# THE EFFECT OF OBESITY ON THE PREVALENCE OF SKIN DISEASES

Thesis
Submitted for partial fulfillment of

**Master Degree**
of
**Dermatology, Venereology and Andrology**

**By**

**Hisham Mohamed Nagib Melegy Shabaiek**
M.B.,B.CH.

## Supervised By

**Prof.Dr.Faisal Abdelaziz Hasan**
Professor of Dermatology,Venereology and Andrology
Faculty of Medicine-Alazhar University

**Ass.Prof.Dr.Abd Elraouf Mohamed Almohsen**
Assistant Professor of Dermatology,Venereology And Andrology
Faculty of Medicine-Alazhar University

**Prof.Dr.Raed Mohamed Alazab**
Professor of Community Medicine and Occupational Medicine
Faculty of Medicine Alazhar University

**Faculty of Medicine**
**Alazhar University**
**2014**

# Acknowledgment

I wish first to thank God Allah for helping me to complete this work.

I would like to express my deepest thanks and gratitude to **Prof. Dr. Faisal Abdelaziz Hasan,** Professor of Dermatology, Venereology and Andrology, Faculty of Medicine, Alazhar University for his valuable advice, guidance and constructive criticism, also for the invaluable assistance and efforts he devoted in the supervision of this study.

I would specially like to thank **Ass. Prof. Dr. Abd Elraouf Mohamed Almohsen,** Assistant Professor of Dermatology, Venereology and Andrology, Faculty of Medicine, Alazhar University, for his friendly careful supervision and for his continuous support to achieve an elaborate output.

I would like to thank the sincere help, guidance and supervision of **Prof. Dr. Raed Mohamed Alazab,** Professor of Community Medicine and Occupational Medicine, Faculty of Medicine, Alazhar University.

# LIST OF CONTENTS

**Chapter** **Page**

# LIST OF TABLES

# LIST OF FIGURES



**Figure** **Page**

# LIST OF ABBREVIATION

**AN** : Acanthosis Nigricans

**APOA2** :Apolipoprotein A-II

**ARC** :Arcuate nucleus

**BAT** : Brown adipose tissue

**BMI** : Body mass index

**CART** : Cocaine- and amphetamine-regulated transcript

**CCK** : Cholecystokinin

**CDC** : Center for Disease Control

**CHD** : Coronary heart disease

**CVD** : Cardio vascular diseases

**DES** : Daily Energy Supply

**EGFR** : Epidermal growth factor receptor

**FAO** : Food and Agriculture Organization

**FFA** : Free fatty acids

**FGFR** : Fibroblast growth factor receptor

**FTO** : Fat mass and obesity associated

**GDP** : Gross domestic product

**GLP-1** : Glucagon-like peptide 1

**GNP** : Gross national product

**GOAT** : Ghrelin O-acetyltransferase

**GWAS** : Genome-wide association studies

**IGF** : Insulin-like growth factor

**IL-6** : Interleukin-6

**IR** : Insulin receptor

**LEPR** :Leptin receptor

**LH** : Lateral hypothalamus

**MAF** :Musculoaponeurotic fibrosarcoma

**MCR** :Melanocortin receptors

**MM** :Malignant melanoma

**MSH** : Melanocyte stimulating hormones

**NCD** :Noncommunicable diseases

**NHANES** : National Health and Nutrition Examination Surveys

**NHLBI** : National Heart, Lung, and Blood Institute

**NMSCs** :Nonmelanoma skin cancers

**NPC1** :Niemann-Pick C1

**NPY** : Neuropeptide Y

**POMC** :Proopiomelanocortin

**PSU** :Pilosebaceous unit

**PTER** :Phosphotriesterase-related

**PWS** :Prader-Willi syndrome

**PYY** : Peptide YY

**RCA** :Retrochiasmatic area

**SES** :Socioeconomic status

**SNP** : Single nucleotide polymorphisms

**STs** : Skin tags

**TGF-α** : Transforming growth-factor

**TNF-α** : Tumor necrosis factor-α

**UK** : United Kingdom

**US** : United States

**USA** : United States of America

**VMH** : Ventromedial hypothalamus

**WAT** : White adipose tissue

# INTRODUCTION

Overweight and obesity are two problems have been recognized worldwide as a major health problems, they affects all ages and have many negative health effects **(Yosipovitch et al., 2007).**

In United States, the estimated prevalence of being overweight which is defined as a body mass index (BMI) equal to (25-29.9kg/$m^2$) and obesity which is defined as a body mass index (BMI) higher or equal to (30kg/$m^2$), combined is 68% and obesity alone is 33.8% **(Flegalet al., 2010),** in Brazil prevalence of overweight is 43.3% and obesity is 13% **(Bozaet al., 2010).**

Overweight and obesity may result from both environmental and genetic factors, based on previous studies, approximately 60% to 70% of the variance in (BMI) can be attributed to environmental and 30% to 40% of variance in (BMI) can be attributed to genetics, dietary choices, socioeconomic status, and behavioral factors, such as inactivity, are all important factors in overweight and obesity **(Sunyer, 2002).**

It is widely recognized that overweight and obesity increase the risk of coronary heart disease, hypertension, hyperlipidemia, osteoarthritis, diabetes and metabolic diseases **(Lenz et al., 2009).**

Overweight and obesity are also known to be directly related to increased risk of sleep apnea, musculoskeletal disorders; severe pancreatitis; urinary incontinence; and idiopathic intracranial hypertension **(Pender and Pories, 2005).**

Overweight and obesity are implicated in a wide spectrum of dermatological diseases **(Schienfeld, 2004 and Tyler et al., 2002)**, including

striae distensae, planter hyperkeratosis, acanthosis nigricans, keratosis pilaris, skin tags, intertrigo, and an increased risk of skin infections **(Hidalgo et al., 1999)**, however, it may also be associated with poor wound healing, and increase of risk of inflammatory dermatoses, such as psoriasis **(Guidaet al., 2010 and AL-Mutairi, 2011).**

# AIM OF THE WORK

The aim of this study is to:

1- Determine the more prevalent skin diseases among the studied overweight and obese patients.

2- Find out if overweight and obesity are risk factors for skin diseases among the studied patients.

# REVIEW OF LITERATURE

## 1. Obesity

### 1.Definition:

The World Health Organization (WHO) defines overweight and obesity as "abnormal or excessive fat accumulation that may impair health" Body mass index (BMI) – the weight in kilograms divided by the square of the height in meters ($kg/m^2$) – is a commonly used index to classify overweight and obesity in adults, WHO defines overweight as a BMI equal to or more than 25, and obesity as a BMI equal to or more than 30 (Table 1) **(WHO, 2012).**

But measuring body composition (eg. percent body fat) methods such as dual-energy x-ray absorptiometry scanning, new infrared interactance, bioelectrical impedance analysis, and hydrostatic (underwater) weighing can produce accurate estimates of body fat, but cost high **(Flegal et al .,2009) .**

**Table (1): WHO classification of obesity (WHO, 2012):**

| BMI classification | |
|---|---|
| Underweight | < 18.5 |
| Normal range | 18.5 - 24.9 |
| Overweight | ⩾ 25.0 |
| *Preobese* | 25.0 - 29.9 |
| Obese | ⩾ 30.0 |
| *Obese class I* | 30.0 - 34.9 |
| *Obese class II* | 35.0 - 39.9 |
| *Obese class III* | ⩾ 40.0 |

Overweight in children is defined as a body mass index at or above the 85$^{th}$percentile and lower than the 95$^{th}$ percentile for children of the same age and gender, obesity in children is defined as a body mass index at or above

the 95th percentile for children of the same age and gender (Figure 1)**(Freedman and sherry,2009).**

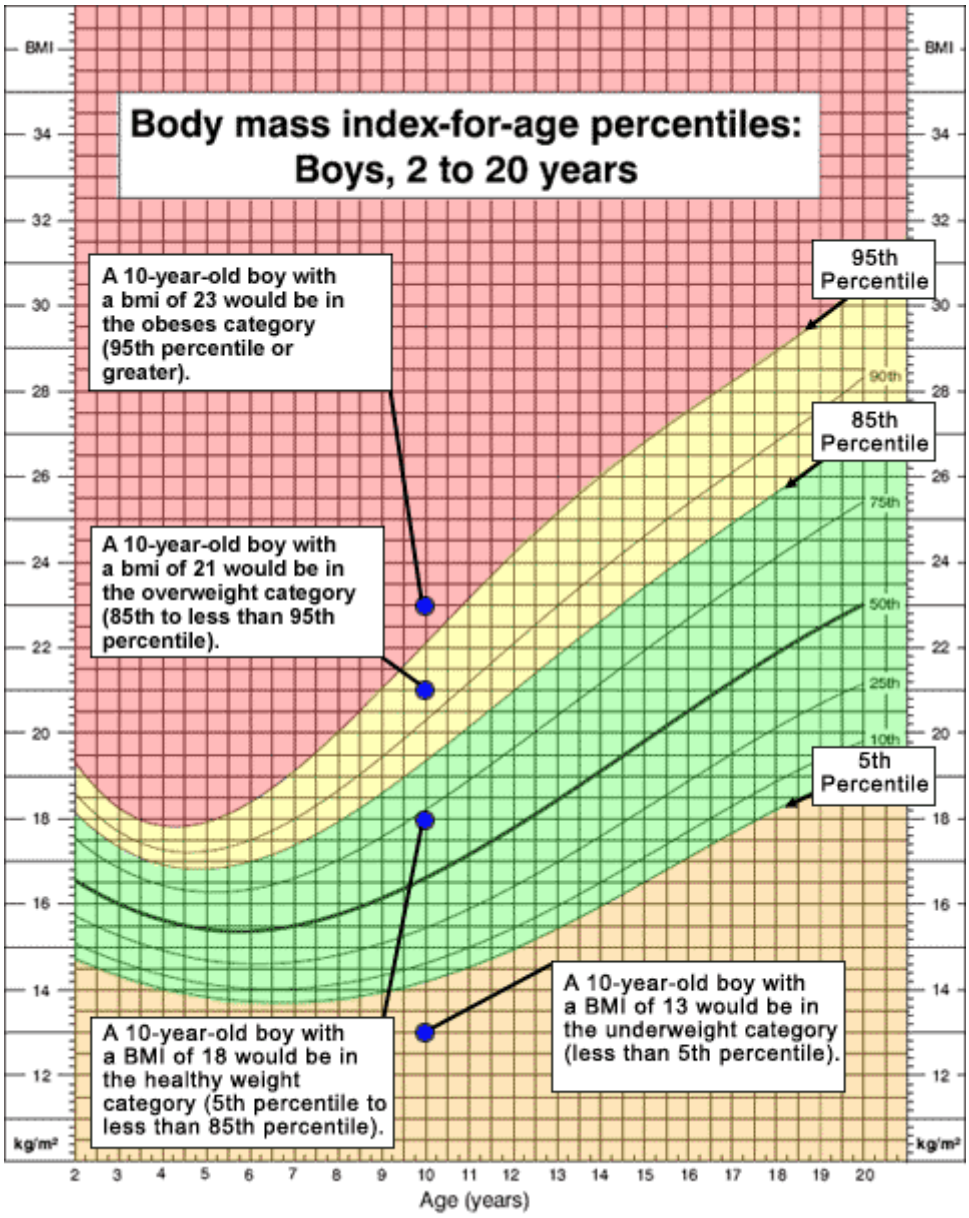


**Figure (1):** Body mass index- for-age percentiles **(Freeman and sherry, 2009).**

Waist measurements may also be relevant, generally if two people have the same BMI, the one with the bigger waist measurement is more likely to develop health problems as a result of being overweight, for men, the chance of developing health problems is higher if someone has a waist measurement

is more than 94 cm (37 inches), and higher still if it is more than 102 cm (40 inches), for women, the chance of developing health problems is higher if someone has a waist measurement of more than 80 cm (31.5 inches), and higher still if it is more than 88 cm (34.5 inches). Waist circumference correlates more closely with body fat among men, but BMI correlates better with body fat among women **(Flegal et al ., 2009) .**

However, alternative measures that reflect abdominal adiposity, such as waist circumference and waist to hip ratio have been suggested as being superior to body mass index in predicting CVD risk. This is based largely on the rationale that increased visceral adipose tissues is associated with arrange of metabolic abnormalities including adverse lipid profiles which is risk factor for CVD **(Huxley et al., 2010).**

## 2. Epidemiology

### A. Prevalence:

In 2008, more than 1.4 billion adults were overweight and more than half a billion were obese, at least 2.8 million people each year dies as a result of being overweight or obese, the prevalence of obesity has nearly doubled between 1980 and 2008, once associated with high-income countries, obesity is now also prevalent in low- and middle-income countries **(WHO, 2012).**

One estimate, which is a recent analysis of new data shows is an underestimate, predicted that in 2030 an estimated 2.16 billion adults worldwide will be overweight and 1.12 billion will be obese **(Kastorini et al., 2011).**

Approximately 100 million adults in the United States are at least overweight or obese, including approximately 35% of women and 31% of

men older than age 19 years, the numbers among children are even more imposing than these figures, although the 2009-2010National Health and Nutrition Examination Surveys updates on the United States obesity prevalence rates surprisingly show a leveling-off of obesity in children **(Ogden et al., 2012).**

During the past 20 years, the prevalence of obesity and overweight has increased sharply for adults in the United States. Data from 2 National Health and Nutrition Examination Surveys (NHANES) show that among adults aged 20-74 years, the prevalence of obesity increased from 15% (in the 1976-1980 survey) to 32.9% (in the 2003-2004 survey), according to the US Center for Disease Control and Prevention (CDC), after a quarter century of increases, obesity prevalence has not measurably increased in the past few years but levels are still high—in 2007, at 34% of US adults aged 20 and older **(Yaemsiri et al .,2011).**

There are over twenty larger countries with half of the adults overweight and obese and a large number of smaller islands that also fit in this category, at the upper level of overweight and obesity are the UK, Australia and the USA among high-income countries and Mexico, Egypt and South Africa among lower- and middle-income countries **(Popkin, 2010).**

Obesity has become an epidemic in many parts of the world. The World Health Organization has warned of the escalating epidemic of obesity that could put the population in many countries at risk of developing noncommunicable diseases (NCD), available studies in Eastern Mediterranean countries indicate that obesity has reached at an alarming level among both children and adults, consequently, the incidence of (NCD) is also