

Relationship of oxidative stress and lipid profile with blood pressure in primary school students from missan city .Iraq.

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Background and objectives: Hypertension is recognized as the most common cardiovascular disorder that's more aheading reason for morbidity and mortality in the young predicts serious events in the adults .

The metabolic cardiovascular syndrome is combination of many factors as heart disease ,diabetes , stroke , obesity insulin resistance , hypertension and dyslipidemia .

Aim : To determine the relationship between oxidative stress as(interpreted by lipid peroxidation) and risk factor for cardiovascular syndrome as (BP , lipid profile , BMI) in school aged children .

Methodology : In this study , 326 primary school students include (156 boys and 170 girls) between aged of 8 to 12 years According to anthropometric were measurements the body mass index (BMI) (Kg/m²), was calculated by the measured of height and weight with the subject in the light clothes without shoes in all study groups . Random total cholesterol (TC) , triglyceride (TG) , High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL) and Very Low Density Lipoprotein (VLDL) and Malondialdehyde were measured in sera spectrophotometrically in addition the main measured of blood pressure .

Results: Both SBP and DBP that significant correlation with age, height , weight and BMI , oxidative oxidation and lipid profiles in all study . But we found the primary school girls had significantly higher in blood pressure (127.7 ± 25 vs. 159 ± 3.3 mmHg $p < 0.05$) for than boys. groups. The cholesterol , triglyceride and LDL concentrations were significantly higher in girls as compared with boys . Regarding the male primary school that increased significantly of MDA serum concentration .

Conclusions: A correlation was attempted with various clinical parameters like age , gender and lipid profile and mean blood pressure in the young school children of 8-12years was high . A Program including screening promptly identification and health promotion school health programmers might assistance prevent future complication of cardiovascular syndrome .

Key words: Malondialdehyde , Lipid profile, hypertension school children

Introduction:

More information that is available regarding human nutrition, the evaluation about dietary status in corporate different anthropometric estimations for providing data or growth and body composition. However, anthropometric estimations can be used to assess body size, proportions and additionally total regional body compositions⁽¹⁾. Nevertheless, lipid levels changing, hypertension and obesity in conjunction with poor eating habits and constitute ideal conditions for the development of heart disease⁽²⁾. These risk factors are not limited to adults, that increasing frequent among children and adult⁽³⁾. Furthermore, the world pattern is should be research and prevent, correcting risk factor likewise initial as time permit since it has been proven that atherosclerosis begins in childhood and might make deferred by early identification. Though, because of this fact, in many countries dietary worries start similarly as early as two years ago⁽⁴⁾. Many countries around the world, including Iraq, are now in advanced phases on progress stages of epidemiological transition result an increasing trouble about cardiovascular disease (DVDs) and their more risk factors such as hypertension, this result in critical investment of economic losses to the country⁽⁵⁾. However, hypertension need its beginning in childhood and studies were showed that slight elevation in blood pressure in childhood will elevate to lift the danger of developing hypertension in adolescence down grown – up a few folds. Expanded vascular oxidative stress might make included in the pathogenesis from calming hypertension, oxidative stress happens when there is an imbalance between the generation of reactive oxygen species (ROS) and the antioxidant defense system, so that eventually get to be predominate⁽⁶⁾. Disturbances in the ordinary redox state about tissues can cause toxic impact through the production of peroxides and preparation free radicals that damage all components of the cell, including lipids creating lipids peroxidation⁽⁷⁾, One of the most frequently used biomarkers providing is an indication of the overall lipid peroxidation level is plasma malondiadehyde level⁽⁸⁾.

Malondialdehyde (MDA) will be a standout amongst those of majority which used as indicator of lipid peroxidation, (MDA) is a exceptionally reactive carbon dialdehyde produced as byproduct of poly unsaturated fatty acid peroxidation, in fact (MDA) is the principle and most studied product of polyunsaturated fatty acid peroxidation ⁽⁹⁾. In addition to scientific information about the reality of association of MDA with serum lipid profile, whereas found abnormal serum concentrations of some biochemical parameters in lipid profile which ones total cholesterol (TC) and low density lipoprotein (LCL -C)are strongly correlated to MDA with early atherosclerotic lesions.

Some studies displayed that both sexes (boys and girls) during few a monitor distinction a sample consisting many adolescents from 9-16 years of age had high blood cholesterol level and 11% of both genders had high blood pressure ⁽¹⁰⁾. Though, an important factor was concluded of these studies as indicated have suggested that obesity is associated with increased oxidative stress and therefore that possible cause lead to increase metabolic cardiovascular syndrome which is may be by a mix of factors that augment to expand an individual's danger for heart disease diabetes and stroke. Offers of these are involved obesity, dyslipidemia, impaired glucose tolerance and hypertension ⁽¹¹⁾.

However, the goal of this study is to investigate of a probable relationship between oxidative stress (lipid peroxidation MDA) with some biochemical norms and blood pressure to reduction of increased the risk factor of metabolic cardiovascular syndrome in primary school children enrolled in public philanthropic (free) and private (paid) schools and how these children's socioeconomic status affects their lifestyle. Furthermore, observe of these changes in biochemical parameters affect the level of the MDA.

Subjects and Methods:-

Sample:- this study has included several schools of the Misan governorate/ Iraq during the period from January 2016 to march 2016. However, some school ignores the invitation and other cases the parents failed to give written authorization for their children to undergo blood test of the total institutions invited to take part, one public school and one privet school to invitation in our study. The samples were limited to 326 students by the number of kits available and the school were chosen at haphazard from the school that agreed to take part but ensuring an equal number of students from each of two different types of schools (public and private). These were attained by assigning half of the kits children registered in public school and half to those enrolled in private schools.

In each type of school drawings were held in several classes to elect the children who were to take part from among those whose parents had given written acceptance for blood tests.

Anthropometrical Measurements : Body mass index (BMI) is a measure used to determine children's obesity. It is calculated using the Childs weight and height. BMI dose not measure body fat directly, but it is are assumable of body fatness for most children and teens.

Blood pressure was measured by a mercury sphygmomanometer (Baumanometer latex inflation Bag made by W. A. Baum company Inc. Copiague New1ork .USA). in both upper limbs after students rested for 10 minutes in a seated position. Students were required with complete an questionnaire regarding their eating habits and physical activity. Moreover, point possible, parents were also asked to complete a questionnaire on the same topics plus questions regarding heart disease and hyper tension.

Five mL of venous blood were aspirated from suitable vein of each student. Sera were obtained after centrifugation at 4000 rpm for 15min the sera used assessing the levels of (lipid profile) that determined by enzymatic method . kits were supplied by Spin react company – Spin.

The concentration of serum MDA was determined according to Buege and Aust (1978) by enzymoligical method. Thiobarbituric acid (TBA) method was used to measure the (MDA) which gives a pink color which read at (532nm). Malanodialdehyde concentration was calculated by using the molar extinction coefficients of 1.56×10^5 .

statistical study .

Analysis involved account of age and sex specific means and standard deviation (SD) for systolic and diastolic blood pressure, correlation coefficient, ANOVA and prevalence of hypertension. analysis was carried out to calculate crude odds ratio (OR) of selected socio-demographic variables and multivariable analysis to distinction independent predictors of hypertension. The results in all above were accepted as statistical significant when the p value less than ($p < 0.05$).

Results :

Data of Current study were revealed that the age and gender specific distribution of school children (n =326) include (156 boys and 170 girls) and anthropometric variables (weight, height and BMI) are depicted in table (1&2). Where this study was appeared no statistical significant differences values of anthropometric parameters across the age groups.

Table1:Characteristics of subjects

Age (yr)	No of total boys	No of total girls	Public school			Private school		
			No.	Boys	Girls	No.	Boys	Girls
8	28	29	46	21	25	11	7	4
9	25	29	41	18	23	13	7	6
10	31	37	59	26	33	9	5	4
11	30	42	56	22	34	16	8	8
12	42	33	63	37	26	12	5	7

Table2:Distribution of anthropometric variables according to age and gender

Age (yr)	Boys				Girls			
	No.	Weight (kg)	Height (m)	BMI (kg/m2)	No.	Weight (kg)	Height (m)	BMI (kg/m2)
8	28	27.4 ± 5.4	123.5 ± 6.8	15.0 ± 2.5	29	21.9 ± 5.0	121.9 ± 7.6	14.6 ± 2.0
9	25	29.7 ± 5.7	127.6 ± 7.3	15.7 ± 2.8	29	23.9 ± 4.6	126.2 ± 7.3	14.9 ± 1.8
10	31	34.6 ± 7.4	130.9 ± 7.2	15.9 ± 2.0	37	27.9 ± 5.7	131.3 ± 6.8	16.0 ± 2.1

11	30	39.9 ± 8.7	135.1 ± 7.6	16.1 ± 1.7	42	31.5 ± 6.6	136.4 ± 6.9	16.8 ± 2.3
12	42	46.7 ± 8.9	141.5 ± 9.4	17.1 ± 2.2	33	34.9 ± 6.7	139.9 ± 6.5	17.7 ± 2.5

Conversely, abnormal body mass was observed in nearly 21% of the study groups with 11.5% being overweight and 5.5% obese and 4% normal .

On the other hand t as in table (3) the results were revealed predominance of underweight category among girls as compared to boys (18% vs. 25% p<0.001).

Table3:Gender distribution of body mass index (BMI) in school children

BMI categories	Boys N(%)	Girls N(%)
Normal	81(53%)	93(55%)
Overweight	15(9%)	19(11%)
Obese	21(13%)	27(16%)
Underweight	39(25%)	31(18%)

However, Table 4 was appeared that the mean gradual in both SBP and DBP in boys and girls. Girl's student's had highly significant of SBP (127.7±2.5 vs. 109.2± 3.3 mmHg, P<0.05) than boys students .

Table4: Blood pressure in study groups

Blood pressure, mmHg	Boys(n=126)	Girls (n=170)	P value
Median SBP (min-max)	109.2± 3.3 (93.4-20.6)	127.7±2.5 (96.1-31.8)	0.05
Median DBP(min-max)	79.4± 1.5(65.2-87.6)	74.7± 2.8(68.1-85.0)	0.61

Notes; SBP=systolic blood pressure; DBP=diastolic blood pressure

Eventually, the malondialdehyde levels and lipid profile standards were estimated as summarized in table 5 along with suggested cut off as far lipid profile: e.g. total cholesterol, triglycerides, HDL and LDL. Out of total participants which included male and female(156, 170) respectively. Regarding girls there was a significant highly in TC,TG,LDL as compared with boys of this study.

Table 5: Mean values of biochemical parameters according to study groups.

Parameters	Boys	Range	Girls	Range	Suggested cut-off value
TC (mg/ dl)	159.88 ± 5 .58	92-199	194.48 ± 3 .71	88-210	190
TG (mg/ dl)	158.20 ± 10 .01	28-201	193.51 ± 7.12	30-185	150
HDL (mg/ dl)	42.50 ± 8.14	24-72	37.33 ± 4.09	20-90	20
LDL (mg/ dl)	104.23 ± 21.10	29-121	112.54 ± 28.27	34-200	110
MDA	1.35	1.40-1.78	0.09	0.05-1.10	0.12

Notes, TC=Total cholesterol; TG=Triglyceride; HDL-C=High density lipoprotein-cholesterol;LDL-C=Low density lipoprotein-cholesterol ,MDA= malondialdehyde

Preferred Cut-off Values

For serum lipids NCEP - ATP III Guidelines were used .According to these standard guidelines, hypercholesterolemia is defined as TC >200mg/dl, LDL-C as >100mg/dl, hypertriglyceridemia as TG >150mg/dl and HDL-C <40mg/dl. Dyslipidemia is defined by presence of one or more than one abnormal serum lipid concentration. For obesity NHLBI criteria were used according to this Obesity is defined as a BMI > 30. Over weight (BMI 25-30) were included who showed absolute healthy look.

However, the current study to estimate of serum MDA level inthemes and data were compared between group. The mean serum MDA levels (mmol/ L) were

significantly different between groups. The mean MDA in boys student (1.81 ± 0.48) were significantly higher than that girls groups (0.79 ± 0.16) $p < 0.001$.

Discussion:-

The socioeconomic development that bring taken place in Iraq generally and especially in south was represented in Maysan. In the previous few years have contributed dramatically to help of sensational lifestyle. They have prompted to rise emergence of new positive health trends, for example; prolonged life expectancy as well as pattern that proceed that continue to cause concern among members of the medical community with the society – threatening obesity epidemic constantly the part greater essential(12). However, Obesity is a problem that affects children an a particular manner .That will be risk factor of cardiovascular disease and predisposes to the improvement of hypertension⁽¹³⁾, insulin resistance and lipid abnormalities⁽¹⁴⁾, leads to consequence result metabolic syndrome. In highly developed countries the prevalence of metabolic syndrome in children – based on upon those adopted criteria–ranges starting with 4% to 9.2%⁽¹⁵⁾. Similarly as there will be no universally accepted definition of metabolic syndrome on children further investigation are needed should be create an set of clinically suitable diagnostic criteria.

Nevertheless, regular physical activity will be prevent progress obesity, furthermore contributes on blood pressure (BP) normalization, in addition systematic physical activity need to demonstrate to reduce CV risk even if it does not lead to weight loss⁽¹⁶⁾.

Data on obesity were limited to annual reports which emerged from the Iraqi ministry of health. Recently, little studies have been carried out on adult obesity in Iraq. However, the study to investigate of relationship between oxidative stress and risk factor for survey metabolic cardiovascular syndrome in childhood, referring to the results, discussed and follows out of primary school (males and females) was found to be obese.

Though, body mass index of children differs from the adult, the assessment of weight is much more complex .this is because children are growing continuously and the growth patterns (BMI) of children differ by age⁽¹⁷⁾. the pattern of development is dependent upon those sex of the child since those development for boys is very different from the growth pattern for girls.

Similarly , further the estimation is required in the group of children with high BP values, hence illustration and diagnosis of hypertension cannot be based on BP values observed on a single visit only even if numerous estimations were made. Consequently, those the teenagers in which abnormal BP values were identified were referred for ambulatory BP monitoring.

However, as its acceptable facts the finding that the BP increment with age during percentile levels, maximum and minimum systolic / diastolic BP values were found less than of what values in the present study(chadha et al., (18)).

Anyhow, the present study was appeared that the prevalence of hypertension in school children is 0.56% in boys and 1.37% in girls. This observation indicates that very low prevalence of hypertension that agreement with Gupta and Ahmed ⁽¹⁹⁾ and Tandoor ⁽²⁰⁾.Conversely, opposite of what obtained from (prabhajotet *al;*.) who found highly prevalence of BP in age 5 – 14 years (11.7%)⁽²¹⁾. However, our justification that low hypertension for those populations might make primarily whereas the reason for this is due to the use of arbitrary criteria to evaluate the blood pressure values. Moreover, The data on BP profile in Iraq school children is inadequate In conjunction with the lack of studies showing different patterns of BP.

This study would serve as a beginning of many more investigations to be undertaken in Iraq children living high and under different socio – economic conditions, eating different dietary and leading divergent life styles. Seeing that different lipid levels are widely either geographical areas , dietary habits and various socio- cultural habits. so it is judicious to establish normative data for each community.

However, due to a lack of information espial in the Iraq Missan city. Therefore, The current study was goaled to investigate the reliable belongings of lipid profile, where shows that (the total serum cholesterol (TC) from study groups were increased significantly were observed between both sex .

Regarding about the high density lipoprotein cholesterol (HDL – C) levels did not differ between the two sexes and different age groups) where this study was displayed that total cholesterol and low density lipoprotein cholesterol (LDL-C) were increased significantly in both sexes. the results are steady with a few past studies which suggested that children and adolescents from families with a history of hypercholesterolemia had increased LDL – C levels thus it is possible to increased of premature cardiovascular metabolic syndrome ⁽²²⁾. conversely, regarding the high density lipoprotein cholesterol (HDL-C) levels did not differ between both sexes.

Furthermore, despite the reduction in HDL in study groups show increased LDL-C that could be due to changes in the diet, many studies suggested to modification of dietary which includes to introduced of a low - saturated-fat diet in infancy and maintained through out the first decade of life associated with enhanced endothelial function in childhood and the effect was explained in party by the diet – induced reduction in cholesterol levels ⁽²³⁾.

With regard to serum triglyceride, the results we have obtained showed observed different results in the above parameters of some boys , that found was elevated higher from recommended cut-off limit (150mg/dl) while girls student was did not differ from normal value.

However, increased cholesterol and TG synthesis in some obese boys will be a significant interest its inferred that serum cholesterol concentration doesn't fundamentally reflect cholesterol synthesis, possibility that the overall increased in cholesterol turnover might reflect synthesis adipose tissue. Where cholesterol turns over more slower than in liver or intestine. Total body cholesterol synthesis is significantly correlated with both excess triglyceride and body weight, the known increased flux of fatty acids and more acetyl COA.

Current study was showed that the lipid peroxidation marker malondialdehyde (MDA) indicates that alterations in the values of MDA is the first evidence of significant altered antioxidant status in per pubertal children in both sexes, with referring to our results that the MDA level in boys students was appeared significantly higher ($p < 0.001$) when compared with other group from girls.

Though, To know the reasons for the results of our study when taking several parameters comparison between both sexes of primary schools, however, dietary analysis revealed that no showed significant differences in daily macronutrient and anti-oxidant intake between boys girls through the questionnaire submitted in studies to examine oxidative stress as MDA. it is critical that the criterion of similar macronutrient and groups is met it has been demonstrated that several nutritional interventions can affect not only the basal of oxidative stress indices and anti-oxidant molecules ^(24,25), but also their response to change the life style from where eating and food habits.

The other explanation , which we believe is the most important , as long as they are elementary school students tend to be reason able sports (exercise) and some events during the period of opportunity between every day subjects, our findings was

illustrated increased of MDA in boys, our justification may be due to more sports such as football and running furthermore, Muscle mass differences of boys compared with girls.

These findings indicate that acute exercise increased boy's blood oxidative stress, according to the information available to us through a review of references about this study, there is no other such information in juveniles has been previously reported. Moreover, the findings of some studies that have compared the adult male response to the oxidant challenge induced by acute exercise with that of the adult female response are scanty and conflicting ⁽²⁶⁾. Other researchers studies have reported that males are more vulnerable than females of the oxidant stress imposed by sports actions ⁽²⁷⁾.

On the other hand, it was observed that children who suffer from obesity observed that there is an increase in the levels of MDA, these alterations of MDA levels conceder the first evidence of a significant altered oxidant- antioxidant status in pre pubertal children affected by sever obesity. Past investigations have indicated that the mean MDA levels would high in obese individuals compared to non-obese, additionally demonstrated that obesity was associated with increases endogenous lipid peroxides ⁽²⁸⁾.

In conclusion, these data provide the evidence of blood pressure modulation by measurable oxidative stress – related parameters such as lipid profile and BMI comparable between boys and girls as students in primary school under study and contribute for the first time to the characterization of a functional dependence between these, so far seemingly unrelated parameters. Accordingly, oxidative stress might one day be considered as a novel therapeutic target for the therapy of essential metabolic cardiovascular syndrome and hypertension.

REFERENCES

1. **Freedman DS**, Perry G. Body composition and health status among children and adolescents. Preventive Medicine 2000;31:34-53.
2. **Castelli WP**, Garrison RJ, Wilson PW, Abbott RD, Kalousdian S, Kannel WB. Incidence of coronary heart disease and lipoprotein cholesterol levels. The Framingham Study. JAMA. 1986; 256: 2835-8.

3. **McNamara JR**, Campos H, Ordovas JM, Wilson PWF, Schaefer EJ. Effect of gender and lipid status on low density lipoprotein subfraction distribution: sresults from the Framingham Offspring Study. *Atherosclerosis*. 1987; 7: 483-90.
4. **American Heart Association**. Cholesterol and atherosclerosis in children. [cited 2006 Apr 4]. Available from: <http://www.americanheart.org/presenter.jhtml?identifier=4499>.
5. **Letllier G**, Desjarlais . Study of seasonal variations for eighteen biochemical parameters over a four-year period. *ClinBioch* 1982;15:206-11.
6. **Malik R**,PirzadoZA,AhmedS,SajidM,Study of lipid profile , blood pressure in rural population .*Pak J Med Res* 2014;34:155-4
7. **Eyre H**, Kahn R, Robertson RM, et al. Preventing cancer, cardiovascular disease, and diabetes: a common agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association. *Circulation*. 2004;109(25):3244-3255.
8. **Ford ES**, Ajani UA, Mokdad AH. The metabolic syndrome and concentrations of c-reactive protein among U. S. youth. *Diabetes Care*. 2005;28(4):878-881.
9. **Rio D.D.**, Stewart A.J., Pellegrini N. A review of recent studies on malondialdehyde as toxic molecule and biological marker of oxidative stress. *Nutr.Metab.Cardiovasc.dis*. (2005) 15:316.
- 10.**Sociedade Brasileira de Pediatria**. Adolescência, saúde e cidadania. [citado em 2006 dez 10]. Disponível em: http://www.cbalergiaped2006.sbp.show_item2.cfm?id.
- 11.**Moreno LA**, Pineda I, Rodriguez G *et al*. Leptin and metabolic syndrome in obese and non-obese children. *HormMetab Res* 2002; 34 : 394-399.
- 12.**Mansour AA**,Wanoose HL, Odaa AH. A three year cohort prospective hypertension and diabetes control study in Basrah. *J Diabetes* . 2011;2:2–0

13. **Muntner P**, He J, Cutler JA et al. Trends in blood pressure among children and adolescents. JAMA,. 2004; 291: 2107–2113.
14. **Freedman D**, Dietz W, Srinivasan S et al: The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study. Pediatrics, 1999; 103: 1175–1182.
15. **Ferranti A**,Gauvreau K, Ludwig D et al. Prevalence of metabolic syndrome in American adolescents. Findings from the third National Health and Nutrition Examination Survey. Circulation, 2004; 110: 2494–2497.
16. **Duncan GE**,Perri MG, Theriaque DW et al. Exercise training, without weight loss, increases insulin sensitivity and postheparin plasma lipase activity in previously sedentary adults. Diabetes Care, 2003; 26: 557–562.
17. **Barbara J M.**, and Clyde Park M T. *Assessment of Children, How to Use Repeated Measures of Body Mass Index (BMI) To Assess and Prevent Obesity in Children.* (2009): 1-19.
18. **Tolonen H**, Laatikainen T, Helakorpi S, et al. Marital status, educational level and household income explain part of the excess mortality of survey non-respondents. Eur J Epidemiol 2010;25:69–76.
19. **Chadha SL**,Tandon R, Shekhawat S, Gopinath N. An epidemiological study of blood pressure in school children (5–14 years) in Delhi. Ind Heart J 1999;51:178–82..
20. **Lessler JT**, Kalsbeek WD. Nonsampling error in surveys. New York: John Wiley & Sons, Inc., 1992. Anand NK, Tandon L. Prevalence of hypertension in school going children. IndPediatr 1996;33:377–81.
21. **Voors AW**, Foster TA, Freichs RR, et al. Studies of blood pressure in children aged 5-14 years in a total biracial community—The Bogalusa Heart Study. Circulation 1976;54:319–27.
22. **Prabhajot A**, Kaur N, Kumari K, Sidhu S. Variation in blood pressure among school children of Amritsar(Punjab). Anthropologist 2005;7:201–4.

- 23.Daniels SR**, Greer FR, Committee on Nutrition. Lipid screening and cardiovascular health in childhood. *Pediatrics*. 2008;122:198-208.
- 24.Yanik FF**, Amanvermez R, Yanik A, Celik C, Kokcu .A.; Preeclampsia associated with increased lipid peroxidation and decreased serum vitamin E levels. *Int J Gynecol Obstet*;64(1):27 – 33.
- 25.Box, W.**, Hill, S., and DiSilvestro, R.A. Soy intake plus moderate weight resistance exercise: effects on serum concentrations of lipid peroxides in young adult women. *J. Sports Med. Phys. Fitness*, 2005. **45**: 524–528. PMID:16446685.
- 26.McAnulty, S.R.**, McAnulty, L.S., Nieman, D.C., Morrow, J.D., Shooter, L.A., Holmes, S., Heward, C., and Henson, D.A. Effect of alpha-tocopherol supplementation on plasma homocysteine and oxidative stress in highly trained athletes before and after exhaustive exercise. *J. Nutr. Biochem*. 2005. **16**: 530–537. PMID:16115541.
- 27.Kaikkonen, J.**, Porkkala-Sarataho, E., Tuomainen, T.P., Nyyssonen, K., Kosonen, L., Ristonmaa, U., et al. Exhaustive exercise increases plasma/serum total oxidation resistance in moderately trained men and women, whereas their VLDL + LDL lipoprotein fraction is more susceptible to oxidation. *Scand. J. Clin. Lab. Invest*. 2002. **62**: 599–607. PMID:12564618.
- 28.Ilhan, N.**, Kamanli, A., Ozmerdivenlic, R., and Ilhana, N. Variable effects of exercise intensity on reduced glutathione, thiobarbituric-acid reactive substance levels, and glucose concentration. *Arch. Med. Res*. 2004. **35**: 294–300. doi:10.1016/j.arcmed. 2004.03.006. PMID:15325503.
- 29. Ahmad A**, Singhal U, Hossain MM, Islam N, Rizvi I. The role of the endogenous antioxidant enzymes and malondialdehyde in essential hypertension. *J ClinDiagn Res*. 2013 Jun;7(6):987-90.
- علاقة فرط الاكسدة ونمط الدهون مع ارتفاع ضغط الدم لدى طلاب المرحلة الابتدائية في محافظة ميسان - جنوب العراق

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الخلفية والاهداف: ضغط الدم من الامراض الاكثر شيوعا التي تسبب اضطراب في القلب والأوعية الدموية والذي يعتبر من الامراض التي تصيب مرحلة البلوغ ويؤدي بعض الاحيان الى الوفاة مع حدوث اخطار محتملة منذ البلوغ

تعتبر متلازمة امراض القلب والاعوية الدموية والتي هي تتضمن عدة عوامل منها امراض القلب ، السكري السكتة الدماغية، مقاومة الانسولين وارتفاع الدهون وضغط الدم الرئيسي

الهدف: تحديد العلاقة بين فرط الاكسدة المتمثلة بالمالون ثنائي الالدهايد وعوامل الخطورة التي تظهر لدى الاطفال بعمر ٨-١٢ سنة والتي تمثلت بمتلازمة القلب والاعوية الدموية في طلاب المدارس الابتدائية

منهجية البحث: تضمنت هذه الدراسة ٣٢٦ طالب مدرسة ابتدائية مقسم حسب العمر ما بين (٨-١٢ سنة) والجنس (طالب طالبة) فتمت المقارنة لبعض القياسات منها البشرية وهي الطول والوزن وطبيعة الاكل لحساب مؤشر كتلة الجسم . وكذا انماط الكوليستيرول والكليسيريدات الثلاثية والبروتينات الدهنية عالية الكثافة وواطئة الكثافة وواطئة الكثافة مع قياس المحدد الرئيسي في الدراسة هو ضغط الدم

النتائج: تم دراسة علاقة ارتباط بين الضغط الانبساطي والانقباضي مع العمر ومؤشر الكتلة لدى الطلبة فقد اظهرت النتائج ان الطالبات لديهن ارتفاع ملحوظ في قيم ارتفاع ضغط الدم كذلك اظهرت ارتفاع معنوي في مستويات مصل الكوليستيرول والكليسيريدات الثلاثية والبروتينات الدهنية الواطئة الكثافة وانخفاض معنوي في مستوى مصل البروتينات الدهنية عالية الكثافة من خلال المقارنة مع الطلبة الذكور.

اما بالنسبة الى لفرط الاكسدة فقد بينت النتائج وجود زيادة معنوية في مستوى الملون ثنائي الالدهايد لدى الطلبة الذكور في عينة الدراسة

الاستنتاجات: من خلال الدراسة نستنتج الارتباط في بعض المعايير السريرية منها العمر والجنس والطول والوزن ومستوى الدهون وضغط الدم في مرحلة البلوغ لدى الاطفال المدارس الابتدائية بعمر ٨-١٢ سنة. كذلك تضمن هذه الدراسة وضع برنامج للمسح او الفحص الفوري لتحديد وتعزيز الصحة المدرسية لتجنب بعض المضاعفات المستقبلية لمتلازمة القلب والاعوية الدموية ومخاطر ارتفاع ضغط الدم