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Review Article

Assessment of Refractive Errors, Dental Caries, and Scoliosis in School Children Aged 6-14 Years: A Study in Durrës Schools

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Abstract

This study aims to assess the prevalence of refractive errors, dental caries, and scoliosis in children aged 6-14 years across several primary and secondary schools in the city of Durrës. The sample includes 370 students from "Vincenc Prendushi", "Nënë Tereza", "Vasil Ziu", "Abedin Dino", and "Bajram Curri" schools. Each school was selected randomly. From each school we have selected different classes and students for further evaluation. Each student underwent a clinical examination to evaluate vision, oral health, and postural status. Refractive errors were assessed using Snellen chart table placed in 6 meters. Dental caries was evaluated through clinical inspection of the teeth, using the DMFT index (Decayed, Missing, and Filled Teeth). Scoliosis was diagnosed through physical examination and the Adams forward bend test, done in physiotherapy lab of Aleksander Moisiu University. The results provide insight into the risk factors and the need for early interventions to improve the overall health of children in this age group.

Out of the 370 students, 28% (104 students) were found to have refractive errors, with myopia being the most common condition, affecting 17% (63 students), followed by hyperopia in 9% (33 students), and astigmatism in 2% (8 students). A total of 42% (155 students) exhibited signs of dental caries, with an average DMFT score of 2.8, indicating a moderate level of oral health concerns. Additionally, 12% (45 students) were diagnosed with scoliosis, with mild curvature observed in 8% (30 students) and moderate to severe curvature in 4% (15 students).

These findings suggest a significant need for vision correction, oral health education, and orthopedic monitoring in the student population. Early detection and preventive measures in schools are crucial to addressing these health issues effectively and ensuring the well-being of children during their developmental years

Keywords: refractive errors; dental caries; scoliosis; school children; vision screening; oral health; postural assessment; durrës

Introduction

Children's health during their formative years is crucial for their physical, mental, and social development [1]. Among the prevalent health concerns in school-aged children are refractive errors, dental cavities, and scoliosis. When these conditions go undiagnosed or untreated, they can severely affect a child's quality of life, learning abilities, and long-term health [2].

Refractive errors, such as myopia (nearsightedness), hyperopia (farsightedness), and astigmatism, are among the most common visual impairments in children. According to the World Health Organization (2021), uncorrected refractive errors are a significant contributor to visual impairment worldwide, particularly in school-aged children. Early detection and treatment are essential to avoid academic and social challenges [3]. Poor vision can result in difficulty concentrating, lower academic achievement, and reduced participation in both sports and social interactions.

In a similar vein, dental caries (tooth decay) is one of the most widespread oral health issues in children [4]. The prevalence of dental caries is driven by poor oral hygiene and limited access to preventive dental care. The FDI World Dental Federation (2020) reports that untreated cavities affect 60-90% of school-aged children globally, causing pain, discomfort, and possibly leading to complications like infection or tooth loss.

Scoliosis, characterized by an abnormal curvature of the spine, is another frequent concern in children of school age. Detecting scoliosis early is critical to preventing its progression, which could lead to discomfort, difficulty breathing, and long-term musculoskeletal issues [5]. The prevalence of scoliosis among school-aged children is estimated to be around 2-3%, with adolescent girls being more susceptible [6].

This study aims to assess the prevalence of refractive errors, dental caries, and scoliosis among children aged 6-14 in Durrës, Albania. Through clinical examinations of students from five different schools, this research seeks to identify the primary health issues in this population and provide

recommendations for interventions aimed at enhancing children's overall well-being and academic performance.

Methodology:

This study used a cross-sectional approach to examine the prevalence of vision problems, dental cavities, and scoliosis among children aged 6-14 attending five schools in Durrës. The school selected randomly were: "Vincenc Prendushi," "Nënë Tereza," "Vasil Ziu," "Abedin Dino," and "Bajram Curri." A total of 370 students were randomly chosen from these schools. A written consent was obtained from the parents or guardians of all participants. Data collection took place in the schools over two months, conducted by trained professionals, including ophthalmologist, dentists, and physiotherapeutic. Students with eye problems, dental caries and scoliosis were referred to medical evaluation in clinic.

Each student underwent vision evaluation, dental evaluation and scoliosis test. The assessment of refractive errors was done using Snellen chat in 6 meters to measure visual acuity. Refractive errors like myopia, hyperopia, and astigmatism were confirmed using automated refractometry. The presence of glasses and their effectiveness were also recorded.

Assessment of dental carries was done by oral examination performed by trained dentist to identify cavities. The DMFT index (Decayed, Missing, Filled Teeth) was used to evaluate dental health. Teeth were inspected under good lighting for visible signs of decay, missing teeth, or fillings. A questionnaire gathered data on oral hygiene practices (brushing frequency, fluoride toothpaste use) and dietary habits (sugar consumption).

Scoliosis was screened using the Adams forward bend test. The degree of spinal curvature was measured with a scoliometer in students who tested positive in the physiotherapy laboratory of Aleksander Moisiu university. Those with significant curvature were referred for medial evaluation. Additional information on posture, physical activity, and family history of scoliosis was collected by a questionnaire.

After the evaluation, data were collected and analyzed. Descriptive statistics determined the prevalence of vision problems, dental caries, and scoliosis. The level of dental decay was done by DMFT index. Prevalence rates were analyzed by age and gender, with statistical comparisons using the chi-square test to identify significant differences.

Results:

The study included 370 students aged 6-14 years from five schools in Durrës. The prevalence of refractive errors, dental caries, and scoliosis was evaluated, and the findings are presented below.

Condition	Number of Students	Percentage
Myopia	63	17%
Hyperopia	33	9%
Astigmatism	8	2%
Total Refractive Errors	104	28%

Table 1: Prevalence of Refractive Errors

Out of the 370 students examined, 28% (104 students) were diagnosed with refractive errors. The most prevalent condition was myopia, affecting 17% (63 students), followed by hyperopia in 9% (33 students) and astigmatism in 2% (8 students). These findings suggest a high prevalence of myopia among students.

DMFT Score	Number of Students	Percentage
0 (No caries)	215	58%
1-2 (Mild caries)	91	25%
3-4 (Moderate caries)	45	12%
5+ (Severe caries)	19	5%
Total with Dental Caries	155	42%

Table 2: Prevalence of Dental Caries (DMFT index)

The data in table 2 reveals that 42% (155 students) had dental caries. Most students (58%) showed no signs of caries, but 25% exhibited mild caries, 12% had moderate caries, and 5% had severe caries with a DMFT score of 5 or more. These findings indicate that while many students maintain good oral health, a significant portion requires dental treatment and improved oral hygiene practices.

Condition	Number of Students	Percentage
No Scoliosis	325	88%
Mild Scoliosis (<20°)	30	8%
Moderate/Severe Scoliosis (>20°)	15	4%
Total with Scoliosis	45	12%

Table 3: Prevalence of Scoliosis

In table 3 we can see the prevalence of scoliosis which is 12% (45 students). From these, 8% (30 students) had mild scoliosis, while 4% (15 students) were diagnosed with moderate to severe scoliosis. These results underscore the importance of regular postural screenings in schools to detect scoliosis in early stages. As soon as we can detect scoliosis, we can prevent the progression by intervention programs.

Condition	Males (%)	Females (%)	Total (%)
Refractive Errors	16% (30)	12% (74)	28% (104)
Dental Caries	22% (81)	20% (74)	42% (155)
Scoliosis	5% (17)	7% (28)	12% (45)

Table 4: Prevalence of Conditions by Gender

In table 4 we have presented the prevalence of each condition by gender. The prevalence of refractive errors and dental caries was slightly higher in females (12% for refractive errors, 20% for dental caries) than in males, though scoliosis was more common in females (7% compared to 5% in males). This pattern aligns with global trends indicating that scoliosis is more prevalent in girls during adolescence.

The results of this study indicate that 28% of students have some form of refractive error, with myopia being the most common. 42% of students show signs of dental caries and 12% of students were diagnosed with scoliosis, with a higher prevalence in girls than boys.

Discussion:

The results of this study underscore the significance of refractive errors, dental caries, and scoliosis among children aged 6-14 years old in Durrës. These findings confirm the presence of these conditions in this age group and highlight the importance of early detection in preventing their progression.

In terms of refractive errors, the prevalence was found to be 28%, with myopia being the most common condition, affecting 17% of the children. This aligns with global data showing a rising incidence of myopia in school-aged children, particularly due to the increase in near-work activities like reading and prolonged screen time [7]. The high occurrence of refractive errors in this study stresses the need for regular vision screening in schools to ensure early identification and correction, which is critical for enhancing academic performance. Other studies have shown that visual outcome can influence quality of life [10]. Additionally, there should be programs to educate parents and teachers on the importance of early vision correction and timely referrals.

Regarding dental health, 42% of the children had dental caries, with a mean DMFT score reflecting moderate oral health issues. Poor oral hygiene and diets high in sugar likely contribute to this high prevalence. Comparable studies conducted in Albania and similar regions have shown that limited access to dental care and insufficient oral health education are major contributors to high caries rates among children [8]. To address this, preventive oral health initiatives, including routine dental check-ups and awareness campaigns focusing on oral hygiene and nutrition, could significantly lower the incidence of dental caries in this population.

The prevalence of scoliosis was observed to be 12%, with a higher rate among girls, consistent with the literature that notes a greater incidence of idiopathic scoliosis in females, particularly during the pre-adolescent growth phase [5]. The discovery that 4% of the students had moderate to severe scoliosis suggests that many cases go undiagnosed until they progress to more serious stages. This reinforces the necessity of routine postural screenings in schools to detect scoliosis early, helping to prevent the development of more severe spinal deformities and associated complications.

In line with the findings, girls showed a slightly higher rate of scoliosis than boys, reflecting the global trend in gender differences for this condition. However, no significant gender disparities were observed for refractive errors or dental caries. While this study did not analyze age-related patterns, such as the higher prevalence of myopia in older students, further investigation into these trends may be beneficial.

The results of this study have important implications for public health. The high percentage of students affected by these conditions indicates the need to integrate health services into the school system. From the other hand even the migration of health workers from Albania, may influence in increasing of these conditions [9]. We suggest the implementation of regular screenings for vision, dental health, and posture should be a priority to facilitate early diagnosis and intervention. Additionally, public health campaigns aimed at increasing parental awareness, promoting healthy diets, and encouraging physical activity could lead to lasting improvements in children's health and development.

Conclusion:

This study revealed that refractive errors, dental caries, and scoliosis are common among school-aged children in Durrës, with almost one-third of students experiencing vision problems, two-fifths suffering from dental caries, and one in ten affected by scoliosis. If not properly managed, these conditions can significantly impair students' quality of life and academic performance.

The findings highlight the need for:

-Regular health screenings in schools to detect and address these issues promptly.

-Preventive education for students, parents, and teachers on vision care, oral hygiene, and posture.

-Accessible medical interventions, such as corrective eyewear, dental care, and scoliosis management, to be provided through school health programs.

By implementing comprehensive health programs in schools, these common but manageable conditions can be effectively addressed, improving children's health and well-being during their formative years.

Limitations

Since this study included the students of 5 primary and secondary schools in the city of Durrës. The data are only for this population group. A more detailed and multicenter study would better determine the prevalence of this condition in this age group.

Conflict of interest: Authors declare that they have no conflict of interest.

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