

Prevalence of asymptomatic hyperuricemia among children from 6-16 years old in Ramadi city, Iraq.

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Abstract

Background: The prevalence of pediatric hyperuricemia is increasing worldwide. No other similar study was done in Ramadi city previously.

Objects: This study was designed to show the prevalence of hyperuricemia among children from 6 to 16 years old in Ramadi city, Iraq, and to study its relation with gender, personal obesity, residency, and economic status of their families.

Materials and methods: Across sectional study was done for 6 months from the first of January 2021 to the end of June 2021, to determine the expected prevalence of hyperuricemia among children from 6-16 years old in the Ramadi population. For all studied cases, data was collected for age, gender, obesity, socioeconomic status, and residency. All cases were sent for serological calculation of uric acid levels.

Discussion: The total number of studied children was 520, the overall prevalence of hyperuricemia among these cases was (11.3%). Girls had more prevalence than boys with female to male ratio (2.2:1). The overweight's and obese children had a higher prevalence of hyperuricemia (29.3%) compared with only (3.3%) among those who were not. Most of the cases were from middle-economic status families with a non-significant relationship as compared with control while it was significant among residence in the urban area.

Conclusion: A higher prevalence of hyperuricemia was found among children in Ramadi city, Iraq, and this requires a specific educational program giving to the families in explaining the attributed risk factors especially the problem of obesity.

Keywords: Hyperuricemia, Prevalence, Children, Ramadi city.

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Introduction

Hyperuricemia is a state described as an abnormal elevation of serum levels of uric acids. Although the risk factors for hyperuricemia have not been fully determined, recent studies have shown that the condition is a part of genetic abnormalities, a part of a bad lifestyle, or maybe due to some dietary factors. As uric acid is an ultimate purine metabolism production, hyperuricemia is directly related to the in taking of purine-rich food. Studies also showed that food like seafood, red, and poultry meats had a high content of purine [1]. Hyperuricemia is a global problem, and that the overall worldwide prevalence is ranging from (0.1% to 10%) and it differs from one country to another. The asymptomatic hyperuricemia is mostly diagnosed among middle and elderly old ages, and even it is mostly presented among some ethnic groups. The hyperuricemia prevalence was increased in the last decades in both developed and developing countries populations. However, its prevalence is still higher among developed countries. The normal serological levels of uric acid among children and adolescents differ in both genders and among different age groups. Many and frequent studies on serum uric acid among healthy populations, showed that the

levels are increased gradually with age from birth till adolescence and that differences between the genders arisen from about 12 years of age. This information is well considered by researchers when defining hyperuricemia in studies. Gout is rarely present among children and adolescents, and most diagnosed cases might have an underlying predisposing problem. The major causes of hyperuricemia among pediatric age groups are chronic conditions, including Down syndrome, metabolic or genetic disease, and congenital cardiac disease, and acute conditions, including gastroenteritis, bronchial asthma (hypoxia), malignant disorders, and drug side effects. Obesity is a major established etiology of hyperuricemia in otherwise healthy children and adolescents [2]. Hyperuricemia among children and adolescents required management, as pediatric patients with hyperuricemia are at increased risk of mortality, especially due to renal and heart complications. As overweight and obesity are the main leading etiology for hyperuricemia among the healthy pediatric age group, serious and efficient programs for reducing body weight through changes in lifestyles which include, diet therapy, and increase physical activities are mandatory. The use of medication therapy with allopurinol is only for refractory cases.

This study was aimed to:

- Identify the prevalence of hyperuricemia among children from 6-16 years old in the outpatient clinics in Ramadi teaching hospital for maternity and childhood.
- Identify the relation of hyperuricemia with age, gender, body mass index, economic status, and residency.

Materials and Methods

A cross-sectional study was done for 6 months from the first of January 2021 to the end of June 2021, to assess the prevalence of hyperuricemia among children from 6-16 years old in the Ramadi city population. The collection of data was randomly among different ages and different genders and was done among persons who visit outpatient clinics of Ramadi teaching hospital of maternity and childhood, Iraq. The study was approved by the Anbar health directorate researches committee. Informed consent was taken from families and studied cases after giving them a full explanation about the purpose of the study. Blood samples were taken from all studied cases for the measurement of serum uric acid. Hyperuricemia was considered in this study if serum uric acid (>5 mg/dl) among both genders for ages between 6-10 years. In ages from 10-12 years (male >5.5 mg/dl, female >4.7 mg/dl). In ages from 12-14 years (male >6.7 mg/dl and female >5.8 mg/dl). In ages from 14-16 years (male >7.8 mg/dl and female >5.8 mg/dl).

Exclusion criteria

- Children with Down syndrome, diabetes mellitus, chronic renal diseases, and genetic metabolic disorders.
- Ages less than 6 years and more than 16.
- Persons who refuse the test.

A questionnaire data form was prepared for each studied case including:

- Age which are divided into 4 groups, from 6-10 years, from 10-12 years, from 12-14 years, and 14-16 years.
- Body mass index was calculated for each studied person for the determination of overweight and obese persons. This was done after measuring the weight and height for each case according to age and gender. The calculations of the body mass index were done by using this equation (weight in kilograms divided by the height in meter square). Overweight diagnosis when the value is between (85%) and (95%), of the expected value for age and among children and the obesity is diagnosed when the value more than (95%).
- Information is taken from persons about any chronic disease like diabetes, renal failure, or inherited metabolic disease.
- Information about the economic state of each studied case. Which is divided into three groups, poor, intermediate, and high economic status depending on the family number,

- Residency, rural or urban.
- Collected data were checked by using the Statistical Package for Social Sciences (SPSS), and the p-value was calculated after measuring the Chi-square. The P-value levels of <0.05 were considered significant in this study [3].

Results

The total studied cases were (520). The males studied cases were (264) and the females studied cases were (256) selected randomly. Hyperuricemia was reported in 59 cases (11.3%) from all studied cases (Figure 1). The relation was significant as compared with control. For male studied cases ($n=264$), there was 18 (6.8%) case reported with hyperuricemia, and from female studied cases ($n=256$), there were 41 (16%) case diagnosed with hyperuricemia (Table 1). From ages between 6-10 years ($n=196$), there were 17 (8.6%) cases diagnosed with hyperuricemia, from ages between 10-12 years ($n=127$) there were 15 (11.8%) cases with hyperuricemia, from ages between 12-14 years ($n=109$) there were 13 (11.9%) cases with hyperuricemia, and lastly from ages between 14-16 years ($n=88$), there were 8 (15.9%) cases with hyperuricemia. The p-value among different age groups was non-significant as compared with the control (Table 2). Hyperuricemia was diagnosed in 47 (29.3%) children with overweight and obesity ($n=160$) and hyperuricemia among non-overweight and non-obese children ($n=360$) was diagnosed in only 12 (3.3%) (Table 3). The relationship was significant with obesity when compared with control. For an economic state of families, for children living in low economic families ($n=130$) there were 15 (11.5 %) cases diagnosed with hyperuricemia, from children living in middle economic state families ($n=288$) there were 32 (11.1%) cases with hyperuricemia, and lastly from children living in high economic state families ($n=102$), there were 12 (11.8%) cases with hyperuricemia (Table 4). The relationship was non-significant as compared with the control. From children living in urban areas ($n=312$) there were 43 (13.8%) cases diagnosed with hyperuricemia, and from children living in rural areas ($n=208$), there were 16 (7.7%) cases diagnosed with hyperuricemia. The relationship with residence was significant when compared with control (Table 5).

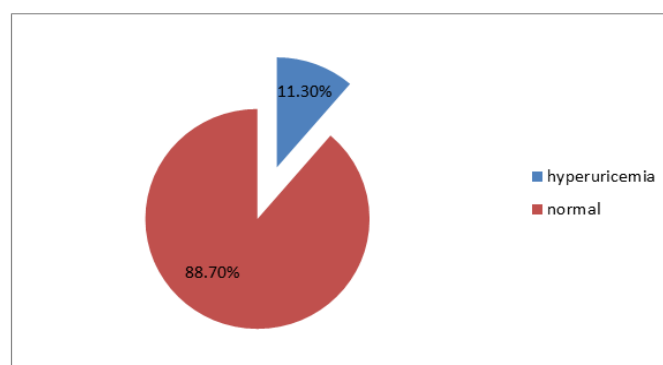


Figure 1. Shows the prevalence of hyperuricemia.

Gender	Normal	Hyperuricemia	Total
Male	246 (93.2%)	18 (6.8 %)	264
Female	215 (84%)	41 (16%)	256
Total	461	59	520

Table 1. Distribution of all studied cases among gender.

Total	Hyperuricemic children	Normal children	Age group
196	17 (8.7%)	179 (91.3%)	6-10 years
127	15 (11.8%)	112 (88.2%)	10-12 years
109	13 (11.9%)	96 (88.1%)	12-14 years
88	14 (15.9%)	74 (84.1%)	14-16 years
520	59	461	Total

Table 2. Distributions of all studied cases among different ages.

Variables	Normal serum uric acid	Hyperuricemia	Total
Overweight and obese children	113 (70.6%)	47 (29.4%)	160
Normal weight children	348 (96.7%)	12 (3.3%)	360
Total	461	59	520

Table 3. The distributions of all studied cases among different body weights.

Economic state	Normal children	Hyperuricemic children	Total
Low economy	115 (88.5%)	15 (11.5%)	130
Intermediate economy	256 (88.9%)	32 (11.1%)	288
High economy	90 (88.2%)	12 (11.8%)	102
Total	461	59	520

Table 4. The distributions of all studied cases among familial economic states.

Residence	Normal children	Hyperuricemic children	Total
Urban	269 (86.2%)	43 (13.8%)	312
Rural	192 (92.3%)	16 (7.7%)	208
Total	461	59	520
P-value is significant=0.031.			

Table 5. The distributions of all studied cases among residence.

Discussion

The prevalence of hyperuricemia in children and adolescents ranging from 0.6% to 50.4% in several countries, and this depends on different gender, ages, ethnicity, and region. Till now, there was no documented study on children and adolescents in Iraq.

In the present study, the overall prevalence of hyperuricemia was (11.3%). Other studies showed variable results, in a study in Korea the prevalence was (9.4%). However, higher results were obtained in the Pakistan study (26.02%), and in U.S study (30.2%). These differences among

studies may be because hyperuricemia is the result of combinations of many factors including, genetic, variable lifestyles, and environmental risk factors, in addition to different age group samples among each pediatric study [3].

Concerning differences in the present study, the prevalence of hyperuricemia among girls was diagnosed in (13.6%), while among boys, it was (8.2%). Similar results were obtained in the US study. However, the result was different from that reported in other studies in Brazil and Japan in children and adolescents in which boys were diagnosed more with hyperuricemia than girls [6]. The age-related increase risk of hyperuricemia was non-significant in this study, generally, the serum uric acid concentration increases gradually with age from the first year till puberty, and it is nearly equally among both genders. In the adults and elderly age group population, the age-related increase of the serological levels of uric acids was due to the changes in renal functions with increasing age, and that the kidney's elimination of the uric acid from the body may not be correct.

Regarding the association of overweight and obesity with serum uric acids, the present study showed that the prevalence of hyperuricemia among obese children was much higher than that reported among non-overweight and non-obese children. Obesity in children and adolescents is now a global problem seen in both developed and developing countries [7]. The prevalence of overweight and obesity among children and adolescents studied previously in Ramadi city showed very high levels which were (16.79%) and (26.78%) respectively. In another study in Spain among children demonstrated that overweight and obesity were big risk factors for hyperuricemia. The association may be due to the dietary habits of increasing purine consumption that result also in excessive increases in body weight. Researches proved that the mean uric acid levels turn out is higher among overweight and obese children and that an excessive increase in body weight is associated with a significant uric acid elevation in early adolescence [4]. In the present study, there was a non-significant relationship between hyperuricemia and the economic status of the families, however, this result is different from many other studies in children and adults which demonstrate an association of hyperuricemia with high-class families explaining this with high red meat consumption [8]. In our community, the majority of families are derived from middle economic status, and this can explain the non-significant association with higher economic families [9,10]. The prevalence of hyperuricemia was reported more in urban regions than in rural regions in this study. Many other studies demonstrate the same results, this may due to the differences in lifestyle activities which is more among the rural population. The limitation of this study is the small sample size, and the refusal of many persons the involvements in this study [5].

Conclusion

The overall prevalence of hyperuricemia in this study was (11.3%), Overweight and obesity were significant risk factors of hyperuricemia. The prevalence of hyperuricemia more among the urban population.

Public intervention educational programs in health centers are needed for the risk of obesity and on a healthy diet. Other researches are recommended for studying the main etiological factors of this high prevalence of hyperuricemia among children.

Conflict of Interest

The authors declare that there is no conflict of interest.

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References

1. Vazquez-Mellado J, Hernandez EA, Burgos-Vargas R. Primary prevention in rheumatology: The importance of hyperuricemia. *Best Pract Res Clin Rheumatol* 2004; 18(2): 111-124.
2. Wang W, Zhang D, Xu C, et al. Heritability and genome-wide association analyses of serum uric acid in middle and old-aged Chinese twins. *Front Endocrinol* 2018; 9(75): 339443.
3. Rong S, Zou L, Wang Z, et al. Purine in common plant food in China. *J Hyg Res* 2012; 41(1): 92-95.
4. Wallace KL, Riedel AA, Joseph-Ridge N, et al. Increasing prevalence of gout and hyperuricemia over 10 years among older adults in a managed care population *J Rheumatol* 2004; 31(8): 1582-1587.
5. Wilcox WD. Abnormal serum uric acid levels in children. *J Pediatr* 1996; 128(6): 731-741.
6. Harkness RA, Nicol AD. Plasma uric acid levels in children. *Arch Dis Child* 1969; 44: 773-778.
7. Prebis JW, Gruskin AB, Polinsky MS, et al. Uric acid in childhood essential hypertension. *J Pediatr* 1981; 98(5): 702-707.
8. Davies DP, Saunders R. Blood urea. Normal values in early infancy related to feeding practices. *Arch Dis Child* 1973; 48(7): 563-565.
9. Poyrazoglu HM, Dusunsal R, Yazici C, et al. Urinary uric acid: Creatinine ratios in healthy Turkish children. *Pediatr Int* 2009; 51(4): 526-529.
10. Shaw GM, Liberman RF, Todoroff K, et al. Low birth weight, preterm delivery, and periconceptional vitamin use. *J Pediatr* 1997; 130(6): 1013-1014.

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