

Nutrition Style and Diet Composition Leading to Obesity and Overweight in a Cross-Sectional Survey Conducted in a Hospitalized Arab Population in Nazareth, Israel

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Abstract

Background: Previously, epidemiological studies of overweight and obesity in the Mediterranean basin were limited, particularly for Arab population. Obesity and overweight are an important adjustable threat for many complex diseases and are the fifth leading risk for global deaths. Extraordinarily enhanced frequency and rising levels of overweight and obesity over the last 3 to 4 decades give it crucial importance as a current pandemic phenomenon and the main public health emergency worldwide, which is beginning to replace malnutrition, under-nutrition, starvation and contagious diseases as the most noteworthy contributor to chronic diseases. Recently, the effects of overweight and obesity are widely documented as one of Arab's leading health challenges, involving all ages and all segments of the society.

Objectives: The objective of this study is to estimate the prevalence of obesity and examine covariates associated factors, diet composition and the eating habits among adults Arab population in Israel.

Methods: A population-based cross-sectional survey of a representative sample of 287 hospitalized patients aged 18 years and older (123 males and 164 females) was conducted in three medical departments (Internal, surgical and orthopedics wards) at E.M.M.S hospital (Nazareth). Demographic data, anthropometric assessments, dietary assessment, socioeconomic and lifestyle characteristics, BP measurements, and biochemical assessment were collected using a previously validated survey instruments. Questionnaires were checked for completeness, accuracy and bias prior to data entry by a dietitian specialist staff at Nazareth hospital.

Results: The mean BMI results were compared between males and females (28.4 ± 0.53) versus (30.31 ± 0.46), respectively (P -value <0.2). The measurement of WC among males and females was as follow: (104.3 ± 1.67) versus (101.4 ± 1.57) respectively, (P -value $=0.8$).

Median intake of refined grain and the whole grain intake (serving/day) in both genders was examined and showed that the median consumption of refined grain is significantly higher than the whole grain in both genders (P -value <0.0001). In addition, we compared the median intake of highly fat dairy products in both genders with low fat dairy (serving/day). We observed that the consumption of high fat dairy products is statistically higher than low fat dairy products (P -value <0.0001).

Conclusions: The study provides current data on anthropometric measurements and obesity in urban Arab populations. The results of our study indicate that rates of abnormal waist circumferences (WC) in both genders in all age groups are high, and WC surprisingly continue to increase progressively even after the age 65 in females. Interestingly, we noticed that the Arab population eating regime is disorganized and usually without awareness and control and that only a small proportion of Arabs are aware of the association between obesity and morbidity. Indeed, we observed that unhealthy diet dominates in Arabic kitchens such as high carbohydrates, low fiber and high fat diet consumption. These results are in conflict with the famous known healthy diet in the Middle East known as "Mediterranean diet", rich in vegetables, fruits, high fiber and low fat diet.

Keywords: BMI; Waist circumference; Obesity; Whole-wheat intake; Diet quality; Adult Arabs

Introduction

Obesity is a multi-factorial disease that transpires as a result of interaction between lifestyle (dietary patterns and sedentary habits)

and genetic factors. Currently, genetic factors are roughly responsible for 40-70% of total human adiposity [1]. Generally obesity has a polygenic background, but also around 20 different genes have been implicated in monogenic causes of obesity; nevertheless, they only account for less than 5% of all obesity cases [2-5].

Extraordinarily, enhanced frequency and escalating levels of overweight and obesity over the last 3 to 4 decades give it the nature of modern epidemic that predisposes to a high risk of premature mortality and to major public health crisis challenge worldwide [6]. Obesity is beginning to replace under-nutrition, hunger and infectious diseases as the most significant contributor to chronic diseases [7]. The World Health Organization predicts there will be 2.3 billion overweight adults in the world by 2015 and more than 700 million of them will be obese [8]. Indeed, obesity and overweight are important adaptable risk factors for many chronic diseases and the fifth leading risk for global deaths [9-11].

Physiologically, the regulation of body weight is coordinated through a complicated system involving interactions between the various components of energy balance, together with feedback mechanisms that regulate appetite, energy intake and energy expenditure. In obese individuals, the long imbalance between energy expenditure or the consumed energy and energy intake leads to weight gain and excess accumulation of body fat. The disequilibrium in energy balance (increase accumulation of body fat and deficient in clearance or low expenditure of energy) is considered part of the quandary. While the underlying mechanisms of overweight and obesity is multifaceted and multifactorial in their nature, diet and physical activity are central to energy balance and weight maintenance, but they are directly and indirectly influenced by a wide range of socioeconomical, environmental, behavioural, genetic and physiological factors. Indeed, characteristics that influence overweight and obesity are largely comparable across populations and are on the increase due to a trend in changes in the economic situation, urbanization, industrialization, globalization and socioeconomic status. The higher susceptibility of some individuals than others to dietary and lifestyle factors (dietary patterns and sedentary habits) that promote weight gain can be explained environmentally and partially by genetics factors [12].

The dramatic increase in obesity frequency emphasizes the importance of prevention strategies for consequent burden of chronic diseases [13]. Furthermore, the accurate characterization of obesity-related health risk has taken on new importance in efforts to generate targeted intervention strategies and appropriately allocate health care resources [14].

In adults, obesity and overweight are often determined using anthropometric evaluation which involves measurement of body dimensions for the purpose of understanding human physical variation [15].

In spite of the existence of other sophisticated methods to measure adiposity, the routinely used approaches in clinical practice are the Body Mass Index (BMI), which provides a proxy measure of total adiposity, and the simplest one which measures the central obesity: waist circumference (WC) – method or waist-to-hip ratio (WHR) [16].

WC is actually a perimeter, which provides an estimate of body girth at the level of the abdomen and is frequently used as a surrogate marker of abdominal obesity, because WC correlates with abdominal fat mass and is linked with cardio-metabolic disease risk [17,18].

Indeed, the measures such as the BMI and WC methods are used as convenient indices of adiposity and guidelines for classifying weight status. Both genders are classified as obese or overweight by a variety of cut-off values based on the mortality and morbidity associated with various levels of weight. Adults who have a BMI ≥ 30 kg/m² are

considered obese and are generally at higher risk for adverse health events than are those who are considered overweight (BMI between 25.0 and 29.9 kg/m²) or lean (BMI between 18.5 and 24.9 kg/m²). Therefore, BMI is considered to be the most suitable, objective anthropometric indicator of nutritional status of the adult and has become the “gold standard” for identifying patients at increased risk of adiposity-related adverse health outcomes [19]. Although this statement is controversial, as some authorities claim that WC is more reflective of adiposity-related mortality [20] than BMI.

The current study comes to shed light on the prevalence of obesity and on the diet composition, quality and quantity, among adult Arabs in Israel, and to evaluate the socioeconomic and lifestyle characteristics associated with it. We evaluated participants’ knowledge and behavior, and their reports on practices of health-care professionals with regard to body weight. We hypothesized that the high prevalence of overweight and obesity among Israeli Arabs came from their relatively low socioeconomic status and lifestyle characteristics presented in the nutrition transition in this population compared to the traditional Arab diet.

Methods

A population-based cross-sectional study was performed with a total of 287 hospitalized patients at E.M.M.S hospital (Nazareth) from different departments (Internal, surgical and orthopedics wards) aged 18 years and older (123 males and 164 females). Patients with history of eating disorders, Bariatric surgery, pregnancy, chronic/acute renal diseases, heart diseases, edema and anasacra were excluded. The study was approved by the institutional ethics committee. All participants provided a written informed consent. Data were collected between January 2012 and December 2012.

Complete medical history and data on demographic, socioeconomic and lifestyle characteristics; reports on height, current body weight and body weight were obtained from all patients 18 years and older. In addition, knowledge and behavior; and health-care professionals’ practices with regard to body weight were obtained by validated questionnaire and interviews. Anthropometric measurements, blood pressure measurements, and biochemical assessment were performed and metabolic abnormalities were identified.

Anthropometric measurements

All measurements were conducted at hospital departments and performed twice by a trained team from January 2012 and December 2012. Body weight was measured using a digital electronic platform Scale with precision to 0.1 kg according to a standardized procedure (lightly dressed, without shoes). BMI was calculated by dividing weight in kg by height squared in meters. Patients were classified as follows: underweight (<20 kg/m²), normal (20-<25 kg/m²), overweight (25-<30 kg/m²), and obese (30+ kg/m²). Waist Circumference (WC) was measured by trained interviewers using a non-elastic flexible tape at the smallest abdominal position in the narrowest zone between the lower costal rib and iliac crest, in the supine decubitus and horizontal positions. Abnormal waist circumference was defined as a value greater than 102 cm for men and 88 cm for women.

Assessment of dietary factors

To assess the diet type and composition we used a semi-quantitative food frequency questionnaire (FFQ) which includes 74 items, each item in its role is subdivided to more specific questions. Questions

about refined grain, whole grain, refined bread, whole bread, high and low fat dairy products, and intake of cheese and sweet soft drinks where our priority top questions and interest in addition to other questions. Trained dietitians data entry coders used our computer system to enter data into the database. The questionnaire was further adapted to capture the traditional dietary habits of the Arab population.

Data Analysis

A statistical analysis was conducted using SPSS (Statistical Package for the Social Sciences) and for the quantitative data, Student's t-test was used to compare the sample means. Pearson's chi-squared test was used to compare the categorical data. Statistical significance was set at $P < 0.05$.

Results

Characteristics of the study participants with the different variables are included in Table 1. The study comprised a total of 287 participants, of whom (43%) were men and (57%) were women. The median age was (53 ± 2.3) years for men and (51 ± 1.4) for women. The marital status of both genders was as follow: (66.2%) of males were married, (33.8%) were single versus (70%) of females were married and (29%) were single. The smoking status was as follow: (45.4%) of males are smokers compared to (22%) of females. The proportion of males who had attained university level education was (29.3%) versus (33.8%) of females. The mean weekly hours exercise among males and females was (0.95 ± 0.13) versus (0.9 ± 0.09) respectively. A full response rate to the interviews and for the anthropometric measurements was observed.

	Men (43%) (n=123)	Women (57%) (n=164)	P value
Age(yrs)	53 ± 2.3	51.16 ± 1.48	0.34
Marital status	33.80%	29%	
Single	66.20%	70%	
Married	-	-	
Divorced			
Educational level	29.30%	33.80%	
Academic	70.70%	66.20%	
Non-academic			
Weekly exercise (hours)	0.95 ± 0.13	0.9 ± 0.09	
BMI kgm^{-2}	28.4 ± 0.53	30.31 ± 0.46	< 0.2
Waist circumference (cm)	104.3 ± 1.67	101.4 ± 1.57	0.8
Smoking status	45.40%	22%	
Current cigarette smoking (%)			

Table 1: Characteristics of the Study Population.

Mean BMI was comparable amongst both males and females (28.4 ± 0.53) versus (30.31 ± 0.46) respectively (P -value <0.2). This result indicated that all males suffered from overweight and almost all

females suffered from obesity. The measurement of waist circumferences (cm) among males and females was as follow: (104.3 ± 1.67) versus (101.4 ± 1.57) respectively (Table 1). The mean waist circumference >88 cm and >94 cm was calculated by age group for female and males respectively (Figures 1 and 2). Both figures showed that all age groups are up to the cutoff points (88 cm and 94 cm). The interpretation of these results demonstrate abnormal and progressive increasing in waist circumference even after the age 65 in females and declining in waist circumference over the age 65.

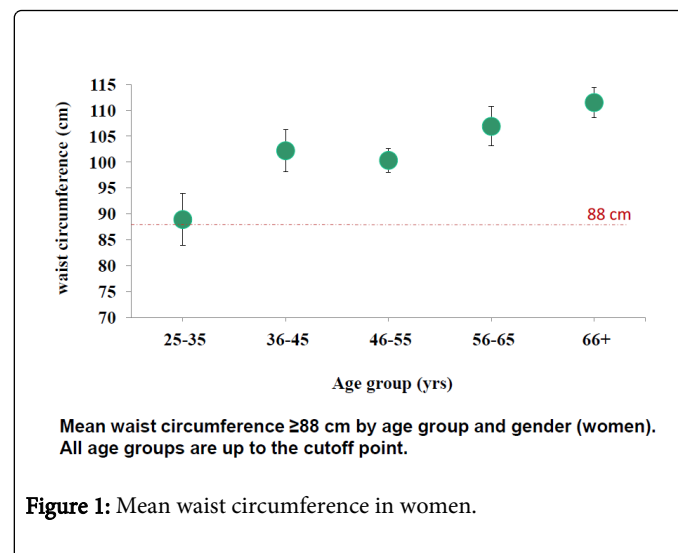


Figure 1: Mean waist circumference in women.

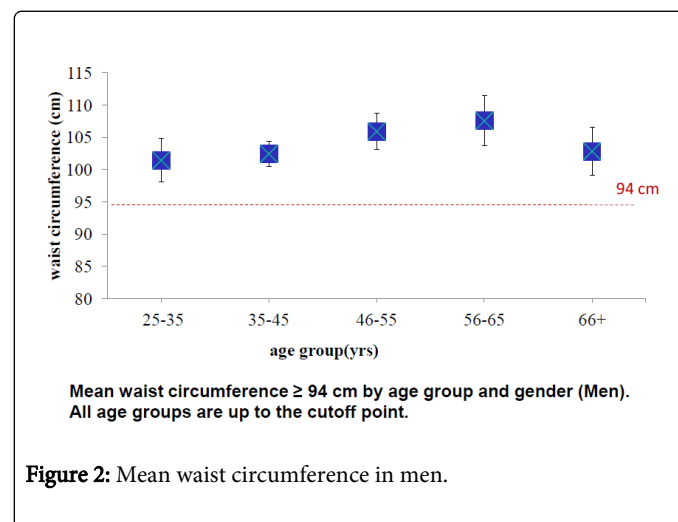


Figure 2: Mean waist circumference in men.

In this study we also analyzed the eating habits among the Arab adults: we compared the median intake of refined grain and the whole grain intake (serving/day) in both genders. We observed that the median consumption of refined grain is significantly higher than the whole grain in both genders (P -value <0.0001), (Figure 3). In addition, we compared the median intake of highly fat dairy products in both genders with low fat dairy (serving/day). We observed that the consumption of high fat dairy products is statistically higher than low fat dairy products (P -value <0.0001), (Figure 4).

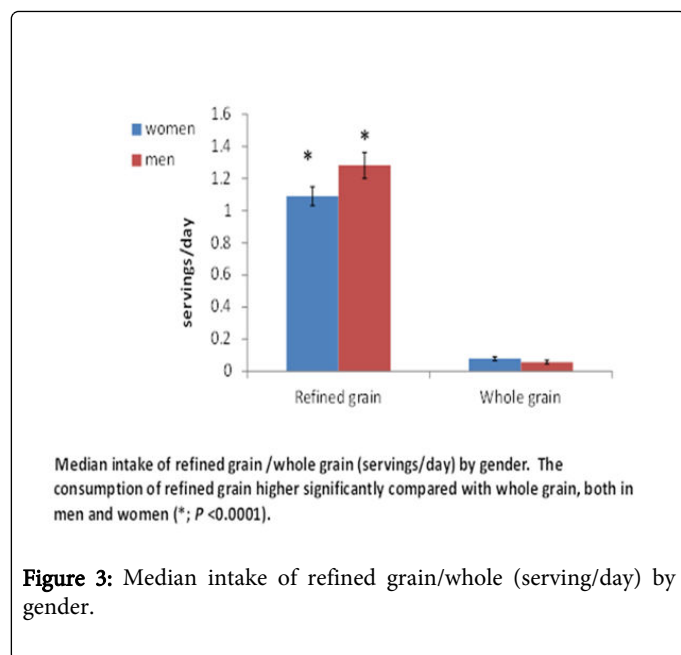


Figure 3: Median intake of refined grain/whole (serving/day) by gender.

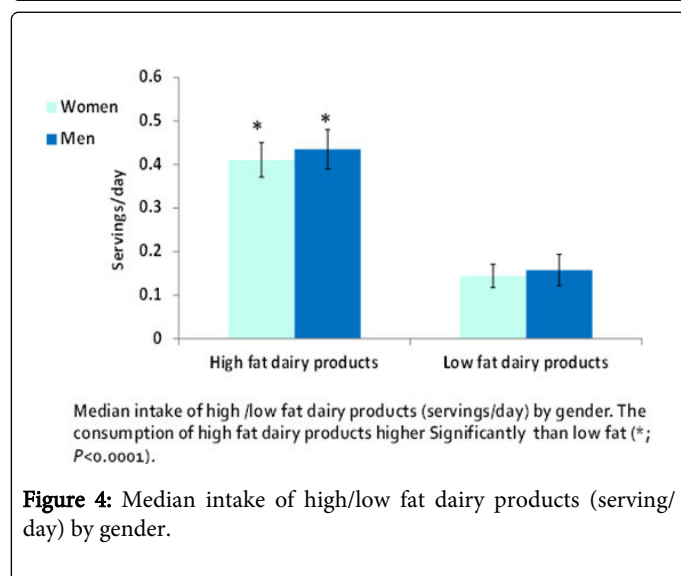


Figure 4: Median intake of high/low fat dairy products (serving/day) by gender.

Discussion

Cultural attitudes partially underlie the high frequency of obesity in developing countries, in addition to the relatively increasing standard of living, changes in the economy; globalization; modernization, industrialization and socioeconomic status. The surrounding western diet style consumed in Israel by the majority of the population influence dramatically the diet choose, the products displayed in the market and the food purchases of Arab population residence in the country. These factors lead Arab consumers to steer away from traditional diet and they play a crucial role in increasing and influence overweight and obesity. Adapting the eating patterns of the majority resulted in rapid transition in diet and physical activity patterns [21].

Adopting high carbohydrate and saturated fatty acid intakes, and relinquishing healthy dietary prototypes, such as higher intake of fiber-rich products in form of legumes and whole grain products

which are both negative consequences of the acculturation process. In our study we observed high and abnormal Waist Circumferences (WC) in all age groups, in both genders. WC in females over the age 65 continues to increase while in men is decreased. We noticed that the Arab population eating regime is disorganized and usually without awareness and control. Indeed, we observed that unhealthy diet dominate in Arabic kitchens such as high carbohydrates, low fiber and high fat diet consumption which are considered leading causes of metabolic disorders and other abnormalities. These results are in a paradox with the famous known healthy diet in the Middle East known as “Mediterranean diet”, rich in vegetables, fruits, grain (mostly whole), olive oil, beans, nuts, seeds, herbs and spices in addition to fish and seafood.

Over the last few decades, the escalating prevalence rates of overweight and obesity have widely recognized globally as pandemic and have become a major public health challenge in developed countries that predisposes to a high risk of morbidity and premature mortality. Similar phenomenon is dramatically raising attention and emerging clearly in most developing countries and increasing progressively in the Arab world including the Palestinian Arabs in Israel [22-24].

Overweight and obesity is considered one of the leading health concerns, involving all age and socioeconomic groups. Physiologically, body weight is coordinated through a complex system involving interactions between the various components of energy balance, together with feedback complex mechanisms that regulate appetite, energy intake and energy consumption. In humans, overload weight results from prolonged energy imbalance, with the overload energy stored as body fat which leads to an increase in adipose tissue mass. Being overweight or obese is powerfully linked with various chronic diseases including type 2 diabetes, cardiovascular disease, hypertension, some cancers, and with psychological health consequences and eating disorders [25-27]. The underlying causes of overweight and obesity are multifactorial; result in a change in lifestyle (i.e. less physical activity) and inadequate eating habits. Indeed, Diet and physical activity are central to energy balance, but are directly and indirectly influenced by a wide range of variables such as socioeconomic, environmental, behavioral, genetic and physiological factors. For many subjects, overweight is hard to avoid and very tough to overturn. Nevertheless, obesity is actually a complex disorder and, consequently, involves a multifaceted prevention ways and/or treatment strategies, which means that there is no universal treatment that would be beneficial for every obese patient; finding strategies to prevent the development of obesity are of critical importance to reduce the population burden of obesity and obesity related disorders. The findings of this study stressed that cultural attitudes may underlie the high prevalence of obesity among adult Arab population and confirm the data from earlier study reports of a high prevalence of overweight and obesity among Arab population in Israel [28]. However, we conducted this cross-sectional study of a population-based sample of hospitalized Arab patients, to examine the relationship between dietary composition, BMI and WC. To deeply examine the phenomenon of obesity among adult Arab population and to ascertain previous finding we used extended questionnaire which addressed several topics related to nutrition and dietary pattern especially by examining the intake of refined grain, whole grain, refined bread, whole bread and fat intake. It is well known that bread is the main staple in the Arab's diet and consumed widely in every home. Decades ago bread was homemade by whole-wheat flour, as traditional

unleavened bread, and today the consumed bread is almost store-bought or commercially produced white-flour bread, indeed, this one of many examples that describes the transition from traditional diet to the modern lifestyle characterized by low fibers and high fat dietary patterns. In fact, during the past five decades, Arab community in Israel, which represents more than fifth of the total population in the country, has undergone major transitions and changes in lifestyle – from agricultural to predominantly urban [29]. Many factors influenced the transition from the traditional diet style to the westernized lifestyle patterns in the Arab minority in Israel: First and foremost the changes in the economy, modernization, industrialization and socioeconomic status in addition to the influence effect of the surrounding western diet style consumed by the majority population in the country.

Limitations of our study

The study sampled only hospitalized patients, which may have a different nutritional and morbidity profile versus the general population.

Conclusions

Obesity and overweight are concerning public health problems among Arab population. A cross-sectional study conducted in a hospitalized Arab sample in Nazareth provided current data on anthropometric measurements, overweight and obesity. The results of our study indicate that rates of WC in both genders in all age groups are high, and WC surprisingly continue to increase progressively even after the age 65 in females. Interestingly, we noticed that the Arab population eating regime is disorganized and usually without awareness and control. Moreover, we realized that a small proportion of Arabs are aware of the association between obesity and chronic diseases, and consequently their body weight is measured less often, and they are less frequently advised by health-care professionals to be physically active or to modify their diet.

Indeed, we observed that unhealthy diet dominate Arabic kitchens such as high carbohydrates, low fiber and high fat diet consumption as a result of diet transition influenced by the majority in the country. These results are in conflict with the famous known healthy diet in the Middle East known as “Mediterranean diet”, rich in vegetables, fruits, high fiber and low fat diet.

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References

1. Chung WK, Leibel RL (2008) Considerations regarding the genetics of obesity. *Obesity (Silver Spring)* 16 Suppl 3: S33-39.
2. Martinez JA, Parra MD, Santos JL, Moreno-Aliaga MJ, Marti A, et al. (2008) Genotype-dependent response to energy-restricted diets in obese subjects: towards personalized nutrition. *Asia Pac J Clin Nutr* 17 Suppl 1:119-22.
3. Alfredo Martínez J, Enríquez L, Moreno-Aliaga MJ, Martí A (2007) Genetics of obesity. *Public Health Nutr* 10: 1138-1144.
4. Bogardus C (2009) Missing heritability and GWAS utility. *Obesity (Silver Spring)* 17: 209-210.
5. Walley AJ, Asher JE, Froguel P (2009) The genetic contribution to non-syndromic human obesity. *Nat Rev Genet* 10: 431-442.
6. Frumkin H, Lawrence F, Richard JJ (2004) *Urban sprawl and public health: Designing, planning, and building for healthy communities.* Island Press.
7. Kopelman PG (2000) Obesity as a medical problem. *Nature* 404: 635-643.
8. Brophy S, Cooksey R, Gravenor MB, Mistry R, Thomas N, et al. (2009) Risk factors for childhood obesity at age 5: analysis of the millennium cohort study. *BMC Public Health* 9: 467.
9. Poirier P, Giles TD, Bray GA, Hong Y, Stern JS, et al. (2006) Obesity and cardiovascular disease: pathophysiology, evaluation, and effect of weight loss: an update of the 1997 American Heart Association Scientific Statement on Obesity and Heart Disease from the Obesity Committee of the Council on Nutrition, Physical Activity, and Metabolism. *Circulation* 113: 898-918.
10. Crimmins EM, Beltrán-Sánchez H (2011) Mortality and morbidity trends: is there compression of morbidity? *J Gerontol B Psychol Sci Soc Sci* 66: 75-86.
11. Lavie CJ, Milani RV, Ventura HO (2009) Obesity and cardiovascular disease: risk factor, paradox, and impact of weight loss. *J Am Coll Cardiol* 53: 1925-1932.
12. Institute of Medicine (US) (2001) Committee on Health and Behavior: Research, Practice, and Policy. *Health and Behavior: The Interplay of Biological, Behavioral, and Societal Influences.* Washington (DC): National Academies Press (US).
13. (2003) Diet, nutrition and the prevention of chronic diseases. *World Health Organ Tech Rep Ser* 916: i-viii, 1-149, backcover.
14. Lobstein T, Louise B, Ricardo U.a (2004) Obesity in children and young people: a crisis in public health. *Obes Rev*; 5:1: 4-85
15. Kain J, Uauy R, Vio F, Albala C (2002) Trends in overweight and obesity prevalence in Chilean children: comparison of three definitions. *Eur J Clin Nutr* 56: 200-204.
16. Wickramasinghe VP (2011) Assessment of Body Composition. *Recent Adv Pediatr* 20: 193.
17. Schunkert H, Marcello RPM, Stritzke J (2012) Waist Circumference and Cardiovascular Risk. *Handbook of Anthropometry.* Springer New York 2: 2137-2153.
18. Okosun IS, Liao Y, Rotimi CN, Prewitt TE, Cooper RS (2000) Abdominal adiposity and clustering of multiple metabolic syndrome in White, Black and Hispanic americans. *Ann Epidemiol* 10: 263-270.
19. Daniels SR (2009) The use of BMI in the clinical setting. *Pediatrics* 124 Suppl 1: S35-41.
20. Saydah S, Bullard KM, Imperatore G, Geiss L, Gregg EW (2013) Cardiometabolic risk factors among US adolescents and young adults and risk of early mortality. *Pediatrics* 131: e679-686.
21. Sam DL, Berry JW (2010) Acculturation When Individuals and Groups of Different Cultural Backgrounds Meet. *PPS* 5: 472-473.
22. Yumuk VD (2005) Prevalence of obesity in Turkey. *Obes Rev* 6: 9-10.
23. Rennie KL, Jebb SA (2005) Prevalence of obesity in Great Britain. *Obes Rev* 6: 11-12.
24. Ogden CL, Yanovski SZ, Carroll MD, Flegal KM (2007) The epidemiology of obesity. *Gastroenterology* 132: 2087-2102.
25. Weinstein AR, Sesso HD (2006) Joint effects of physical activity and body weight on diabetes and cardiovascular disease. *Exerc Sport Sci Rev* 34: 10-15.
26. Huang Z, Willett WC, Manson JE, Rosner B, Stampfer MJ, et al. (1998) Body weight, weight change, and risk for hypertension in women. *Ann Intern Med* 128: 81-88.
27. Samanic C, Chow WH, Gridley G, Jarvholm B, Fraumeni JF Jr (2006) Relation of body mass index to cancer risk in 362,552 Swedish men. *Cancer Causes Control* 17: 901-909.

28. Kalter-Leibovici O, Atamna A, Lubin F, Alpert G, Keren MG, et al. (2007) Obesity among Arabs and Jews in Israel: a population-based study. *Isr Med Assoc J* 9: 525-530.
29. Abramson JH, Gofin R (1979) Mortality and its causes among Moslems, Druze and Christians in Israel. *Isr J Med Sci* 15: 965-972.