

EPIDEMIOLOGY OF ADOLESCENT IDIOPATHIC SCOLIOSIS IN STUDENTS OF THE PUBLIC SCHOOLS IN GOIÂNIA-GO

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ABSTRACT

Objective: To investigate the prevalence of adolescent idiopathic scoliosis in school children from 10 to 14 years in public schools in Goiânia, GO, Brazil. **Methods:** In a cross-sectional study, 476 students were randomly selected from 5 public schools, from a total of 33,343 students distributed in 162 schools. These subjects received the informed consent prior, which was returned after being signed by parents on physical examination day. We evaluated the symmetry of the shoulders, the scapulae, the triangle-cut, the hip evenness and the Adams test. In suspected cases, students were referred to panoramic radiographs of the spine. **Results:** 418 students

participated in the study (adjusted sampling error of 3.2%). Of this total, 31 students were suspected of scoliosis (17 males and 14 females). Twenty-eight students took radiographs, of which 18 were diagnosed with adolescent idiopathic scoliosis (11 female and 7 male), determining the prevalence of 4.3%. The chi-square test suggested no statistical difference in prevalence between the sexes. One student had congenital scoliosis. **Conclusion:** The prevalence of adolescent idiopathic scoliosis in the public schools of Goiânia is 4.3%. **Level of Evidence III, Study of Nonconsecutive Patients.**

Keywords: Epidemiology. Scoliosis. Public health.

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INTRODUCTION

Adolescent idiopathic scoliosis (AIS) is defined as a lateral and rotational curve of the vertebral column, measuring at least 10 degrees, determined by the Cobb method.^{1,2}

The etiology is unknown and considered by many authors to be multifactorial, involving nutritional, hormonal, postural and genetic factors, asymmetric growth of the limbs and trunk, neuromuscular or connective tissue alterations, deviation from the growth pattern, alterations of the sagittal configuration of the vertebral column and hereditary factors.²⁻⁴

AIS affects mainly female individuals (about 85%). The age group most affected by the disease is between 9 and 13 years of age. The diagnosis is of exclusion, performed using anamnesis, physical examination and radiologic image. Scoliotic curves progress mainly during the growth spurt, and can evolve to severe deformities.^{2,3}

Epidemiologically, the prevalence of adolescent idiopathic scoliosis in the world ranges from 1 to 13% in different contexts. It is important to stress that we do not yet have a study on this topic in our community. With the performance of this trial, we will discover the prevalence in our population, and thus be able to sketch a public health plan and to establish guidelines for the

teachers and students of our community. The aim of this study is to investigate the prevalence of Adolescent Idiopathic Scoliosis in children from 10 to 14 years of age at public schools in Goiânia, state of Goiás, Brazil.

METHODS

This project was approved by the Institutional Review Board of Santa Casa de Misericórdia de Goiânia.

It is a cross-sectional study conducted with primary school students aged from 10 to 14 years attending public schools in Goiânia, Goiás, Brazil, in 2012.

The municipality of Goiânia currently has 33,343 school children from 10 to 14 years in 162 municipally run public schools. Lots were drawn, adopting a confidence level of 95% and a margin of error of 3%. Thus, the study was conducted with 476 students.

In the first phase of the study, the students whose names were drawn received the informed consent form for evaluation and consent of their parents, returning it signed the next day.

The physical examinations were held in an appropriate room, prepared beforehand by the management of the participant schools. The inspections were carried out with the boys shirtless and the girls using a cropped top. The evaluation

All the authors declare that there is no potential conflict of interest referring to this article.

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involved height and symmetry of the shoulders and scapulae, the triangle-cut, the plumb line and the Adams test. After the examination, cases with suspicious findings were regulated via the Municipal Department of Health and referred to the spine outpatient clinic of Santa Casa de Misericórdia de Goiânia for the performance of the second phase of the study.

In this phase, the suspected cases were submitted to full spine radiographies at Santa Casa de Misericórdia de Goiânia. The radiographies were analyzed and the cases that presented scoliosis, referred for outpatient follow-up. The parents and the participant received guidance on the disease.

STATISTICAL ANALYSIS

We used descriptive statistics, using the chi-squared test was used to verify the association of variables, with a significance level of 5%. The data analysis was performed in EpiInfo 3.5.1.

RESULTS

The names of 476 students were drawn, obtaining the participation of 418 students in the study. The sample error was corrected from 3.0% to 3.2%. Of this total, 31 students presented suspicion for scoliosis (17 male and 14 female). (Figure 1)

Twenty-eight students had the radiographies, where 18 were diagnosed with adolescent idiopathic scoliosis, (Figure 2) of which 11 cases involved female students and 7 male students,

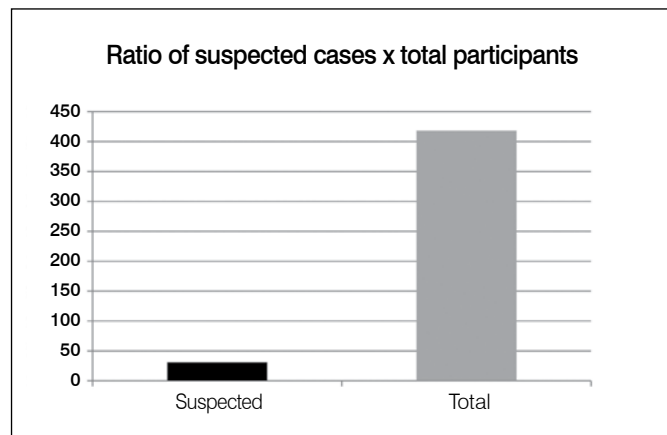


Figure 1. Total cases studied and suspected.

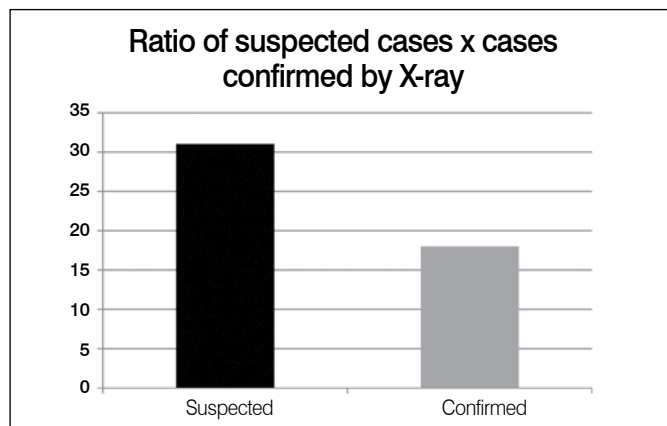


Figure 2. Relation between suspected and confirmed cases.

determining the positivity ratio between the suspected case and the confirmed case of 64%.

Table 1 demonstrates that there is no statistically significant difference between the male and female sexes.

The prevalence of idiopathic scoliosis was 4.3%. (Figure 3)

Table 1. Study of prevalence between sexes ($p=0.449$).

Procedure				
Scoliosis				
	Yes		No	Total
Male	7	$\chi^2=$	192	199
Female	11	$\chi^2=$	208	219
Total	18		400	418
Calculation of Expected Cases				
x1=	8.57	x2=	190.43	
x3=	9.43	x4=	209.57	
	0.29		0.01	
	0.26		0.01	
		Value of Chi-Square = 0.57		$p= 0.44897$

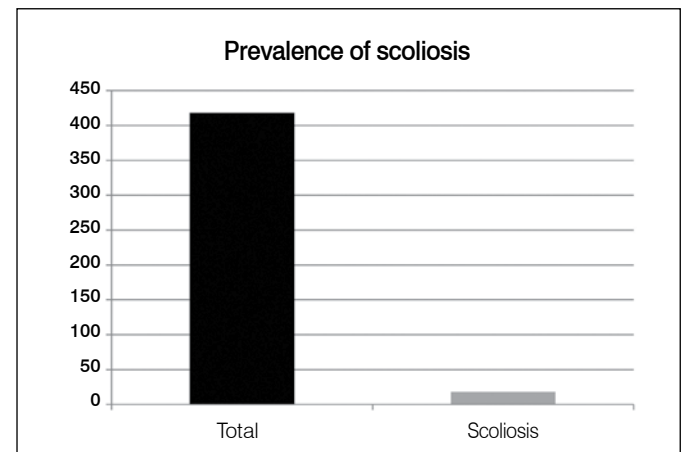


Figure 3. Prevalence of adolescent idiopathic scoliosis.

DISCUSSION

Adolescent idiopathic scoliosis has unknown etiology and is defined as a lateral and rotational curve of the spine, measuring at least 10 degrees, determined by the Cobb method, and its prevalence in the world ranges from one to 13%.^{2,3} There are no studies on prevalence in our community.

The physical examination constitutes an important part of the diagnosis, since it is through this procedure that suspected cases of scoliosis are selected as this disease is painless in most cases. Hence the physical examination favors early diagnosis and enables effective treatment, almost always without the need to resort to surgical treatment, which besides the high cost, also poses risks to the patient. The treatment of scoliosis in adolescence can prevent the evolution of the curvature, through the use of vests in association with physiotherapy.

Patients with a structured scoliotic curve after the growth phase cannot treat the deformity efficiently. The curvature can determine important postural alteration, pain, restricted breathing and even cor pulmonale.⁵

Hereditary factors are also associated with symptoms of adolescent idiopathic scoliosis, corresponding to approximately one third of the patients diagnosed with AIS, yet the inheritance pattern is not yet known.

In Cuiabá, state of Mato Grosso, Brazil, among 382 school children, the estimated prevalence of scoliosis was 5.3% for curves of five or more degrees and 2.2 % for curves of 10 Cobb degrees or higher. The variable sex is associated with the epidemiology, as AIS is more prevalent in patients of the female sex than in those of the male sex. In this study the female sex corresponded to 61.11% and the male sex, 38.8%, reaching a value similar to that found in the literature, although without determining statistically significant difference.⁶

In Brazil, the prevalence of scoliosis ranges between 2% and 4% in teenagers aged between 10 and 16 years.⁷ The literature includes cases described in relation to the epidemiology of AIS, such as the study conducted in Belo Horizonte, state of Minas Gerais, Brazil, which verified the percentage of scoliosis at 4.8% among the 358 school children studied.⁸

In the study conducted by Figueiredo and Figueiredo⁹ in Maranhão, Brazil, in 1981, 7295 students were examined with the prevalence of adolescent idiopathic scoliosis observed in 7.3% of the boys and 15.8% of the girls. In Niterói, state of Rio de Janeiro,

Elias and Teixeira¹⁰ examined 4750 asymptomatic adolescents in the year 1992 and observed prevalence of 1.03% for idiopathic scoliosis, with curve between 11 and 20 Cobb degrees.

This study involved 418 adolescent subjects with a total of 18 cases, determining prevalence of 4.3%, which is compatible with the literature.

Among the students with scoliosis (18), 61.11% were female, formulating a ratio of 1.5 female students to one male student. This result is similar to that found in several publications.¹¹⁻¹⁴ According to the IBGE (Brazilian Institute of Geography and Statistics) Census of 2010,¹⁵ the city of Goiânia is home to 99,345 adolescents between 10 and 14 years of age. If we adopt the proportion of idiopathic scoliosis prevalence of 4.3%, we would total 4,270 individuals affected by the disease.

Using the same source of data, the state of Goiás, with 530,958 adolescents between the ages of 10 and 14 years, would present 22,800 individuals with scoliosis.

This shows the importance of the knowledge of these data for their use in the public and private health systems.

CONCLUSION

The prevalence of adolescent idiopathic scoliosis in the municipally run public schools of Goiânia is 4.3%.

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