

# The Emerging Burden of Rickets: Impact of High Rise Buildings in Karachi

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## ABSTRACT

**Objectives:** Study the impact of high rise Buildings, as a contributory factor toward nutritional rickets in preschool children

**Study Design:** Prospective descriptive study

**Method:** Children visiting Hamdard College of Medicine, Department of Pediatrics were screened for Rickets, by history and clinical examination, supplemented by Blood and Radiological Examination of the Left Wrist joint. All confirm cases of Nutritional rickets were enrolled. Children living in apartments (High rise buildings) were studied and results compared with children living in own open houses each, and skull (6.8%). No lesion was noted in Total number of case seen in outpatient Department of Pediatrics, Hamdard College of Medicine by consultants during the study period 14600 approximately Total numbers of cases

studied with rickets were 54 / 14600 (1.054%) Total number of Children living in Apartments (High rise Buildings) =98 /154. (63.632%) Numbers of Children living in open houses were 56 /154(36.363 %).

Number of children Exclusive breast feed for six months with rickets was 106 /154 (68.83%)

Number of Children with supplement of Vitamins and Iron from the age of 8 weeks were/ 154 (20 %)

Numbers of normal weight children with rickets were 134 / 155 (87.01%)

**Conclusion:** Children living in high rise buildings in Karachi are not exposed to sunlight due to our cultural and they require additional 'and needs Vitamin D supplements

**Keywords:** Pediatrics, Nutritional Rickets, Sunlight Exposure.

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## INTRODUCTION

Vitamin D deficiency is a worldwide problem with health consequences[1] .and is one of the important micro-nutrient deficiencies still seen by the primary care physicians. leading to acute respiratory infection [2] resulting in morbidity and mortality in under five children in developing countries The major cause of nutritional rickets is lack of exposure to sunshine due to lack of awareness and traditional beliefs of not exposing infants to sunshine[3,4,5,6,7]. It was only in the early part of the 20th century that the role of ultraviolet light irradiation was established in vitamin D formation. Since then, there has been a resurgence of the disease in many countries such as United Kingdom [8] and Denmark [9] probably due to avoidance of direct sunlight because of the risk of the development of skin cancers. The disease is also widely recognized in many developing countries, including some situated in subtropical regions [10,11,12,13]. Very few foods items naturally contain

vitamin D, and foods that are fortified with vitamin D are often inadequate to satisfy child's vitamin D requirement. Vitamin D deficiency causes rickets in children and can precipitate and exacerbate osteopenia, osteoporosis, and fractures in adults [14]. Vitamin D deficiency has been associated with increase risk of common cancers, autoimmune diseases, hypertension, and infectious diseases [14].

Nutritional rickets remains prevalent in many developing countries, despite the availability of ample sunlight. The disease is associated with poor socioeconomic status, low birth weight, protein-energy malnutrition and common childhood infections.

Nutritional rickets has been described from at least 59 countries in the last 20 years [15]. Its spectrum of causes differs in different regions of the world. .in majority of situations variable combinations of both dietary and sunlight probably play a role. Although low dietary calcium intakes appear to be central to the

pathogenesis of rickets in Nigeria, genetic [16,17] and/or other environmental factors are also likely to contribute. But to date no single factor has been isolated as contributing significantly [18].

## METHOD

This study was carried out from Jan 2006 to Dec 2008. Preschool Children between the ages of 2 months to 5 year visiting, the department of Pediatrics Hamdard College of Medicine were seen by consultants and were especially screened for Rickets, by history and clinical examination, supplemented by Blood (Calcium, Phosphorous, Alkaline Phosphates, and Calcium / phosphate ratio) and Radiological examination of the left wrist joint. Liver function tests and renal screening were also carried out. All confirm cases of Nutritional rickets were enrolled. The Ethical Committee of Hamdard College of Medicine and Dentistry approved this study.

Nutritional rickets is defined as rickets responding to two mega units of injectable Vitamin D<sub>3</sub>. Non responders had other causes of rickets.

Hamdard University Hospital is an undergraduate teaching hospital, situated in the heart of city at M.A. Jinnah Road Karachi. Department of pediatrics have five fellows as part of teaching facility, and provides outpatient facilities six days a week, and emergency cover to all the pediatric problems, including neonatal care round the clock.

Children living in apartments (High rise buildings) were studied and results with of children living in open houses were compared.

**Exclusion Criteria:** Children with liver disease, renal diseases and children not responding to two mega doses of rickets were considered as non nutritional rickets and were not included in the study Data was analyzed by Statistical Package for Social Sciences version 15 (SPSS Inc., Chicago, IL., USA) A  $p < 0.05$  was Considered statistically significant.

## RESULTS

Total number of case seen in outpatient Department of Pediatrics, Hamdard College of Medicine by consultants during the study period 14600 approximately. Total numbers of cases studied with rickets were 154 / 14600 (1.054%). Total number of Children living in Apartments (High rise Buildings) = 98 / 154. (63.632%). Numbers of Children living in open houses were 56/154 (36.36%). Number of children Exclusive breast feed for six months with

rickets were 106 / 154 (68.83%). Number of Children with supplement of Vitamins and Iron from 8 weeks onwards were 31/ 154 (20 %). Numbers of normal weight children with rickets were 134 / 155 (87.01%) Living in high rise building has significant impact.

**Table-1**  
**Age Group Comparison**

AGE	Number of Children living in open houses with rickets	Number of Children living in high rise building with rickets	p-value
2 months- 6 months	29	51	< 0.001
7 months – 12 months	12	20	< 0.001
13 months – 24 months	11	22	0.047
25 months – 36 months	4	5	NS (0.5)

**Table-2**  
**Relation of Nutritional Grade**

Nutritional Grade ( Modified Gomez classification)	Number of Children living in open houses With rickets	Number of Children living in high rise buildings with rickets	p-value
Normal	42	92	0.006
Grade 1	5	3	NS
Grade 2	9	3	0.048

**Table-3**  
**Distribution of Children with Rickets**

Number of Children with Rickets	Number of children living in homes (%)	Number of Children living in apartments (%)	p- valve
154	56	98	0.05

## DISCUSSION

Rickets is not a disease of past [19], over one billion humans have insufficient circulating levels of vitamin D, and dietary insufficiency of calcium is more common in developing countries. Worldwide, nutritional rickets is considered to be the most common non-communicable disease of children [20]. the lack of appreciation that sun exposure in moderation is the major source of vitamin D for most

humans is the cause of rickets [21] in addition to prematurity, low birth weight delayed weaning, due to lack of awareness, poor socioeconomic situation, and not exposing the child to sunlight due to cultural, social, and religious beliefs, rapid urbanization / immigration [22] and lack of feeding advice, by proper weaning food. Simple feeding advice can solve number of nutritional problems [23] In our study majority of children were between 2 months to six months, this finding is different than other studies [24] Simple presence of sunlight in the area is not a protection from rickets, Studies from Kuwait [25] Saudi Arabia [26] Also support this finding

It is the exposure of the child to sunlight that prevents rickets , 63.63 % Children living in apartments / high rise buildings with inadequate sun light exposure, due to our culture beliefs, inadequate space between buildings blocks also prevent sunlight exposure In our Study children suffering from rickets were of normal nutrition status; other Studies have not supported this finding [27] Majority of children were breast feed is finding is consistent with other studies[28,29]. None of children presented with fits due to Hypocalcemia as in other studies hypocalcemia is a significant finding [30]. **Study limitations of our study were** .Serum 25-hydroxyvitamin D (25OHD levels were not done either in child or the mothers due to financial reasons, single test of vitamin D3 cost around 2000/- Pakistani rupees

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