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Original Research Article

Prevalence of rickets: a clinical study

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ABSTRACT

Background: Rickets is a growing bone disease that is common in children and adolescents. It is triggered by the inability of the osteoid to calcify in a growing individual. Even in countries with ample sun exposure, rickets is a common health problem which leads to frequent morbidities. Inadequate information on its prevalence and risk factors is available. For the study of prevalence and prominence of clinical characteristics of rickets in children aged between 0 - 10 years.
Methods: The present research was a cross-sectional analysis. This study was conducted over a period of one year from June 2018 to June 2019. Department of Pediatrics, Malla Reddy Medical College, Hyderabad, India. This prospective study was conducted on 100 children presenting with signs of rickets in the pediatric department of Malla Reddy Medical College, Hyderabad. The detailed history thorough clinical examination, anthropometric measurements and ratios of each child enrolled in the study was taken. The social and demographic data was also obtained through a structured questionnaire.
Results: The prevalence of rickets was found to be more prevalent in males with (70%) than in females (30%). Rickets prevalence was around 46% in the study which is higher compared to other studies. Most of the cases around 85% belonged to the age group of 0-5 years. Rachitic rosaries were the most prominent sign amongst all.
Conclusions: Because of its greater prevalence among infants, Rickets continue to be a major health problem. Rachitic rosaries and thickened epiphysis are the most common clinical signs. Since Rickets are a disease which can be prevented, vitamin D should be supplemented.

Keywords: Epiphysis, Prevalence, Rachitic Rosaries, Rickets, Vitamin - D

INTRODUCTION

Rickets is a condition associated with bone-deformity due to inadequate mineralization in growing bones.[1] Rickets is a condition that often occurs in childhood when the bones becomes soft and deformed. Where some of these cases are due to inherited syndromes, renal disease and drug use, world's widespread rickets are caused due to nutritional deficiency. Bone pain, leg deformations and sometimes endangering hypocalcaemia are characteristic for nutritionary rickets. Vitamin D or dietary calcium deficiency, low exposure to sunlight can also contributes to poor mineralization of the developed bones. Nutritional rickets are common in many developing countries and are also more frequent in wealthy countries.[2-4] Modern lifestyle limits this exposure to sunlight, which photosynthesizes vitamin D in the skin, and the incidence of nutritional rickets has been resurging.

Vitamin D is one of the first hormones; it is photosynthesized in all organisms from the phytoplankton to mammals. Rickets affect children in particular; however, they can also affect adults in a condition called osteomalacia. Generally, since early

infancy, the child has experienced serious and long-lasting malnutrition.

When left untreated, a rickets affected child is more likely to suffer bone fractures. People with severe and prolonged rickets may experience permanent bone deformities. Serious low concentrations of calcium in blood can cause cramps, convulsions and respiratory problems. In rare case rickets can also disrupt heart muscles.

The differential diagnosis for children with non-growth, developmental delay and orthopedic disorders should include rickets. Early diagnosis is critical because if children are treated before age 8 months, morbidity can be reduced.

METHODS

The present study was conducted in Outpatient department. The present study was a Cross sectional study. It was conducted in Outpatient department in June 2018 - June 2019. This study was conducted on 100 children presenting with Consecutive sampling.

Inclusion criteria

Children aged between 0 - 10 years who displayed both the biochemical inclusion criteria of Vitamin - D deficiency and the clinical signs/symptoms or radiological signs of rickets like Broadening and cupping of the epiphyseal ends increased joint space, frying of the epiphyseal ends and zone of preparatory calcification. Patients who displayed both the biochemical inclusion criteria of Vitamin - D deficiency and the clinical signs/symptoms or radiological signs of rickets were included in the study.

Exclusion criteria

The research excluded patients with significant congenital abnormalities, chronic hepatic disorder, chronic renal disease or with anticonvulsant medication.

Statistical analysis

Data were presented in the form of statistical Tables and charts. SPSS software version 20 was used for statistical analysis.

The detailed history, thorough clinical examination, anthropometric measurements and ratios of each child enrolled in the study was taken. The social and demographic data was also obtained through a structured questionnaire.

A radiological test by x-ray from both hands is performed for each infant with any medical symptom of rickets, which is seen as the "gold standard" of racket diagnosis. When these characteristics exist, rickets are deemed radiological: epiphysical beginnings, extended epiphysis finishing, frying and preparatory calcifying areas.[5]

RESULTS

The prevalence of rickets was found to be 46% among the study population. The most frequent sign was rachitic rosaries 24%, followed by thickened epiphysis and delayed closure of fontanel 20 and 17% respectively. The Frontal bossing was found in 15% and mafan's sign in 11%. Craniotabes with 7% followed by Harrison's sulcus with 4% and the least being parietal bossing with 2%. (Table 1).

Table 1: Relative frequency of different clinical diagnostic signs of rickets among rachitic group.

Clinical signs of rickets	No.	(%)
Rachitic rosaries	11	24 %
Thickened epiphysis	9	20%
Delayed closure of fontanel	8	17 %
Frontal bossing	7	15 %
Marfan's sign	5	11 %
Craniotabes	3	7 %
Harrison's sulcus	2	4 %
Parietal bossing	1	2 %

Table 2: Distribution of prevalence of rickets among age and gender.

Indicators	Prevalence	Percentage
Age (years)		
0 - 5	85	85
6 - 10	15	15
Sex		
Male	70	70%
Female	30	30%

The prevalence of rickets was found to be more prominent in males (70%) than in females (30%). The age group of 0-5 years was the most prominent with 85% of the cases and the least belonged to the age group of 6-10 years age group with 15% (Table 2).

DISCUSSION

Rickets are often viewed as an illness of the 19th century. Nonetheless, though vitamin D is accessible and has proven its efficacy to prevent rickets, rickets and vitamin deficiency remain an issue of substantial morbidity in public health. In many nations, the incidence of the subclinical deficiency of vitamin D for children and adults is strong and clinical rickets can only be the tip of the iceberg.[6]

In this study the incidence of rickets was observed to be more prevalent in males (70%) than in females (30%) with a ratio of 3:1, which is comparable with other studies with similar results. A study conducted by Siddiqui et al showed that the proportion between men and women was 3.71:1 (78% vs 21%).[7] The same findings were recorded by Khattak et al in an analysis of

male to female ratios of 1.77:10.9 While Beck-Nielson et al in an extensive study in Denmark noticed no gender distribution discrepancy. In another research from turkey a ratio of male to female testing was reported as 2.9:1.15.[8,9] Rickets were the most prominent in this 0-5-year group with 85% of cases and the least 15% belonged to 6-10 years of age group.

The most common signs of rickets were Rachitic Rosaries 24%, followed by thickened epiphysis 20%, and a delayed fontanel closure 17%. The Frontal bossing was identified in 15% and the sign of the mafan in 11%. Craniotabes with 7% led by the sulcus of Harrison with 4% and the least sign is parietal bossing found in 2% of the children. Early manifestations of nutritional rickets include rachitic rosaries. Therefore, it can probably be found in most rickets cases.[10] The thickened epiphysis and rachitic rosaries are caused by disturbed endochondrial ossification and epiphysis with the buildup of excessively disrupted hypertrophic cartilage that widen the metaphysis and clinically appear as a swollen joint. Since this is the normal pathophysiology of rickets and is predicted to be more frequent.[11]

Results of the present study prevalence is slightly higher than that reported by Najada et al, Kabir et al. and Thacher et al, who reported that, in some places, nutritional rickets is merely reported sporadically, while in other areas, up to 9% of the childhood population is clinically affected.[12-14] On the other hand, the prevalence of the present study was lower than that recorded in Qatar.[15]

CONCLUSION

Rickets tend to be a major health concern, while their incidence in children grew. Rachytic rosaries and thickened epiphysis are the most common clinical signs. A multifactorial disease that plays a critical part in lack of sunlight exposure, calcium deficiency, excessive breasts without treatment and insufficient weaning activities. The most important factors of risk tend to be young age, accelerated birth rate, overcrowding and low social status. Clinical signs had substantial sensitivity and specificity values, making rickets diagnosis a useful method for evaluating rickets. Health education and rickets awareness are critical as it can help curtail rickets.

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