بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

MONA MAGHRABY

Association of Glycosylated Hemoglobin levels with Insulin Resistance in adolescent among medical students Ain Shams University

Thesis

Submitted for Partial Fulfillment of Master Degree in Clinical Nutrition

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List of Abbreviations

Abbr.	Full term
ACCORD trial	Action to Control Cardiovascular Risk in Diabetes
AGIs	α-Glucosidase Inhibitors
BMI	Body Mass Index
EAG	Estimated Average Glucose
DCCT	Diabetes Control and Complications Trial
DPP-4	Dipeptidyl Peptidase-4
FDA U.S.	Food and Drug Administration
FSIVGTT	Frequently Sampled Intravenous Glucose Tolerance Test
GCKR	Glucokinase Regulatory Protein
GDM	Gestational Diabetes Mellitus
GI	Gastro Intestinal
GIR	Glucose Infusion Rate
GLP-1	Glucagon-Like Peptide 1
GLUT 4	Glucose Transporter 4
HDL	High Density Lipoprotein
HGBA1c	Glycated Hemoglobin
HOMA IR	Homeostatic Model Assessment for Insulin Resistance
HPL	Human Placental Lactogen
IFCCHL	International Federation of Clinical Chemistry and Laboratory Medicine
IGFBP-1	Insulin-like Growth Hormone Binding Protein-1
IGFI	Insulin Growth Factor
IRS1	Insulin Receptor 1
IST	Insulin-Suppression Test
IVGTT	Intravenous Glucose Tolerance Test
LDL	Low Density Lipo protein
NAFLD	Non Alcoholic Fatty Liver Disease
NAT2	N-AcetylTransferase 2
NGT	Normal Glucose Tolerance
OGTT	Oral Glucose Tolerance Test
PUFA	Polyunsaturated Fatty Acid Polyunsaturated Fatty acids
QUICKI	Quantitative Insulin Sensitivity Check Index
RPL	Recurrent Pregnancy Loss
SGLT2	Sodium-Glucose Cotransporter 2
SSPG	Steady-State Plasma Glucose
T1D	Type 1 Diabetes Mellitus
T2D	Type 2 Diabetes Mellitus
TG	Triglycerides
TNF	Tumor Necrosis Factor
TZDs	Thiazolidinediones
US	United States
W\H	Waist Hip Ratio

INTRODUCTION

Insulin resistance is when cells in muscles, fat, and liver don't respond well to insulin and can't easily take up glucose from blood. As a result, pancreas makes more insulin to help glucose enter cells. As long as pancreas can make enough insulin to overcome cells' weak response to insulin, blood glucose levels will stay in the healthy range. ***(Marathe et al., 2017)***

Insulin resistance is a common pathway for the development of glucose metabolism disorders and high blood pressure, all of which are components of the metabolic syndrome. ***(Heianza et al., 2012)***

The earlier onset of obesity may cause a longer period of insulin resistance, which may explain the concomitant earlier onset of impaired glucose tolerance in young Over weight people and adolescents so insulin resistance has been implicated as risk factor for metabolic disorders and it is of real importance to develop simple test that can be used in routine clinical setting for identifying insulin resistant individuals in advance so ,HOMA-IR(Homeostatic Model Assessment for Insulin Resistance) and HbA1c(glycated

haemoglobin) screening to identify young at high risk for insulin resistance and diabetes at an early stage. ***(Borai et al., 2011)***

"Screening for type 2 diabetes to reduce the lead time between diabetes onset and clinical diagnosis". ***(Herman et al., 2015)***

Major benefits are likely to occur from the early diagnosis and treatment of glycemia and cardiovascular risk factors in type 2 diabetes. The intensity of glucose, blood pressure, and cholesterol treatment after diagnosis is less important than the time of its initiation. ***(Valerio et al., 2006)***

AIM OF THE WORK

The main aim to evaluate the association of HOMA-IR (Homeostatic Model Assessment of Insulin Resistance) and HbA1c levels in overweight and non-overweight young medical students to assess insulin resistance, a condition that can cause diabetes mellitus and metabolic syndrome in earlier life.

Insulin

Insulin is a hormone that allows glucose to enter cells which also reduces blood glucose (blood sugar). Insulin is released by the pancreas in response to carbohydrates consumed in the diet. ***(Deng et al., 2017)***

Insulin resistance

Definition of insulin resistance

Insulin resistance (IR) is a pathological condition in which cells fail to respond normally to the hormone insulin, where the same amount of insulin does not have the same effect on glucose transport and blood sugar levels***(Lawson and Lawrence, 2019)***

Risk factors of insulin resistance

1-Lifestyle Factors

Dietary factors likely contribute to insulin resistance, this include foods high in sugar with high glycemic indices, high in dietary fat and fructose, low in omega-3 and fiber and hyper-palatable which increases risk of overeating. Overconsumption of fat- and sugar-rich meals and beverages have been proposed as a fundamental factor behind the metabolic syndrome epidemic.***(Scinta et al., 2017)***

It is hypothesized that increasing cell membrane fluidity by increasing PUFA(polyunsaturated fatty acids) concentration might result in an enhanced number of insulin receptors, an increased affinity of insulin to its receptors, and reduced insulin resistance.***(Saini and Keum, 2018)***

Vitamin D deficiency has also been associated with insulin resistance. ***(Moschonis et al., 2018)***

Sedentary lifestyle increases the likelihood of development of insulin resistance. ***(Fareed et al., 2017)***

Studies have consistently shown that there is a link between insulin resistance and circadian rhythm, with insulin sensitivity being higher in the morning and lower in the evening. A mismatch between the circadian rhythm and the meals schedule, such as in circadian rhythm disorders, may increase insulin resistance. ***(Jan et al., 2018)***

2-Medications

Some medications are associated with insulin resistance including corticosteroids, protease inhibitors (type of HIV medication), and atypical antipsychotics. ***(Burghardt et al., 2018)***

3-Hormones