

Predisposing Factors for Nutritional Rickets in Children Presenting in Shaikh Zayed Hospital, Lahore

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ABSTRACT

Background: Nutritional rickets resulting from different causes continue to be a major pediatric concern in many developing countries. It's the most frequent non-communicable disease among children globally. Even developed countries have not been exempted from this disease.

Aim: To determine the predisposing factors for nutritional rickets in children, presenting in Shaikh Zayed Hospital Lahore

Study design: Cross sectional study

Place and duration of study: Department of Pediatric Medicine, Sh. Zayed Hospital, Lahore from 01-01-2019 to 31-07-2019.

Methodology: One hundred and thirty children of nutritional rickets were enrolled. Children of both genders and age 9 months to 2 years were included. All children on anti-convulsant therapy and chronic liver diseases were excluded.

Results: There were 83(63.85%) between 9-18 months, 47(36.15%) were between 19-24 months of age with mean age was 17.36±3.92 months. Seventy four (56.92%) males and 56(43.08%) were females. Predisposing factors reveal 89(68.46%) exclusive breast feeding, 68(52.31%) low nutritious status of mother, 93(71.54%) had cow's milk, 87(66.92%) had lack of sunlight exposure and 63(48.46%) had malnutrition.

Conclusion: Exclusive breast feeding, low nutritious status of mother, cow's milk, lack of sunlight exposure and malnutrition are the significant predisposing factors for nutritional rickets in children.

Keywords: Nutritional rickets in children, Predisposing factors, Exclusive breast feeding, Low nutritious status of mother

INTRODUCTION

Nutritional rickets is a childhood disease characterized by impeded growth and deformity of the long bones, characteristic radiological findings (metaphyseal flaring, widening) and biochemical changes (low serum calcium and high alkaline phosphatase)¹. Nutritional rickets is a public health issue in many countries and continues to be problematic in infants who are exclusively breast-fed without vitamin D supplementation. Nutritional rickets is largely found in low income countries in Asia, Africa, or the Middle East. The prevalence in Pakistan is not clear, although its prevalence in South East Asia is about 15-18%². Prevalence of Rickets in Africa is in excess of 10% and UNICEF has estimated that it is up to 25% in China³.

Its spectrum of causes differs in different regions of the world. Deficiency of vitamin D, calcium and phosphate is associated with nutritional rickets in growing children. Vitamin D deficiency, in turn is attributed to a number of causes including malnutrition, excessive clothing, exposure to sunlight, season, geographic location and pollution⁴.

Nutritional rickets may be subclinical or may present with growth retardation, skeletal deformities, hypocalcaemia, tetany, muscle weakness and seizures. Bowing of the legs, rachitic rosary, thickening ends of the long bones, frontal bossing and pathological fractures are all examples of bony abnormalities⁵.

Among patients with nutritional rickets, 62% were exclusively breast fed, 59% were born to mothers with low nutritious status and 75% were on cow's milk⁶, while there was lack of sunlight exposure in 61.2% and 40% has malnutrition^{7,8}.

Nutritional rickets has long standing effects, on growth of children in young age and also, on final height which remains below that of normal for that age. Nutritional rickets is almost eliminated from western societies but despite abundance of sunlight in our country, it is prevailing at a high rate and has a high treatment cost. This shows that these are other factors, apart from lack of sunlight, which contribute to development of rickets. No single study has outlined all predisposing factors in our area so that preventive strategies and local remedies are formed emphasizing on improving education of parents regarding these

factors. As a result nutritional rickets can be prevented, consequently, decreasing burden on hospital out-patient departments, treatment expenses and psychosocial effects in community.

The objective of the study was to determine the predisposing factors for nutritional rickets in children, presenting in Shaikh Zayed Hospital Lahore

MATERIALS AND METHODS

This cross-sectional study was conducted at Department of Pediatric Medicine, Shaikh Zayed Hospital Lahore from 1st January 2019 to 31st July 2019. A total of 130 cases is calculated with 95% confidence interval, 8.5% margin of error and taking expected percentage of malnutrition i.e. 40% (least among all) predisposing factors for nutritional rickets in children. Patients presenting with rickets either both gender with age 9 months to 2 years were included from the study. Anti-convulsant therapy assessed by history, Chronic liver disease assessed by history, clinical examination and investigation in form of liver function tests (SGOT, SGPT, bilirubin) and chronic renal disease assessed by history, clinical examination and investigation in form of renal function tests (urea, creatinine, urine complete examination) were excluded.

After induction, a detailed history of patients was taken including data regarding predisposing factors for nutritional rickets as per operational definition. All the investigations were performed in the same laboratory free of cost in Shaikh Zayed Hospital, Lahore. All information regarding data of patient was recorded. All data was entered and analyzed using SPSS-20.

RESULTS

There were 83(63.85%) were between 9-18 months, 47(36.15%) were between 19-24 months of age with mean age was 17.36±3.92 months. Seventy four (56.92%) males and 56 (43.08%) were females (Table 1). The means were of weight 8.7±1.4kg, serum calcium 6.9±0.97, phosphorus 1.48±0.34 and alkaline phosphatase 924.62±101.65 respectively (Table 2). The predisposing factors reveal 89 (68.46%) exclusive breast feeding, 68(52.31%) low nutritious status of mother, 93(71.54%) had cow's milk, 87(66.92%) had lack of sunlight exposure and 63(48.46%) had malnutrition (Table 3).

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Table 1: Demographic information of the patients (n=130)

Variable	No.	%
Age (months)		
9-18	83	63.85
19-24	47	36.15
Gender		
Male	74	56.92
Female	56	43.08

Table 2: Descriptive statistics of weight, serum calcium, phosphorus and alkaline phosphatase

Variable	Mean±SD
Weight	8.7±1.4
Serum calcium	6.9±0.97
Phosphorous	1.48±0.34
Alkaline phosphatase	924.62±101.65

Table 3: Frequency of predisposing factors for nutritional rickets

Predisposing Factors	No.	%
Exclusive Breast Feeding	89	68.46
Low nutritious status of mother	68	52.31
Cow's milk	93	71.54
Lack of sunlight exposure	87	66.92
Malnutrition	63	48.46

DISCUSSION

Nutritional rickets, which can be caused by a variety of factors, remain a major paediatric issue in many developing countries.⁽⁹⁾ It's the most frequent non-communicable illness among children throughout the world.¹⁰ This disease has not spared even the most developed countries.

Despite the abundance of sunlight in our country, it is prevailing at a high rate. This shows that there are other factors, apart from lack of sunlight, which contribute to development of rickets. No single study has outlined all predisposing factors in our area, however, the current study was planned so that preventive strategies and local remedies are formed emphasizing on improving education of parents regarding these factors. As a result nutritional rickets can be prevented, consequently, decreasing burden on hospital out-patient departments, treatment expenses and psychosocial effects in community.

In the present study, the mean age was 17.36±3.92 months and 74 (56.92%) male and 56 (43.08%) were females. The predisposing factors reveals 89 (68.46%) exclusive breast feeding, 68 (52.31%) low nutritious status of mother, 93 (71.54%) had cow's milk, 87 (66.92%) had lack of sunlight exposure and 63 (48.46%) had malnutrition. These findings are similar to those of Muchuka et al¹¹ found that children with rickets were diagnosed at an average age of 14.8 months. The gender distribution is closely contrasted to 2008 census statistics, which showed 52.3% males and 47.5% girls. Both girls and boys were affected by rickets, indicating that there was no link between sexuality and the prevalence of rickets in these children^{12,13}. The findings of the study regarding frequency of risk factors are in agreement with previous studies, where 62% were exclusively breast fed, 59% were born to mothers with low nutritious status and 75% were on cow's milk, while there was lack of sunlight exposure in 61.2% and 40% had malnutrition^{6,7}.

It's become obvious that some of the components are more important than others in the producing of nutritional rickets. These variables have been calculated. For example, Lack of exposure to sunshine as a result of the child's total wrapping was found to play a significant influence. It clearly shows that mother education, lack of exposure to sunshine as a result of the children's total wrapping, and a bad weaning diet were important than the other factors. In the winter, milk provides just 10 IU of vitamin D per day, whereas in the summer, milk gives 20 IU per day¹⁴. The development of rickets is explained by the decreased vitamin D content of breast

milk throughout the winter and spring season seasons, as well as the reduced opportunity for newborns to obtain sunlight exposure.

The results regarding breast feeding are consistent with those from a study in which found that 71% of rachitic infants had been breastfed.¹¹ A study in 2022 had also reported that about 93% of children with nutritional rickets had been breastfed¹⁵. Our study found similar trends to other studies in terms of decreased vitamin D, calcium phosphatase, magnesium and phosphorous^{16,17}.

The current study found that nutritional rickets is a complex disease in which inappropriate weaning methods, lack of exposure to sunshine, calcium shortage, and extended breast feeding without supplements are all important factors. Health education is important as it can affect all of above factors.

CONCLUSION

The exclusive breast feeding, low nutritious status of mother, Cow's milk, malnutrition and lack of sunlight exposure are the significant predisposing factors for nutritional rickets in children. However, preventive strategies and local remedies should be formed emphasizing on improving education of parents regarding these factors so that nutritional rickets can be prevented, consequently, decreasing burden on hospital out-patient departments, treatment expenses and psychosocial effects in community.

Conflict of interest: Nil

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