PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Pakistan Journal of Nutrition 13 (2): 116-121, 2014
ISSN 1680-5194

Updates of Overweight and Obesity Status and Their Consequences in Palestine

Mohammed Ellulu[1], Asmah Rahmat[1] and Yehia Abed[2]
[1]Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, University Putra, Malaysia
[2]Faculty of Public Health, Al Quds University of Gaza- Palestine

Abstract: Overweight and obesity are worldwide public health issues which are defined as abnormal or excessive fat accumulation. WHO reported that there are one billion overweight people in the world, 300 million of whom are obese. Total body and abdominal obesity have well-known associations with all-cause mortality, morbidity and disability, resulting in unhealthy life-years with poor quality of life and increased health care costs. The increased measure of BMI more than 25 and 30 kg/m^2 will result in overweight and obesity respectively, while waist circumference is important for determining the central obesity. All Arab Countries including Palestine referred as the Eastern Mediterranean Region according to WHO. Palestine has many reports about increasing levels of Non Communicable Diseases (NCDs) like diabetes, hypertension, stroke and heart diseases which linked directly with overweight and obesity. The death conditions in Palestine due to NCDs are also escalated over years. However, the number of studies and reports focused on overweight and obesity in Palestine is very little in comparing with the high evidences of NCDs linked to them. The main data was collected from three sources; Governmental, Non-governmental organizations and individual studies from Master Thesis. In other way, the data collected divided into three categories; the first one designed mainly to evaluate overweight and obesity, the second had assessed overweight and obesity as a secondary objective in the way for evaluating nutritional status and the last one had the assessment within the context of the study. The results revealed data collected among vulnerable groups in both sexes. Most of studies indicated high measure of overweight and obesity among older adults rather than young adults. Finally; Palestine still in need for more studies to include all age groups and different cities.

Key words: Overweight, obesity, Palestine, public health

INTRODUCTION

Overweight and obesity could be described as the New World Syndrome, there prevalence is continuously increasing among people in many countries, irrespective of age or gender (Calderon-Guzman *et al*., 2011). Overweight and obesity are a degree of excess weight that is associated with adverse health consequences. They are chronic conditions that are characterized by long term energy imbalance due to excessive caloric intake with slightly energy expenditure (Zabut *et al*., 2007). In adults, overweight and obesity are defined using the body mass index (BMI), which is the ratio of weight in kilograms divided by the height in meters squared. Overweight is defined as a BMI between 25.0 and 29.9 kg/m^2 and obesity is defined as BMI higher than 30.0 kg/m^2. In children, the term overweight has been preferred because of the potential for stigmatization associated with the term obesity. 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 (Bessesen, 2008). Obesity and the related health risks have been noted to be an epidemic problem worldwide, especially in developing countries (Mathers and Loncar, 2006). Within the Eastern Mediterranean Region, an increasing prevalence of overweight has been recorded and has been noted to be at "an alarming level" (Musaiger, 2011). According to World Health Organization, the Eastern Mediterranean Region (EMR) refers to all Arab Countries, including Palestine and excluding Algeria, in addition to Afghanistan, Iran and Pakistan. Palestine is increasingly characterized by the double burden of malnutrition: the persistence of under-nutrition especially among younger children, combined with a rapid rise in overweight, obesity and diet related chronic diseases among adults (Nutrition and NCDs, 2012).

Assessment of overweight and obesity: Overweight and obesity have assessed according to World Health Organization by different ways, the most two important ways are evaluating Body Mass Index (BMI) and Waist Circumference (WC). BMI and WC are the main methods to assess overweight and obesity.

BMI: There is little disagreement about the classification of overweight and obese using BMI in adults as shown by Table 1. The table illustrates the degrees of BMI with level of comorbidities risk.

Corresponding Author: Mohammed Ellulu, Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, University Putra, Malaysia

Table 1: BMI classification (WHO, 2000)

Classification	BMI (kg/m^2)	Risk of co-morbidities
Underweight	<18.5	Low (other health risk)
Healthy weight	18.5-24.9	Average
Overweight (pre-obesity)	25-29.9	Increased
Obesity, class I	30-34.9	Moderate
Obesity, class II	35-39.9	Severe
Obesity, class III	>40	Very severe

WC: Another parameter illustrated by Table 2 used to detect obesity is used to determine the excess of body fat in the abdomen. According to the National Institution of Health (NIH) protocol, WC measurement is taken at the level of the superior border of the iliac crest and parallel to the floor (NIH, 2006).

Table 2: Waist circumference classification (NIH, 2006)

Sex	(WC)	Classification
Male	Less than 102 (cm)	Normal
	More than and equal 102	High risk for metabolic complications
Female	Less than 88 (cm)	Normal
	More than and equal 88	High risk for metabolic complications

WC: Waist Circumference

Obesity related diseases: The public health agenda of WHO put the obesity in the apex as it avoidable risk factors for many disorders according to reports deal with diet, nutrition and prevention of chronic diseases (WHO, 2003). The followed Global Strategy on diet, physical activity and health explored that more than 65% of all death cases especially in poor countries related to Non Communicable Diseases (NCDs). NCDs explained by WHO as diabetes, hypertension, stroke and heart diseases. As the mortality rate in these countries elevated and associated with unsuitable health services; the death from NCDs among low ages will escalate (WHO, 2003).

In Palestine especially North Governorates, the cases of death due to NCDs were explained by Ministry of Health report in 2011. The number of death cases among all groups of age and sex resulted from (1) diabetes mellitus were 192 cases, (2) hypertension 65 cases, (3) heart diseases 411 cases and (4) renal disease 85 cases. The past results indicated a high mortality prevalence of NCDs when compare with other cases like infections or even accidents (Bitar, 2011). In other hand, the number of patients who suffer from the previous diseases which linked directly to overweight and obesity reveal the bad health situation in Palestine. The number of diabetic patient-type 1 and 2- from both sexes and all groups of age was 61458 patients; about 60% of them have diabetic complications like nephropathy, neuropathy, cerebro-vascular accidents and diabetic foots (Bitar, 2011). In the same way, the UNRWA established a screening program for hypertension and diabetes to Palestinian refugees in several Arabic countries, 727 (29.7%) male and 2518 (47.4%) female of patients were obese (Mousa, 2010). In other hand, among schizophrenic patients in Northern Palestine, the prevalence of metabolic syndrome among male and female together was 43.6%, the obesity was assessed by WC to be above the normal range (Sweileh *et al*., 2012). The prevalence of diabetes according to annual health report of UNRWA in 2010 was 10.5% among the served population 40 years of age or older and the prevalence of hypertension was 16.2% to the same group of Palestinian population (UNRWA, 2011). By September 2011, the Palestinian Ministry of Health recognized the four leading causes of death in the occupied Palestinian territory in 2010 were cardiovascular diseases, cerebrovascular diseases, cancer (led by lung, colorectal and breast cancer) and respiratory system diseases, which means the leading cause of death related directly to nutrition and obesity status (Palestinian Ministry of Health, 2011).

Economic cost of obesity: Thompson (2007) suggested the worse of obesity by decreased life quality, increased health care costs and absenteeism. There is an exponential rising of costs due to CVD and diabetes type 2 as result of obesity, along with associated complications. These costs become unmanageable by health budget in poor countries and aligned health initiatives (more toward communicable diseases).

Prevalence of overweight and obesity: The prevalence of overweight and obesity have discussed and collected by Musaiger (Musaiger, 2011) for *Eastern Mediterranean Region* (EMR). EMR refers to all Arab Countries including Palestine. Palestine shares Arabic countries by many social and life habits including nutritional behaviours. The Review Article of Musaiger (Musaiger, 2011) composed of many comparisons between the countries for school aged and adults. The following Table 3 has adopted from the Review Article is about adult because it included the prevalence in Palestine.

Socio-demographic characters of Palestine: The current population for the occupied Palestinian territory is 4 168 858 (2 580 167 in the West Bank and 1 588 691 in the Gaza Strip) (Palestinian Ministry of Health, 2011). Overall life expectancy is 73.6 years for females and 70.8 years for males. The population of the occupied Palestinian territory is increasing at an annual rate of 2.9% (i.e., 2.6% in the West Bank and 3.3% in the Gaza Strip) (Palestinian Ministry of Health, 2011).

Review: In Palestine, there are a very little number of studies deal with overweight and obesity; few statistics came from Non-Governmental Organizations or the Ministry of Health reports. In this review, we collect the maximum studies as possible to explore the overweight and obesity in Palestine.

Table 3: Prevalence of overweight and obesity in Arabic countries

Country	Date	Sample size	Sex	Age	Overweight (%)	Obesity (%)	Reference
Bahrain	2007	863	M	20-65	34.8	32.3	MOH (2010)
		906	F		31.1	40.3	
Kuwait	2007	918	M	20-65	38.9	39.2	MOH (2007)
		1362	F		28.9	53.0	
Lebanon	1995-96	501	M	20-70	43.4	14.3	Sibai *et al.* (2003)
		715	F		30.6	15.5	
Libya	2000	334	M	15-50	19.2	5.8	FAO (2005)
		350	F		21.1	7.1	
Morocco	1998-99	9120	M	18+	28.0	5.7	Mokhtar *et al.* (2001)
		8200	F		33.0	18.3	
Oman	2000	3076	M	20-70	30.6	15.5	MOH (2000)
		3367	F		27.2	22.3	
Saudi Arabia	2005	1658	M	25-65	43.0	31.5	MOH (2010)
		1621	F		28.8	50.4	
Tunisia	2005	2379	M	35-70	51.7	37.0	El-Ati *et al.* (2008)
		2964	F		71.1	13.3	
Palestine	2002	1534	F	15-49	--	10.9	FAO (2005)

A descriptive study by Kanoa *et al.* (2008) in Gaza strip was designed among the female university students in order to assess the frequency of female who practiced weight reduction and to study the weight reduction behaviour and perception. The study included 467 participants, classified according to BMI. The BMI distributed as the following: underweight 20 (4.3%), normal 350 (74.9%), overweight 81 (17.3%) and obese 16 (3.4%). The overweight and obese results considered very high, because the sampling method included the participants in university age that hovering around 20 years, adds to that (83.3%) of all participants said they used to have exercise.

By the year of 2007, the NCD's screening program of UNRWA evaluated 7762 Palestinian refugees in Jordan, Syria, Lebanon, Gaza Strip and West Bank. The screening objected to find the causes of hypertension and diabetes type 2 among male and female patients for all ages. The patients were categorized into two groups according to BMI, BMI $\geq$ 30 was obese and BMI < 30 was non-obese. The number and percents of patients who were obese have explained by the Table 4 according to area of operation.

Table 4: UNRWA screening for obesity among Palestinian refugees

	Obesity			
	Male		Female	
Area of operation	No.	(%)	No.	(%)
Jordan	280	32.7	957	53.7
Syria	72	22.4	168	38.7
Lebanon	105	24.0	493	42.7
Gaza Strip	168	34.1	471	41.6
West Bank	102	28.7	429	52.6

The total numbers of obese patients in all areas of operations were 727 (29.7%) male and 2518 (47.4%) female. This information linked the obesity strongly with the development of hypertension or diabetes type 2, as the p-value for male and female $p<0.001$ separately (Mousa, 2010).

A study was established among Severe Mental Illness (SMI) persons. The sample was divided into two groups to compare; 518 participants in the first group which contained the Western countries: Germany, UK and Australia, while 147 participants in the second group that contained the Middle Eastern country: Palestine. The results indicated high level of overweight and obesity among Palestinian participants (62%) compared with a collaborated result from Western countries (47%). Palestinian BMI distributed as the following: underweight 2 (1.4%), normal 54 (37.5%), overweight 57 (39.6%) and obese 31 (21.5%) (Jakabek *et al.*, 2011).

Sweileh *et al.* (2012) recruited 250 schizophrenic patients in order to investigate the prevalence of metabolic syndrome (MS) in Palestine. The investigators used the regulations of ATP-III to assess the components of MS, by which they assessed the WC to identify abdominal obesity. 137 (54.4%) patients had normal WC and 114 (45.6%) patients had WC above the normal range, 58 were male and 56 were female.

Case control study designed to investigate whether parental obesity influences serum leptin hormone concentrations among obese adults in the Gaza Strip. 83 overweight and obese participants selected as case and the same number selected as control with normal BMI. The level of leptin hormone among overweight and obese group was 58.74 ng/mL and SD equal 33.55 which significantly higher than the mean among normal BMI with 13.96 ng/mL and SD equal 9.80 (Zabut *et al.*, 2007).

For a long of one year (October 1999-October 2000), Abdeen *et al.* (2012) used the data from First National Health and Nutrition Survey; that established a cross-sectional study design and selected 3617 adults aged 18-64 years in order to provide a baseline data on the prevalence and distribution of overweight and obesity in Palestine. The results of anthropometric measurements explained by the Table 5.

Table 5: Abdeen *et al.* (2012) screening results for overweight and obesity

	Male		Female	
Age	BMI	WHR	BMI	WHR
All ages				
Mean	26.12	0.90	27.94	0.85
SD	4.25	0.10	5.53	0.10
Number	1725	1725	1653	1653

The study indicated overall overweight class as the mean for male and female BMI and indicated that normalized ratio of WHR, that for all participants for all age groups. By comparing the anthropometric results across age groups, both male and female aged more than 45 years had a significant elevation of BMI and WHR than younger participants.

Musaiger *et al.* (2012) designed a cross-sectional study to find out the prevalence of overweight and obesity among adolescents in seven Arab countries using similar reference standard. One of these countries was Palestine; the study was conducted in Al-Khalil city, West Bank. According to the results of the study, 220 male and 257 female students recruited for BMI assessment. Among male students, the prevalence of overweight and obesity were 12.7 and 5%, respectively. While among female students, the prevalence of overweight and obesity were 12.5 and 3.5%, respectively.

Bayyari *et al.* (2013) purposed to explore dieting practices of female Palestinian college students in West Bank. 410 participated in the study from 4 Universities. The study included the assessment of BMI. BMI ranged from 13 to 40 (mean = 21.91, SD = 2.92) km/m^2, with the majority being of normal or healthy weight (77.3%, n = 317), 8.5% (n = 35) underweight, 12.4% (n = 51) overweight and only 1.7% (n = 7) obese. A cross-sectional study was conducted on 304 Students (50% males and 50% females) from An-Najah National University in Palestine, aimed to assess the prevalence of overweight and obesity and their associations with dietary habits. The prevalence rates of overweight and obesity among students were 20.1% and 4.6%, respectively. Overweight and obesity were more common among males compared to females (27.0 and 5.9% vs. 13.2 and 3.3%, respectively). The prevalence of abdominal obesity among students was 17.8% and was more common among females (23.0%) compared to males (12.5%) (Al-Sabbah, 2012)

A case control study designed by Abu-Gamar *et al.* (2011) in order to assess lifestyle, socioeconomic factors and some biochemical alteration associated with gall stones formation among newly diagnosed adult patients in Northern Governorates of Gaza strip. 202 patients were interviewed in study and divided into two equal groups' case and control. The obesity status according to BMI revealed 53.4% of cases and 23.8% of controls were obese. Table 6 shows BMI and WC measurements for male and female patients.

Table 6: Obesity status by BMI and WC by Abu-Gamar *et al.* (2011)

BMI		Case	Control
Male	Non-obese	19 (61.2%)	21 (67.8%)
	Obese	12 (38.8%)	10 (32.2%)
Female	Non-obese	28 (40%)	56 (80%)
	Obese	42 (60%)	14 (20%)
WC			
Male	WC> 102 cm	45.2 %	19.4%
Female	WC> 88 cm	84.2 %	32.8%

Lubbad *et al.* (2011) surveyed the body measurements by BMI and dietary intake among 140 university students aged 19 to 30 years in Gaza strip to evaluate food consumption and dietary habits associated with weight status in healthy young adult students. For male, Underweight students were 3 (2.1%), normal 39 (27.9%), overweight 24 (17.1%) and obese students were 4 (2.9%). For female, Underweight students were 6 (4.3%), normal 54 (38.61%), overweight 10 (7.1%) and obese students of female represented (0%) of all students in the study.

Jawada *et al.* (2010) recruited 235 lactating women in Gaza Strip to determine the prevalence of malnutrition by cross sectional study. The study depended on two parameters; the first one was BMI while the last one was waist to hip ratio. By MBI, the underweight were 6 (2.6%), normal 108 (46.4%), overweight 71 (30.5%) and obese were 48 (20.6%). In the other hand, subjects who were less than or equal 0.8 of waist to hip ratio compromised 78 (33.5%) and subjects who were more than 0.8 compromised 155 (66.5%).

To assess the nutritional status among elderly people who aged 60 years and above, 327 subjects included through cross sectional study by Obaid *et al.* (2010). BMI measurements indicated 2 (0.6%) were underweight, 65 (19.9%) normal weight, 96 (29.4%) overweight, 134 (41%) obese and 30 (9.2%) very obese. Khellah *et al.* (2010) had a cross sectional study with 371 subjects to evaluate the prevalence of over-nutrition, people who were 19 to 59 years on Gaza Strip. The result of study indicated BMI for all subjects as the following: 8 (2.2%) underweight, 142 (38.3%), 126 (34%) overweight and 95 (25.6%) were obese.

In order to determine the prevalence of anaemia among female secondary students in Gaza Strip Jalambo *et al.*, (2011) recruited 316 subjects aged 15-18 years in a cross sectional designed study evaluated by BMI indicator, underweight were 4 (1.3%), normal weight 249 (78.8%) and overweight and obese together were 63 (19.9%).

Conclusion: As appeared by the mentioned studies related to overweight and obesity among Palestinians, the numbers of studies are very little. In Palestine, the political situation and the Israel occupation reduces the chance to get more effective and comprehensive studies related to overweight and obesity in all stages of age. The previous studies could be divided into three parts,

the first one evaluated overweight and obesity directly which considered it as the main objective like (Abdeen *et al*., 2012; Musaiger *et al*., 2012; Al-Sabbah, 2012; Jakabek *et al*., 2011; Lubbad *et al*., 2011). In the second one, the assessment of overweight and obesity had done as a secondary objective in the way for evaluating nutritional status like (Mousa *et al*., 2010; Zabut *et al*., 2007; Bayyari *et al*., 2013; Jawada *et al*., 2010; Obaid *et al*., 2010; and Khellah *et al*., 2010). The last group had assessed the overweight and obesity within the context of the study as (Kanoa *et al*., 2008; Abu-Gamar *et al*., 2011; Jalambo *et al*., 2011).

Among the mentioned studies, some of population were vulnerable groups, such as Severe Mental Illness persons (Jakabek *et al*., 2011), schizophrenic patients (Sweileh *et al*., 2012), elderly people (Obaid *et al*., 2010) and lactating women (Jawada *et al*., 2010).

The review consisted of both sexes, it displayed that the obesity according to WC measurements was equal between male and female (Sweileh *et al*., 2012). Musaiger *et al*. (2012) found the difference of prevalence of overweight among male and female was much closed, while the difference become more appealable in obesity status by a slight increase among male subjects than female subjects. Al-Sabbah (2012) approved strongly that the prevalence rates of overweight and obesity were more common among males compared to females. Lubbad *et al*. (2011) agreed the results of male is higher than female in obesity status, while (Abu-Gamar *et al*., 2011) disagreed by specific case control study.

The effect of age appeared significantly by Abdeen *et al*. (2012) who found that both male and female aged more than 45 years had a significant elevation of BMI and WHR than younger participants.

Khellah *et al*. (2010) said that the range of overweight and obesity was very high, in collaboration between both the percent exceeded 60% of the study population. Palestine is in need for more and more studies to display the prevalence of overweight and obesity in all ages and community groups, Palestine still lack of a comprehensive evaluation of overweight and obesity status. Because of that, we can't judge certainly the overweight and obesity status as the results show unclear evidences.

REFERENCES

Abdeen, Z., C. Jildeh, S. Dkeideek, R. Qasrawi, I. Ghannam and H. Al-Sabbah, 2012. Overweight and Obesity among Palestinian Adults: Analyses of the Anthropometric Data from the First National Health and Nutrition Survey (1999-2000), vol. 2012.

Al-Sabbah, H., 2012, Overweight and obesity among university students in Palestine, in International Conference and Exhibition on Nutritional Science and Therapy, 2: 79.

Abu-Gamar, Z., J. Ahmed and B. Zabut, 2011. Lifestyle, Socioeconomic Factors and Some Biochemical Alteration Associated with Gall Stones Formation Among Newly Diagnosed Adult Patients in Northern Governorates Gaza strip, Master Thesis. Al-Azhar Univerity Gaza.

Bitar, J., 2011. Health Report of Palestine, Ramallah.

Bayyari, W.D., L.J. Henry and C. Jones, 2013. Dieting behaviours, obesity and predictors of dieting among female college students at Palestinian universities, East. Mediterr. Heal. J., 19: 30-36.

Bessesen, D.H., 2008. Update on Obesity, J. Clin. Endocrinol. Metab. Mar., 6: 2027-2034.

Calderon-Guzman, D., E. Hernandez-Garcia and G. Barragan-Mejia, 2011. Obesity and lung disease in city children, Acta Pediatr Mex., 32: 115-118.

El-Ati, J., P. Traissac, C. Beji, H. Aounallah-Skhiri, S. Gaigi and P. Kolsteren, 2008. Change in nutritional status of adult women in Tunisia from 1996 to 2005: effect of living environment and socio-economic factors, Int. J. Obes., 32: 215.

FAO, 2005. Nutrition Country Profile-Libyan Arab Jamahiriya, Food and Nutrition Division.

FAO, 2005. Nutrition Country Profile-Palestine, Food and Nutrition Division.

Jakabek, D., F. Quirk, M. Driessen, Y. Aljeesh and B. Baune, 2011. Obesity and nutrition behaviours in Western and Palestinian outpatients with severe mental illness, BMC Psychiatry, 11: 159.

Jawada, H.K., Y. Abed and M. Ramadan, 2010. Nutritional Assessment of Lactating Women in Gaza Strip, Master Thesis. Al-Azhar University of Gaza.

Jalambo, M.O., A.T. Hamed and Y. Abed, 2011. Anemia and Risk Factors among Female Secondary Students in the Gaza Strip, Master Thesis. Al Azhar University Gaza.

Kanoa, B.J., O.S. Abu-Nada, M.A. El-Sakka, M.A. Kariri, A.I. Al-Hindi and H.K. Jawada, 2008. Weight Reduction Perception and Practice among Female Students in Al-Azhar University-Gaza, Palestine Basil J. Kanoa, Turkish J. Public Heal., 6: 46-54.

Khellah, M.K., S. El-Jabour and Y. Abed, 2010. Assessment of Nutritional Status among The Adult Palestinian Aged 19-59 Years in Gaza Strip, Master Thesis. Al Azhar University, Gaza.

Lubbad, T., S. Eljabour and A. Salama, 2011. Food Consumption Patterns and Dietary Habits Associated with Weight Status in Healthy Young Adult Studdents, Master Thesis. Al-Azhar University Gaza.

Mathers, C.D. and D. Loncar, 2006. Projections of global mortality and burden of disease from 2002 to 2030., PLoS Med., 3: 442.

Musaiger, A.O., 2011. Overweight and obesity in eastern mediterranean region: prevalence and possible causes., J. Obes., 2011: 407237.

Mousa, A., S. Yousef, F. Riccardo, W. Zeidan and G. Sabatinelli, 2010. Hyperglycaemia, hypertension and their risk factors among Palestine refugees served by UNRWA., East. Mediterr. Heal. J., 16: 609-14.

MOH, 2010. National Non-communicable Diseases Risk Factors Survey 2007, Bahrain.

MOH, 2007. Risk Factors for Non-communicable Diseases in Kuwait, Kuwait.

Mokhtar, N., J. Elati, R. Chabir, A. Bour, K. Elkari, N. Schlossman, B. Caballero and H. Aguenaou, 2001. Diet culture and obesity in northern Africa, J. Nutr., 131: 887-892.

MOH, 2000. National Health Survey. Vol 1: Study of Lifestyle Risk Factors, Oman.

MOH, 2010. Country-Specific Standard Report, Riyadh, Saudi Arabia.

Musaiger, A.O., M. Al-mannai, R. Tayyem, O. Al-lalla, E.Y.H. Ali, F. Kalam, M.M. Benhamed, S. Saghir, I. Halahleh, Z. Djoudi and M. Chirane, 2012. Prevalence of Overweight and Obesity among Adolescents in Seven Arab Countries: A Cross-Cultural Study, J. Obes., 2012.

Nutrition and NCDs, 2012. A Palestinian Agenda, in Fifth Conference on Nutrition.

NIH, 2006. Obesity: the prevention, identification, assessment and management of overweight and obesity in adults and children National Institute for Health and Clinical Excellence.

Obaid, S.J., Y. Abed and M. Taleb, 2010. Nutritional Assessment of Elderly People Aged 60 Years and Above in Gaza City and North Gaza, Master Thesis. Al Azhar University Gaza.

Palestinian Ministry of Health, 2011. Health Annual Report Palestine, 2010, Palest. Heal. Inf. Cent.

Palestinian Ministry of Health, 2011. Health Report, Palestine Mid Year 2011, Palest. Heal. Inf. Cent.

Sweileh, W.M., S.H. Zyoud, S. a Dalal, S. Ibwini, A.F. Sawalha and I. Ali, 2012. "Prevalence of metabolic syndrome among patients with schizophrenia in Palestine.," BMC Psychiatry, 12: 235.

Sibai, A., N. Hwalla, N. Adra and B. Rahal, 2003. Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study, Obes. Res., 11: 1353-1361.

Thompson, D., 2007. The costs of obesity: what occupational health nurses need to know, AAOHNJ, 55: 265-270.

UNRWA, 2011. The Annual Report of the Department of Health 2010, Palestine.

WHO, 2000. Obesity: Preventing and Managing the Global Epidemic-WHO technical report 894, Geneva.

WHO, 2003. Diet, Nutrition and the Prevention of Chronic Diseases. Report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series 916, Geneva.

Zabut, B., N. Holi and Y. Aljeesh, 2007. Parental Obesity Compared with Serum Leptin and Soluble Leptin Receptor Levels Among Obese Adults in the Gaza Strip Obesity, leptin and soluble leptin receptor levels, Islamic University-Gaza.