

Prevalence of overweight and obesity among primary school children in Port Said city

Thesis

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By

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List of Abbreviations

BMI.	<i>Body Mass Index.</i>
DXA.	<i>Dual-Energy X-ray Absorptiometry.</i>
FM.	<i>Fat Mass.</i>
WHR.	<i>The waist-to-hip ratio.</i>
WC.	<i>Waist Circumference.</i>
SFT.	<i>Skin Fold Thickness.</i>
BMC.	<i>Bone Mineral Content.</i>
BIA.	<i>Bioelectrical Impedance Analysis.</i>
EMR.	<i>Eastern Mediterranean Region.</i>
ADP.	<i>Air-Displacement Plethysmography.</i>
NHANES.	<i>The National Health and Nutrition Examination Study.</i>
SGA.	<i>Small for Gestational age.</i>
SES.	<i>Socio Economic Status.</i>
MAOIs.	<i>Monoamine Oxidase Inhibitors.</i>
TSH.	<i>Thyroid Stimulating Hormone.</i>
PTH.	<i>Parathormon Hormone.</i>
POMC.	<i>Pro-Opiomelanocortin.</i>
PC1.	<i>Proconvertase.</i>
MC4R.	<i>Melanocortin 4 Receptor.</i>
CNS.	<i>Central Nervous System.</i>
GHS-R.	<i>Growth Hormone Secretagogue Receptor.</i>
Arc.	<i>Arcuate Nucleus.</i>
NPY.	<i>Neuropeptide Y.</i>
CCK.	<i>Cholecystokinin.</i>
NAFLD.	<i>Nonalcoholic Fatty Liver Disease.</i>
GLP-1.	<i>Glucagon-like peptide 1.</i>
IL-6.	<i>Interleukin 6.</i>
TNF.	<i>Tumor Necrosis Factor.</i>
HDL.	<i>High-Density Lipoprotein.</i>
HRQOL.	<i>Health-Related Quality of Life.</i>
IGTT.	<i>Impaired Glucose Tolerance.</i>
CAD.	<i>Coronary Artery Disease.</i>
VLDL.	<i>Very-Low-Density Lipoprotein.</i>
IDL.	<i>Intermediate-Density Lipoprotein.</i>

List of abbreviations

TG.	<i>Triglycerides.</i>
LDL.	<i>Low-Density Lipoprotein.</i>
IGFBPs.	<i>Insulin-Like Growth Factor Binding Proteins.</i>
PCOS.	<i>Polycystic Ovary Syndrome.</i>
OSA.	<i>Obstructive Sleep Apnea.</i>
IGF.	<i>Insulin-Like Growth Factor.</i>
AGB.	<i>Adjustable Gastric Banding.</i>
RYGB.	<i>Roux-en-Y Gastric Bypass.</i>
WHO.	<i>World Health Organization.</i>
NCD.	<i>Non-Communicable Diseases.</i>

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Abstract

This is a descriptive cross-sectional study that was carried out at Port Said city during the second term of school year 2010/2011 to estimate the prevalence of overweight/obesity among school children aged 6-12 years and to investigate the relationship between BMI (Body Mass Index) and both socioeconomic status and life style factors.

After having the parents consent, eight hundred and fifty two students participated in this study. The researcher took the anthropometric measurements inside the nurse room into the school and gave the questionnaire to the students to be answered by one of child's parents.

The questionnaire was separated into two sections; first section included the anthropometric measurements, the second section included questions related to socioeconomic status, life style (physical activity and eating habits) and family history of overweight and obesity.

In this study, prevalence of overweight and obesity was found to be 17.7% and 13.5% respectively among the study sample.

Socio economic class, faulty dietary habits, sedentary life, low level of physical activity and positive family history of overweight and/or obesity were significantly correlated with student's BMI.

Key words :- Obesity – Overweight – Prevalence rate – Port said city - School aged children

Introduction

Childhood obesity has reached epidemic levels in developed countries. Twenty five percent of children in the US are overweight and 11% are obese. About 70% of obese adolescents grow up to become obese adults (Nicklas TA. et al., 2001). In some European countries such as the Scandinavian countries the prevalence of childhood obesity is lower as compared with Mediterranean countries; nonetheless, the proportion of obese children is rising in both cases (Livingstone MB., 2001).

The highest prevalence rates of childhood obesity have been observed in developed countries, however, its prevalence is increasing in developing countries as well. The prevalence of childhood obesity is high in the Middle East, Central and Eastern Europe (James PT., 2004).

Although the mechanism of obesity development is not fully understood, it is confirmed that obesity occurs when energy intake exceeds energy expenditure. There are multiple etiologies for this imbalance, hence, and the rising prevalence of obesity cannot be addressed by a single etiology. Genetic factors influence the susceptibility of a given child to an obesity-conducive environment. However, environmental factors, lifestyle preferences, and cultural environment seem to play major roles in the rising prevalence of obesity worldwide (Hill JO. and Peters JC.1998 & Grundy SM. 1998).

In a small number of cases, childhood obesity is due to genes such as leptin deficiency or medical causes such as hypothyroidism and growth hormone deficiency or side effects due to drugs (e.g. – steroids) (Link k. et al., 2004).

Overweight and obesity in childhood have significant impact on both physical and psychological health; for example, overweight and obesity are associated with Hyperlipidaemia, Hypertension, abnormal glucose tolerance, and infertility. In addition, psychological disorders such as depression occur with an increased frequency in obese children (Daniels SR. et al., 2005).

Overweight children followed up for 40 (Mossberg HO., 1989) and 55 years (Must A. et al., 1992) were more likely to have cardiovascular and digestive diseases, and die from any cause as compared with those who were lean.

Introduction

Body composition can be measured by a variety of methods, and these methods vary in their sophistication, accuracy, feasibility, cost, and availability. Some procedures are clearly unsuitable for young children (e.g., underwater weighing), whereas others are limited because of availability and cost (e.g., magnetic resonance imaging and dual-energy X-ray absorptiometry (DXA) (Eisenmann et al., 2004).

Theoretically, BMI represents an index of body mass independent of stature such that at any age, greater relative body mass may be attributed to the increased body fatness. However, the relationship between BMI and fatness in childhood has received insufficient attention (Eto et al., 2004).

During childhood, obesity management can be even more difficult than with adults because it is dependent on both changing habits and availability of parents and is further complicated by the child's lack of understanding of the damage caused by obesity (Daniels S.R. et al., 2005).

Aim of work

1. To estimate the prevalence of obesity among school children aged 6 up to 12 years old in Port Said city.
2. To investigate the relationship between BMI and risk factors for obesity.

CHAPTER ONE

Definition of childhood obesity

Obesity is defined as excess body fat leading to health impairment (WHO, 2000 & Abdul-Rahim H.F. et al., 2003).

For boys, obesity was defined as >20% fat mass (FM). For girls, the cut-off point for obesity was >25% FM (Eto C. et al., 2004).

However, FM is extremely difficult to measure in young children, because accurate techniques require a high degree of the subject compliance (Eto C. et al., 2004).

The ideal definition, based on percentage body fat, is impracticable for epidemiological use. The measurement of change in adiposity in children is challenging because of the effects of maturation and growth on lean muscle mass, fat mass, and hydration status (Elberg J. et al., 2004).

Although less sensitive than skin fold thicknesses (Malina RM. and Katzmarzyk PT., 1999), the body mass index (weight/height²) is widely used in adult populations, and a cut-off point of 30 kg/m² is recognized internationally as a definition of adult obesity (WHO, 1995). Body mass index in childhood changes substantially with age (Cole TJ. 1995). For many years, establishing an international definition of overweight and obesity among children based on pooled international data for BMI linked with adult obesity cut-off point, remained a big challenge (Cole TJ. et al., 2000).

In the United States, criteria for overweight in childhood are based on the 2000 Centers for Disease Control BMI-for-age growth charts with values at or above the 95th percentile categorized as overweight (Chinn S., 2006).

In 2007, the WHO established new growth references for school-age children and adolescents depending on z scores (Standard Deviation $\pm$ 3SD), they were introduced in place of percentile scores (De Onis M. et al., 2007).

Methods of assessment of obesity:

Unfortunately, there is no consensus on how body fat is linked with morbidity and mortality because of the absence of appropriate prospective studies. Specifically, no accepted published body fat ranges exist; those reported are based on empirically set limits and population percentiles. Additionally, methods of limited accuracy such as anthropometry are typically used to estimate fatness in population surveys (Gallagher D. et al., 2000).

Theoretically, BMI represents an index of body mass independent of stature such that at any age, greater relative body mass may be attributed to the increased body fatness. However, the relationship between BMI and fatness in childhood has received insufficient attention (Eto C. et al., 2004).

Body composition can be measured by a variety of methods, and these methods vary in their sophistication, accuracy, feasibility, cost, and availability. Some procedures are clearly unsuitable for young children (e.g., underwater weighing), whereas others are limited because of availability and cost (e.g., magnetic resonance imaging and dual-energy X-ray absorptiometry (DXA) (Eisenmann JC. et al., 2004).

Four main issues were identified for discussion in the attempt to establish a reasonable index with which to assess adiposity (overweight) in children and adolescents worldwide: 1) choice of an index measure, 2) choice of a reference population, 3) definition of cutoff points for overweight and obesity, and 4) use of ancillary measures to validate the index (Bellizzi M.C. and Dietz, 1999).

Studies in children also showed that a greater deposition of central fat is correlated with less favorable patterns of serum lipoprotein concentrations and blood pressure. Because adiposity and cardiovascular risk factors track from childhood into adulthood, early identification of children with high central adiposity is important (Taylor R.W. et al., 2000).

I- Body weight:

Body weight does not give information about the specific components of body composition. For example, very athletic persons may

be heavy because of excess muscle or lean body mass rather than because of excess body fat (Kuczmarski R.J. and Flegal K.M., 2000).

The health complications associated with obesity are related to the elevated deposition of body fat rather than to body weight per se (Taylor R.W. et al., 2002).

II- Weight-to-height indexes:

Height- and weight-based measurements are the most practical tools for assessing nutritional status because of their simplicity and low cost (Mei Z. et al., 2002).

Relative weight and weight-for-height indexes each have the same limitations, because both are based on measurements of body weight rather than body composition (Kuczmarski R.J. and Flegal K.M., 2000).

III- Body mass index (BMI):

This measure was first described by the mathematician Lambert Adolphe Jacques Quetelet and has sometimes been referred to as the Quetelet index (Daniels S.R. et al., 1997).

$$(BMI) = \text{weight}/\text{height}^2 \text{ (kg/m}^2\text{)}$$

The main assumption of BMI guidelines is that body mass, adjusted for stature squared, is closely associated with body fatness and consequent morbidity and mortality (Gallagher D. et al., 2000).

BMI correlates significantly with body fat, morbidity, and mortality and it can be calculated quickly and easily in a busy clinical setting (Aronne L.J., 2002).

Disadvantages of BMI

Some individuals who are overweight are not over fat (eg, bodybuilders). Others have BMIs within the normal range and yet have a high percentage of their body weight as fat. Although these misclassified persons are uncommon relative to the population as a whole, the question arises as to how they might be evaluated correctly according to body fatness (Gallagher D. et al., 2000).