بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / هناء محمد علي

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات: ....

Relation between Severity of NAFLD and Insulin Resistance in Obese Children

Thesis

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Safaa Salama

List of Contents

List of Tables

List of Tables Cont...

List of Figures

List of Figures Cont...

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 prevelance 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 4and 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 95^{th} percentile for age and sex ***(Styne et al., 2017)***

Prevelance:

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).***