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Penulis : **Mexitalia M**, Romadhona S

Corresponding author: Maria Mexitalia

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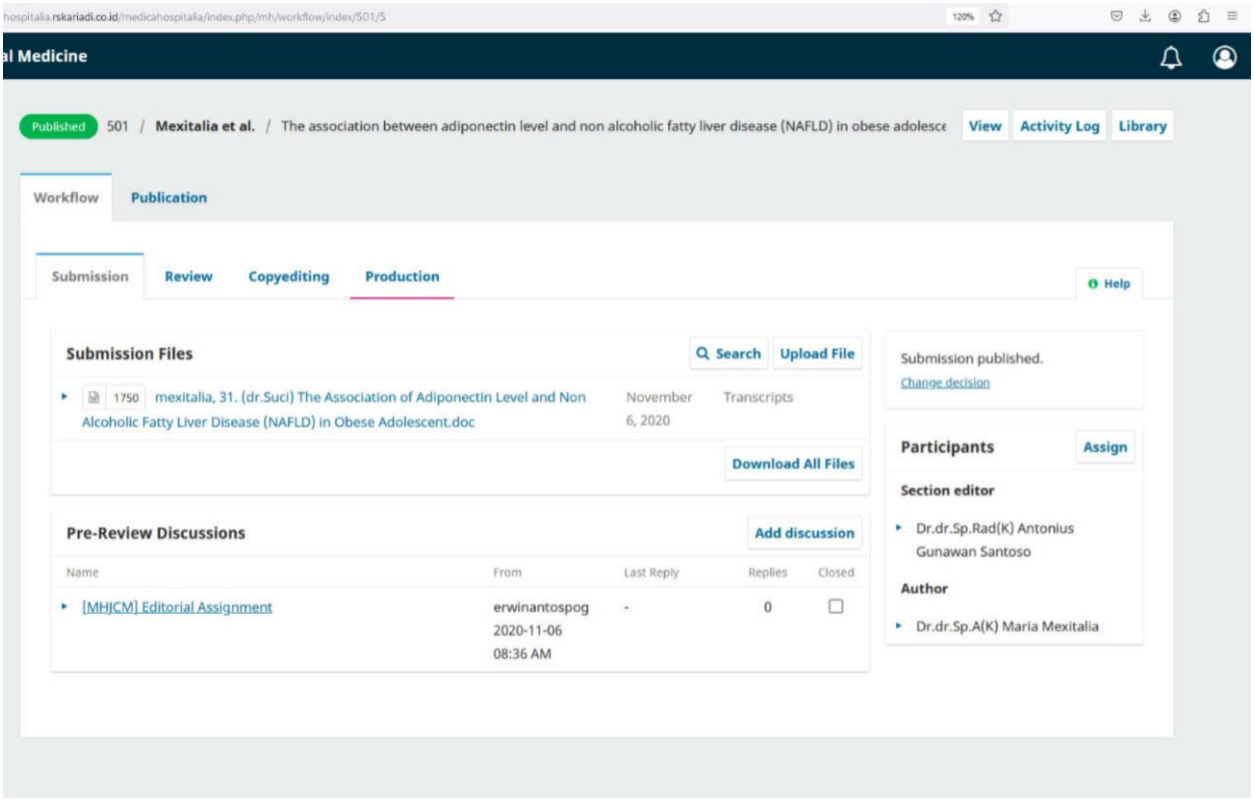

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Original Article

The association between adiponectin level and non alcoholic fatty liver disease (NAFLD) in obese adolescents

Maria Mexitalia[1], Suci Romadhona[1,2]

[1]Bagian / KSM Ilmu Kesehatan Anak Fakultas Kedokteran Universitas Diponegoro / RSUP Dr. Kariadi Semarang
[2]Direktorat Mutu Akreditasi Rumah Sakit Kementerian Kesehatan Republik Indonesia Jakarta

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Afiliasi Penulis:
Bagian / KSM Ilmu Kesehatan Anak
Fakultas Kedokteran Universitas Diponegoro/
RSUP Dr. Kariadi Semarang

Korespondensi Penulis:
Maria Mexitalia
Jl. Dr. Sutomo No. 16, Semarang,
Jawa Tengah 50244, Indonesia

E-mail:
dr.mexitalia@gmail.com

Abstract

Background : Non alcoholic fatty liver disease (NAFLD) has been associated with cytokines and inflammatory mediators. Adiponectin has insulin sensitizing effects and has correlation with severity of NAFLD disease. However, the study about the relationship between adiponectin level and NAFLD is lacking. The objective of the study was to determine the association between adiponectin level and NAFLD in obese adolescents through the role of insulin resistance.
Methods : This was a cross-sectional study, that was done in August 2007. The inclusion criteria were obese adolescents aged 11–14 years, and normal weight adolescent as control group. Adiponectin was assessed by using ELISA, insulin resistance was obtained by Homeostasis Model Assessment Insulin Resistance (HOMA-IR). NAFLD was confirmed by abdominal ultrasound, which represented by fatty liver imaging. The comparison of adiponectin level and HOMA-IR among 3 groups were analyzed by Kruskal Wallis test, meanwhile the correlation between adiponectin level and some variables were analyzed by Spearman correlation.
Results : There were 73 subjects, consisted of 37 obese and 36 non obese. Among obese subjects, 54.1% got NAFLD. All of our obese subjects were insulin resistance, the HOMA-IR level of obese non NAFLD was 6.1 and obese with NAFLD was 6.8. The adiponectin levels in normal children was (5.1g / ml), obese non NAFLD (4.1g / ml) and obese with NAFLD (4.0g / ml) (p <0.001). There were no association between adiponectin level and other variables.
Conclusions : There were significant differences of adiponectin levels and insulin resistance measured by HOMA-IR between normal and obese subjects, but no significant differences between the obese groups with or without NAFLD.

Keywords : NAFLD, adiponectin, HOMA-IR, obesity, adolescent

2. Tanggal 19 November 2019

Gmail

Maria Mexitalia <dr.mexitalia@gmail.com>

Hasil Review Dari Reviewer

1 message

Editors Medica Hospitalia <medica.hospitalia@yahoo.com> Tue, Nov 19, 2019 at 2:41 PM
To: Maria Mexitalia <dr.mexitalia@gmail.com>

Best Regards,

Medica Hospitalia
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RSUP Dr. Kariadi Semarang

3 attachments

31. (dr.Suci) The Association of Adiponectin Level_Reviewed by WW.doc
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The Association of Adiponectin Level and ~~Non~~ Non-Alcoholic Fatty Liver Disease (NAFLD) in Obese Adolescent

Maria Mexitalia[1], Suci Romadhona [1,2], ~~Maria Mexitalia[1]~~
Bagian / KSM Ilmu Kesehatan Anak Fakultas Kedokteran Universitas Diponegoro / RSUP Dr. Kariadi Semarang
Direktorat Mutu Akreditasi Rumah Sakit Kementerian Kesehatan Republik Indonesia Jakarta

ABSTRACT

Background: Recently, NAFLD has been associated with insulin resistance and hypoadiponectin. However, the study about the relationship ~~of~~ between adiponectin level and NAFLD is ~~lacking~~.

Objective: This research aims ~~T~~to determine the association between adiponectin level and NAFLD in obese adolescent and to determine the prediction of NAFLD by using adiponectin level and insulin resistance.

Methods: This study was a cross-sectional study, that was done in August 2007. The inclusion criteria were obese adolescents aged 11 to 14~~ years~~. Adiponectin was assessed using ELISA and was defined as hypoadiponectin by the level < 2,65 µg/ml. Insulin resistance was obtained by Homeostasis Model Assessment (HOMA > 3,16 mg/dl) which was calculated from blood glucose and fasting insulin. NAFLD was confirmed by abdominal Ultrasonography, which represented by Bright Liver imaging. The association between categorical variables was analyzed with Chi-square Test.

Result: There were 37 subjects, 26 (70,3%) boys and 11 (29,7%) girls. Twenty subjects (54.1%) had bright liver. Correlation test between adiponectin level and HOMA was ~~negatif~~ negative (r = -0,503 , *p*: 0,001). There were no significant association between hypoadiponectinemia and bright liver (*p*: 0,350). The prediction by discriminant analysis between adiponectin level and HOMA > -0,259 may predict NAFLD in the obese adolescent.

Conclusion: Hypoadiponectin was not associated with NAFLD in obese adolescents. Discriminant analysis between adiponectin level and HOMA > -0,259 may predict NAFLD in the obese adolescent.

Keywords: adiponectin, NAFLD, obesity, adolescent

Corresponding author
Dr. dr. Maria Mexitalia, SpA(K)
Email : dr. mexitalia@gmail.com

Commented [WW1]: Pertimbangan untuk tidak menggunakan banyak singkatan dalam abstract

Commented [WW2]: Apakah ini benar 2007 atau 2017?

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INTRODUCTION

Nonalcoholic fatty liver disease (NAFLD) represents a spectrum of disorders characterized by macrovesicular hepatic steatosis occurring in individuals without a relevant alcohol consumption. [1,2] There was increasing evidence that NAFLD often represents a component of the metabolic syndrome characterized by obesity, hyperinsulinemia, insulin resistance, diabetes, hypertriglyceridemia and hypertension, it was also correlated with ~~children~~ childhood obesity. [3,4,5] It was reported that 53% of obese children ~~has~~ have NAFLD. [6] NAFLD was confirmed by abdominal ultrasonography which was represented by bright liver imaging. Abdominal ultrasonography has 94% sensitivity and 84% specificity to detect NAFLD that described ~~-~~ increased echogenicity as a bright liver. [7,8] Adiponectin also known as Acrp30 is a 30kDa, the protein that is almost exclusively secreted from white adipose tissue, is a potent modulator of glucose and lipid metabolism and an indicator of metabolic disorders. Adiponectin gene expression and plasma levels correlated with the insulin sensistive state. Dysregulation in the synthesis and/or secretion from the adipose tissue may play a role in the pathogenesis of insulin resistance in obesity. Adiponectin level was lower in the obese children and had associated with insulin resistance, which was obtained by homeostasis model assessment (HOMA) equation. The homeostasis model assessment [(homeostasis model assessment) – insulin resistance = insulin/22.5$e^{-\ln(\text{glucose})}$]. [9,10,11] Obesity has emerged as a global epidemic in children with a spectrum of psychosocial and medical ~~consequenses~~ consequences manifesting a lifespan. Obesity is defined medically as a state of increased body weight more specifically adipose tissue of sufficient magnitude to produce adverse health consequences. Obesity develops when ~~only if~~ energy intake in the form of

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feeding chronically exceeds total body expenditure. Energy expenditure includes physical activity, basal metabolism and adaptive thermogenesis. [12,13]

The purpose of the study are to determine the association between adiponectin level and NAFLD in obese adolescent and to determine the prediction of NAFLD by using adiponectin level and insulin resistance.

METHODS

The study design was a cross-sectional study. The inclusion criteria were obese adolescents aged 11 to 14 years, which consists of 37 subjects (26 boys and 11 girls) of Private Junior High School in Semarang grade VIII in ~~august~~ August 2007. Informed consents were signed by subject's parents. Anthropometric measurements, weight (to the nearest 0,1 kg) were measured by BIA.TANITA BC 545 and height (to the nearest 0,1 cm) were measured by *microtoise* while the subjects were fasting and wearing only their undergarments. The waist circumference was measured at the level of the umbilicus (to the nearest 0,1 cm). All obese adolescents had a body mass index (BMI) greater than 95th percentile specific for age and sex, whereas nonobese adolescents had a BMI between the 50th and 75th percentiles. Fat percentage ~~were~~ was measured by BIA.TANITA BC 545. Three ~~mililiter~~ millilitre venous blood sample was taken after 8 hours of fasting for measuring adiponectin level, insulin level, fasting blood glucose level. Adiponectin level (µg/ml) was assessed using ELISA ELX 800 Universal Microplate Reader. Fasting blood glucose level (mg/dl)

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0,8).

~~Cutoff~~ The cutoff point for hypoadiponectin that caused NAFLD were analyzed using *Receiver Operator Curve* (ROC) with *Area Under the Curve* 0,982. Association between adiponectin and nonalcoholic fatty liver disease were analyzed using chi-square. Nonalcoholic fatty liver disease prediction ~~were~~ was analyzed using discriminate equation that consisted of adiponectin level and HOMA. Data analysis were done using *Statistics Program for Social Science* v.15,0. (SPSS Inc, USA). ~~P~~ P-value were considered significant if $p < 0,05$ with 95% confidence interval.

RESULTS

There were 37 subjects, 26 (70,3%) boys and 11 (29,7%) girls. This results showed that boys' adiponectin level was lower than girls'. Twenty ~~There were 37~~ subjects~~, 20~~ (54,1%) had NAFLD and 17 (45,9%) normal. This results showed that adiponectin level was lower, and HOMA was higher in NAFLD than normal, as seen in Table 1.

There was significant~~ly~~ correlation (p <0,05) adiponectin level and HOMA, as seen in Table 2. This results showed that low adiponectin level inversely related to high HOMA.

We analyzed the association between adiponectin level and NAFLD. There ~~were~~ was no association between hypoadiponectin and NAFLD ($p > 0,05$), as seen in Table 3.

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Variables	Adiponectin level (µg/ml)	
	r	*p*
1. Fasting blood glucose level (mg/dl)	-0,249	0,137
2. Insulin level (IU/L)	0,098	0,564
3. HOMA (mg/dl)	-0,503*	0,001

* *Pearson test*

Table 3. Chi-square test between adiponectin level and NAFLD

Variables	NAFLD	Normal	Total
Hypoadiponectin	1 (100%)	0 (0%)	1
Normal	19 (52,8%)	17 (47,2%)	36
Total	20	17	37

$X^2 = 0,000$ *p*: 0,35

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DISCUSSION

In this study, most boys were in the group of subjects. There was significant~~ly difference~~ different between boys and girls in adiponectin level. According to the other studies that also found that boys had more visceral fat mass therefore low adiponectin level mostly occurs in boys.[5]

Twenty subjects that had NAFLD. This study showed that adiponectin level was lower and HOMA was higher in NAFLD than normal. This result was similar ~~with~~ to other studies which ~~who~~ reported that NAFLD caused low adiponectin level and high insulin resistance that showed in HOMA.[14]

Commented [WW17]: Apakah ini incomplete sentence? Apakah maksudnya twenty participants found to have NAFDL in this research

This study was a moderately significant correlation between adiponectin and

3. Tanggal 26 Mei 2020

Gmail **Maria Mexitalia <dr.mexitalia@gmail.com>**

Revisi artikel NAFLD
1 message

Maria Mexitalia <dr.mexitalia@gmail.com> Tue, May 26, 2020 at 8:11 PM
To: Editors Medica Hospitalia <medica.hospitalia@yahoo.com>
Bcc: Maria Mexitalia <dr.mexitalia@gmail.com>

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Editor in - chief Medica Hospitalia

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Terimakasih

Mexitalia

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4. Tanggal 27 Mei 2020

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Original Article

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Bagian / KSM Ilmu Kesehatan Anak
Fakultas Kedokteran Universitas Diponegoro/
RSUP Dr. Kariadi Semarang

Korespondensi Penulis:
Maria Mexitalia
Jl. Dr. Sutomo No. 16, Semarang,
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Keywords : NAFLD, adiponectin, HOMA-IR, obesity, adolescent