

Inflammatory Markers in Relation to Cardio metabolic Risk Factors in Prepubertal and Pubertal Iraqi Children

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ABSTRACT

To determine the level of circulating pro-inflammatory peptides in prepubertal children and its relationship with abdominal obesity, through waist circumference measurement, and diagnose cardio metabolic risk factors. Between November 2020 and June 2021, a sample of 90 healthy Iraqi children (45 Pubertal and 45 Pubertal children) aged 6-16 years participated in this case-control study. Illness, onset of puberty, any drug intake at the time of investigation, or chronic inflammatory disease. This information was obtained through interviews and a comprehensive physical examination of the participants. A significantly higher blood sugar, total cholesterol, triglyceride, and low-density lipoprotein cholesterol levels in prepubretal children when compared with pubretal children. Serum levels of interleukin 6 are also elevated and there are significant differences between children group, the tumor necrosis factor alpha value increased significantly in the cases ($p = 0.01$). conclusion: in adolescence, inflammatory markers are related to risk factors for cardiovascular disease. body size, nutritional assessment and physical activity have been presented as non-pharmacological measures to control inflammation markers, resulting in effects on controlling obesity, blood lipids, insulin resistance, hypertension and diabetes.



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1. INTRODUCTION

Adolescents' deferens can have an impact on their behavior in terms of physical activity, social elements, and cognitive abilities, including the adoption of a sedentary lifestyle with poor eating habits [1]. Obesity-related metabolic and cardiovascular disorders are complicated by the location of central adipose tissue [2]. Discovered that the verified stature, BMI, and BF percent of girl adolescents differed depending on the stage type of somatic maturation. Poor physical activity and a sedentary lifestyle, combined with the consumption of high-calorie, low-fiber diets, have been linked to an increase in the prevalence of obesity and, as a result, metabolic alterations in the form of the body during adolescence [3]. Furthermore, an

accurate evaluation of body shape is vital in evaluating and monitoring the nutritional condition of adolescents due to changes caused by a sex-specific manner. In many countries, the increased frequency of CVD and its association with risk factors has contributed to an increase in morbidity and death. Adipose tissue buildup is one of the key risk markers for developing CVD [4]. Obesity is considered a chronic systemic inflammatory disease. These levels of inflammation and insulin resistance together lead to diabetes, metabolic syndrome, and cardiometabolic risk factors. This defect is related to the metabolic factor of abdominal obesity, which is an active endocrine organ that secretes many cytokines and mediators, called adipokines [5]. Abdominal obesity is characterized by low-grade chronic inflammation and high secretion of inflammatory peptides, such as high-sensitivity active protein (hsCRP), interleukin 6 (IL6), and tumor necrosis factor (TNF α) [6]. Obesity The role of inflammatory peptides and its relationship with the increased risk of MetS in childhood [7], [8]. Many surveys of studies found that children and adolescents were obese with an association between circulating adipokine levels, anthropometric indicators, and cardiometabolic risk factors [9], [10]. To determine the relationship between obesity, such as BMI and CRP as factors that increase the risk of heart disease [11], the relationship between individual age diversity reports or inconsistent results. Presence and possible relationship with low-grade systemic inflammation in central obesity in healthy children Before puberty Metabolic changes [12].

This study aims to determine the levels of circulating inflammatory peptides hsCRP, IL6 and TNF α in healthy prepubertal children, as well as the relationship between and obesity markers measured by waist circumference (WC), and the diagnostic effect of inflammatory peptide on cardio metabolic risk factors.

2. Material and Methods

2.1 Subjects

Ninety Iraqi healthy children (45prepubertal and 45 pubertal), age (6–16) years (mean age 8.0 ± 2.20 vs. 12.0 ± 4.30 years), were attended to the national diabetes center / Mustansiriyah university, Baghdad, Iraq in the period between November 2020 and June 2021. The WC was measured according to method [13]. The exclusion criteria for children and adolescence with family unknown and old medical histories, acute and chronic inflammatory diseases, or any medication drug intake at the time of diagnostic. All information was reported in a short interview and full examination of the participants.

The information was obtained directly by medical history in a private interview. Not all children who were using any medications and subjects of liver, renal defect, malignant disorders, diabetes, and diseases of the pituitary or thyroid disorder, were depended on this study.

2.2 Measurements

The WC, BMI, and body fat percent (BF%) were calculated for every child (14). Blood glucose and lipid profile were measured using auto-analyzer technique, Hitachi. Also, hsCRP, IL6, and TNF- α were measured by Elisa kit.

2.3 Statistical Analysis

Study analysis of data are presented as means \pm SD. ANOVA test was done to equate the variance of means values between the groups. The p value ≤ 0.05 was significant.

3. Results

Table 1 shows the clinical characteristics and biochemical parameters of children proved that WC ,BMI, FBS, TC,TG and LDL-C increased significantly ($P < 0.05$) while, decreased significantly of HDL-C

between two groups (prepubertal and pubertal children). Table 2 shows the markers of inflammation in prepubertal and pubertal children. The hsCRP level showed a significant increase between two groups ($p < 0.01$). Levels of IL6 and TNF α are also significant differences between prepubertal and pubertal children ($p < 0.01$).

Table 1: Variables parameters among prepubertal and pubertal children

Parameters	Prepubertal Children (n=45)	Pubertal Children (n=45)	p-value
	Mean \pm SD	Mean \pm SD	
Sex (Boy/Gril)	22/23	20/25	/
BMI	30.1 \pm 2.12	24.33 \pm 3.0	0.05
Waist(cm)	102.08 \pm 5.44	85.10 \pm 4.25	0.05
FBS (mg/dl)	101.22 \pm 6.22	74.23 \pm 7.20	0.05
TC (mg/dl)	190.12 \pm 10.14	164.12 \pm 15.92	0.05
TG (mg/dl)	187.22 \pm 16.89	90.14 \pm 19.14	0.01
HDL-c(mg/dl)	40.55 \pm 4.09	52.70 \pm 5.55	0.74
LDL-c(mg/dl)	120.77 \pm 10.66	80.83 \pm 9.56	0.05

Table 2: Inflammatory markers among prepubertal and pubertal children

Parameters	Prepubertal Children (n=45) Mean \pm SD	Pubertal Children (n=45) Mean \pm SD	<i>p</i> value
hsCRP (mg/dl)	4.32 \pm 2.05	13.22 \pm 4.31	0.01
IL6 (ρ g/ml)	56.41 \pm 2.10	64.21 \pm 1.30	0.01
TNF- α (ρ g/ml)	13.22 \pm 4.31	20.15 \pm 1.40	0.01

4. Discussion

A report from this Article is one of the few studies showing a relationship between central obesity, WC use, and measurements of inflammation markers in healthy children, and markers of risk due to cardio metabolic even before onset of puberty. The lack of adult confounding effects, such as chronic diseases, vascular disorders diseases, smoking and others [14]. Among our Donnager individuals, these clear interrelationships have certain advantages. BMI is used as a measure of obesity in some studies to examine obesity and inflammatory factors in children This study measured the recommended ratio to assess the quality of abdominal adipose tissue to determine the impact on the waistline. The veracity of this decision and the central adipose tissue are closely related to the risk of CVD in adults and diabetes in adolescents, adolescents with normal weight or obesity with BMI [14]. Obesity is defined as a chronic disease As a result of chronic positive energy balance, the cause of obesity is related to lower levels of intake of high energy density food and Physical activity [15]. Obesity is a global epidemic, and its prevalence in developing countries is increasing. The incidence of these CV is higher in adults and the elderly. In addition, studies report that most of these CVDs occur in puberty and prepuberty [16], [17]. Due to the stigma of obesity, in addition to suffering psychosocial damage and chronic diseases, obese adolescents are also at a high risk of development [18], [19]. The concentrations of hsCRP, IL6, and TNF α in the study group were used to assess low-grade inflammation. High sensitivity CRP is an acute protein phase and the

liver responds to cytokines. The author considers that the correlation of the evidence with the development of CV events is an important indicator of atherosclerosis in obese young children [20]. This study found that, compared to normal waist circumference before puberty, protein levels of this inflammatory marker of abdominal obesity were increased in boys. There is a significant correlation when measuring the distribution of central obesity, because waist circumference is the only anthropometric predictor that measures elevation. Several studies mention the same findings, using samples from older children and adolescents or based entirely on clinical research groups [21]. In addition, some authors have measured the association with total fat or identified non-sensitive CRP [22].

The creator protein provides one of the most important functions. can bind to the cell membrane structure to form a complex, and performs the classical pathway and cycle of phagocytosis. Vascular endothelium cells play a key role in the communication between the site of the inflammatory process and circulating white blood cells [23]. In the presence of inflammation and cardiovascular risk factors, the lack of the role of endothelial cells can lead to increased inflammation, vasoconstriction, thrombosis, and vascular wall cell proliferation [24]. It has been suggested that the metabolic markers of obesity are the causes of inflammatory response mechanisms, endothelial cell damage and atherosclerotic deformation.

According to [25]. This present study found that serum levels of FBS, TC, TG and LDL-c were elevated and decreased significant of HDL-C in the Prepubertal Children when compared with pubertal Children this is agreement with [26], [27]. The inflammatory component of atherosclerosis has received increasing recognition in the past decade. The author believes that inflammatory peptides are processed at all stages of atherosclerotic disease, not only during the occurrence and evolution of lesions, but also during the accumulation of acute thrombotic complications.

Assessment of inflammatory factors in adolescence can monitor the changing stages and manifestations of chronic diseases in adulthood. It has been reported that chronically elevated levels of and IL6 in the systemic circulation are always associated with a high risk of cardiovascular morbidity and mortality in the system, independent of other inflammatory factors [28]. It increases the level of IL6 in, muscle induces the production of IL1 β and IL10, which are anti-inflammatory peptides, can also be produced by IL6, and inhibit the production of cytokine TNF α . These may be involved in regulating the beneficial effects of exercise on health and preventing diseases associated with low-grade inflammation [29]. However, Puglisi and Fernandez [30] has a consensus that weight loss is related to loss of TNF α , IL and CRP and increased adiponectin. These interventions did not provide consistent results, namely the effects of exercise and diet.

5. Conclusion

In adolescence, inflammatory markers are related to risk factors for cardiovascular disease. body size, nutritional assessment and physical activity have been presented as non-pharmacological measures to control inflammation markers, resulting in effects on controlling obesity, blood lipids, insulin resistance, hypertension and diabetes.

6. References

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