

ملاحظات:



Relation between Severity of NAFLD and Insulin Resistance in Obese Children

Thesis

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By
Safaa Salama Farag
M.B.B.Ch

Under supervision of
Prof. Hamed Ahmed El khayat
Professor of Paediatric
Faculty of Medicine, Ain Shams University

Dr. Mohamed Tarif Hamza Sallam
Professor of Clinical Pathology
Faculty of Medicine - Ain Shams University

Dr. Heba Essam El kholy
Lecturer of Paediatric
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالَ

سَبَّحَانَكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْعَظِيمُ

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List of Contents

Title	Page No.
List of Tables	i
List of Figures	iii
List of Abbreviations.....	v
Introduction	1
Aim of the Work.....	3
Review of Literature	
Obesity	4
Metabolic Syndrome and Non Alcoholic Fatty Liver (NAFLD)	38
Subject and Methods.....	59
Results	69
Discussion	100
Summary	108
Conclusion	110
Recommendations	111
References	112
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	Secondary causes of pediatric obesity.....	9
Table (2):	Clues to underlying endogenous obesity.....	24
Table (3):	Laboratory screening in obese children	26
Table (4):	Stages of treatment for childhood obesity	29
Table (5):	Indications and contraindications for adolescent metabolic bariatric surgery	35
Table (6):	Waist-to-hip designation.....	64
Table (7):	Age and sex distribution among the study population (n=20).....	69
Table (8):	Anthropometric measurements distribution among the study population	71
Table (9):	WHR and WHtR distribution among the study population	73
Table (10):	Body composition analysis among the study population	74
Table (11):	Fasting GLUCOSE, fasting insulin and HOMA IR distribution among the study population	76
Table (12):	Distribution of NAFLD grades among the study population	77
Table (13):	Association between NAFLD grades and age and sex of the study population.....	79
Table (14):	Association between NAFLD grade and the anthropometric measurements of the study population	80
Table (15):	Association between NAFLD grade and WHR and WHtR of the study population	81

List of Tables Cont...

Table No.	Title	Page No.
Table (16):	Association between NAFLD grades and the body composition of the study population as regards Fat mass and body fat analysis%.	84
Table (17):	Association between NAFLD grades and Fasting Glucose level (mg/dl), Fasting insulin level (mIU/ml) and HOMA IR of the study population.	85
Table (18):	Correlation between WHR and WHtR and fasting insulin and fasting glucose, and HOMA IR of the study population.	89
Table (19):	Correlation between NAFLD Grades and age and anthropometric measurements of the study population.	94
Table (20):	Correlation between NAFLD Grades and WHR and WHtR of the study population.	95
Table (21):	Correlation between NAFLD Grades and the body composition of the study population as regards fat mass and body fat analysis.	97
Table (22):	Correlation between NAFLD Grades and Fasting Glucose level (mg/dl), Fasting Insulin Level (mIU/ml) and HOMA IR of the study population.	97

List of Figures

Fig. No.	Title	Page No.
Fig. (1):	Ranking of Middle East and North Africa (MENA) countries by prevalence of overweight and obesity.....	5
Fig. (2):	Comorbidities of obesity.....	17
Fig. (3):	Schematic summary of the complications of childhood obesity.....	18
Fig. (4):	Diagnostic algorithm for approach forwards childhood obesity.....	25
Fig. (5):	A, Sleeve gastrectomy, B, Roux-en-Y gastric bypass, C, Adjustable gastric band.....	36
Fig. (6):	Obesity-mediated insulin resistance and associated complications.....	43
Fig. (7):	Pathophysiology of non-alcoholic fatty liver disease (NAFLD), cause and consequences of which resemble those of metabolic syndrome.....	49
Fig. (8):	Algorithm for management of suspected NAFLD.....	57
Fig. (9):	Mechanical weight scale ZT-160.....	61
Fig. (10):	Stadiometer seca 217.....	62
Fig. (11):	Waist measurement in child.....	63
Fig. (12):	Body composition scale: Tanita SC 330 (Japan).....	65
Fig. (13):	Pie chart of the age distribution among the study population.....	70
Fig. (14):	Pie chart of the sex distribution among the study population.....	70
Fig. (15):	Histogram of WHR and WHtR distribution among the study population.....	73
Fig. (16):	Pie chart of body fat analysis% distribution among the study population.....	74

List of Figures Cont...

Fig. No.	Title	Page No.
Fig. (17):	Pie chart of HOMA IR distribution among the study population.	76
Fig. (18):	Pie chart of NAFLD grades distribution among the study population.....	78
Fig. (19):	Association between NAFLD grades and WHR of the study population.....	82
Fig. (20):	Association between NAFLD grades and WHtR of the study population.....	83
Fig. (21):	Association between NAFLD grades and fasting Glucose level in the study population	86
Fig. (22):	Association between NAFLD grades and fasting insulin level in the study population.....	87
Fig. (23):	Association between NAFLD grades and HOMA IR of the study population.....	88
Fig. (24):	Correlation between WHR and fasting insulin.	90
Fig. (25):	Correlation between WHR and HOMA IR.....	91
Fig. (26):	Correlation between WHtR and fasting insulin.	92
Fig. (27):	Correlation between WHtR and HOMA-IR.....	93
Fig. (28):	Correlation between NAFLD Grade and WHR	95
Fig. (29):	Correlation between NAFLD Grade and WHtR.....	96
Fig. (30):	Correlation between NAFLD Grade and Fasting insulin level.	98
Fig. (31):	Correlation between NAFLD Grade and HOMA IR.....	99

List of Abbreviations

Abb.	Full term
AAP.....	American Academy of Pediatrics
AGB	Adjustable gastric band
ALT.....	Alanine aminotransferase
ARFI.....	Acoustic radiation force impulse
ASMBS	American Society for Metabolic and Bariatric Surgery
AST	Aspartate aminotransferase
BFM.....	Body Fat Mass
BMI.....	Body mass index
CDC	Centers for disease control and prevention
CHD.....	Coronary heart diseases
cIMT	Carotid intima-media thickness
CK-18.....	Cytokeratin 18
DNL	De novo lipogenesis
FBG	Fasting blood glucose
FDA	Food and Drug Administration
FFA.....	Free fatty acids
FINS	Fasting insulin
GBD.....	Global burden of disease
GDM	Gestational diabetes mellitus
HOMA-IR	Homeostatic model assessment for insulin resistance
Ht.....	Height
IR	Insulin resistance
Wt	Weight
IRS.....	Insulin receptor substrate
LFTs	Liver function tests
LSG.....	Laparoscopic sleeve gastrectomy
MAFLD.....	Metabolic (dysfunction) associated fatty liver disease

List of Abbreviations Cont...

Abb.	Full term
MBS.....	Metabolic and bariatric surgery
MENA.....	Middle East and North Africa region
MetS	Metabolic syndrome
MI	Motivational interviewing
MS.....	Metabolic syndrome
NAFLD	Non Alcoholic fatty liver disease
NASH	Non alcoholic steatohapatits
NCHS	National Centre for Health Statistics
NEFAs	Non Esterified Fatty Acids
NRC	National Research Centre
HOMA IR	Homeostasis model assessment of insulin resistance
OSA.....	Obstructive sleep apnea
PNFI	Pediatric NAFLD Fibrosis Index
QOL	Quality of life
QUICKI	Quantitative insulin sensitivity check index
RYGP	Roux-en-Y gastric bypass
SCFE	Slipped capital femoral epiphysis
T2DM.....	Type 2 Diabetes Mellitus
TG.....	Triglycerides
TNFa	Tissue necrosis factor
USPSTF.....	US Preventive Task Force
WC	Waist circumference
WHO	World Health Organization
WHR	Waist to hip ratio
WHtR.....	Waist to height ratio

INTRODUCTION

Childhood obesity become a serious public health problem nowadays as its prevalence rate has doubled the last three decades (GBD 2015) became 5% of children worldwide (*Ng et al., 2013*), the rate is rising and the onset become at younger age (*WHO, 2016*).

Obesity is the main risk factor of insulin resistance and type 2 diabetes in children (*Ben-Sefer et al., 2009*), it also increase the risk for developing hypertension, dyslipidemia, heart disease, gall stones, osteoarthritis, respiratory problems and certain types of cancer. Obesity and its related health problems are also preventable (*WHO, 2016*).

Obesity can be defined as excess body fat and diagnosed by BMI from 2 years age and older (*WHO, 2016*), it is calculated by the ratio of weight to height (kg/m^2) (*Berger & Kathleen, 2014*), childhood obesity defined as BMI at or above 95th percentile for children of same age and sex (*CDC, 2009*).

Although genetic is the most important cause of obesity (*Anderson and Butcher, 2006*), it needs environmental and behavioral factors to affect body weight (*CDC, 2010*). Excessive food energy and sedentary lifestyle is the cause of most obesity cases (*Lau et al., 2007*).

Childhood obesity leads to many metabolic complications like insulin resistance, glucose intolerance and type 2 diabetes (*Weiss & Kaufman, 2008*).

Insulin resistance (IR) is a pathological condition in which all of the body cells don't respond well to insulin (*American Diabetes Association, 2014*). It's usually undiagnosed until leading to type 2 diabetes (*Chiu et al., 2007*).

Non alcoholic Fatty liver is a condition in which abnormal fat accumulates in liver and the cause is not alcohol intake (*Chalasani et al., 2018*). It's usually associated with insulin resistance and obesity (*Tilg et al., 2017*) and it's the commonest chronic liver disease in pediatrics (*Molleston et al., 2014*).

Early onset type 2 diabetes usually associated with insulin resistance and obesity. Nonalcoholic fatty liver is considered also a risk factor for type 2 diabetes (*Bedogni et al., 2012*).

The severity of fatty liver have positive relationship with HOMA index, FBS, fasting insulin and direct relationship with BMI (*Saki and Karamizadeh, 2014*).

AIM OF THE WORK

Study the relationship between the severity of fatty liver and insulin resistance.

Chapter 1

OBESITY

Definition of childhood obesity

Obesity is defined as accumulation and storage of excess body fat leading to negative effect on health (*WHO, 2016*).

Obesity is mainly diagnosed by **BMI** (body mass index) which is a replacement marker for body fat measured by dividing the body weight in kilograms to height in meters squared (kg/m^2) (*Freedman & Sherry, 2009*). BMI has no constant value it changes with age it decreases between 4 and 6 years of age followed by rebound increase during adolescence (*Lo et al., 2013*), so we use the centers for disease control and prevention (CDC) growth charts for age and sex-specific BMI for children older than 2 years of age (*Styne et al., 2017*).

Childhood obesity is diagnosed if BMI is greater or at 95th percentile for age and sex (*Styne et al., 2017*)

Prevalance:

Childhood obesity became a worldwide epidemic, 39 million children under 5 worldwide were overweight or obese in 2020, and over 340 million children and adolescents aged 5-19 were overweight or obese in 2016 (*WHO, 2021*).