 – 7.3) of Brazilian schoolchildren. The prevalence was higher in females (7.7%; 95%CI 7.5 – 8.0), among schoolchildren aged 16 years or more (9.8%; 95%CI 9.2 – 10.4), among those currently working (8.7%; 95%CI 8.3 – 9.2) and the children of mothers without schooling (9.6%; 95%CI 8.7 – 10.6). The worst assessment was in schoolchildren with yellow (8.9%; 95%CI 7.7 – 10.2) and indigenous race/skin color (9.6%; 95%CI 8.7 – 10.7), with no difference between school types (Table 1).

The prevalence of poor self-reported health was higher among students who: did not live with at least one parent (9.5%, 95%CI 8.8 – 10.4), did not eat meals with their parents (14.2%; 95%CI 13.2 – 15.2), have used tobacco in the last 30 days (12.8%; 95%CI 11.9 – 13.7), have used alcohol in the last 30 days (9.5%; 95%CI 9.1 – 9.9), experimented drugs (11.8%; 95%CI 11.2 – 12.5), had sexual intercourse (9.7%; 95%CI 9.3 – 10.0), consumed soft drinks frequently (8.5%; 95%CI 8.2 – 8.8), did not eat breakfast (8.6%; 95%CI 8.2 – 8.9), felt lonely (12.9%; 95%CI 12.4 – 13.4), reported insomnia (14.4%; 95%CI 13.7 – 15.0), had no friends (10.9%; 95%CI 10.0 – 11.9), reported having asthma (9.6%; 95%CI 9.2 – 10.1), perceived themselves as fat (10.5%; 95%CI 10.1 – 11.0) and missed classes for health reasons, with 6.7% (95%CI 6.4 – 7.1) having 1 to 3 absences, and 11.8% (95%CI 11.3 – 12.2) having 4 or more absences. No difference was found according to frequent fruit consumption, daily physical activity practice, and demand for health services (Table 1).

Table 1 also shows the analyzes of the simple and multiple models. The characteristics of the students who remained associated with poor HSA after adjustment for all variables of the model were: females (PR: 1.12; 95%CI 1.06 – 1.20); aged 15 years (PR: 1.16; 95%CI 1.06 – 1.28) or 16 years or more (PR: 1.32; 95%CI 1.18 – 1.48); yellow (PR: 1.44; 95%CI 1.26 – 1.64), brown (PR: 1.11; 95%CI 1.04 – 1.19) and indigenous race/skin color (PR: 1.44; 95%CI 1.25 – 1.67). Being currently working did not remain associated in the multiple analysis. In relation to the family characteristics, a higher maternal schooling was a protective factor [primary (PR: 0.82; 95%CI 0.74 – 0.91), secondary (PR: 0.80; 95%CI 0.71 – 0.89) and higher education (PR: 0.72; 95%CI 0.65 – 0.81)]; the act of not having a meal with those responsible was positively associated with HSA (PR: 1.76; 95%CI 1.59 – 1.94). Alcohol consumption in the last 30 days (PR: 1.08; 95%CI 1.00 – 1.15), drug experimentation (PR: 1.14; 95%CI 1.04 – 1.25), having had sexual intercourse (PR: 1.29; 95%CI 1.20 – 1.38), frequent consumption of soft drinks (PR: 1.19; 95%CI 1.12 – 1.26), regular physical activity (PR: 1.14; 95%CI 1.06 – 1.22), feeling lonely (PR: 1.51; 95%CI 1.40 – 1.62), having insomnia (PR: 1.55; 95%CI 1.43 – 1.68), not having friends (PR: 1.38; 95%CI 1.22 – 1.55), asthma report (PR: 1.30;

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Table 1. Poor or very poor assessment of health status, prevalence, unadjusted odds ratio, multivariate model and respective 95% confidence intervals of the associated factors. National Adolescent School-based Health Survey, Brazil, 2015.

| Variable | Poor or very poor assessment of health status | | | | | | | | | | | p-value |
| | % | 95%CI | | OR unadjusted | 95%CI | | p-value | OR unadjusted | 95%CI | | |
		Bottom	Higher		Bottom	Higher			Bottom	Higher	
Total	7.1	7.0	7.3								
Age in years < 13	6.5	4.4	9.4	1.07	0.72	1.61	0.731	1.24	0.80	1.91	0.339
13	6.1	5.6	6.6	1.00				1.00			
14	6.5	6.0	6.9	1.07	1.00	1.15	0.063	0.97	0.90	1.05	0.483
15	8.3	7.7	9.0	1.41	1.30	1.53	< 0.001	1.16	1.06	1.28	0.002
16 or more	9.8	9.2	10.4	1.68	1.54	1.84	< 0.001	1.32	1.18	1.48	< 0.001
Gender											
Male	6.5	6.2	6.8	1.00				1.00			
Female	7.7	7.5	8.0	1.21	1.15	1.27	< 0.001	1.12	1.06	1.20	< 0.001
Race/Skin color											
White	6.8	6.1	7.6	1.00				1.00			
Black	7.1	6.3	8.1	1.05	0.97	1.14	0.198	1.01	0.92	1.11	0.883
Yellow	8.9	7.7	10.2	1.34	1.19	1.50	< 0.001	1.44	1.26	1.64	< 0.001
Brown	7.0	6.3	7.9	1.04	0.98	1.10	0.173	1.11	1.04	1.19	0.001
Indigenous	9.6	8.7	10.7	1.46	1.29	1.65	< 0.001	1.44	1.25	1.67	< 0.001
School type											
Private	7.2	6.8	7.7	1.00							
Public	6.6	6.2	7.0	0.90	0.84	0.97	0.005				
Currently working											
No	6.9	6.5	7.3	1.00							
Yes	8.7	8.3	9.2	1.30	1.22	1.39	< 0.001				
Maternal schooling											
No schooling	9.6	8.7	10.6	1.00				1.00			
Primary (incomplete/ complete)	7.4	6.9	7.9	0.75	0.68	0.83	< 0.001	0.82	0.74	0.91	< 0.001
Secondary (incomplete/ complete)	7.2	6.7	7.7	0.73	0.66	0.81	< 0.001	0.80	0.71	0.89	< 0.001
Higher (incomplete/ complete)	6.7	6.3	7.1	0.67	0.61	0.75	< 0.001	0.72	0.65	0.81	< 0.001

Table 1. Continuation.

Variable	Poor or very poor assessment of health status										
	%	95%CI		OR unadjusted	95%CI		p-value	OR unadjusted	95%CI		p-value
		Bottom	Higher		Bottom	Higher			Bottom	Higher	
Living with mother and/or father											
No	9.5	8.8	10.4	1.00							
Yes	7.0	6.8	7.1	0.71	0.65	0.78	< 0.001				
Eats breakfast regularly											
No	8.6	8.2	8.9	1.00							
Yes	6.3	6.1	6.5	0.72	0.69	0.76	< 0.001				
Has meals with their guardian											
No	14.2	13.2	15.2	2.41	2.23	2.61	< 0.001	1.76	1.59	1.94	< 0.001
Twice a week or less	8.0	7.5	8.4	1.26	1.19	1.34	< 0.001	0.99	0.91	1.07	0.736
3 to 4 times a week	6.8	6.0	7.7	1.07	0.94	1.23	0.303	0.91	0.78	1.06	0.207
5 or more times a week	6.4	6.2	6.6	1.00				1.00			
Regular tobacco use											
No	6.8	6.3	7.3	1.00							
Yes	12.8	11.9	13.7	2.01	1.85	2.18	< 0.001				
Regular alcohol use											
No	6.4	6.1	6.7	1.00				1.00			
Yes	9.5	9.1	9.9	1.54	1.46	1.62	< 0.001	1.08	1.00	1.15	0.038
Drug experimentation											
No	6.7	6.2	7.1	1.00				1.00			
Yes	11.8	11.2	12.5	1.89	1.76	2.02	< 0.001	1.14	1.04	1.25	0.007
Body image											
Thin	7.0	6.6	7.5	1.00				1.00			
Normal	6.0	5.7	6.4	0.85	0.80	0.90	< 0.001	0.94	0.88	1.01	0.073
Fat	10.5	10.1	11.0	1.56	1.46	1.67	< 0.001	1.42	1.31	1.54	< 0.001
Soft drink consumption (> 5 times a week)											
No	6.6	6.3	6.9	1.00				1.00			
Yes	8.5	8.2	8.8	1.31	1.25	1.38	< 0.001	1.19	1.12	1.26	< 0.001

Table 1. Continuation.

Variable	Poor or very poor assessment of health status											
	%	95%CI		OR unadjusted	95%CI		p-value	OR unadjusted	95%CI		p-value
		Bottom	Higher		Bottom	Higher			Bottom	Higher	
Frequent fruit consumption (> 5 times a week)											
No	7.2	6.9	7.5	1.00							
Yes	6.9	6.7	7.2	0.97	0.92	1.02	0.174				
Regular physical activity											
No	7.0	6.7	7.4	1.00				1.00			
Yes	7.4	7.0	7.8	1.05	0.99	1.12	0.091	1.14	1.06	1.22	< 0.001
Feeling lonely											
No	6.0	5.7	6.3	1.00				1.00			
Yes	12.9	12.4	13.4	2.32	2.20	2.45	< 0.001	1.51	1.40	1.62	< 0.001
Insomnia											
No	6.2	5.8	6.5	1.00				1.00			
Yes	14.4	13.7	15.0	2.54	2.40	2.70	< 0.001	1.55	1.43	1.68	< 0.001
Friends											
1 or more	6.9	6.3	7.6	1.00				1.00			
None	10.9	10.0	11.9	1.65	1.50	1.82	< 0.001	1.38	1.22	1.55	< 0.001
Sexual intercourse											
No	6.1	5.9	6.4	1.00				1.00			
Yes	9.7	9.3	10.0	1.63	1.55	1.72	< 0.001	1.29	1.20	1.38	< 0.001
Asthma											
No	6.6	6.3	7.0	1.00				1.00			
Yes	9.6	9.2	10.1	1.51	1.42	1.60	< 0.001	1.30	1.21	1.39	< 0.001
Demand for any health services											
No	7.2	6.9	7.5	1.00				1.00			
Yes	7.0	6.8	7.2	0.97	0.92	1.02	0.200	0.83	0.78	0.88	< 0.001
Missed classes for health reasons											
Não	5.6	5.3	6.0	1.00				1.00			
1 to 3 days	6.7	6.4	7.1	1.21	1.15	1.29	< 0.001	1.28	1.20	1.38	< 0.001
4 or more	11.8	11.3	12.2	2.24	2.11	2.38	< 0.001	2.15	1.99	2.32	< 0.001

95%CI: 95% confidence level; OR: odds ratio.

95%CI 1.21 – 1.39), perceiving oneself as fat (PR: 1.42; 95%CI 1.31 – 1.54) and missing classes for health reasons (for 1 to 3 days [PR: 1.28; 95%CI 1.20 – 1.38] and for 4 days or more [PR: 2.15; 95%CI 1.99 – 2.32). Having sought health care services was a protective factor (PR: 0.83; 95%CI 0.78 – 0.88).

DISCUSSION

Poor self-rated health was reported by 7.1% of 9th grade students. This finding was higher than that estimated for the adult population in the 2013 PNS[14]. However, it was lower than in a study carried out among high school students of public schools in Santa Catarina between 2001 and 2002, in which the frequency of negative HSA was 14%[17].

The sociodemographic characteristics associated with the poor self-rated health observed in the present study were female gender, age 15 years or older, yellow, brown and indigenous skin color/race. Studies performed in adolescents as well as in adults and the elderly also identified these differences[5,12-14,17].

Maternal schooling, an important proxy for income, showed that the lower the mother's schooling, the higher the prevalence of poor self-rated health. This finding was reported in surveys conducted with students from other countries[15,21]. Adolescents who reported not meals with their guardians had a higher prevalence of poor self-rated health. The habit of not having a meal with one of the guardians has been associated with other negative outcomes among adolescents, such as the use of alcohol, tobacco, and other drugs[23].

In the present study, tobacco consumption in the last 30 days did not remain associated with the outcome in the multiple analysis, contrary to what was observed in other studies[13,16,17,21]. However, alcohol consumption and drug experimentation were identified as independent factors, and these harmful habits were also associated with poor health status in other studies[18,19]. These associations have already been described in other studies using data from surveys conducted with Brazilian schoolchildren[23].

Schoolchildren reporting physical activity also reported a higher prevalence of poor self-reported health, as opposed to what was observed in a study among Thai adolescents who presented lower negative health perceptions when participating in vigorous physical activity, involving muscle strength or sports[24]. Brazilian studies with adolescents[17] and adults[12] also found an association between poor health status and sedentary lifestyle, as opposed what was identified in this study. Therefore, the association found here still needs to be further investigated, as it may be a case of reverse causality.

In this study, both perceiving oneself fat and having negative eating habits (regular soda consumption and not eating breakfast regularly) remained strongly associated with the outcome.

To report episodes of insomnia and asthma, to seek health services and to miss classes for reasons related to one's own health also remained associated with poor a self-rated

health status. Studies with adults showed that the presence of diseases or disabilities was associated with the outcome studied[5,12]. In addition, it should be noted that, although HSA is an important proxy of mortality, presenting high reliability, it also reflects other constructs, such as well-being, satisfaction, control over life, and quality of life[25]. Thus, feeling lonely, having few friends and sexual activity in such a young age group showed a positive association.

It is necessary to emphasize that these behaviors must be observed and valued, since emotional behavior and interpersonal relationships suggest the presence of diseases such as depression, which is associated to a poor self-rated health status[26]. In addition, these characteristics may reflect a state of stress experienced by schoolchildren. In studies carried out with students from Santa Catarina[17] and Canada[21] it was identified that the level of stress was also associated with a poor self-rated health status. Adolescence is an important period of transformation, with increased personal responsibilities, as well as exposure to diverse experiences and new behaviors and practices that can increase the level of stress and, consequently, lead to a worse evaluation of the health status.

This study dealt with the factors associated with the self-rated health status of Brazilian schoolchildren. However, it is important to emphasize that, because it is a cross-sectional study, cause and effect are measured simultaneously, which may lead to reverse causality, as it possibly occurred in relation to the practice of physical activity.

The PeNSE sample is representative of schoolchildren, and the survey was performed in the school environment, which excludes out-of-school adolescents, who may present different risk profiles and even underestimate the outcome studied[27]. It is also important to emphasize that HSA in adolescents may represent the perception not only of physical health[16,21], but also of emotional health, with issues related to pessimism, optimism[28] and self-esteem[21]. Finally, there is the possibility of under or overestimation[17,29], of other aspects, such as illicit drug use, smoking, alcohol consumption and physical activity, interfering with the associations found.

This study described the poor self-rated health status of Brazilian schoolchildren, and it is reiterated that it is an outcome that has not been explored in the country in this age group.

CONCLUSION

Less than 10% of 9th grade schoolchildren self-rated their own health status as poor. However, this prevalence was higher than that observed in studies with the Brazilian adult population. In addition to sociodemographic characteristics, risk behaviors, such as alcohol and drug consumption, and issues related to physical and emotional health were associated with the outcome studied. The results found contribute to increase the knowledge on issues related to the life and health of schoolchildren in Brazil. Also, they contribute to the planning of health promotion and prevention actions in this population.

The school environment should be more explored to address these issues, as it presents itself as safe and opportune to promote a healthy lifestyle to these students, in order to prioritize access to information and to trigger changes in health-related behaviors.

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