

The Prevalence of Rickets Disorder among Children in Saudi Arabia

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ABSTRACT

Background: Despite the modern life and the availability of nutrition, the prevalence of children suffering from rickets in Saudi Arabia is increasing these days. Rickets can cause an effect to the children growth and cause an impaction on their later life. Identifying the prevalence of rickets in Saudi Arabia and comparing it with other countries can bring useful information about it in reaching the causes, risk factors and prevention methods that have been done in the community to avoid it. **Objectives:** This study was done to investigate the prevalence of rickets among children in Saudi Arabia. **Methods:** A cross-sectional study on knowing the prevalence of rickets among children living in Saudi Arabia was carried out on 864 participants within different social media platforms during the period from February to April 2018. **Results:** 15.3% of the children were diagnosed with rickets, 50.5. % of the diagnosed children was between the ages of 0 to 5. Regarding risk factors, 41.9% of the children drink soft drinks and 15.4% of them were obese. Only 55% of the participants breast fed their children, 35.9% of the participants know what rickets is, 45.3% ask for medical help once their child has been diagnosed and 70.5% of the participants thought that vitamin D can prevent rickets. **Conclusion:** At the end of this study, there were an increased number of children that have been diagnosed with rickets in Saudi Arabia.

Keywords: rickets, vitamin D, breast feeding.

INTRODUCTION

Vitamin D has an important role in calcium homeostasis, development and maintenance of human bones, and enhancement of the human immune system⁽¹⁾. The initial result of vitamin D deficiency is hypocalcemia, followed by hypophosphatemia, and then a rise of alkaline phosphatase. These findings are known as biochemical rickets or osteomalacia. Although, the hypophosphatemia has an invariable finding in vitamin D-deficiency rickets, might not be as effective as is the hypocalcemia in the early stage of the disease⁽²⁾. Stimulation of the parathormone by hypocalcemia leads to bone resorption in an attempt to maintain normal serum calcium⁽³⁾. In the growing bones, bone matrix continues to be produced but due to impaired calcification, its accumulation becomes abnormal leading to widening at the epiphyseal ends of the bones which manifests clinically in areas of fast bone growth like the wrist and costochondral junction. In weight-bearing long bones, inadequate mineralization may induce deformities of the bones in varying severity. Rickets is a term which stands for failure of mineralization of growing bone or with characteristic changes of growth plate cartilage among infants before closure of their growth plate⁽⁴⁾. Vitamin D deficiency rickets is increasing in the developing countries and it is

among the five most common diseases in infants⁽⁵⁾. In Saudi Arabia, even though having a great economic affluence and adequate sunlight throughout the year, vitamin D deficiency is slightly common in infants, adolescents, as well as pregnant and lactating Saudi women^(6,7). It is usually common practice for families to keep infants and young infants indoors with minimal or total avoidance of direct sunlight. Even though there is an awareness of the high prevalence of vitamin D deficiency in Saudi Arabia, a review of the literature revealed a lack of data on the most common presentations.

MATERIALS AND METHODS

A cross-sectional study involving 864 participants all over Saudi Arabia was done between February to April 2018. The sample size for this study was selected and distributed randomly. Self-administered questionnaires were developed after a careful review of literature on the subject and it included 17 questions demonstrated to people in Saudi Arabia. The questionnaires had two parts. Part one; demographical data that includes age, gender and marital status. Part two; the participants were asked whether they have or know a relative that has children who have been diagnosed with rickets or not, how old was the

child if he was once diagnosed with rickets, wither the participants know anything about rickets or not and have they required medical help once their child had rickets. Participants were also asked if their children had a normal breast feeding or not, what type of milk they gave to their children if they did not breast fed them. They were also asked about the skin color of their children, wither their children were obese or not, wither their children drink soft drinks or not and what is the family income. Finally, participants were asked about how much time their child usually spend on the sunlight, wither their child were suffering from symptoms of rickets like bowing of the legs or bone pain, wither their children had a consequences of vitamin D deficiency like bone fractures and they were also asked wither they think that vitamin D would prevent rickets or not. Data were collected through a survey that was distributed among a website-link through participants in Saudi Arabia in different social media sites and platforms. Statistics were descriptively used to describe the answers of the participants in the study using numbers and percentages.

The answers were compared for different questions within the different groups using Pearson chi-square test. Statistical significance was set at $p < 0.05$ and analysis was performed using IBM SPSS statistics, version 23 (IBM, Armonk, NY, USA).

The study was done after approval of ethical board of University of Hail.

RESULTS

Table (1): Age distribution of the participants

Age	Frequency	Percent
1-10	7	0.7
10-20	181	21
20-30	388	44.9
30-40	208	24.1
>40	80	9.3
Total	864	100

Table (2): Marital status and gender of the participants

Marital status	Frequency	Percent
Single	498	57.6
Married	366	42.4
Total	864	100
Gender		
Male	585	67.7
Female	279	32.3
Total	864	100

Table (3): Participants who have or know a relative who has children that were diagnosed with rickets:

A total of 864 participant women from all over Saudi Arabia had been participated in the study and 44.9% of them were between the ages of 20 to 30 years old, 24.1% were between 30 to 40 years old, 21% were between 10 to 20 years old and only 9.3% were more than 40 years old (Table1). More than half of the participants 57.6% were single and 42.4% were married (Table 2). Regarding participants who have or know a relative who has children that were diagnosed with rickets, 15.3% of the participants have or know a relative who has children that were diagnosed with rickets and 84.7% don't (Table 3). Regarding the age of children once they were diagnosed with rickets, 50.5% were between 0 to 5 years old, 37% were between 5 to 10 years old and 12.5% were between 10 to 18 years old (Table 4). Concerning the general questions about the children, 55% of the children had normal breast feeding, 50.8% if children who did not had a normal breast feeding had high fat formula milk, 72.8% of the children had white skin color, 41.9% of the children drink soft drinks, 15.4% were obese, 70.2% were exposed to less than 20 minutes to sunlight, 9.8% of the children had cowing legs and 4.5% had muscle cramps (Table 5).As for the general questions about the participants, 35.9% of the participants did not know what is rickets, 45.3% of them have sought medical help once their child had been diagnosed with rickets, 73.1% had an average income and 70.5% think that vitamin D can prevent rickets (Table 6).

Diagnosed with rickets	Frequency	Percent
Yes	132	15.3
No	732	84.7
Total	864	100

Table (4): Age of children once they were diagnosed with rickets:

Age	Frequency	Percent
0-5	67	50.5
5-10	49	37
10-18	16	12.5
Total	132	100

Table (5): General questions about the children:

Normal breast feeding	Frequency	Percent
Yes	329	55
No	269	45
Total	598	100
Children who had formula milk		
High fat	190	50.8
Low fat	132	35.3
No fat	52	13.9
Total	374	100
Children skin color		
White	439	72.8
Brown	16	2.7
Black	148	24.5
Total	603	100
Drink soft drinks		
Yes	250	41.9
No	346	58.1
Total	596	100
Suffer from obesity		
Yes	93	15.4
No	510	84.6
Total	603	100
Expose to sunlight		
>20 minutes	191	29.8
<20 minutes	451	70.2
Total	642	100
Suffer from bowing legs		
Yes	85	9.8
No	779	90.2
Total	864	100
Suffer from muscle cramps		
Yes	39	4.5
No	825	95.5
Total	864	100

Table (6): General questions about the participants:

The Prevalence of Rickets Disorder among Children in Saudi Arabia

Know what is rickets		
Yes	310	35.9
No	554	64.1
Total	864	100
Seek medical help		
Yes	192	45.3
No	232	54.7
Total	424	100
Economic income		
High	54	6.3
Average	632	73.1
Low	178	20.6
Total	864	100
Think vitamin D can prevent rickets		
Yes	609	70.5
No	255	29.5
Total	864	100

DISCUSSION

In the present study, we found that there is an increased number of children suffering from rickets in Saudi Arabia. The prevalence of rickets shown in this study was 15.3% and more than half of the diagnosed children were between 0 to 5 years of age. In USA, Kreiter ⁽⁸⁾ reported high prevalence of rickets in children who were 5 to 25 months age. In Pakistan, a study showed that 74% of rachitic infants were below 12 months of age ⁽⁹⁾. The reason for increased incidence in this age group is the increased metabolic need due to rapid growth in the body.

In the USA, Weisberg reviewed the cases between 1980 and 2003 and concluded that osteomalacia and rickets are still prevalent in the US ⁽¹⁰⁾. A study done in the UK conducted in 2002, showed that vitamin D deficiency in Asian families' children is a continuing problem and increasing in prevalence ⁽¹¹⁾. Even though there are many studies which are from countries that are prone to have a high prevalence of osteomalacia and rickets due to their limited exposure to sunlight, there are many reports showed that countries with adequate or high sun exposure, like Saudi Arabia and Australia have also an increased number of rickets ^(12,13). In Saudi Arabia, inadequate vitamin D levels were detected in a population-based study, and it showed that vitamin D deficiency osteomalacia/ rickets is common and increasing these days ⁽¹⁴⁾. Al Jurayyan reported that the most of the patients in their study presented with nonspecific symptoms such as bone pain, which makes the

diagnosis to be difficult in the less-severe cases ⁽⁶⁾. Whereas most infants with rickets are easily recognized and treated, some can have lasting bone deformities or mild-to-severe neurological symptoms. Vitamin D supplements can easily prevent rickets and help children to grow healthier. This study showed that there is 12.5% of the children who diagnosed with rickets were between 10 and 18 years of age which can tell us that rickets affect not only younger children but also older ones.

CONCLUSION

We can conclude that there is an increased number of children who are suffering from rickets in Saudi Arabia. Doctors should inform, teach families by providing them with necessary information about rickets and inform women about the importance of normal breast feeding and the advantages of it and how to deal with the early symptoms of vitamin D deficiency. People also should seek medical care once they feel that their child is having symptoms like bone pain, bowing of the legs and growth failure.

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