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Prevalence of Overweight and Obesity among School-Age Children in Nablus City

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Dedication

الى من فارق جسدها دنيانا الى من تمنيت ان تشهد هذا
امي
الى فلذة كبدي و روحي
أشرف
الى رفيق عمري فيصل
اهدي عملي هذا

الإقـــرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Prevalence of Overweight and Obesity among School-Age Children in Nablus City

انتشار زيادة الوزن والبدانة بين أطفال المدارس بعمر 6- 12 سنه في مدينة نابلس والعوامل المتعلقة بها

اقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص، باستثناء مـــا تمـــت الإشارة إليه حيثما ورد، وان هذه الرسالة ككل، أو أي جزء منها لم يقدم من قبل لنيل أية درجة علمية أو بحث علمي أو بحثي لدى أية مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's name: **اسم الطالب:**

Signature: **التوقيع:**

Date: **التاريخ:**

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Glossary / Abbreviations

Percentile:	Represents the rank of the person among 100 peers Matched for age and gender.
CAD	Coronary Artery Disease
WHO	World Health Organization
BMI	Body Mass Index. Measurement of a person's weight in kilograms (kg) divided by his / her height in meters (m) squared.
NCD	Non-Communicable Disease
CVD	Cardio- Vascular Disease
OPT	Occupied Palestinian Territories
MOH	Ministry of Health
CDC	Center for Disease Control and Prevention
TV	Television
FAO	Food and Agriculture Organization of the United Nations
UNRWA	United Nations Relief and Works Agency
NCHS	National Center for Health Statistics
PCBS	Palestinian Central Bureau of Statistics
IOTF	International Obesity Task Force
HBSC	Health Behavior in School Aged Children

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Prevalence of overweight and obesity among school age children in Nablus city

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Abstract

This is a descriptive cross-sectional study that was carried out at Nablus city during the first term of school year 2008/2009 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 socioeconomic status and life style factors.

One thousand seven hundred and forty four students participated in this study. The researcher took the anthropometric measurement inside the class room and gave the questionnaire the students to be answered by one of child's parents.

The questionnaire was separated into two sections; first section included the type of school and the anthropometric measurement. The second section included questions related to socioeconomic status and life style (physical activity and eating habits).

The data was analyzed using the Statistical Package for the Social Sciences (SPSS Version 15).

In this study, prevalence of overweight and obesity was found to be 13.3% and 7.9% respectively among males, while it was13.6% and 4.9% respectively among females.

Mother's education, pocket money, number of carbonated beverages/week, way of transportation to school, length of daily playing outside the home, and parents' BMI were significantly correlated with student's BMI. While family monthly income, type of school, mother's profession, number of quick meals/week, number of home cooked meals, breastfed during lactation period and watching T.V. were not having significant correlation with student's BMI.

This study is considered as the first study in its field regarding this age category in West Bank, and it is promoting future researches in obesity and its determinant.

Chapter one

Introduction

Thirty years ago, fundamental changes in social and economic situation occurred all over the world, thus leading to the presence of modern conveniences in homes as well as in the work place. These changes have shifted societies from communicable to non-communicable diseases (NCD) [1-3]. Overweight and obesity are a serious health problem, since they are associated with other diseases, and they contribute to ill health[4].

1.1 Definition:

Obesity is defined as a situation by which there is excess body fat leading to health impairment[5,6]. Clinically, it's defined for adults as Body Mass Index (BMI) ≥ 30[5]. Nowadays, obesity is a major serious public health problem and a big challenge, since its prevalence is accelerating rapidly not only in developed but also in developing countries[5,7,8].

The widespread of obesity is not restricted to adults but is also rampant among children. 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 of 30 kg / m^2, remained a big challenge. In 2007, the WHO (World Health Organization) established new growth references for school-age children

and adolescents depending on z scores (Standard Deviation ± 3SD). They were introduced in place of percentile scores[9,10].

Data collected from Eastern Mediterranean region indicated high prevalence of obesity among adults[8]. In Palestine, few studies were conducted in the last decade that showed high prevalence of overweight and obesity, especially among women in urban areas[6,11]. One cross-sectional study done by Abdul-Raheim *et al*., (2003) in Ramallah district to compare prevalence of obesity, food consumption patterns, and physical activity patterns between rural and urban adults. They found that prevalence of overweight and obesity was 36.8%, and 18.1% in rural women and men, respectively compared with 49.1% and 30.6% in urban women and men, respectivly[6].

1.2 Determinants of overweight/obesity

The underlying cause of obesity is not definitely known[3]. It is determined by several behavioral factors which interact with environmental ones. These factors affect body energy balance (energy intake should equal energy expenditure). Increase in energy intake will lead to overweight and/or obesity. Dietary factors are associated with age, gender, predisposition, and obesity[5]. The eating patterns include eating outside homes, drinking sweetened beverages and fresh juice, eating large

quantities and taking frequent meals and snacks. All these patterns interact with each other, and contribute to the increase of energy intake, which, by time accumulate. Thus leading to obesity[12-15].

Physical activity is the other determinant in energy equation. Children who are physically active promote their health, either by improving their mental health, and self-esteem, or by protecting themselves from other NCD mainly type 2 diabetes, hypertension, hyperlipidemia, and cardiovascular diseases[16]. People who are active at young age are more likely to be active in adulthood and will make healthy choices all over their life span[13].

Socioeconomic status of society is determined by income, educational level of the parents, and place of residence. Livings in urban areas promote overweight. Educational level is inversely proportional to obesity [4]. Family income is inversely proportional in developed countries and directly proportional in developing ones[3-5]. Family history (genetic factors), the predisposing factor for having obesity, determines up to seventy percent of individuals' BMI differences. Common form of obesity is not inherited in families in predictable pattern like Huntington's disease but rather in a complex way were the majority of individual's weight status is attributable to interactions of multiple genetic and environmental

factors[2,17,18]. Another factor associated with increased weight is several (drugs) medicines, including conventional and atypical antipsychotic agents, selective serotonin reuptake inhibitors and tricycles' antidepressants[13,19].

Studies conducted in Palestine showed that the fundamental cause of obesity in adults is the poor quality of food which largely depends on starch[11]. There is lack of information about children's and adolescents' nutrition and anthropometric measurement to determine their health and morbid situations. Anthropometric measurement is taken by MOH only for grade 1children; where the prevalence of obesity reaches 1.1% among them[11]. The social and political situation Palestinians live in, with rampant unemployment, low income, and stress do affect family. Though parents cannot purchase high quality food, subscribe to gym clubs play or walk with them making their children feel lonely, and spend a lot of time watching TV (Television)[11,20]. These unhealthy habits (lifestyles) promoted eating and decreased physical activity[5].

1.3 Measures of overweight/ obesity

Several ways are used to determine overweight/ obesity. One commonly used parameter is BMI[13, 21]. Other methods include estimating the amount of adipose tissues in skin fold thickness, underwater weighing,

bioelectrical impedance, and dual energy X-ray absorptiometey[19]. In the present study, BMI was used to estimate overweight/obesity.

1.4 Impact of overweight/obesity on health

Obesity has a considerable impact on children's health in the future; it increases morbidity of chronic diseases such as CVD (Cardio Vascular Disease), Type 2 diabetes, hypertension, dyslipidemia, osteoarthritis, reproductive malfunction and some kinds of cancers[3,4]. A study in Bogalusa, Freedman *et al*., (2001) concluded that an overweight child is 77% likely to be obese adult and will be at risk of adult level diabetes, high blood pressure, and hyperlipidemias[22]. Del Rio-Navarro *et al*.,(2008) conducted cross-sectional study in Mexico city to explore how overweight, obesity are related to the presence of high pressure, high triglyceride level, and high glucose level in population of Mexican school children aged 6-13 year. They found that overweight, obesity, and abdominal obesity are associated with higher blood pressure, and triglyceride levels[23]. Riva *et al*., (2005) reported that sleep-disordered breathing is associated mainly with the degree of obesity[24]. Pinhas-Haniel *et al*., (2006) concluded that obese adolescents were at risk for B12 vitamin deficiency[25]. The impact of obesity is not restricted to this but it extends to the psychological side. Daniels *et al*.,(2005) reported a relationship between obesity and depression[26]. In a four year follow up study of children 9-10 years old,

Strauss *et al*., (2000) found that lower level of self-esteem in obese boys, Hispanic girls, and white girls compared to their non-obese counterparts. Decreasing self-esteem in obese children was associated with increase rate of sadness, loneliness, and nervousness [27].

The few limited studies in Palestine showed high prevalence of obesity among adults[6,28]. However, no studies have estimated the magnitude of children's obesity and the factors associated with it. Therefore, the objective of this study is to estimate the prevalence of overweight and obesity among school children who are between 6-12 years old in Nablus city, and determine the factors associated with it.

Chapter two

Literature review

This chapter introduces overweight/obesity from an epidemiological view in different developed and developing countries. It also discusses the etiology (such as genetics factors), the relation of BMI to socioeconomic situation of parents, sedentary lifestyle, some eating patterns, and breastfeeding. The chapter then moves to a discussion of the threat of being overweight/obese at earlier age. At the end of this chapter the statement of the problem, and objectives of the study.

2.1 Definition

Obesity is defined as a situation by which there is excess body fat leading to health impairment[5,6]. Clinically, it's defined for adults as Body Mass Index (BMI) ≥ 30 [5], while among children it has remained a challenge for many years, as there is no international agreement about the cut-off-point. In 2000, the CDC (Center for Disease Control and Prevention) developed growth charts for children, 2-20 years, taking into account age and gender. Cut-off-point for overweight was 85%, and 95% for obesity. With accelerated spread of obesity in the world, Cole *et al.*, (2000) developed a new chart taking into account age, sex, internationally pooled, and adult cut-off-point, depending on z score[9]. Finally, in 2007, the WHO developed a new chart for children and adolescents' growth,

according to the adults' cut-off-point, and depending on z score (SD±3)[10]. From an epidemiological view, the twenty first century health professionals consider obesity as an epidemic[19,29].

2.2 Prevalence of obesity

Obesity prevalence has doubled or even tripled in the past two decades in developed countries[30]. Apfelbacher completed a study in Germany to identify factors associated with overweight/obesity. The study included school beginners in East and West Germany. About 35,434 five-to-seven-year-old children were included in the study; 50.9% of them were boys. A cross–sectional study was conducted between 1991-2000. About 15.5% were overweight and 4.3% were obese. Several variables were discussed in this study such as smoking in the living place, birth weight, educational level, and breastfeeding for more than three months. It was found that smoking and increased birth weight were positively associated with overweight and obesity, while increase of educational level, wide living space> $75m^2$, and breastfeeding were inversely associated[31].

In USA Hedley *et al.*, (2004) updated the US prevalence estimation among children and adults (children were defined as a person aged 2 through 19 years; adult are persons aged 20 years or older). National Health and Nutrition Examination Survey (NHANES) was the source of data. A complex multistage probability sample of the US non institutionalized

civilian population was done. The subjects were 4,115 adults and 4,018 children (1999-2000) and 4,390 adult and 4,258 children (2001-2002). Height and weight measurements were obtained. Obesity in adults was defined according to WHO's cut-off-points. For children, the 2000 CDC growth charts were used. A person is defined as at risk of overweight if his BMI for age and sex are at or above the 85th percentile, but less than the 95th percentile. After classification, children were identified to determine who should be referred for a second level of screening to determine if they are any additional health risks that would warrant intervention. Overweight was defined as at or above 95th percentile for the sex specific BMI for age growth chart. There was an indication that the prevalence of obesity among USA children was continuously increasing. In 2001-2002, it reached 31.5% were at risk for overweight or overweight, 16.5% were overweight [32,33].

Baratta *et al*., (2006) conducted a cross- sectional study; a large cohort of randomly selected 11-15 year-old Sicilian school children was studied to evaluate the prevalence of overweight/obesity in children and adolescent in Sicily between 1999 to 2001. About 48,897 subjects were allocated randomly. The subjects were 24,119 males and the rest were females. It was found that there was high prevalence of overweight (40%) among Sicily children at age 11years, and decreased by age[34].

Bar Dayan (2005) estimated the prevalence of obesity and associated morbidity among 17 years old adolescents. A comparison between the morbidity of females and males was also performed. Anthropometric measurement was done to calculate BMI and determine overweight/obesity. WHO cut-off-point for adults (BMI≥30kg/m^2) was approved, and several biochemical tests were done to diagnose Type 2 diabetes, and taking blood pressure several times to diagnose hypertension. Source of data was taken from Israeli army office. The subjects were all 17 year-old Israeli nationals who are obliged by law to join the army: 76,732 consecutive conscripts. Of those, 32,402 (42.2%) females and 44,330 (57.8%) males were taken for study. Obesity prevalence was 4.1% in males and 3.3% in females. The prevalence of borderline overweight was 12.4% in males and 11.4% in females. In this study, it was found that prevalence of hypertension and Type 2 diabetes were significantly higher among conscripts with BM1>30k/m^2 in both sexes, and it was significantly higher among males compared with females. Arabs, orthodox religious Jews and females, who volunteered for national service, were excluded[35].

A cross–sectional study was conducted in Irbid, Jordan. About 2,131 children were included in this study. About 19.4 % of the total sample was overweight: 18.8 % for boys and 19.9% for girls. About 5.6 % were obese: 5.6 % for boys and 5.5 % for girls. Watching TV >2hr/day, having daily

pocket money more than 20 piaster/day, and having overweight or obese mother/ father were significantly associated with increased odds of both overweight and obesity for the child. In contrast, female gender and family size (less than four) were associated with overweight, but total monthly family income was more associated with obesity[7]. Furthermore a study was done in Lebanon by Chaker *et al.*, (2006) in which 33 private schools were selected. About 12,299 students were engaged in this study. It was found that 24.4% were at risk of obesity, and 7.5% were obese[36].

A study was conducted by Jackson *et al*., (2007) for comparison of prevalence of overweight adolescent's girls in three countries in Eastern Mediterranean Region (Egypt, Kuwait, and Lebanon). The sample was drawn from studies conducted previously in these countries. Different cut-off-points were used (Cole *et al*. points, CDC 2000 charts, and Must *et al*). Anthropometric measurements were taken and BMI was calculated. The prevalence of overweight and obesity is illustrated in Table2-1

Table (2-1): Comparison of BMI for age in adolescent girls in three countries in the Eastern Mediterranean Region

Country	Cole et al.	Must et al.	CDC2000
Lebanon			
Overweight%	18.8	15.5	16.4
Obesity	2.1	2.7	2.7
Kuwait			
Overweight%	33.1	31.0	31.0
Obesity%	12.2	13.5	14.3
Egypt			
Overweight%	35.9	35.9	34.4
Obesity%	11.2	11.2	13.5

Source: *WHO Eastern Mediterranean Region* (Jackson *et al*., 2007)[37]

In England, there was a two-to-five-fold increase in the prevalence of overweight and obesity among children aged 5-10 years in 1997, and in 2002/3 overweight prevalence rose from 11.3% to 22.6% in boys, and 9.6% to 23.7% in girls, while obesity rose from 1.8% to 6.0% in boys, and 1.3% to 6.6% in girls[38].

Lobestein (2003) reported the prevalence of overweight among pre-pubertal children in various European countries. Data was collected for this study by requesting latest material survey with figures on childhood's BMIs, by communicating with different corporations interested in children's obesity as childhood obesity task force, and other professional bodies. This study indicated that central and Eastern Europe showed lower prevalence of overweight/obesity, contrary to higher prevalence among the southern countries of Europe. In the UK (United Kingdom), the prevalence

of obesity among children, aged 7-11 years, rose from 8% to 20% between 1984-1998; in Spain, overweight prevalence among children, aged 6-7 years, rose from 23% to 35% between 1985/6-1995/6. In France, surveys showed an increase in childhood overweight from 10% to 16% between 1992-2000. In Thessaloniki, Greece, prevalence of obesity in children, aged 6-12 years, increased by around 7% between 1984-2000 [39].

According to WHO European ministerial conference on the prevalence of obesity in Turkey, 30%-80% of adults and one third of children were overweight. International Obesity Task Force (IOTF) predicted that about 38% of school-age children in the European region would be overweight by 2010, and that more than a quarter of these children would be obese[30]. Among school-age children, the highest prevalence rates of overweight were in Portugal (7-9 years, 32%) Spain (2-9 years, 31%) and Italy (6-11 years, 27%). The lowest rates were in Germany (5-6 years, 13%), Cyprus (2-6 years, 14%) and Serbia and Montenegro (6-10years, 15%). In older children, (11 years old) it was shown that there was a greater proportion of being overweight: 17% boys, 14% of girls [30]. In England, the numbers increased from 8% to 20% between 1974 and 2003[30]. In addition, according to London's Susan Mayor, the total number of overweight and obese children rose from 22.7% to

27.7% between1995 and 2003. She emphasized that the highest rates were among children aged 8-10 years[40].

In United Arab Emirates' global school-based students, a health survey was conducted in 2005. The prevalence of overweight and obesity was as follow: 21.5% of students were at risk of becoming overweight, 12.1% were classified as overweight. There was no significant difference between male students (21.2%) and female students (21.7%) at risk of being overweight. Also there was no significant difference between the overweight male students (13.2%) and the overweight female students (11.0%)[41].

2.3 Factors associated with obesity among school children

The specific cause of obesity is not known, for it is multifactorial, and is influenced by several factors. Some of these factors are modifiable while others are not. The major causes of obesity among children are namely sedentary life, dietary composition and pattern, and socioeconomic status.

2.3.1 Sedentary versus physical activity

Physical activity is defined as "any bodily movement produced by skeletal muscles that result in a substantial increase over the resting energy expenditure[5, 13].

Although there is realistic relationship between physical activity –the major modifiable component in energy equation- and well being for people at all levels and ages [5,13] since it is plays a major role in preventing many NCDs, mainly obesity [5], it declines all over the industrialized societies [1]. According to the European Forum in Turkey "at least two-thirds of adults in European countries appear to be not physically active at recommended levels"[30]. Also according to HBSC (Health Behavior in School Aged Children) (2001/2002), the study reported that a third of the 11, 13 and 15 year-old children (34%) were reported undertaking the recommended levels of physical activity for 60 minutes at moderate intensity on five or more days a week. In this study, great variation in activity was found between different countries, and differ gender. It was higher in boys [42].

A study in the Emirates showed that 38.8% of students had spent three or more hour per day doing sitting activities during a typical or usual day, with no differences between male and female students [41]. Another study, conducted in Thusabana, South Africa, showed that overweight/obese children were least active at all times. They spent time sedentary mainly watching TV [43]. Likewise, Jordanian children viewed TV more than 2 hrs/day. This habit was significantly associated with obesity [7].

On the other hand, the increasing information communication technology, such as TV, video, and computer, as well as, living in

apartments, coupled with motorized transportation, and modern conveniences in homes, with broken relationships on family/community levels all have led to increase in sedentary life style, making people less active all over the world [5,13,44,45]. Boycy reviewed the relationship between media and obesity. A study was completed in 1985 to determine the link between obesity and media consumption. It was found that the prevalence of obesity increased by 2% in 12-17 year-olds for each additional hour of TV viewed. This research mainly sought to identify the relationship between incidence of obesity and television viewing. It was found that it was associated with obesity. Obesity incidence was the lowest in children who viewed less than one hour/day of television, and highest in those who viewed more than 4 hrs/day[44]. This research also discussed the effect of media in increasing sedentary, increasing consumption of unhealthy food either because of advertisements for different kinds of food, or because of the increasing consumption of snacks that are high in energy, fat, salt, sweetener, and carbonated beverages while watching TV[1,42,44]. According to HBSC 2001/2002 study, there was strong association between TV viewing, physical inactivity and obesity [42]. Rey-López (2007) made a review to determine the effect of sedentary behavior and obesity development in children and adolescents. He reported a positive association between television watching and obesity in children younger than 10 years.

TV viewing seemed to be the most sedentary behavior affecting overweight[45].

2.3.2 Genetic factors and parental BMI

Individual genetic factors play an important role in determining susceptibility to obesity. Studies on impact of heredity factors on obesity confirmed that heredity factors influenced 45%-75% of the inter individual variation in BMI[2,18] . Common forms of obesity are inherited in complex patterns of segregation. This means that multiple genes are involved[2,18]. As obesity tracks in families, weight status of a child's parents is strongly associated with child's risk of persistence of overweight at all ages[18]. As London's Susan Mayor pointed out "Children were much more likely to be overweight or obese if both parents were overweight or obese. Nearly one in five (19.8%) children living in households in which both parents were overweight or obese was themselves obese. While 6.7% of children living in households in which neither parents were overweight or obese. Were it reached 8.4% of children if one of the two parents was overweight or obese[40]. According to Krebs' *et al.*, (2007) which discussed the impact of parental weight status, the children with~95th percentile with at least one obese parent were at the highest risk for adult obesity[13]. Barker discussed maternal weight status and relative diseases in later life. The mother with high BMI had an increased risk of gestational diabetes. Children of diabetic

mothers have high birth weight, with excess fat, and risk of being obese during childhood[46].

2.3.3 The Role of Dietary factors and breast feeding

Nutrition of children begins early in uterus and after delivery. If mother's choice is to breastfeed, this choice will reduce her child's chance of being overweight in his/her childhood and adulthood [46]. Scholtens *et al.* (2008) conducted a study to assess the association between breastfeeding and children's diet and lifestyle at seven years of age. The study included 2,043 children born between 1996-1997. This study found that breastfed children were less likely to have an unhealthy diet later in life[47]. Both diet composition and dietary pattern play a role in increasing obesity. The plenty and variety of manufactured food with different palatable tastes, highly rich in fat, sugar, salt all the time, in addition to the spread of restaurants, have changed people's trend to food. There has also been a consumption increase as these high dense fat-sugar foods affect satiety signals to become weak, and give pleasurable mouth feel so the individual has the appetite to eat and drink more[5,38,48,49]. Nielsen *et al*., (2003) indicated that the portion size of food increased when children were eating fast food whether at home or in restaurants[14]. St-Onge *et al*., (2003) confirmed this. He found that there was about 300% increase in fast food consumption, when compared with other types, and an increase in soft

drinks and beverages[12]. Ludwig *et al.* (2001) found an association between BMI and sugar-sweetened drinks[15]. The dependence on highly dense food, salty snacks, and avoidance of fruits and vegetables, have led to overweight[5,13]. Kerbs *et al*., (2007) pointed out the effect of taking breakfast. Skipping breakfast showed a positive relationship with BMI. A follow-up study of children, aged 9-14, found that "overweight children who never ate breakfast had a greater decline in BMI than did overweight children who ate breakfast. Normal-weight children who never ate breakfast, however, had weight gains comparable to those of normal weight children''. Meal frequency and snacking demonstrate inverse relationship with BMI[13]. A follow-up cross-sectional study was done by Liebman *et al*. (2005) to assess the association between BMI and dietary intake-eating behavior, and physical activity. The study consisted of 883 men and 1,030 women aged 18-96 years. In 2003, it was 66% in male and 56% in female. This prevalence was associated with supersized portion, eating while doing another thing, consuming soft drinks and consuming fast food, in parallel with a decrease in physical activity[50].

2.3.4 Socioeconomic situation

The socioeconomic situation is largely determined by residence, income, educational level of parents, and the spread of modernization and

urbanization. All these variables are behind the increase in the prevalence of obesity all over the world. Abdul Rahim *et al.*, (2003) reported on the prevalence of obesity in both rural and urban areas in Palestine. He found that it was more prevalent in urban areas. The prevalence of obesity was 36.8% in women and 18.1% in men in rural areas as opposed to 49.1% and 30.6% in urban women and men, respectively[6]. The effect of income varies between developed and developing countries. Studies conducted in the USA and other developed countries showed an inverse relationship between lower occupational status, low income and obesity. There are those who cannot purchase healthy food, and depend on cheaper quality, that is rich in fat, salt, and sugar[44]. In developing countries, the picture is different from advanced countries but now it seems to appear in different developing countries[3,5]. A cross-sectional study was completed by Marwaha *et al.*, (2006) to assess differences in socioeconomic situation and its relationship with overweight/obesity among school children in Delhi. They classified government schools (non-fee paying) as having low socioeconomic status (LSES), and those in private schools (fee-paying) as having high socioeconomic status (HSES). About 8,840 children were randomly chosen from government schools (3,566 boys, and 5,274 girls) and 12,645 from private schools (6,197 boys and 6,448 girls). They found significant differences between socioeconomic status and BMI. The

prevalence of overweight and obesity in HSES children was 16.75% and 5.59% in boys, and 19.01% and 5.03% in girls, respectively[51].

The participation of women in the work force has promoted obesity. Their families have found themselves eating more pre-packed food, sometimes taking food away from home, or substituted main meal by snacks, thus leading to intake of unhealthier food[5]. Huerta *et al*.,(2006) investigated the effect of parental education and smoking on the child's BMI. They found that it was highly associated with the educational level of parents. The more educated the parents were, the more declines there was in the child's BMI. A positive association was found between smoking and the increase of risk for overweight. There were 8,623 school children, aged 8-13 years old involved in this study taking 85th percentile, 95th percentile cut-off-points for overweight and severe overweight [52].

2.3.5 Ethnicity, Gender and Age

There is consideration for ethnicity on obesity. According to Freedman's study (2006) which examined sex, and race/ethnicity differences in secular trends for childhood BMI, 6-17-year-old black children have much greater increase in BMI than white children. He also found that the previous thirty years period, prevalence of overweight increased three fold (from 4% to 13 %) among 6-11 year-old white children, but fivefold (from 4% to 20%) among black children in most age

groups[53]. This was emphasized in a commentary by Kimm *et al.*, (2002). She found that prevalence of overweight in Mexico was about one third higher in black girls than in white ones: 31% versus 22%. On other hand, the prevalence of obesity in Black girls was twice as high compared to white ones: 18% versus 8% respectively[29]. Terres *et al*., (2006) conducted a cross sectional study in Pelotas, southern Brazil, to assess prevalence of overweight/obesity and associated factors. Anthropometric measurement was taken. In this study, prevalence was 5.0% for obesity, and 20.9% for overweight. Pertaining to gender, it was not found to be associated with overweight/obesity but there was an inverse relationship between obesity and age[54].

2.4 Childhood obesity risk factors and health consequences

Seventy seven percent of overweight children remain obese in adulthood. Overweight / obesity exacerbate several health problems, either independently or associated with other diseases. Many of health risks associated with increasing body weight begin to appear in children and young people[23]. That was well recognized in adults.

The metabolic syndrome (also known as the insulin-resistance syndrome) is now found in early ages[23]. Del-Rio-Navarro *et al*., (2007) explored how overweight, obesity and abdominal obesity are related to the presence of high blood pressure, high triglyceride level and high glucose

level in the population of Mexico; they found that overweight/obese children were associated with higher blood pressure and triglyceride, an increase of glucose level among overweight and abdominal obesity [23]. The prevalence of the metabolic syndrome in US adolescents is 4% overall, but it is 30% to 50% in overweight children. The metabolic syndrome has a profound effect on CVD risk in youth. Data such as these suggest that risk factors associated with the metabolic syndrome that are precursors of CVD can begin in childhood but track into adulthood[26]. According to Freedman *et al* (2001) there is a weak relationship between childhood BMI and adult levels of lipids, insulin, and blood pressure and Type 2 diabetes mellitus which had been primarily a disease of adulthood [22]. However, it now occurs in adolescents typically with a BMI >30 kg/m^2 [26]. Onset of diabetes in children and adolescents can result in advanced complications such as CVD and kidney failure [55].

Other consequences of obesity are psychosocial. Obese children are exposed to social stigmatization which may cause low self-esteem. Further, they may become targets of early and systematic social discrimination[55].

Impaired glucose tolerance was highly prevalent among severe obese children and adolescents [56]. Additional health risks, asthma, hepatic steatosis, atherosclerosis, inflammation**,** obstructive sleep apnea are also associated with obesity in children and adults[33, 26].

2.5 Statement of problem

The Palestinian population was estimated to be about 3.6 million in mid-2004[57]. About 56.0% lived in urban areas, 29.0% in rural areas, and 15.0% in refugee camps[59]. About half of the population (53.0%) are children under 18 years[58]. These figures indicate the society is mostly young and urbanized.

Hypertension and diabetes affect 14% and 11% of Palestinians between 18-64 years respectively[58]. These diseases are highly correlated with overweight and obesity. Studies showed that these diseases and overweight in particular are beginning to appear among children[22,23,57]. About 77% of overweight/obesity children were still overweight in adulthood[13, 26] . The Palestinian society is fairly young and there is lack of information about anthropometric measurements for school age children[11]. There is a need to determine the potential risk factors (obesity) in particular for children to decrease mortality, and morbidity, in the adult stage.

2.6 Objectives of study:

1. To estimate the prevalence of obesity among school children aged 6-12 years in Nablus city.
2. To investigate the relationship between BMI and, socioeconomic and life style factors.

Chapter Three

Methodology

This is a descriptive cross-sectional study conducted in Nablus city. The total number of population in Nablus is 320,830 which represent 10% of total population of the West Bank. (PCBS-2007) [57].

3.1 Data source

Educational directorate provided the researcher with a list containing schools names, range of grades within each school, total number of students classified according to sex and type of school (government, private, and UNRWA).

3.2 Research design

Cross-sectional study was conducted on a sample of students who attended government, private, or UNRWA schools during the first school term between September 2008 and January 2009 in Nablus city.

This type of study characterized by its less cost, studies the relationship between different variables at a point in time. Cross-sectional analysis relates to how variables affect each other at the same time and period.

The sampling frame was all schools listed as either government, private, or UNRWA given by educational directorate at Nablus city.

3.3 Sample type

A stratified random sampling was used to select a sample, as in this study it has different segregation (strata) of school types, gender, and grade.

3.4 Study population and sampling

The size of student population with the indicated age rang is about 39,453 students. The total number of student is listed in table 3-1

Table (3-1): Number of students representing population from which the sample was selected

Type of school	**Numbers of students**		**Percent from the theoretical population**
	Male	**Female**	
Government	12,952	14,797	70%
Private	3,716	2,206	15%
UNRWA	2,029	3,753	15%
Total	18,697	20,756	100%
	39,453		

Planning section in Educational directorate in Nablus governorate (2007-2008)

The total number of schools in Nablus is ninety one, 66 governments, 16 private and 9 UNRWA. Schools were sorted according to gender then each one of these schools was given a number. The different numbers written on pieces of papers, these pieces were put in a bag and

numbers were randomly chosen. The following table shows the chosen schools.

Table (3-2): The names and types of school chosen

Name of school	Type of school	gender
Ibn El-Haitham	government	Male
Ibn- Hazem	government	Male
Abdul Rahim mahmood	government	Female
Fadwa toqan	government	Female
Banat Mokhyam rqm1	UNRWA	Female
Thokoor nablus	UNRWA	Male
Nablus al mokhtalth	UNRWA	Male
Tala' a-Al Amal	private	Female
Islamic school for boy	private	Male

According to students sampling, the researcher used simple random sampling for class section. In government schools the whole class was taken, while in private and UNRWA systematic random sample was selected.

3.5 Sample size

Consist of 1825 student; a stratified random sampling was done. The students sample was selected to represent distributions of schools by type and gender, according to the following equation

$$n = \frac{1.96^2 \times (1-p)}{p \times \varepsilon^2}$$

Where 1.96^2 is statistical parameter corresponding to the confidence level of 95%.

P: is the expected prevalence: 0.05

Є: relative precision = 0.20

Table (3-3): Distribution of sample size on different school types

Name of school	Type of school	Gender	Number of students	Total
Ibn El-Haitham	government	Male	300	300
Ibn- Hazem	government	Male	295	295
Abdul Rahim mahmood	government	Female	341	341
Fadwa toqan	government	Female	341	341
Banat Mokhyam rqm1	UNRWA	Female	144	144
Thokoor nablus	UNRWA	Male	70	70
Nablus al mokhtalth	UNRWA	Male	60	60
Tala' a-Al Amal	private	Female	102	102
Islamic school for boye	private	Male	172	172
Total				**1825**

Number of students included in the study

A total of 1900 questionnaire and the consent form (appendix B) were distributed to students among the chosen schools. Only1824 questionnaires were returned. The researcher excluded those less than 6 years, or more

than 12 years leaving 1744 to be included in this study. Table (3-4) shows the total numbers of students included in the study

Table (3-4): Students included in the study stratified by gender and type of school

Type of school	**Numbers of students**		**Total**
	Male	Female	
Government	605	665	1270
Private	155	95	250
UNRWA	107	117	224
Total	867	877	1744

3.6 Inclusion and exclusion criteria

Students between 6-12 years were included. While those, student less than 6 or more than 12 years old, were excluded.

3.7 How will the subjects be allocated?

A permit from the head of Nablus Directorate of Education and from high rank authority of UNRWA to conduct this study was obtained. A consent form was signed by one of the parents for every student. (See appendix B)

3.8 Instrument of the study.

Both interview and questionnaire were used. Primarily the researcher interviewed students to explain how to deal with questionnaire.

Permission was obtained from heads of educational directorates. Then the researcher visited the chosen schools to inform them about the survey. All the classes from the first to the sixth grade in each selected school were included in the study. All the students in each class participated in the study.

Questionnaire was adopted from a study done in Jordan by khader, and Irshaidat (permission was granted). (Appendix B) The questionnaire has two sections; the first section was filled in classroom, including personal information: age, grade, gender, date of birth, school type in addition to anthropometric measurements. The second section was concerned about socioeconomic status of family, frequency of eating fast food, and drinking carbonated beverages, Information about parents weight, high, in addition to information about the sedentary/activity of individual.

The researcher filled the first part of the questionnaire at the classroom. After that, the researcher measured the height, weight, waist circumference, hip circumference, and mid upper arm circumference for each student in the class. The researcher herself did all measurements. And then the students were asked to take the questionnaire to their homes for the second part to be filled by one of their parents or guardians and to bring it

back the next day. The filled questionnaires were collected in the next day and defaulters were asked to bring it in the following day.

3.8.1 Anthropometric measurements:

The researcher personally took the different anthropometric measurements at the class room, after instructing the students to take off heavy clothes, shoes and belt.

3.8.1.1 Weight:

One suitable weight balance measuring to nearest 0.5 kg (seca type) was used. This scale was standardized daily by using standard five kg weight. Students were weighed while wearing school uniform, without shoes.

3.8.1.2 Height:

Suitable metallic meter scale measuring to the nearest 0.5 cm, fixed on the wall was used. The researcher measured the heights of the subjects without shoes, taking into account that heals, buttocks, shoulders and head are closed to vertical wall surface, and ruler was used horizontally to take height.

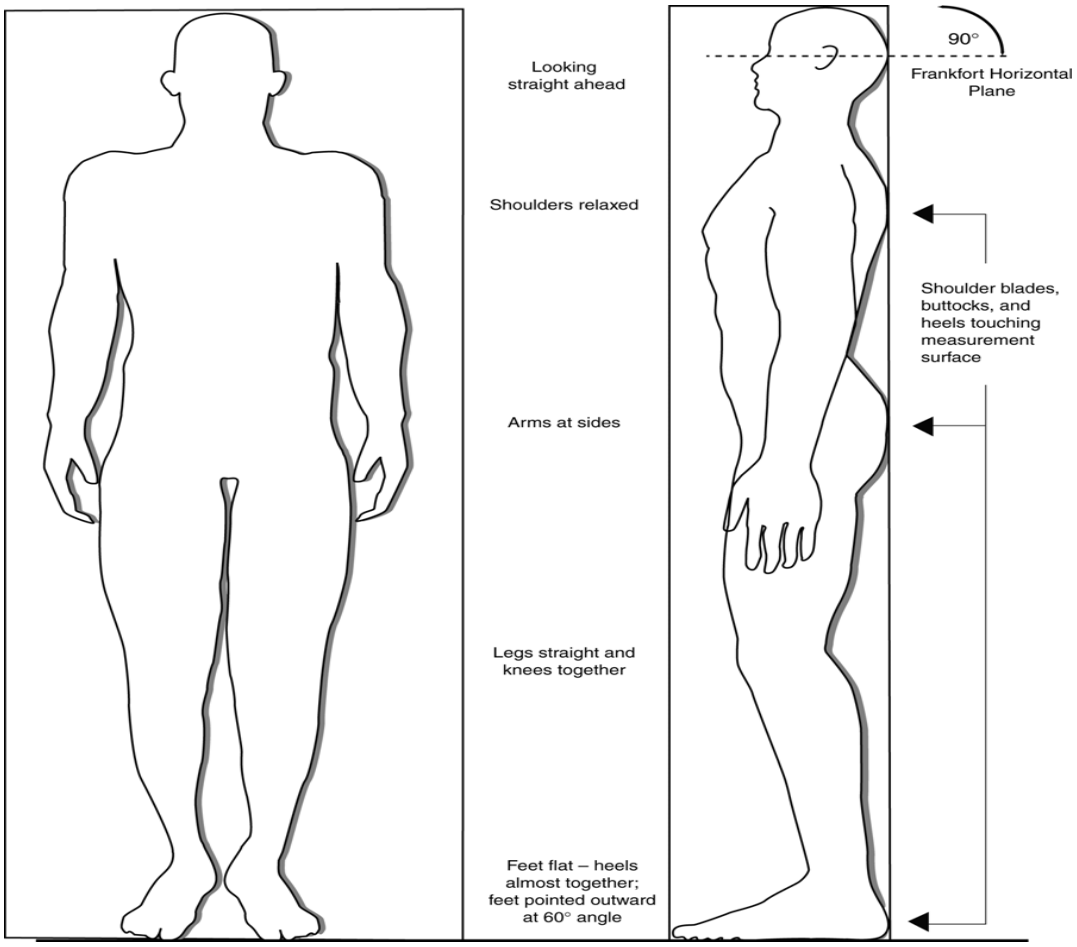

Fig (3-1): standing height position

Source: National health and Nutrition Examination survey-2007 Anthropometry Procedures Manual [59]

3.8.1.3 Waist and Hip Circumference:

Were measured to the nearest 0.1 cm using a plastic tape with the students in the standing position. Waist circumference was measured at the smallest girth between the costal margin and the iliac crest. Hip circumference was measured at the level of maximum protrusion of the buttocks. (Figure 3-2)

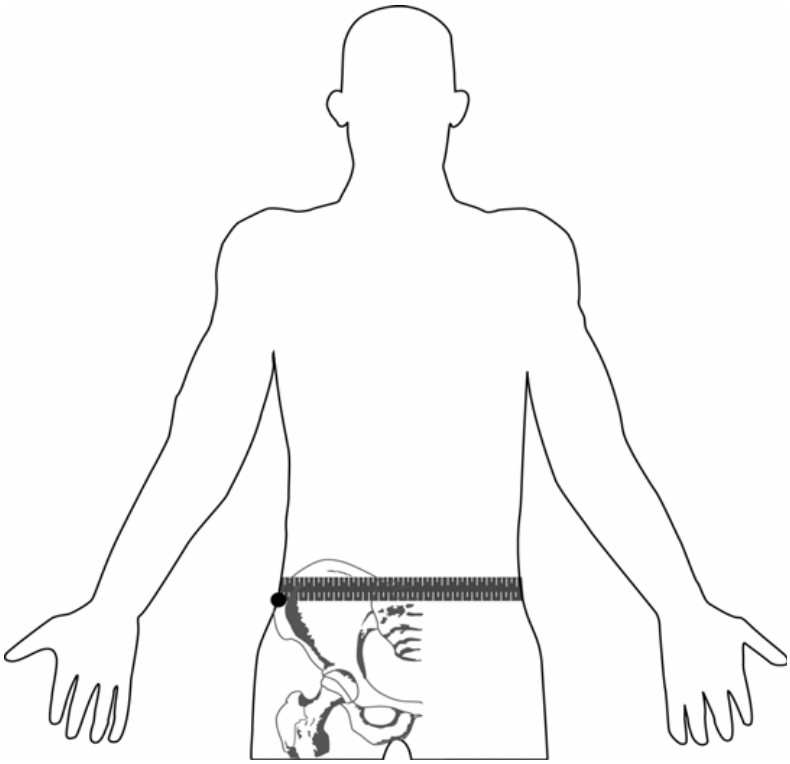

Figure (3-2): Measuring tape position for waist circumference[59]

3.8.1.4 Mid Upper Arm Circumference (MUAC)

The MUAC was measured using a plastic tape. The length from the tip of the left shoulder to the tip of the left elbow was measured then the length was divided by two. The tape was wrapped around the straighten arm at that midpoint to measure the MUAC. The measurements were recorded to the nearest 0.5cm**.**

3.8.2 Operational Definitions.

The following operational definitions were used in this study.

Body mass index (BMI): Weight in kilograms over height in meters squared (BMI = wt/ ht^2) [5].

Overweight/Obesity: Obesity was defined for the study based on the child's age and sex specific BMI cut off for overweight/obesity according to international cut off points. See the following table (3-5)

Table (3-5): International cut off points for BMI for overweight & obesity based on gender for children between 2-18 years[9].

International cut off points for body mass index for overweight and obesity by sex between 2 and 18 years, defined to pass through body mass index of 25 and 30 kg/m^2 at age 18.				
	BMI 25 kg/m^2		BMI 30 kg/m^2	
Age (years)	Males	Females	Males	Females
6	17.6	17.3	19.8	19.7
7	17.9	17.8	20.6	20.5
8	18.4	18.3	21.6	21.6
9	19.1	19.1	22.8	22.8
10	19.8	19.9	24.0	24.1
11	20.6	20.7	25.1	25.4

3.9 Validity:

The questionnaire was adapted from a similar study in the region, granted permission by the authors (see appendix B). To ensure that the content of the questionnaire was valid, the questionnaire was reviewed and accordingly edited by two specialists at An-Najah National University, one at Al-Quds Open University, and one of the Ministry of Agriculture. The specialists approved of the validity of the questionnaire in general but suggested some modifications.

Pilot test:

The questionnaire was distributed among 40 families to be answered. After four days the researcher visited these families, answering the questionnaire again after interviewing one of the parents. Both questionnaires were tested using correlation test to confirm validity.

3.10 Ethical consideration:

The study was approved by the Research Ethical Committee of the Faculty of Higher Education at An-Najah University, and Directorates of Education in Nablus city, Palestine. Approval was also obtained from high rank authority of UNRWA. The consent form was signed by one of the parents (see appendix B).

3.11 data analysis:

BMI was calculated according to IOTF cut off points, and categorized as normal, overweight, and obese.

The data was analyzed using the statistical package for the social sciences (SPSS) version 15. Continuous variable were expressed as mean ± SD, while categorical variables were expressed as frequency.

Significance was tested using chi-square test, while correlation was tested using Kendall tau, and Spearman.

Chapter Four

Results

4.1 Descriptive analysis of study sample

One thousand nine hundred questionnaires were distributed. Out of these, 1824 responded giving a response rate of 96%. Eighty respondents were younger than 6-years of age or older than 12 year's age and were excluded. The final number of participants that were included was 1744. Approximately half (49.7%) of the participants were males with mean age of 8.90 ±1.57 years. Females had a mean age 8.9 ±1.54 years. More than two thirds (70%) of the students were from governmental schools, others were from private and UNRWA schools.

The means and standard deviation of anthropometric measurements for males were as follows: weight: 30.90 ± 8.98 kg; height: 1.35± 0.59 m; BMI: 17.27±3.4 kg/m^2; waist circumferences: 59.03± 8.77 cm; hip circumferences: 67.60± 8.58 cm; arm circumferences: 20.09± 3.30 cm.

The means and standard deviation of anthropometric measurements for females were as follows: weight: 30.35±9.27 kg; height: 1.32±0.11m; BMI: 16.96±2.97 kg/m^2; waist circumferences: 57.67±7.72 cm; hip circumferences: 69.01±8.78 cm; and arm circumferences: 19.87±3.06 cm.

4.1 Prevalence of overweight/ obesity according to gender

Among the 1744 participants, 13.3% of the males were overweight, and 7.9% were obese, while 13.6% of the female participants were overweight and 4.9% were obese as shown in table (4-1)

Table (4-1): Distribution of males & females according to body weight categories, and gender

BMI	Male	Female
	Frequency (%)	Frequency (%)
Normal	683 (78.8)	715(81.5)
Overweight	115 (13.3)	119 (13.6)
Obese	69 (7.90)	43 (4.90)
Total	867(100.0)	877 (100.0)

Tests have shown a statistically significant association between body weight categories and gender. Data shows that males and females are similar in the percentage of overweight, but there are more obese males compared to females as seen in table (4-2) below

Table (4-2): Relation between body weight categories with gender

BMI	Male	Female	Chi-Square	P-Value
	Frequency (%)	Frequency (%)		
Normal	683 (78.8)	715 (81.5)	6.779	0.034*
Overweight	115 (13.3)	119 (13.6)		
Obese	69 (7.90)	43 (4.90)		

* Significant at ($\alpha = 0.05$)

4.1.1 Prevalence of overweight\ obesity according to age among males

The Percentage of overweight\obesity among different age groups of males is shown in Table (4-3) and Figure (4-1) below. The prevalence peaks at age 7 years.

Table (4-3): Distribution of body weight categories according to age in males

Age	**Normal**	**overweight**	**Obese**	**Total**
	Frequency (%)	Frequency (%)	Frequency (%)	
6	48 (7.0)	10 (8.70)	7 (10.1)	65
7	102 (14.9)	26 (22.6)	24 (34.8)	152
8	90 (13.2)	17 (14.8)	9 (13.0)	116
9	140 (20.5)	18 (15.7)	12 (17.4)	170
10	174 (25.5)	19 (16.5)	10 (14.5)	203
11	129 (18.9)	25 (21.7)	7 (10.1)	161
Total	683 (100)	115 (100)	69 (100)	867

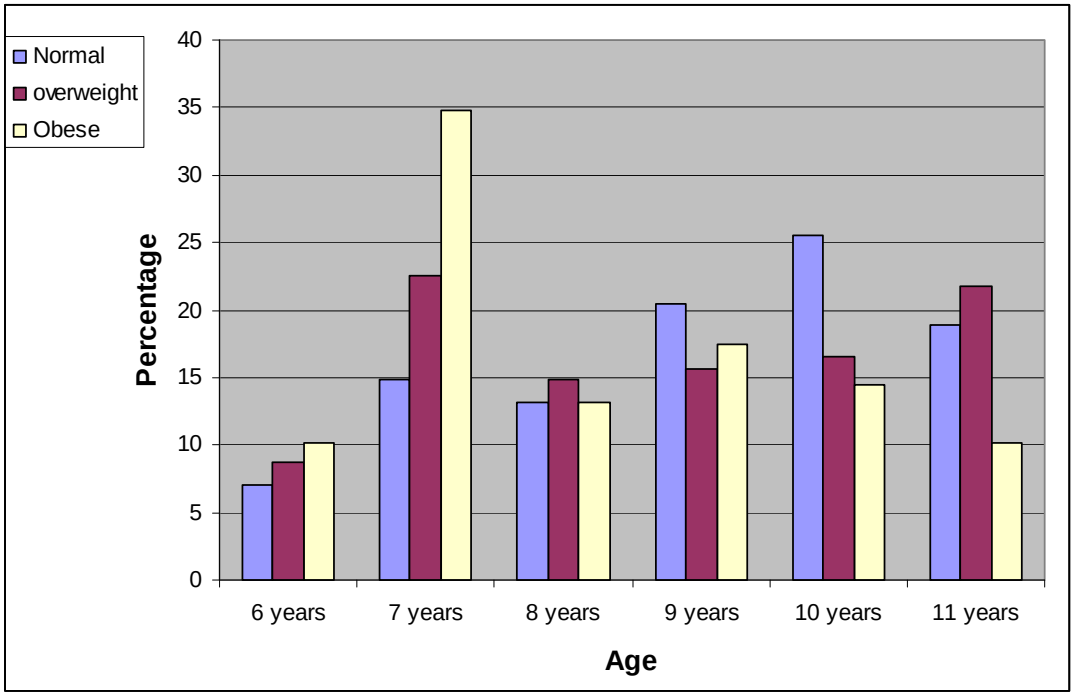

Figure (4-1) : Percentage of body categories according to age in males

4.1.2 Prevalence of overweight\ obesity according to age among females

The Percentage of overweight\obesity among different age groups of females is shown in Table (4-4) and Figure (4-2) below. Frequency of overweight/obesity was highest at age 7 and 8 years.

Table (4-4): Distribution of body weight categories according to age in females

Age	Normal	Overweight	Obese	Total
	Frequency (%)	Frequency (%)	Frequency (%)	
6	42 (5.90)	11(9.20)	6 (14.0)	59
7	90 (12.6)	22 (18.5)	12 (27.9)	124
8	132 (18.5)	25 (21.0)	9 (20.9)	166
9	142 (19.8)	25 (21.0)	6 (14.0)	173
10	159 (22.2)	17 (14.3)	1 (2.30)	177
11	150 (21.0)	19 (16.0)	9 (20.9)	178
Total	715 (100)	119 (100)	43 (100)	877

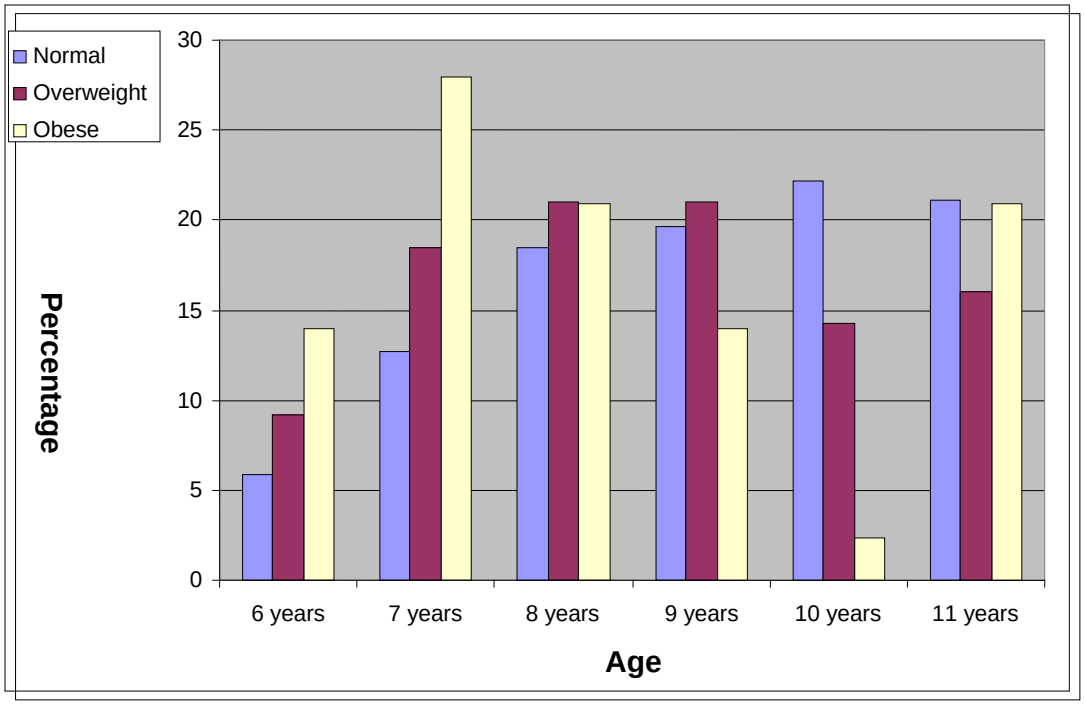

Figure (4-2): Percentage of body categories according to age in females

4.2 Determinants f BMI

Several variables were tested to determine their effect on BMI. The variables included socioeconomic class of the family, dieting habits, physical activity, and parental BMI.

4.2.1 Relationship between BMI and Socioeconomic status

Data presented in Table (4-5) shows a significant correlation between mother's education and BMI, (r= 0.07, p=0.004), a direct proportion is detected.

Table (4-5): Correlation between BMI and mother education

Mother education	BMI			Spearmen correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
≤ Elementary	347	44	26	0.072	0.003**
Secondary	644	106	44		
2 years College	177	31	19		
University and above	208	50	23		

** Statically significant at (α = 0.05).

In addition, students allowance (pocket money) daily showed significant positive correlation (r= 0.087, p= 0.00001), the more allowance, the more prevalence of overweight/obesity. See table (4-6)

Table (4-6): Correlation between body weight categories and pocket money

Pocket money	BMI			Spearman correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
One NIS	381	49	17	0.087	0.00001 *
1.5 NIS	150	23	9		
≥ 2 NIS	855	161	86		

** Statically significant at (α = 0.05).

The monthly income of the family did not show a significant correlation with BMI (r=0.04, p=0.13). Furthermore, the type of school was

not significantly correlated with BMI (r=-0.003, p=0.89). Tables (4-7) and (4-8).

Table (4-7): Correlation between BMI and monthly income

Monthly income	BMI			Spearmen correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
< 1000 NIS	270	45	11	0.041	0.132
1000-1500 NIS	430	70	35		
1501-2000 NIS	183	22	16		
≥ 2000 NIS	185	33	22		

Table (4-8): Correlation between BMI and school type

School	BMI			Kendall's tau correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
Government	1019	174	77	-0.003	0.896
Private	190	36	24		
UNRWA	189	24	11		

Mother's work was not significantly associated with students' BMI (p=0.062).table (4-9)

Table (4-9): Relation between BMI and mother profession

Mother profession	BMI			Sig*
	Normal	Overweight	obese	
Don't Work	1147	184	85	0.062
Work	196	40	22	

* Significant at ($\alpha = 0.05$)

4.2.2 Relationship between BMI and dietary habits

The data showed that eating quick meals was not significantly correlated with BMI (r=¯0.002 p=0.930), while drinking carbonated beverages showed significant positive correlation with BMI (r=0.053 , p=0.030). Table (4-10) and (4-11).

Table (4-10): Correlation between number of quick meals per week and BMI

Weekly having quick meals	BMI			Spearmen correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
None	313	55	16	-0.002	0.930
Once a week	605	103	67		
≥ twice a week	336	50	24		

Table (4-11): Correlation between BMI and number of carbonated bottles that a child drinks weekly

Number of carbonated beverages bottles that child drink weekly	BMI			Spearmen correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
Never	262	36	21	0.053	0.030*
Less than once	12	4	1		
Once	477	75	31		
2-4 days	492	87	41		
5-6 days	46	7	6		
Every day	44	15	8		

* Statically significant at ($\alpha = 0.05$).

There was no significant correlation between the child's BMI and the fact that the child had breast fed, formula fed or both during lactation period (r=0.027, p= 0.242).Table (4-12)

Table (4-12): Correlation between BMI and nutrition during lactation period

Nutrition	BMI			Kendall's tau correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
Breast fed	909	142	71	.027	0.242
Formula fed	141	31	11		
Both	333	59	30		

Furthermore, the number of cooking \ week did not show any significant correlation with BMI (r= - 0.03, p= 0.223).Table (4-13)

Table (4-13): Correlation between BMI and the number of cooking\week

Cooking	BMI			Spearman correlation coefficient (r)	P- value
	Normal	Overweight	Obese		
Daily	310	58	30	-0.030	0.223
Once per two days	703	116	56		
≤ twice a week	350	56	25		

4.2.3 Relationship between BMI and physical activity /sedentary

The relation between BMI and physical activity was investigated based on these parameters: the kind of transportation to school and the length of outside play. There was a significant association between BMI and type of transportation. Students who went to school on foot had lesser BMI than students who went to school by transportation.

Additionally, the length of outside playing showed significant association with BMI, students who played more than an hour\day had lesser BMI than students who played less than an hour/day. Tables (4-14) and (4-15) below.

Table (4-14): Relation between BMI and type of transportation

Type of transportation	BMI			Sig*
	Normal	Overweight	obese	
On foot	1063	170	72	0.015*
Transportation	326	62	40	

* Statically significant at ($\alpha = 0.05$).

Table (4-15): Relation between BMI and the length of playing\day

Daily playing time	BMI			Sig*
	Normal	Overweight	obese	
< 1 hour	439	78	50	0.016*
≥ 1 hour	903	139	58	

* Statically significant at (α = 0.05).

The time spent watching TV and playing videogames has no significant relationship (P=0.255) with BMI, as well as the time spent watching TV, less or more than or equal to 2 hours/day. See next table

Table (4-16): Relation between BMI and Daily watching TV/ computer & playing video games

Daily watching	BMI			Sig*
	Normal	Overweight	obese	
< 2 hours	359	53	26	0.517
≥ 2 hours	1001	175	84	

* Statically significant at (α = 0.05).

4.2.4 Relationship between BMI and Parents' BMI

The analysis of the data regarding the mother's and father's BMI with child's BMI are shown in Table (4-17). It was found that both mother's and father's BMI had significant positive correlation with the child's BMI (r=0.117, p= 0.0001), and (r= 0.148, p= 0.0001) for the mother and the father, respectively.

Table (4-17): Correlation between the child'sBMI, and his mother's and father's BMI

	Mother's BMI		Father's BMI	
	r	P	r	P
Child BMI	0.117**	0.0001**	0.148**	0.0001**

** Statically significant at ($\alpha = 0.05$).

Chapter Five
Discussion

This study was the first study that estimates the prevalence of overweight and obesity among 6-12 years old children and determines their associated factors in Nablus city. The etiology of obesity is still not understood, especially because it more likely arises from the interaction between the genetics and the environmental factors[5]. Few cases of child obesity arise as a result of genetic factors, like Prader-willi syndrome, or thyroid disorder, or as a side effect of steroid drugs [60]. The environmental factors still play an important role in developing obesity. Behavioral and social factors affect energy intake, thus developing obesity [30]. This study deals with some socioeconomic and life style factors thought to be responsible for childhood obesity.

Obesity is defined as excess body fat [5]. The diagnosis depends on the measurement techniques used. In the field of research, the techniques used include under water weighing, bioelectrical impedance, and dual energy x-ray absorptiometey. These methods enable diagnosis to be based on the percentage of body fat [19]. In investigation studies, weight for height, BMI was prevalently used [13,30]. For adults, the definitions of obesity is agreed, for example BMI >25 for overweight and >30 for obese[5]. However, for

children, no such consensus exists because of their changing body shape as they progress through normal growth [9].

5.1 Discussion of overweight/obesity prevalence

In this study the overall prevalence of overweight was 13.3% among boys and 13.6% among girls, and that of obesity was 7.9% among boys and 4.9% among girls. The differences in prevalence of overweight and obesity between sexes was significance towards males.

No previous studies were carried out in West Bank at this age group which makes it difficult to compare. One study done by Al-Sabbah *et al.*,(2008) in West Bank and Gaza that included 17817 Palestinian adolescents from 405 schools found that about 16.5% of adolescents were overweight and obese (13.3% overweight; 3.2% obese) [20], while in Irbid, a study on 2131 Jordanian children aged 6-12 years found that 19.4% were overweight and 5.5% were obese[7]. A study in Kuwait that included 14,659 students aged 10- 14 years showed that the prevalence of overweight and obesity among males was 30.0% and 14.7%, respectively, while it was 31.8% and 13.1% among females, respectively[62]. While Hedly *et al*., (2004) reported that 31.5% of the USA children and adolescents were at risk of overweight, and that 16.5% were actually overweight [32].

With respect to the differences in ages and ethnicity, this study indicated that obesity but not overweight was higher than in Jordan and even among Palestinian adolescents, but lower than children in Kuwait and USA.

5.2 Discussion of determinant

5.2.1 Relationship between BMI and socioeconomic status

The results of several studies completed in developed countries showed an inverse relation between the income, wealth, mother's education, and overweight/obesity. On the other hand, in developing countries direct correlation was seen[5,7,13]. In this study, mother's education and pocket money showed a significant positive correlation with BMI. While family monthly income, type of schools, and mother's work were not significantly correlated with BMI. These results disagreed with study done by Chakar *et al.*, (2006) in Lebanon, they explained the high overweight prevalence due to socioeconomic status[36]. Mo-Suwan *et al.*, (2000) in Thailand indicated that boys and girls in the high income families had higher mean BMI level [21], and according to Khader *et al.*, (2008) study in Jordan, the daily pocket money was associated with overweight, while family monthly income associated with obesity [7]. The study results could be explained by the fact that mothers with higher education mostly will have a job leaving their children for longer times

enabling them to take several unhealthy snacks. The pocket money of children positively correlated with their BMI. It is important to note that children could gain more pocket money from relatives, purchasing several unhealthy snacks that are available in schools' canteens and groceries. Also many families hide the real monthly income they have. Although private schools students are considered as wealthy (coming from wealthy families), yet there was no significant correlation between type of school and students BMI. This is disagreed with Marwaha *et al*., (2006) were they reported that prevalence of overweight/obesity at private schools was higher[51]. This is probably due to parents believes that private's schools are better than government schools.

5.2.2 Relationship between BMI and dietary habits

Nutrition of children begins at delivery. Breast feeding has been associated with a reduced risk of overweight in childhood and adulthood [49]. In this study there was no significant correlation between nutrition during lactation period and BMI. That disagreed with scholtens *et al*., (2008) where they reported in their cohort study on Dutch children that breastfed children had significantly lower risk of overweight at 8 years[47]. The differences may be due to differences in duration of lactation. Majority of mothers here lactate their children for > 16 week which is the recommended breastfeed duration.

Nowadays, the modern food environments provide a wide range of opportunities to consume food and drink products leading to what is called passive consumption[48]. This study showed significant positive correlation between BMI and drinking carbonated beverages. This is in agreement with Ludwig *et al.*, (2001) who found that for each consumed additional serving of sugar sweetened drinks BMI and obesity increased after adjustment for anthropometric, demographic, dietary and life style variable[15]. On other hand, eating quick meals did not significantly correlate with BMI. This is not in agreement with a study done by Thompson *et al*., (2004) where they reported that the frequency of eating quick food was positively associated with BMI z-score in their longitudinal study among girls at Massachusetts Institute of Technology[62]. The difference is probably due to difference in gender and the lack of sufficient power of the study to detect significant association of obesity with quick meals.

5.2.3 Relationship between BMI and physical activity/sedentary

There are concerns that increasing levels of sedentary behaviour in children and adolescence are reducing energy expenditure while energy intake remains unaltered resulting in a rising prevalence of overweight and obesity. In this study, no significant association was found between time spent on watching TV and BMI. These results disagree with the results which emerged from WHO/HBSC survey which found that prevalence of

obesity increased by 2% in 12-17 years old for each additional hour of television viewed. Obesity incidence increases in children who viewed more than 4 hours per day [42]. Kruger *et al*., (2005) found that overweight children were the least active, mainly watching TV all the time[43]. In addition, with Khader *et al*., (2008) also found that the prevalence overweight (obesity) is more if sitting more than two hours/day[7]. Al-Sabbah *et al*., (2008) found that of overweight boys were significantly less physically active than non-overweight[20].

This difference is probably due to cross sectional study type where there are suggestions that there is delayed effect of TV viewing on body fatness, which may not be evident when examining cross sectional data. In addition, it may be due to inaccurate measurement since this part of questionnaire was self-reported by parents. Also in this study, playing for more than one hour, taking motorized transportation was significantly associated with BMI respectively. This is in partial agreement with Sibia *et al*., (2003) since they found that obesity in children was significantly more prevalent in those who do not exercise[63]. The less active child increases the probability to be overweight since activity is the major modifiable component of energy equation that consumes energy.

5.2.4 Relationship between BMI and parents BMI

The weight status of the child's parents was associated with the child's risk of persistence of overweight. The risk of adult obesity was greater if one or both parents were obese[13].

A strong positive correlation between child BMI and mother's and father's BMI was found in this study. This is probably due to either genetic or life style factors. Several studies concurred with this result. Mo-suwan *et al*., (2000) found that the risk for obesity in child increased 2-3 fold if having family history of obesity[21]. Terres *et al*., (2006) study was assuring that result as well[54].

5.3 Limitations:

The limitations of the study occurred due to the self reported questionnaire. Additionally, body mass index fails to distinguish between fat and fat free mass. (muscle and bone).error in sample distribution leads to use nonparametric tests.

5.4 Conclusion:

This study found a relatively moderate prevalence of overweight and obesity among 6-12 years Palestinian children. Prevalence of overweight and obesity was 13.3%, 7.9%, respectively among males and 13.6%, 4.9% respectively, among females. This was lower than the prevalence of overweight among USA children and adolescents (31.5% at risk of overweight,16.5% overweight), Kuwait adolescents were30.0% considered as overweight and14.4% for obesity. And among Lebanon adolescents aged 10-19 years (20.0%, 5.0% for overweight, obesity respectively). Parental BMI, pocket money, and mother education level, drinking carbonated beverages, way of transporting to school, and daily length in playing, showed a strong correlation with the BMI of the students. Thus, familial disposition has to be taken into account to identify risk groups for preventive measures.

5.5 Recommendations:

According to the findings of this study, it is recommended to:

1. Conduct further studies on same age groups in different areas in Palestine.
2. Give attention to what schools canteen offer for children.
3. Increase awareness about childhood overweight/obesity through Publications and symposia, for parents.
4. Official authority should arrange four starting common clubs for different sport activities.
5. Family involvement in the responsibility to modify eating habits, and increasing activity mainly sharing their children when playing.
6. Distribution of pamphlets by the health office at schools to children and advice them on their eating habits as much as possible.

REFERENCES

1. Ulijaszek SJ. **a disorder of convenience**. Obesity Reviews, 2007; 8 (s1):183–187.

2. Farooqi IS, O'Rahilly S. **Genetic factors in human obesity**. Obesity Review, 2007; 8 (s1) : 37–40 .

3. Abdul-Rahim HF, Abu-Rmeileh NME, Husseini A, Holmboe-Ottesen G, Jervell J, Bjertness E. **Obesity and selected co-morbidities in an urban Palestinian population**. International Journal of Obesity, 2001; 25: 1736 – 1740.

4. Kopelman P. **Health risks associated with overweight and obesity.** Obesity Reviews, 2007; 8 (s1) : 13–17

5. *WHO obesity*: **Preventing and managing the global epidemic**. Technical report series894.WHO: Geneva 2000.

6. Abdul-Rahim HF, Holmboe-Ottesen G, Stene LCM, Husseini A, Giacaman R, Jervell JBE. **Obesity in a rural and an urban Palestinian West Bank population**. International Journal of Obesity, 2003; 27: 140-146.

7. Khader Y, Irshaidat O, Khasawneh M, Amarin Z, Alomari M, Batieha A. **Overweight and Obesity Among School Children in Jordan: Prevalence and Associated Factors**. Matern Child Health Journal 2008; doi 10.1007/s10995-800-0362-0.

8. Khatib1 O. **Noncommunicable diseases: risk factors and regional strategies for prevention and care** .Eastern Mediterranean Health Journal, 2004;10(6)

9. Cole TJ, Bellizzi MC, Flega**l** KM, **a**nd Dietz WH. **Establishing a standard definition for child overweight and obesity worldwide: international survey**, British Medical Journal, 2000; 320: 1240 ;

10. De Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. **Development of a WHO growth reference for school-aged children and adolescents**. Bulletin of the World Health Organization 2007; 85:660-7.

11. MOH, WHO. UNICEF .The state of nutrition, of West Bank and Gaza Strip, comprehensive review of nutrition situation of West Bank and Gaza Strip. June2005

12. St-Onge MP, Keller KL, Heymsfield SB. **Changes in childhood food consumption patterns: a cause for concern in light of increasing body weights**. American Journal of Clinical Nutrition.2003; 78 :1068 – 1073

13. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, and Styne D. **Assessment of child and adolescent overweight and obesity.** Pediatrics 2007; 120(Supplement_4): S193 - S228.

14. Nielsen SJ, Popkin BM. **Patterns and trends in food portion sizes, 1977–1998**. JAMA. 2003; 289 :450 –453

15. Ludwig DS, Peterson KE, Gortmaker SL. **Relation between consumption of sugar-sweetened drinks and childhood obesity: A prospective, observational analysis.** Lancet.2001; 357 :505 –508

16. Reilly JJ, Methven E, McDowell ZC, Hacking B, Alexander D, Stewart L, Kelnar DJ. **Health consequences of obesity.** Archives of Disease in Childhood 2003;88:748-752

17. Lob-Corzilius T. **Overweight and obesity in childhood – A special challenge for public health**. International Journal of Hygiene and environmental Health 2007; 210(5): 585-589 doi:10.1016/j.ijheh.2007.07.019. 585-589

18. Lyon HN, Hirschhorn JN, **Genetics of common forms of obesity: a brief overview**. American Journal of Clinical Nutrition, 2005;82(1):215s-217s

19. Wardlaw G, Hampl J, Disilvestro R, **Perspectives in nutrition.** Six edition;An-Najah university library. Chapter thirteen.

20. Al Sabbah H, Vereecken C, Abdeen Z, Coats E, Maes L . **Associations of overweight and of weight dissatisfaction among Palestinian adolescents:findings from the national study of**

Palestinian schoolchildren (HBSC-WBG2004). Journal of Human Nutrition and Dietetics. doi: 10.1111/j.1365-277X.2008.00901.x

21. Mo-suwan L, Tongkumchum P, Puetpaiboon. **Deterterminants of overweight tracking from childhood to adolescence: a 5y follow-up study of Hat Yai schoolchildren.** International Journal of Obesity, 2000; 24(12):1642-1647

22. Freedman DS, Khan KL, Dietz WH, Srinivasan SR, and Berenson GS. **Relationship of childhood obesity to coronary heart disease: Risk factors in adulthood: The Bogalusa Heart Study**. Pediatrics, 2001; 108: 712-718.

23. Del-Rio-Navarro E, Velazquez-Monroy O, Lara-Esqueda A, Violante-Ortiz R, Fanghanel G, Perez-Sanchez L, and Berber A. **Obesity and Metabolic Risks in Children**. Archives of Medical Research. 2008;39,Issue2:215-221,doi:10.1016/j.arcmed.2007.07.008

24. Riva Tauman R, O'Brien LM, Ivanenko A, and Gozal D. **Obesity rather than severity of sleep-disordered breathing as the major determinant of insulin resistance and altered lipidemia in snoring children**. Pediatrics 2005 116: e66-e73

25. Pinhas-Hamiel O, Doron-Panush N, Reichman B, Nitzan-Kaluski D, Shalitin S,and Geva-Lerner L. **Obese children and adolescents: A**

Risk group for low vitaminB_{12}concentration. Arch Pediatr Adolescent, 2006; 160: 933 – 936

26. Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, Robinson ThN, Scott BJ, Jeor SSt, andWilliams CL. **Overweight in children and adolescents:Pathophysiology, consequences, prevention, and treatment**. Circulation, 2005; 111:1999 – 2012

27. Strauss R S. **Childhood Obesity and Self-Esteem.** Pediatrics, 2000;105 No. 1 :p. e15

28. Stene LCM, Giacaman R, Abdul-Rahim H, Husseini A, Norum KR, Holmboe-Ottesen G. **Obesity and associated factors in a Palestinian West Bank village population**. European Journal of Clinical Nutrition. 2001; 55: 805– 811.

29. **Commentary:** Childhood Obesity: A New pandemic of the new millennium. **Pediatrics. 2002; 110. 5: pp. 1003-1007**

30. WHO European Ministerial conference on counteracting obesity; Istanbul, Turkey,15-17 November, 2006;**The challenge of obesity in the WHO European Region and the strategies for response**.Available at http://www.euro.who.int/document/nut/instanbul_conf_edoc06.pdf

31. Apfelbacher CJ, Loerbroks A, Cairns J, Behrendt H, Ring J, Krämer U. **Predictors of overweight and obesity in five to seven-year-old children in Germany: Results from cross-sectional studies**. BioMed Central Public Health. 2008; 8: 171.

32. Hedley AA, Ogden CL, Johnson CL, Carroll MD,Curtin LR,Flegal KM. **Prevalence of Overweight and Obesity Among US Children, Adolescents, and Adults, 1999-2002.** Journal of the American Association, 2004; 291:2847-2850.

33. U.S. Department of Health and Human Services. **The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity.** Rockville, MD: Public Health Service, Office of the Surgeon General, 2001

34. Baratta R, Degano C, Leonardi D,Vigneri R, Frittitta L. **High prevalence of overweight and obesity in11-15-year-old children from Sicily.** Nutrition Metabolism and Cardiovascular Diseases, 2006; 16(4):249-255

35. Bar Dayan Y, Elishkevits K, Grotto I, Goldstein L, Goldberg A, Shavarts S, Levin A, Ohana N, Onn E, Levi Y, Bar Dayan Y. **The prevalence of obesity and associated morbidity among 17-year-old Israeli conscripts**, Public Health, 2005;119(5):385-389

36. Chakar H, and Salameh PR. **Adolescent obesity in Lebanese private schools**. European Journal of Public Health 2006; 16: 648 - 651.

37. Jackson RT, Rashed M, Al-Hamad N, Hwalla N, and Al-Somaie M. **Comparison of BMI-for-age in adolescent girls in 3 countries of the Eastern Mediterranean Region**. Eastern Mediterranean Health Journal, 2007;13 (2)

38. Canoy D, Buchan I. **Challenges in obesity epidemiology.** Obesity Reviews. 2007; 8 (s1): 1–11.

39. Lobstein T, Frelut ML. **Prevalence of overweight among children in Europe.** Obesity Reviews, 2003; 4:195-200

40. London Susan Mayor. **Obesity in children in England continues to rise.** *BMJ* ,2005;330:1044

41. United Arab Emirates, Global School-based Student Health Survey.2005

42. WHO/HBSC forum 2006,addressing the socioeconomic determinant of healthy eating habits and physical activity levels among adolescents:pp14-25 Available at http://www.euro.who.int/document/e89375.pdf

43. Kruger R, Kruger HS, Maclntyre UE. **The determinants of overweight and obesity among 10-to-15-year-old school children in the north west province, south Africa-the THUSA BANA**(transition

and health during urbanization of south Africans; BANAchildren)study, Public Health Nutrition, 2005;9(3):351-358

44. Boyce T. **The media and obesity**. Obesity Reviews. 2007 ;8 (s1): 201–205.

45. Rey-López JP,Vicente-Rodríguez G, Biosca M, and Moreno LA. **Sedentary behavior and obesity development in children and adolescents.** Nutrition, Metabolismand Cardiovasculer Diseases. 2008;18(3): 242-251

46. Barker DJP. **Obesity and early life**. Obesity reviews, 2007; 8(1):45-49

47. Scholtens S, Brunekreef B, Smit HA, Gast GM, Hoekstra MO, de Jongste JC, Postma DS, Gerritsen J, Seidell JC, WijgaAH. **Do Differences in Childhood Diet Explain the Reduced Overweight Risk in Breastfed Children?** nature publishing group,2008;16(11) Available at www.obesityjournal.org

48. Rolls ET. **Understanding the mechanisms of food intake and obesity**.
Obesity Reviews, 2007; 8 (s1): 67–72.

49. Jebb SA**. Dietary determinants of obesity.** Obesity Reviews, 2007; 8(s1), 93-97.

50. Liebman M, Pelican S, Moore SA, Holmes B, Wardlaw MK, Melcher LM, Raidl M, Wheeler B,Haynes GW. **Dietary intake-, eating**

behavior-, and physical activity-related determinants of high body mass index in the 2003 Wellness in the Rockies cross-sectional study. Nutrition Research, 2006;26(3):111-117

51. Marwaha RK, Tandon N,Singh Y, Aggarwal R, Grewal kh, Mani K**. A study of growth parameters and prevalence of overweight and obesity in school children from Dilhi**, Indian Pediatrics, 2006;43(17)

52. Huerta M, Bibi H, Haviv J, Scharf S, Gdalevich M. **Parental smoking and education as determinants of overweight in Israeli children.** Prev Chronic Dis. 2006 Apr;3(2):A48. *Epub* 2006 Mar 15.PMID: 16539789 [PubMed - indexed for MEDLINE]

53. **Freedman DS, Khan LK, Serdula MK, Ogden CL, and Dietz WH.** Racial and Ethnic Differences in Secular Trends for Childhood BMI, Weight, and Height. **Obesity, 2006;14:301-308**

54. Terres NG, Pinheiro RT, Horta BL, Pinheiro KAT, Horta LL. **Prevalence and factors associated to overweight and obesity in adolescents**. Rev Saúde Pública 2006;40(4)

55. http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/consequences.htm

56. Sinha R, Fisch G, Teague B, Tamborlane WV, Banyas B, Allen K, Savoye M, Rieger V, Taksali S, Barbetta G, Sherwin RS, Caprio S. **Prevalence of Impaired Glucose Tolerance among Children and**

Adolescents with Marked Obesity. The New England Journal of Medicine, 2002;346(11):802-810

57. Palestinian Central Bureau of Statistics, 2006. Annual Report 2006. Palestinian Children–Issues and Statistics. Child Statistics Series (No.9) .Ramallah-Palestine

58. FAO. 2005. Nutrition country profile Palestine. Food and Agriculture Organization of the United Nations. Rome. Available at ftp://ftp.fao.org/es/esn/nutrition/ncp/pse.pdf

59. http://www.cdc.gov/nchs/data/nhanes/nhanes_07_08/manual_an.pdf

60. Rudolf MCJ.**The obese child.** Archives of disease in childhood education and practice edition, 2004;89:ep57-ep62

61. AL-Isa AN. **Body mass index, overweight and obesity among Kuwaiti intermediate school adolescents aged 10-14 years**. European Journal of Clinical Nutrition. 2004 Sep; 58(9):1273-7.

62. Thompson OM, Ballew C, Resnicow K, Must A, Bandini LG, Dietz WH. **Food purchased away from home as a predictor of change in BMI z-score among girls.** International Journal of obesity and Relat Metabolic Disorder, 2004;28(2):282-9

63. Sibai AM, Hwalla N, Adra N, Rahal B. **Prevalence and covariates of obesity in Lebanon: findings from the first epidemiological study**. Obes Res (2003) 11:1353–61

Appendix A

Appendix

Questionnaire

Section one: Personal information (student)

No._____ Date _____

1-Student name: _____

2-School name: _____

3-Grade : _____

4-Male _____ Female _____

5-Age _____ yr. _____ month

6-Height _____ m 7- Weight _____ kg

8-Waist circumferences _____ cm

9-Hip circumferences _____cm

10-Arm circumferences _____cm

Part II: information about mother and child

1- Residence _____ telephone_____

2-Religion : Muslim _____ Christian_____

3-Mother age _____

4-Mother's height ____ ms 5-Mother's weight_____ kgs

6-Mother’s educational level

Nil ____ elementary ____ secondary _____ university ____

7-Mother Job don't work outside home _____

work outside home_____

8-Family income (from total sources)_____NIS

9-Do you have a car at home Yes____ No _____

10-Number of family member : girls 0__ 1__ 2 __ 3 __ >4__

Boys 0__ 1__ 2 __ 3 __ >4__

11-Date of birth _____

12-Your number between your brothers and sisters

1____2___3___ 4____ differ signify _____

13-Did you smoke during first stage of this child pregnancy?

Yes _____ No _____

14- Birthday weight for this child _____ kgs

15-How was the delivery of this baby?

Natural _____ caesarean _____

16-What type of this child nutrition at lactation period?

Natural _____ artificial _____ both _____

17-How far your house from school of this child?

Less than 1km___ (1-2)km ___ (2-3)km ___ 4km &more ___

18-How your child goes to school?

On foot _____ special car ____ service _____

19-How many hours your child spend daily watching TV/ computer,& playing video games? (_____) hour

20-How many hours your child study daily? (_____) hour

21-How many hours approximately your child spend playing and riding bicycle out home? (_____) hour

22-How much you pay your child for his daily expenses? (_____) NIS

23-How many time you cooking in a week?

Daily _____ one in tow days _____ twice a week or less ____

24-What kind of food your child takes with hem to school?

_____

25-How many times your child takes junk food during a week(such pizza, burger, shawerma, fried potato). (_____)

26-How many bottles of Coca-Cola your child drink during the week? (_____)

27-How many times your child eat chocolate, biscuits: (_____)

Chips: (_____)

Father information:

1- Father age (_____)

2- Father's height _____ ms

3-Father's weight _____kgs

4-What is the father’s educational level?

Nil ___ elementary ____ secondary ____ university ___ higher education ___

5-father’s job: don’t work _____ work(type of work_____)

استبيان لقياس مدى انتشار السمنة بين أطفال المدارس
(6-12 سنة) والعوامل المتعلقة بها.

رقم الاستبانة:---------- التاريخ : ----------

معلومات تتعلق بالطالب

1- اسم الطالب:

2- اسم المدرسة:

3- الصف:

4-العمر:

ذكر 2- أنثى. 1-- 5- الجنس

6- الوزن :( )كغم.

7-الطول:( )م.

8- محيط الخصر:( )سم.

9-محيط الورك:( )سم.

10-محيط الذراع العلوي المتوسط:( )سم.

معلومات تخص الأم وطفلها

1-مكان الإقامة:_____ هاتف_____

2-الديانة: 1- مسلمة _____ 2- مسيحية _____

3- عمر الأم:_____

4- وزن الأم:(_____) كغم 5- طول الأم:(_____) م

6-تعليم الأم:

1-غير متعلمة 2-أساسي 3- ثانوي 4-كلية 5- جامعية فما فوق.

7-مهنة الأم: 1- لا تعمل خارج البيت 2- عاملة خارج البيت.

8-دخل الأسرة الشهري(من جميع المصادر): ( )شيقل.

9-هل تملكون سيارة خاصة في البيت نعم _____ لا _____

10- عدد أفراد أسرتك: بنات: 0 ، 1 ، 2 ، 3 ، >4 .

أولاد: 0 ، 1 ، 2 ، 3 ، >4 .

11-تاريخ ميلاد طفلك:__/__/_____.

12-ما ترتيب ابنك بين إخوته: 1-الأول 2-الثاني 3-الثالث 4-الرابع أو أكثر

13-هل كنت تدخنين في المرحلة الأولى من حملك بطفلك هذا؟

1- نعم _____ 2- لا_____.

14- كم كان وزن طفلك عند الولادة؟ _____كغم.

15--كيف كانت ولادة طفلك هذا؟ 1-طبيعية 2-قيصرية

16-ما نوع تغذية طفلك في فترة الرضاعة:1- رضاعة طبيعية 2- رضاعة صناعية(رضّاعة)

3- كلاهما معا

17-كم يبعد بيتك عن مدرسة طفلك؟

1 - أقل من 1كيلومتر 2- (1-2)كم 3- (2- 3)كم

4- 4كم أو أكثر.

18-كيف يذهب طفلك إلى المدرسة ؟

1- مشيا على الأقدام 2- بالمواصلات العامة(السر فيس) 3- سيارة خاصة

19-كم ساعة تقريبا يقضي طفلك يوميا في مشاهدة التلفاز والكومبيوتروالعاب الفيديو(الأتاري)؟ (

_____)ساعة.

20-ما معدل دراسة طفلك يوميا؟(_____) ساعة.

21-كم ساعة تقريبا يقضي طفلك يوميا في اللعب وركوب الدراجة خارج المنزل ؟

( ) ساعة.

22-كم يأخذ طفلك مصروفه اليومي؟( )شيقل.

23-تقومين بالطبخ:1- يوميا 2- مرة كل يومين 3-مرتين في الأسبوع أو أقل.

24-ماذا يأخذ طفلك معه إلى المدرسة؟

25--كم مرة في الأسبوع يأكل طفلك الوجبات السريعة(البرغر، البيتزا، الشاورما، البطاطا المقلية)؟ ( ).

26-كم زجاجة كولا يشرب طفلك أسبوعيا؟( ).

27-كم مرة في اليوم يأكل طفلك؟الشيـــبس:( )

الشوكولاتة والبسكويت:( )

معلومات تخص الأب

1-عمر الأب:(_____)سنة

2-وزن الأب:(_____)كغم.

3-طول الأب:(_____)سم.

4-تعليم الأب: 1-غير متعلم 2-أساسي 3- ثانوي

4-كلية 5- جامعي فما فوق.

5-مهنة الأب: 1- لا يعمل 2- عامل(المهنة:_____-).

Appendix B

جامعة النجاح الوطنية

كلية الدراسات العليا

انتشار زيادة الوزن والبدانة بين أطفال المدارس بعمر 6- 12 سنه في مدينة نابلس والعوامل المتعلقة بها

إعداد

منتهى عبد اللطيف صبيح

إشراف

د. أنسام صوالحة

د. سامر حميدي

قدمت هذه الأطروحة استكمالاً لمتطلبات درجة الماجستير في الصحة العامة بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس- فلسطين.

2009

انتشار زيادة الوزن والبدانة بين أطفال المدارس بعمر 6- 12 سنه في مدينة نابلس والعوامل المتعلقة بها

إعداد

منتهى عبد اللطيف صبيح

إشراف

د. أنسام صوالحة

د. سامر حميدي

الملخص

هذه دراسة وصفية تمت في مدينة نابلس خلال الفصل الأول من السنة الدراسية 2009/2008 تهدف الى الاستقصاء حول مدى انتشار زيادة الوزن والبدانة بين تلاميذ المدارس الذين تتراوح أعمارهم بين 6-12 سنة ، ودراسة الاسباب التي لها علاقة بها.

شملت هذة الدراسة 1744 طالباً, و قد اعتمد مؤشر السمنة لقياس مدى انتشارها. وقد قام الباحث بأخذ الأطوال والاوزان في داخل الغرف الصفية وقام بتوزيع الاستبانة.

تقسم الاستبانة إلى قسمين ، القسم الأول ويشمل نوع المدرسة ومقاييس الطلبة، واما القسم الثاني فيشتمل على اسئلة متعلقة بالوضع الاجتماعي والاقتصادي ونمط الحياة (النشاط البدني وعادات التغذية)

وتم تحليل البيانات باستخدام برنامج التحليل الاحصائي SPSS V15.0

وقد وجد ان معدل زيادة الوزن والبدانة هي 13.3 ٪ و 7.9 ٪ على التوالي لدى الذكور، في حين أنها وجدت 13.6 ٪ و 4.9 ٪ على التوالي بين الإناث .

وقد تبين من الدراسة ان تعليم الأم و المصروف اليومي وعدد زجاجات المشروبات الغازية ووسيلة النقل إلى المدرسة ومدة اللعب خارج المنزل وموشر السمنة لدى الآباء لها علاقة مع مؤشر كتلة الجسم لدى الطالب. في حين أن الدخل الشهري للأسرة ونوع المدرسة

ومهنة الأم وعدد الوجبات السريعة في الأسبوع والرضاعة الطبيعية ومشاهدة التلفاز ليست لها علاقة مع مؤشر كتلة الجسم للطالب.

تعتبر هذه الدراسة أول دراسة في هذا المجال وفقا لهذه الفئة من العمر في الضفة الغربية ، ومحفزة لعمل ابحاث اخرى لدراسة السمنة والعوامل المؤثرة بها وطرق الوقاية منها في شمال الضفة الغربية.