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ARTIGO ORIGINAL

Aptidão física relacionada à saúde e fatores sociodemográficos associados: estudo com escolares de Santa Cruz do Sul – RS

Health-related physical fitness and sociodemographic factors: a study with schoolchildren from Santa Cruz do Sul - RS

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RESUMO

Justificativa e objetivos: na criança e adolescente, a aptidão física pode ser identificada como um dos mais importantes indicadores de saúde; porém, boa parte dos escolares não consegue alcançar níveis satisfatórios. O presente estudo, com característica transversal, objetiva verificar possível associação entre os indicadores de aptidão física relacionada à saúde e fatores sociodemográficos de escolares de Santa Cruz do Sul – RS. **Método:** os sujeitos participantes da pesquisa são 1254 escolares, sendo 686 do sexo feminino, com idades entre 7 e 17 anos, de escolas da zona rural e urbana. Para avaliação da aptidão física relacionada à saúde dos escolares, foram realizados os seguintes testes preconizados pelo Projeto Esporte Brasil: teste de resistência abdominal, flexibilidade, Índice de Massa Corporal (IMC) e aptidão cardiorrespiratória (APCR). **Resultados:** os resultados da pesquisa demonstram, com relação à flexibilidade, que a zona de risco à saúde é mais prevalente entre escolares do sexo masculino (RP: 1,15; $p < 0,001$), adolescentes (RP: 1,04; $p = 0,042$), para a periferia (RP: 1,05; $p = 0,022$) e para a classe econômica C (RP: 1,05; $p = 0,029$); já em relação ao teste de resistência abdominal, a zona de risco à saúde é mais prevalente entre escolares do sexo masculino (RP: 1,13 $p < 0,001$) e para escolares de escolas municipais (RP: 1,09; $p = 0,084$). Para a APCR, a zona de risco à saúde é menos prevalente entre escolares do sexo masculino (RP: 0,95; $p = 0,004$); por outro lado, a prevalência é maior entre os adolescentes (RP: 1,08 $p = 0,001$), para

moradores da região central (RP: 1,08; $p = 0,014$) e periferia (RP: 1,09; $p < 0,001$). Já em relação ao IMC, constatou-se que a prevalência de sobrepeso/obesidade é maior em escolares do sexo masculino (RP: 1,06; $p = 0,005$) e menor entre os adolescentes (RP: 0,89; $p < 0,001$). **Conclusão:** quanto aos níveis de aptidão física relacionada à saúde, conclui-se que há diferença na comparação dos fatores sociodemográficos, especialmente nos resultados entre meninos e meninas.

Palavras-chave: Aptidão Física; Saúde; Criança; Adolescente.

ABSTRACT

The present cross-sectional study aims to verify a possible association between health-related physical fitness indicators and sociodemographic factors in schoolchildren of Santa Cruz do Sul - RS. The subjects investigated were 1,254 schoolchildren (686 females) aged between 7 and 17 years from rural and urban schools. Evaluation of children's and adolescents' physical fitness and health was performed by the following tests (recommended by Sport Brazil Project): abdominal resistance, flexibility, body mass index (BMI) and cardiorespiratory fitness (CRF). The results show, with respect to flexibility, that being within a health risk zone is more prevalent among male students (PR: 1.15; $p < 0.001$), adolescents (PR: 1.04; $p = 0.042$), and residents of the periphery (PR: 1.05; $p = 0.022$) and C socioeconomic class (PR:



1.05; $p=0.029$). Regarding abdominal resistance, health risk is more prevalent among male students (PR: 1.13; $p<0.001$) and in students from municipal schools (PR: 1.09; $p=0.084$). For CRF, health risk is lower for male students (PR: 0.95; $p=0.004$) but higher for adolescents (PR: 1.08 $p=0.001$), and central region (PR: 1.08; $p=0.014$) and periphery residents (PR: 1.09; $p<0.001$). In relation to BMI, we found that the prevalence of overweight/obesity is higher among male students (PR: 1.06; $p=0.005$) and lower in adolescents (PR: 0.89; $p<0.001$). We evaluated health-related physical fitness levels in schoolchildren from Santa Cruz do Sul and concluded that there is a difference according to sociodemographic factors, especially between males and females.

Keywords: Physical fitness; health; rural; urban; schoolchildren.

INTRODUCTION

Physical performance and physical fitness are basic health parameters.¹ Physical fitness is understood as the ability of an individual to be physically active and includes resistance patterns, strength, agility, coordination and flexibility.² In children and adolescents, physical fitness can be identified as a major health indicator.^{3,4} Increased levels of physical fitness are associated with improvements in musculoskeletal and cardiorespiratory functions, positive alterations in glucose and lipid profiles and blood pressure. Additionally, physical fitness is a risk predictor of developing diseases and functional disabilities in adulthood.⁴

Despite the known importance of acquiring good levels of physical fitness for health and well-being, most of the students fail to achieve satisfactory levels of physical fitness.⁵ Therefore, the construction of a set of motor skills during childhood is considered a fundamental attribute; good fitness levels and motor performance are achieved with effective participation in daily activities such as running, jumping and rolling, in which children improve their fundamental skills of movement. These skills are then reflected in their levels of physical fitness and motor performance.⁶

Evidence suggests that increasing urbanization has also led to increased physical inactivity during childhood and adolescence.⁷ This effect is due to the reduction in time devoted to physical activity and the lack of suitable spaces for sports, whether outdoors or in gyms, which cause decreases in physical fitness levels.⁷⁻⁹

The above mentioned set of factors has drawn the attention of researchers in the exercise and health sciences areas because these factors directly contribute to lower levels of physical standards, particularly in children and adolescents.^{9,10} However, another variable is becoming essential for a better understanding of this problem: sociodemographics. It has been noted that physical activity behavior differs when comparing age, sex, social status, education level, and urban and rural living areas.²

Thus, it is important to identify the factors associated with physical fitness in schoolchildren to facilitate the establishment of public policies able to promote better fitness levels and allow for increased practice of physical and sports activities in children and adoles-

cents. This study aims to inspect the possible association between health-related physical fitness indicators and sociodemographic factors in schoolchildren from Santa Cruz do Sul - RS.

METHOD

This is a cross-sectional study of 1,254 schoolchildren, 686 of whom are female (54.7%), aged between 7 to 17 years and from private, state and municipal schools of urban and rural areas from the city of Santa Cruz do Sul in the state of Rio Grande do Sul, Brazil.

The present study is part of a broader research project called "Evaluation of health biochemical parameters of schoolchildren using infrared spectroscopy, polymorphisms, oral health and lifestyle related factors: a study in Santa Cruz do Sul - Phase II," which has been approved by the Ethics Committee in Research with Human Beings of the University of Santa Cruz do Sul (UNISC) under protocol number 2959-11.

To evaluate health-related physical fitness, the following tests recommended by the Sport Brazil Project¹³ were performed: abdominal strength/resistance, flexibility (sitting and standing) and cardiorespiratory fitness (CRF) (9 minute run/walk test). The tests' classifications followed the cutoff points established by Sport Brazil Project,¹³ considering gender and age for each parameter evaluated. Body mass index (BMI) was classified according to the percentile curves of the CDC/NCHS¹⁴ for gender and age, considering a value ≥ 85 percentile as overweight/obese.

Data were analyzed using SPSS v. 20.0 (IBM, Armonk, NY). To test a possible relationship between physical fitness indicators and sociodemographic variables, Poisson regression was used by the prevalence ratio values and confidence intervals for 95% were calculated, considering significant differences when $p<0.05$.

RESULTS

Table 1 shows health and sociodemographic characteristics of the assessed schoolchildren. Overall, we observe a high percentage of children and adolescents in risk classes for flexibility (42.3%), abdominal resistance (48.2%) and CRF (50.8%).

It was found in Table 2 that being in the health risk zone for flexibility is more prevalent among male students (PR: 1.15; $p<0.001$), in adolescents (PR: 1.04; $p=0.042$), and in those from the periphery (PR: 1.05; $p=0.022$) and C socioeconomic class (PR: 1.05; $p=0.029$). For abdominal resistance, being in the health risk zone is more prevalent among male students (PR: 1.13; $p<0.001$) and among students from public schools (PR: 1.09; $p=0.084$).

In Table 3, it was found that for CRF, the prevalence of those in the health risk zone is lower for male students (PR: 0.95; $p=0.004$); on the other hand, it is greater for adolescents (PR: 1.08; $p=0.001$), and for residents of the central region (PR: 1.08; $p=0.014$) and the periphery (PR: 1.09; $p<0.001$). In relation to BMI, it was found that the prevalence of overweight/obesity is higher in male students (PR: 1.06; $p=0.005$) and lower among adolescents (PR: 0.89; $p<0.001$).

Table 1 - Descriptive characteristics of 1,254 schoolchildren from rural and urban schools of Santa Cruz do Sul - RS.

Sociodemographic and physical fitness variables	n (%)
Gender	686 (54.7)
Female	568 (45.3)
Male	
Age group	344 (27.4)
7 - 9 years (children)	910 (72.6)
10 - 17 years (adolescents)	
School	77 (6.2)
Private	493 (39.3)
Municipal	684 (54.5)
State	
Place of living	495 (39.5)
Rural	266 (21.2)
Downtown	493 (39.3)
Suburb	
Socioeconomic level	679 (54.1)
A-B	539 (43.0)
C	36 (2.9)
D-E	
Flexibility	723 (57.7)
Healthy zone	531 (42.3)
Health risk zone	
Abdominal resistance	650 (51.8)
Healthy zone	604 (48.2)
Health risk zone	
CRF	617 (49.2)
Healthy zone	637 (50.8)
Health risk zone	
BMI	889 (70.9)
Low weight/normal	365 (29.1)
Overweight/obesity	

DISCUSSION

The flexibility results found in this study were not statistically significant when comparing the three different types of schools. However, for the men, their results were unsatisfactory compared to those for females. Similar results were also found in a study of children enrolled in public institutions in Paraná, in which the variable flexibility demonstrated a stabilizing behavior at all ages in females and when verifying the same variable in males, they observed a trend toward a reduction in flexibility levels with increasing age.¹⁵ A Ministry of Education survey in Taiwan assessed the physical fitness profiles of 135,546 students aged 9 - 10 years and found that, in general, boys have better fitness levels than girls, except in the flexibility variable.¹⁶

On the other hand, the present study showed an association between health-related physical fitness components and place of living; students from the suburb (PR: 1.05) and belonging to the C class presented the highest levels of flexibility within the health risk zone. This association was also found in a study conducted in Minas Gerais, which showed that lower flexibility levels were found in students from an urban area (PR = 1.55).¹⁰ In addition, another study in Kenya compared 173 children aged 9-13 years living in urban and rural areas with data from 274 Canadian children in the same age group, and it found that children living in an urban area of Kenya were less flexible than those living in rural areas of this country and also in comparison to the Canadian children. Girls were more flexible than boys in all groups in that study.¹⁷

Table 2 - Prevalence and prevalence ratio (PR) of students in the health risk zone for flexibility and abdominal resistance among schoolchildren from Santa Cruz do Sul - RS.

	n (%)	Flexibility (CI 95%)	p	n (%)	Flexibility (CI 95%)	p
Gender						
Female	232 (33.8)	1		273 (39.9)	1	
Male	299 (52.7)	1.15 (1.10 - 1.19)	<0.001	330 (58.2)	1.13 (1.09 - 1.18)	<0.001
Age group						
7 - 9 years	134 (39.0)	1		165 (48.0)	1	
10 - 17 years	397 (43.7)	1.04 (1.0 - 1.09)	0.042	438 (48.2)	1.01 (0.97 - 1.05)	0.686
School						
Private	35 (45.5)	1		21 (27.3)	1	
Municipal	193 (39.2)	0.92 (0.84 - 1.02)	0.121	226 (46.0)	1.09 (0.99 - 1.21)	0.084
State	303 (45.5)	0.96 (0.88 - 1.05)	0.424	356 (52.0)	1.16 (1.05 - 1.27)	0.002
Place of living						
Rural	191 (38.6)	1		238 (48.3)	1	
Downtown	112 (42.1)	1.01 (0.95 - 1.08)	0.714	109 (41.0)	0.97 (0.91 - 1.03)	0.326
Suburb	228 (46.3)	1.05 (1.01 - 1.10)	0.022	256 (51.9)	1.01 (0.97 - 1.06)	0.545
Socioeconomic level						
A-B	275 (40.6)	1		315 (46.5)	1	
C	242 (45.1)	1.05 (1.01 - 1.09)	0.029	269 (50.2)	1.02 (0.98 - 1.06)	0.343
D-E	14 (38.9)	1.02 (0.91 - 1.14)	0.771	17 (47.2)	1.01 (0.90 - 1.13)	0.883

Table 3 - Prevalence and prevalence ratio (PR) of students in health risk zone for CRF and BMI of schoolchildren from Santa Cruz do Sul - RS.

	n (%)	CRF (CI 95%)	p	n (%)	BMI (CI 95%)	p
Gender						
Female	375 (54.7)	1		176 (25.7)	1	
Male	262 (46.1)	0.95 (0.91 – 0.98)	0.004	189 (33.3)	1.06 (1.02 – 1.10)	0.005
Age group						
7 - 9 years	149 (43.3)	1		141 (41.0)	1	
10 - 17 years	488 (53.6)	1.08 (1.03 – 1.12)	0.001	224 (24.6)	0.89 (0.85 – 0.93)	<0.001
School						
Private	35 (45.5)	1		21 (27.3)	1	
Municipal	241 (48.9)	1.08 (0.98 – 1.19)	0.132	141 (28.6)	0.98 (0.88 – 1.08)	0.633
State	361 (52.8)	1.07 (0.98 – 1.17)	0.145	203 (29.7)	0.99 (0.90 – 1.08)	0.804
Place of living						
Rural	219 (44.2)	1		134 (27.1)	1	
Downtown	142 (53.4)	1.08 (1.02 – 1.15)	0.014	66 (24.8)	0.97 (0.91 – 1.03)	0.339
Suburb	276 (56.0)	1.09 (1.04 – 1.14)	<0.001	165 (33.5)	1.04 (0.99 – 1.09)	0.108
Socioeconomic level						
A-B	355 (52.3)	1		198 (29.2)	1	
C	265 (49.3)	0.98 (0.94 – 1.02)	0.328	150 (27.9)	0.98 (0.94 – 1.02)	0.373
D-E	16 (44.4)	0.95 (0.85 – 1.07)	0.395	15 (41.7)	1.10 (0.97 – 1.23)	0.133

CRF: cardiorespiratory fitness; BMI: body mass index

Regarding abdominal resistance, we found a higher prevalence of poor results among male students and municipal schools. This relationship is contradictory to those found in similar studies, which evaluated this variable and found that the female is more likely to present a force and abdominal resistance disability.^{18, 19} A possible explanation for the lower prevalence levels of abdominal resistance in males may be its association with inadequate body composition, i.e., a minor concern with weight control and social acceptability of excess body fat in boys may be causing higher unsatisfactory levels of abdominal resistance.²⁰

For CRF, students from downtown and the suburb presented unsatisfactory results. Regarding gender, no significant differences were found. These data are consistent with a previous study's findings conducted in Castilha - La Mancha, Spain, where 1,725 children were evaluated, and a decline in CRF with age in both genders was observed.²¹ One might assume that the cause of this increasing occurrence of unsatisfactory levels of physical fitness in urban area identified in this study is linked to greater access to sedentary activities. Children and adolescents of these population subgroups are engaged primarily in games on electronic equipment, leaving the practice of physical activities in the background.^{10, 20}

The results of the present study demonstrate that being in the health risk zone for BMI (overweight/obesity) is less prevalent in students who are in the age group 10 - 17 years (teenagers). Another study with schoolchildren from the city of Rio Grande - RS did not find differences in BMI between genders.²¹ Still, evidence from this study contradict the findings of a study that examined physical fitness in students from Ponta Grossa, Paraná, which did not find significant differences ($p < 0.05$) on any age-related component. It is possible that these findings can be explained by the pre-puberty period of children in this age group becoming exposed to the bodily changes of puberty.¹⁵

This study found that students from the suburbs show lower levels of flexibility and CRF. In addition,

being in the health risk zone for flexibility is more prevalent among students in the intermediate socioeconomic level (Class C). It was anticipated that children and teenagers from rural schools would present more satisfactory physical fitness results than students from the urban schools.¹⁰ Traditionally, rural school students are more physically fit due to having greater contact with supportive environments for physical activity and outdoor games that give them experience and considerably higher energy expenditure.²² All these factors highlight the urbanization expansion to rural areas, resulting pattern changes, lifestyle habits and the existence of a new rural lifestyle that is increasingly influenced by sedentary habits from the urban zone.²⁴

Data from this study show that the changes in students' physical standards are taking place on a globalized basis. A study with similar characteristics to this was carried out in Georgia, United States in order to assess the health-related physical fitness of children and adolescents. The study involved 93 schools and 5,248 students and demonstrated that 52% of students did not reach the desirable standard of aerobic fitness and that 23% of participants did not achieve positive values of muscle strength, abdominal strength and flexibility. Additionally, 22% of students reported not complying with the recommendation to engage in 60 minutes a day of moderate to intense physical activity.²⁵

This study emphasizes the importance of physical activity as an effective method to improve physical fitness in childhood and adolescence.¹² Furthermore, it emphasizes the need to create a favorable environment for encouraging the practice of physical activity in urban and rural areas, with the school being one of the best environments for this awareness of children and adolescents, especially through physical education classes.⁴

CLOSING REMARKS

Regarding the health-related physical fitness levels, we observed differences in the comparison of so-

ciodemographic factors. Males were more likely to be at risk for problems with flexibility, abdominal resistance and BMI. Relevant differences in socioeconomic status and school localization were not observed. Adolescents had reduced levels of flexibility and CRF; on the other hand, overweight/obesity was more prevalent among children. We hope this study may help to better understand the development of health-related physical fitness and demographic indices of schoolchildren.

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