

**An-Najah National University
Faculty of Graduate studies**

**The Association of Lifestyle Determinants and Body
Mass Index with School Achievement of Ninth
Grade Students in the District of Tulkarm, Palestine**

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**This Thesis is Submitted in Partial Fulfillment of the Requirements
for the Degree of Master in Public Health, Faculty of Graduate
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.....

Dedication

بعد حمد الله وشكره جل و علا الذي من علي بإتمام هذه الرسالة
و الذي ابتغي فضله و رضاه بها،
إلى من أضاءت لي الدنيا وتمرتني بحبها و حنانها وعطفها،
من علمتني الصبر والتضحية الى أمي العنونة الغالية.
إلى من دائما يشجعني لأكون أفضل، من تعلمت منه القوة و الجلد
إلى أبي العزيز.
إلى روح جدي الغالي رحمه الله .
إلى رباحين قلبي، أختي الغالية و أخوتي الأعماء و أبنائهم.
إلى صديقاتي و زميلاتي و كل من شجعني و وثق بقدراتي.
إلى من لهم معزة في قلبي أحبوا لي الخير وأرادوا لي الأفضل .
إلى أبناء شعبي، الذين ارتبطوا بالأرض و حافظوا على الجذور.
مع خالص حبي، تقديري واهتمامي

*To my dear family: mother, father, sister and my
brothers for their patience and encouragement,
To my friends and colleagues.*

WITH ALL LOVE AND RESPECT

MAYADAH

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To my friends and colleagues and everyone wanted me to succeed, progress and develop and shared me with their emotions.

WITH ALL LOVE AND RESPECT

Mayadah

الإقرار

أنا الموقعة أدناه مقدمه الرسالة التي تحمل عنوان:

The Association of Lifestyle Determinants and Body Mass Index with School Achievement of Ninth Grade Students in the District of Tulkarm, Palestine

علاقة محددات نمط الحياة و مؤشر السمنة بالتحصيل المدرسي لطلبة
الصف التاسع الأساسي في محافظة طولكرم - فلسطين

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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:

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Abstract

This study was conducted to investigate the impact of some lifestyle determinants and body mass index on school achievement of ninth grade students in the district of Tulkarm and study the factors associated with them. The study was carried out on 781 ninth grade students (407 females, 374 males) attending governmental schools of the district. The data were collected via personal interviews. Descriptive statistics, ANOVA, and Fisher's exact test were employed in the analyses. The results showed that 62.9% of the students (46.7% of females, 80.6% of males) take breakfast before going to school, but no relationship was found with school achievement. Of all interviewed students, 27% (29% of females, 24.7% of males) suffered from low concentration in the first three lessons. Low concentration in class was associated with skipping breakfast, smoking, non-daily consumption of fruits, tiredness, psychological stress at school, and waking up late and was associated with poor school achievement. Daily consumption of fruits improved student scores in Technology, English language, and the overall average. Students suffering from psychological stress at home had lower average scores than their peers in some subjects and overall average. About 6% of male students were smokers (none of the females declared smoking) and smoking was

associated with low school achievement. About 72% of students (82.5% of females, 61.5% of males) don't receive any help from their parents in their lessons and homeworks and these students achieved higher scores in all subjects (except General Science) than those who received assistance. About 32% of students had average night sleeping hours of 8 to 9 hours per day and these students had higher scores in General Science and Technology, as well as overall average than students sleeping less than 8 hours or more than 9 hours. There were no differences in school achievement between students with regard to eating lunch and dinner, BMI status, weekly physical activity, daily time spent watching TV, daily time spent using computer and method of transport.

These results should raise awareness among students and parents for the need to follow healthy lifestyle such as eating breakfast and focus on eating fruits daily, to avoid smoking, to have good sleep-wake up habits, to have enough family time and avoid factors which cause stress to students.

Chapter One
**Background and Conceptual
framework**

Chapter One

Background and Conceptual framework

1.1 Background

Lifestyle plays an important role on the person's health and well-being (WHO, 2008). The growing development and use of technology affect the daily lifestyle and behavior in a positive or negative direction. Some lifestyle determinants as breakfast, physical activity, smoking, watching television and using computer are important factors on society, (WHO, 2008) particularly students. Adolescence is one of the most important stages in a person's life (Kurz et al., 1994; Roldan et al., 1994). In this stage, physiological changes occur (Tanti et al., 2010) and the adolescents may acquire both good and bad nutritional habits. The impact of these habits appears on the adolescents' behavior, nutrition, health and performances. Malnutrition is associated with emotional concerns and social problems such as mental retardation, aggressive behavior and decrease in intelligence and has a relationship with chronic diseases. Breakfast is an important meal which helps assimilation in school and increases performance (Connors & Blouin, 1983, Gajre et al., 2008). Musaiger et al., (2005) found that students who take breakfast obtain adequate nutrient intake and thus are more likely to do physical activity, have more energy and ability to be alterative in school and are more likely to have high school achievement; they also tend to have lower BMI (body mass index), (Fiore et al., 2006). The BMI as well as physical activity affect school achievement (Taras and Potts-Datema, 2005) while obesity is

due to consumption of unsuitable food and poor physical activity. Time spent in watching television and using computer can increase the chance of having obesity and decreasing school performance (Charles, 2008) since it is associated with lowering physical activity and eating foods rich in calories (Kaur et al., 2003).

In 2008/2009, there were 2488 schools in Palestine (1848 in the West bank and 640 in Gaza):1833 governmental schools, 309 belong to the UNRWA and 288 private schools. The number of students was about 1.1 million (549 thousand males and 549 thousand females). Among these there were 772 thousand in governmental schools, 255 thousand in UNRWA schools and 82 thousand in private schools. The number of children less than 18 years (at the end of 2008) was 1.9 million from a total of about 3.9 million with an increase in percentage of people less than 15 year to 42.5%. The demographic statistics indicate that most of Palestinian community will consist of children in the incoming years. In the district of Tulkarm there were 119 schools (in the academic year 2008-2009) with 40,522 students (20,457 females and 20,065 males), 34,217 (17,012 females, 17,025 males) in primary schools, and 6,305 students (3445 females, 2860 males) in secondary schools (PCBS, 2009).

In 2006, the average family size was 5.7 in the north of West Bank. The indicator of increase in living cost in March 2008 was 38.58 % (35.55% in the West Bank and 34.81% in Gaza). About one half of the Palestinian population lived under the formal poverty level which is 2.10

US dollars daily and 16% lived in severe poverty and that is mainly due to lost jobs. Due to Israeli occupation measures, 63.7% of Palestinians can't insure a suitable food where 61.9% obtained bank loans and 43.3% sold their possessions to feed their families and 32.1% of families depend upon food assistance from international governmental institutions, UNRWA and other organizations (PCBS, 2009).

The average of malnutrition among children increased where 6 out of 100 of less than 5 years suffer from stunting with the highest percentage found in Selfit and the lowest in Tulkarm. In 2006, the percentage of stunting was 10.2% among children less than 5 years, underweight (2.9%), wasting (1.4%). Stunting and wasting were higher among males and higher in the West Bank than in Gaza; 20% of students suffered from iodine deficiency and 22% of children (12-59 month) suffered from vitamin A deficiency; about 38% of children (6-59 month) had or suffered from anemia (35.5% in the West Bank and 41.6% in Gaza). In 2007, the major reason of infant mortality in the West Bank was diseases related to the respiratory system including inflammation (40.1%), malformation (16.1%), and birth with underweight (13.4%), (Palestinian Central Bureau of Statistics, 2009). Life expectancy in 2008 was 70.2 years for males and 73 years for females (70.6 years for males and 73.6 years for females in the West Bank). Two in ten people smoke in the north of West Bank (Palestinian Central Bureau of Statistics, 2007). The highest percentage was in Qalqilia and the lowest was in Tulkarm. One in ten persons suffers

from at least one chronic disease; the highest percentage was in Qalqilia and the lowest was in Selfit (PCBS, 2009).

1.2 Conceptual framework

Previous studies showed that several factors affect school achievement of school students (Figure 1.2.1 and Figure 1.2.2).

Socio-demographic factors (gender, type of locality, family size, educational level of parents, occupation of parents and family income) are associated with student scores. Achievement of males in mathematical assignments was better than females (Mills, 1993), but according to Kimball (1989) females outperformed males in mathematics. Others (Ajewole and Okebukola, 1998) showed that males achieved higher in science than females while on the contrary, females achieved better in history tests, language abilities as writing skills, vocabulary and word fluency than males (Wilberg and Lynn, 1999). School achievement also can be affected by family size where higher school achievement was associated with small size of family (Eman and Keegan, 2005; Marjoribanks, 1996) and poor scores were linked with large families (Goux and Maurin, 2005; Marks, 2006).

Education level of parents is an important factor; education of parents enhanced students' achievement (Grissmer, 2003; Musgrave, 2000). Ferguson (1991) found that college-educated parents were associated with better school performances of students.

Other studies found that occupation of parents affected school achievement of students where (Simon, 2004; Dubey, 1999). Crane (1991) found that students with parents of high occupational levels were more likely to achieve better in Math. Zill et al., (1995) showed that poverty and welfare receiving was negatively associated with school scores.



Figure (1.2.1): Factors related to school achievement

School environment, such as the badly-constructed school buildings, is associated with poor achievement (Bakare, 1994). Schools that lack the resources make students face some mental and behavioral health problems. Improving class room resources can reduce the problems and enhance students' achievement (Milkie and Warner, 2011). The overcrowded class

rooms (El-Desoki, 2005) can weaken students' motivation to achieve good school scores. Adeyemo (2005) noticed that the quality of the teaching staff could affect school achievement where the selection of appropriate methods and materials for teaching in addition to writing the lesson objectives promote school achievement (Asikhia, 2010; El-Desoki, 2005; Ajayi, 1988). Morakinyo (2003) found that not adopting the verbal reinforcement and enhancement policy by teachers and teachers' bad comments on the performance of students can defeat them and reduce their performance. Other factors include students' psychological problems, the lack of individual assistance, the lack of encouragement either by parents or by teachers, fear of exams and the concentration difficulties all decrease school scores of students (Hembree, 1988; Needham, 2006). Moreover, depression and anxiety are said to negatively affect the academic abilities of students, which in turn weakens school achievement (Cole et al., 1999). Several studies (Ganesan, 1995; Suldo et al., 2009; Rydell et al., 2010) showed that students achieve worse due to exposure to academic stress. A study by Kouzma and Kennedy (2004) found that the main sources of stress were exams, homework and time spent on studying, which reduces the time allocated to family or sleeping.

Family problems were found to have an important effect on school scores. The democracy and behavior of parents leading to fear and anxiety reduction enhance self-confidence of school children and give them a strong will to succeed in their study (Aremu, 2000). On the other hand, the existence of a barrier between sons and fathers, the permanent problems at

home, parents' objection to their children's hobbies and their attempt to choose a future career for them, the lack of family interest in duties and the absence of encouragement all lead to negative reactions on the sons' part (Sa'ed, 2009).

Students of compound or polygamous families suffered from poor school achievement because of their exposure to mental pressures as well as the vulnerability to social delinquency and lack of time spent in the study as they are involved in several tasks, compared with children from nuclear families who find time to study (Ajala and Iyiola, 1988).

Family support in learning and education was indicated in some studies as one of the factors associated with school achievement. The more the parental involvement in their children's education is, the better the children's performance and education at school will be. Family involvement may include supporting their children in learning and educational progress, the discussion between parents and their children about school and academic matters (Lee, 1994; Sui-Chu and Willms, 1996). Attending meetings, participating in sport activities, volunteering, providing money for learning resources, sharing school in decision-making and participating in special parenting training programs had a positive impact on school achievement of their children (Sui-Chu and Willms 1996); Stevenson and Baker, 1987; Lee, 1994; Olatoye and Ogunkola, 2008)

Relationships between teachers and families also affect school children. Effective collaboration between parents, teachers and the community helps to remove barriers to work effectively and motivate students to learn by providing a learning environment at home and school (Lee and Chroninger, 1994; Willms, 1986).

Also receiving tutoring from community volunteers was investigated in various studies. Parents who do not encourage their children to take private lessons discover that their children find it difficult to make a significant progress in school achievement (Olatoye and Ogunkola, 2008).

Dietary habits (taking breakfast, taking milk products at breakfast, taking lunch, taking dinner and daily consumption of fruits) influence school performance. Breakfast enhances diet quality (Affenito et al., 2005; Wilson et al., 2006) by providing the important nutrients; moreover, it enhances physical activity and lowers the likelihood to get overweight due to lower body mass index. Breakfast increases energy, reduces tardiness, increases students' attention at school, and improves cognitive ability, memory and school performances, especially, those related to mathematics and reading and writing skills (Wesnes et al., 2003). Some studies (Simeon and Grantham-McGregor, 1989; Nicklas et al., 1993) confirmed that students who skip their breakfast or who do not regularly take it, usually suffer from laziness, tardiness, sleepiness, school attention decrease, lower physical activity and low school achievement. For example, a study showed that higher percentage of students who skip breakfast do not meet

two-thirds of their recommended dietary allowances of vitamins A, E, D and B6 (Nicklas et al., 1993). The study also showed that they tended to eat candies, fast food and other kinds of food that are rich in high calories. These cause laziness and low physical activity which would in turn lead to an increase in body mass index, increased likelihood to obesity and an increase in students' tendency to smoking. Andersen et al., (1998) reported that students who skip breakfast become less concerned with their health, more likely to smoke, more likely to have lower physical activity and lower school performance. Overweight and obese adolescents were less likely to eat breakfast than non overweight students (Boutelle et al., 2002).

Some researchers (Briefel et al., 1999; Grantham-McGregor et al., 1998; Miller et al., 1998) showed that consumption of breakfast improves school performance especially in mathematics, reading, vocabulary, cognitive tests, and memory. Also mood, behavior, emotion, attention and health status are affected by skipping breakfast because students are more likely to be tired, having depression and anxiety (Briefel et al., 1999; Grantham-McGregor et al., 1998; Miller et al., 1998). Children who miss breakfast didn't do well in mathematics and had the potential to repeat a grade (Alaimo et al., 2001). Bellisle (2004) found an association between taking breakfast and school performance where taking breakfast enhanced student's academic performance. Taking part in breakfast - eating sessions at schools can improve math grade, attendance and punctuality (Murphy et al., 1998; Powell et al., 1998). Students eating balanced breakfast meal, not one kind, didn't make many mistakes and acted faster in mathematics and

number checking tests (Wyon et al., 1997). A study (Kleinman et al., 1998) confirmed that skipping breakfast make children exposed to behavioral, emotional, and academic disorders. Other researchers (Simeon et al., 1998; Pollitt et al., 1995) showed that children who are malnourished tend to have lower results in cognitive tests. Children who let themselves hungry are expected to be tardy, and absent more than other breakfast-eaters and tend to have behavioral, emotional, and academic troubles more than their peers (Murphy et al., 1998). They are also more likely to be deprived from school activities, to be alienated and be alone (Alaimo et al., 2001). Two studies (Simeon and Grantham-McGregor, 1989; Chandler et al., 1995) demonstrated that supplying slightly malnourished children with food at school is more likely to improve their speed and memory in cognitive tests. Also children who don't skip breakfast depict a high cognitive function, attention and memory (Wesnes et al., 2003). Children who skip breakfast find it difficult to differentiate among similar images, make more errors and have weak memories (Pollitt et al., 1998; Pollitt et al., 1981). But children do better on vocabulary tests as well as figure matching activities after eating breakfast (Jacoby et al., 1996; Pollitt et al., 1998). Kleinman et al., (1998) showed that if one compares children who don't eat breakfast to their low- income peers, he finds out that the former are more likely to repeat grades and to receive special education or mental health support. Affenito et al., (2005) described the association of breakfast intake with dietary calcium and fiber and BMI. The study proved that frequent consumption of breakfast was associated with higher calcium and fiber

intake and healthy BMI. Girls who used to take breakfast had lower BMI (Fiore et al., 2006). A significant benefit for academic performance appears clearly in cognitive learning, mathematics, reading, concentration and writing (Symons, 1997). So, both good nutrition and adequate physical activity lead to better academic performance.

BMI status is associated with school achievement. Overweight children are more likely to be overweight in adulthood. Bagully (2006) found that low school achievement was associated with overweight students in standardized tests, especially Mathematics. Also, Taras and Potts-Datema (2005) found a positive relationship between overweight and bad school achievement.

Social and other patterns of behavior (feeling tired in class, feeling low concentration in the first three lessons, exposure to psychological stress at home or at school, parental help, sleep-wake up behavior) influence school achievement. Some researchers indicated that lack of concentration and attention resulted in poor school achievement (Keoghi et al., 2004; Eysenck, 2001; Needham, 2006). A study by Wolfson and Carskadon (2003) conducted on high-school adolescents showed that students with high school achievement had early sleep-wake up schedules compared to students with lower achievement. Lack (1986) confirmed that students who achieve poor grades sleep late and wakeup late.

Smoking status also had clear impact on school scores; a study conducted by the Palestinian School Health Center (2002) found that

smoking negatively affected school achievement. Others (Borland, 1975; Palmer, 1970; Collins et al., 2007; Ellickson et al., 2001) found that smoking was significantly correlated with low school performances compared with good achievement of non smokers.

Sedentary lifestyle factors (physical activity, method of transport to and back from school, daily time spent in watching TV and using computer) also have an impact on school achievement. Watching TV and using computer may lead to overweight and less physical activity, especially when it is associated with eating fast food and snacks of high calories. A regular physical activity of three to four times on a weekly average (not less than 1/2 hour a day) is said to give the body its needs of flexibility, toleration and general protection. Fitness also protects internal organs such as the heart and blood veins (Batty and Lee, 2002) and enhances their performance as well (California Department of Education, 2002) as increasing concentration, grades of Math and literacy and decreasing the disturbance of behavior (Shephard, 1997). Several studies found that physical activity improved academic achievement (Dwyer et al., 1996, 2001; Shephard, 1997; Taras and Potts-Datema, 2005). Two studies (Shephard et al., 1984; Shephard et al., 1997) demonstrated that allocating more time for physical activity can lead to increased test scores; particularly in the area of mathematics and another study (Symons et al., 1997) linked physical activity programs to stronger academic achievement, increased concentration, and improved math and reading and writing test scores. Students with daily physical activity exhibit better attendance, more

positive attitude to school and superior school performance; especially in mathematics and reading skills. Cohen (2003) proved that girls who seek to increase their weight tend to skip breakfast and are less likely to have physical activity or tend to smoke (70 %) compared with girls who don't (51%). Anderson et al., (1998) confirmed a relationship between physical activity and time spent in watching TV with body weight and fitness. Boys and girls who spent more hours in watching TV(4 hours daily) had higher body fat and higher BMI. Another study by Sharif and Sargent (2006) confirmed that watching TV also affects school performances. Students who watch TV for long time tend to have poor school performance since watching TV shortens the time allotted for learning, doing homework and for learning sports (Sharif and Sargent, 2006; Sharif, 2007). Excessive time spent in watching TV also decreases the students' ability to read books. In addition, it lessens students' attention to the teacher as well because they don't sleep enough (Sharif and Sargent, 2006; Sharif, 2007). Students become more likely to consume various types of food stuff as a consequence of TV commercials (Sharif and Sargent, 2006). This means that eating habits can be affected and that students become overweight because of eating unhealthy food and consuming snacks of high calories while watching TV.

Unhealthy nutritional habits, poor diet and inadequate physical activity and smoking can cause cardio-vascular diseases, diabetes, cancer, hypertension, and other chronic diseases and have both short and long-term consequences on learning and school achievement.

Little research was carried out on school students of the West Bank to investigate the factors influencing school achievement. Based on the results of previous mentioned studies, the researcher will investigate the association of the following factors (depicted in figure 1.2.2) on school achievement of ninth grade students in the district of Tulkarm:

1. Socio-demographic factors.
2. Dietary habits.
3. Smoking, social, psychological and other behavioral patterns.
4. Sedentary lifestyle.
5. Health status measured as BMI status.

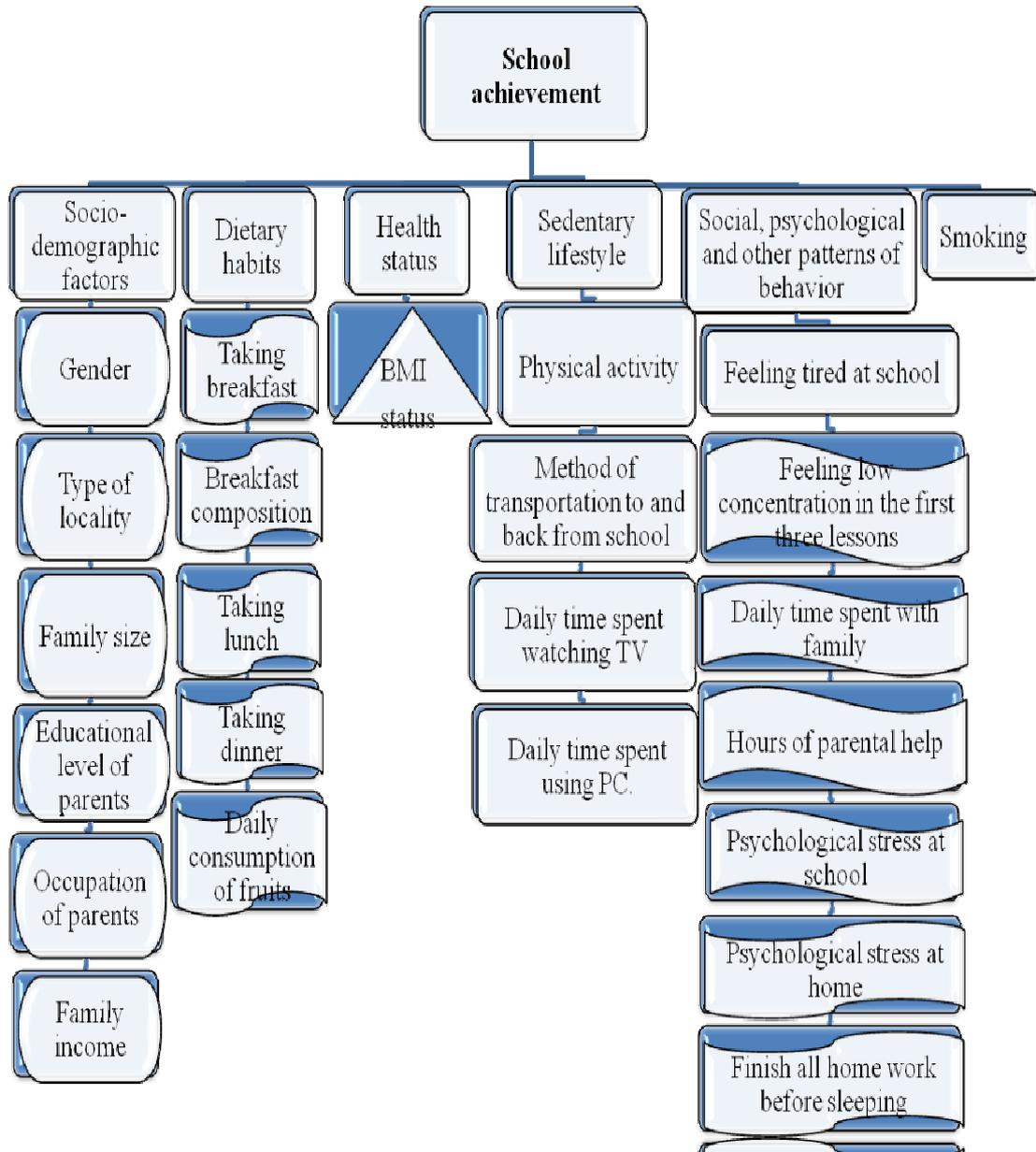


Figure (1.2.2): Factors considered for the study of their association with school achievement of ninth grade students in the district of Tulkarm, Palestine.

1.3 Why ninth grade students?

This age group is considered as a critical adolescence stage for it represents the transitional phase between the early adolescence (12-14 years) and the central one (14-17 years). At this stage and based on the

personal experience of the researcher as a school teacher and her observations concerning students' nutrition and health, some important behavioral changes occur such as vulnerability and friendships, cigarette experiences, the emergence of some interests in mental skills as well as the ability of work and production. The negative dealing with this stage can lead to many problems including smoking, depression, and failure to study. Adolescent students in our region are likely to skip breakfast and buy unhealthy food from school canteens, which may cause adulthood diseases. Therefore it is important to study the factors which affect school scores (indicator of school achievement) and BMI status (as an indicator of health status) as such studies are rare for students in our region for this and other age groups.

1.4 Purposes of the study

The main objectives of this study were:

1. To study the effects of lifestyle determinants (breakfast, physical activity, smoking and time spent in watching TV and using computer) and BMI on school scores of ninth grade students in governmental schools of Tulkarm.
2. To study the effects of some demographic and socio-economic factors on school achievement of ninth grade students in governmental schools of Tulkarm.

1.5 Research questions

The study aimed at answering the following research questions:

1. Is there a relationship between school achievement and BMI status?
2. Is there a relationship between school achievement and dietary habits (taking breakfast, taking milk products at breakfast, taking lunch, taking dinner and daily consumption of fruits)?
3. Is there a relationship between school achievement and social and other patterns of behavior (feeling tired in class, feeling low concentration in the first three lessons, smoking status, Sleep-wake up behavior)?
4. Is there a relationship between school achievement and sedentary lifestyle factors (physical activity, method of transport to and back from school, daily time spent in watching TV and using computer)?

Chapter Two

Methodology

Chapter Two

Methodology

2.1 Study population

The study covered ninth grade students (males and females) in Tulkarm governmental schools (in Northern West Bank), Table: 2.1. This age group (grade 9) is considered as a critical adolescence stage for it represents the transitional phase between the early adolescence (12-14 years) and the central one (14-17 years).

2.2 Study sample

Initially, a target sample of 850 students (425 males and 425 females) representing about 25% of the study population was determined by stratified sampling with stratification based on gender and school area. First, the district of Tulkarm was divided into four geographical areas (Al-sharaweyeh, Wadi Al-shaeer, Al-kafreyyat, and the city and its suburbs, Table: 2.1). The number of male and female students to be sampled from each area was calculated based on the proportion of students in the given area relative to the total number of students in the district for each gender. Second, random sampling was performed within schools in each area according to the proportion of students in the school relative to the number of students in the given area. Within each school, students to be interviewed were randomly drawn from the list of names held by the classroom teacher. A total of 781 students were actually interviewed (374 males and 407 females), Table: 2.1. The reasons for not interviewing all students were absence of some students, and more important is that the

final exams started before the end of the interviewing process which forced the researcher not to complete the interviews for some schools of less than 10 sampled students.

2.3 Inclusion and exclusion criteria

2.3.1 Inclusion Criteria

All students in ninth grade (male or female) in the public schools of the district of Tulkarm.

2.3.2 Exclusion Criteria

- 1- Any student not in ninth grade.
- 2- Students with diseases or mental disabilities.
- 3- Students in schools directed by the UNRWA.

Table (2.1): Distribution of the study population (ninth grade students in the district of Tulkarm in the school year 2009-2010) and the study sample.

Area	Study Population		Study Sample	
	No. of schools	No. of students	No. of schools	No. of students
<u>Males</u>				
City and it's suburbs	6	711	5	159
Al-sharaweyeh	10	620	6	125
Wadi Al-shaer	5	307	4	70
Al-kafreyyat	1	58	1	20
Sub total	22	1696	16	374
<u>Females</u>				
City and it's suburbs	9	652	7	173
Al-sharaweyeh	11	654	7	138
Wadi Al-shaer	6	320	3	77
Al-kafreyyat	3	85	2	19
Sub total	29	1711	19	407

2.4 Questionnaire

A questionnaire was adapted from previous studies (Khan, 2000; Abudayya et al., 2002; Bagully, 2006; Al-abbad and Hussain, 2008) and evaluated by a panel of experts in the in public health master program to carry out the study. It included questions related to socio-demographic factors and habits related to breakfast, physical activity, smoking and time spent in watching TV and using computer. The questionnaire included six sections. The first section included personal details (student's name, date of birth, sex, address, and residence area). The second section consisted of family details including family size, parents' level of education, occupation of parents, and family income. The third section included school details (school name, educational district, class code, and class size). The fourth section included student's weight (measured with an electronic scale) and height (measured with a meter). These were used to calculate body mass index (BMI). The fifth section covered lifestyle determinants and consisted of four parts:

1. Dietary habits and meal patterns, and whether the student suffers from tiredness and lack of concentration during the first three lessons.
2. Daily activities included information on sports and physical activities, daily time spent on using PC and watching TV, and method of commuting to and from school.
3. Smoking habits.

4. Social behavior (feel psychological stress at home and at school, time spent by family in helping the student in doing school homework and sleep-wake up behavior).

The last section included school results (grades) and overall average of the ten subjects studied in ninth grade (Religious Education, Arabic Language, English Language, Mathematics, Science, Social and Civic sciences, Technology and Applied Sciences, Art & Crafts, Physical Education, and the Elective course).

Before implementation on the final sample, the questionnaire was first evaluated by a panel of experts and then validated using a random sample of 20 ninth grade students. Based on the results of the pilot sample, some adjustments were made to facilitate the collection of data (some questions were deleted and some others were rewritten). Coordination was made with the Ministry of Education and school principals for implementation of the study.

The questionnaire was completed by the researcher via personal interviews with students. The weight and height of students was recorded and used to calculate BMI. Student grades were obtained from the Ministry of Education on all subjects taught to students. Interviews were completed in the period from April through May of 2010.

2.5 Description of variables

1. Dependent variables

These consisted of student scores in ten subjects of the school curriculum (Math, Science, Technology, Religious Education, English, Arabic, Social Civics, Craft & Arts, Physical Education and Elective subject) and the overall average in these ten subjects. All subject grades were out of 100 except Social Civics was out of 200. The overall average was calculated out of 100.

2. Independent variables:

- a. Socio-demographic factors: gender, type of locality (urban, rural), family size (≤ 6 , 7, 8, > 8) educational level of parents (elementary, secondary, two-year college, university or higher), occupation of parents (does not work, worker, farmer, trade and other businesses, private sector employees, government sector employee, other) and family income (< 1500 shekel, 1500-4000 shekel, > 4000 shekel).
- b. Dietary habits: take breakfast (yes, no), take milk products at breakfast (yes, no), take halawa at breakfast (yes, no), take tea at breakfast (yes, no), take lunch (yes, no), take dinner (yes, no), and take fruits daily (yes, no).
- c. Smoking and other patterns of behavior: smoking status (yes, no), feeling tired at school (never, occasionally, often), feeling low concentration in the first three lessons (yes, no), daily time spent with family (in hours),

daily hours of parental help, psychological stress at school (yes, no), psychological stress at home (yes, no), finish all home work before sleeping (yes, no), sleeping behavior (sleep late, sleep early), wakeup behavior (wakeup late, wakeup early), sleep-wake up behavior (sleep late-wakeup late, sleep late-wakeup early, sleep early-wakeup late, sleep early-wakeup early) and number of night sleeping hours.

d. Sedentary lifestyle: weekly physical activity (in hours), method of transportation to school and back from School (walking, bus or car, walking with any other method), daily time spent watching TV (in hours), and daily time spent in using PC (in hours).

e. Health status: measured by BMI status (underweight, healthy, overweight, obese).

2.6 Measurement of weight and height

Weight: Students were weighed bare footed and taking off coats or jackets using weighing balance (QE-2003A) measuring to the nearest 0.1 kg.

Height: Student height was measured barefoot using meter scale measuring to the nearest 0.1 cm.

2.7 Calculation and classification of body mass index (BMI)

BMI was calculated and classified into four categories based on weight (kg), height (cm), gender, and age of student. The classification followed the international cut off points for B.M.I. percentiles for age (2 to 20) as below:

1st to 4th percentile: under weight.

5th to 84th percentile: normal weight.

85th to 94th percentile: overweight.

≥ 95th percentile: obese.

2.8 Statistical analysis

The study employed both descriptive (frequencies, means, etc) and inferential statistical procedures (tests of hypothesis). Fisher's exact test was used to test relationships among pairs of cross tabulated (categorical) variables of interest. Analysis of Variance (ANOVA) was used to test differences in student grades (overall average and individual subject grades) among levels of studied factors. Each of these factors of interest (BMI status and lifestyle determinants) was tested separately after fitting (adjusting for) socio-demographic factors and number of days of absence from school. The socio-demographic factors included gender, type of locality, family size, education of father, education of mother, and income. All analyses were carried out using SPSS (Statistical Package for Social Sciences), v17.0 (SPSS Inc., Chicago, IL, USA).

2.9 Ethical considerations

The study was approved by the graduate committee of the master program of Public Health at An-Najah University. The study was then approved and facilitated by the Ministry of Education and Higher

Education of the Palestinian Authority upon official correspondence by the university administration.

Before starting each interview, the researcher explained the aims of the study to each interviewed student, and assured him/her of the anonymity and the confidentiality of the information obtained. No interview was made without the consent of the student.

Chapter Three

Results

Chapter Three

Results

3.1 Distribution of the study sample

3.1.1 Distribution of the study sample according to socio-demographic factors

Table: (3.1.1) shows the distribution of the study sample according to socio-demographic factors. The total number of interviewed students in this study was 781 (374 males and 407 females) and thus the response rate is 92%. About 25% (194 students: 90 females and 104 males) lived in urban areas and 75% (587 students: 317 females and 270 males) lived in rural areas. As for family size, 230 (30%) of the student families consisted of 6 or less members; which represented the highest percentage (26.3% of females and 34.2% of males); whereas the lowest percentage (19.5%) was for family size of 8 (21.5% of females and 17.2% of males); 24.4% of the students (22.8% of females and 26.2% of males) had families of 7 members, and 26.1% of the students families (29.5% of females and 22.4% of males) consisted of 8 or more members.

About 27% of fathers of students (28.7% of females and 24.9% of males) had elementary or lower education; 37% (37.1% and 37.4% of females and males, respectively) had secondary education, 10.5% had 2-yr college (12.1% of females and 8.8% of males), and 23.1% had university education (20.3 % of females and 26.2% of males). Higher percentages of mothers had elementary and secondary education compared to fathers:

31.6% of mothers (33.1% of females and 29.9% of males) had elementary or lower education, 46.6% (47.9% of females and 45.2% of males) had secondary education, 8.3% completed 2-yr college (7.9% of females and 8.8% of males), and 13.5% (11.1% females and 16% of males) had university education). The distribution of students based on father's education and mother's education was nearly the same for females and males. Concerning family income, 61.4% of students (60.6% of females and 62.3% of males) belonged to the middle class category (1500 - 4000 NIS) while the two other categories (< 1500 NIS and > 4000 NIS) were nearly equally frequent with 19% (20.5% of females and 17.4% of males) for the first and 19.5% for the second (18.8% of females and 20.3% of males).

Of all interviewed students, 25.5% had no recorded absence from school (31% of females and 19.5% of males), 54.2% were absent for one to five days (54.8% of female students and 53.5% of male students), 13.8% (9.8% of females and 18.2% of males) were absent for 6 to 10 days, 3.6% (2% of females and 5.3% of males) were absent for 11 to 15 days, and 2.9% were absent for more than fifteen days (2.5% and 3.5% of females and males, respectively).

Table (3.1.1): Distribution of the study sample by Socio-demographic factors

Factors	Females		Males		Total	
	count	%	count	%	count	%
Type of locality						
Urban	90	22.1%	104	27.8%	194	24.8%
Rural	317	77.9%	270	72.2%	587	75.2%
Family size						
≤ 6	105	26.3%	125	34.2%	230	30.0%
7	91	22.8%	96	26.2%	187	24.4%
8	86	21.5%	63	17.2%	149	19.5%
> 8	118	29.5%	82	22.4%	200	26.1%
Education of father						
Elementary or lower	116	28.7%	93	24.9%	209	26.9%
Secondary	150	37.1%	140	37.4%	290	37.3%
2-year college	49	12.1%	33	8.8%	82	10.5%
University or higher	82	20.3%	98	26.2%	180	23.1%
Not alive	7	1.7%	10	2.7%	17	2.2%
Education of mother						
Elementary or lower	134	33.1%	112	29.9%	246	31.6%
Secondary	194	47.9%	169	45.2%	363	46.6%
2-year college	32	7.9%	33	8.8%	65	8.3%
University	45	11.1%	60	16.0%	105	13.5%
Income (in shekel)						
<1500	83	20.5%	65	17.4%	148	19.0%
1500-4000	245	60.6%	233	62.3%	478	61.4%
>4000	76	18.8%	76	20.3%	152	19.5%
Days of absence						
0	126	31.0%	73	19.5%	199	25.5%
1-5	223	54.8%	200	53.5%	423	54.2%
6-10	40	9.8%	68	18.2%	108	13.8%
11-15	8	2%	20	5.3%	28	3.6%
>15	10	2.5%	13	3.5%	23	2.9%

3.1.2 Distribution of the study sample according to BMI status and dietary habits

The distribution of the sample according to BMI status and dietary habits is shown in table: (3.1.2). Most students (76.1%) had normal weight (77%

and 75.2% of males and females, respectively), 11.1% were overweight (12.9% of females and 9.2% of males), 7.7% were obese (7.8% of females and 7.5% of males), and 5.1% were underweight (2.3% of females and 8.1% of males).

The number of students who take their breakfast before they go to school was 490 (62.9%). The percentage of students who take their breakfast was higher for males than for females (80.6% for males compared to 46.7% for females). Most students (75.2%) didn't take any milk products at breakfast (78.1% of females and 72% of males). Few students (17 students, 2.2%) consumed Halawa at breakfast (1.5% of females and 3.0% of males).

Of all interviewed students, 58.3% declared taking tea at breakfast with higher percentage among males (70.1% vs. 47.5 for females). Only 1.8% of students (2.2% of females' and 1.3% of males) didn't take their lunch after returning from school. The distribution was different for taking dinner where 14.2% (21.1% of females and 6.7% of males) declared skipping dinner. About 64% of students consumed fruits daily (62.4% of females and 65.3% of males).

Table (3.1.2): Distribution of the study sample according to BMI and dietary habits.

Factor	Females		Males		Total	
	count	%	count	%	count	%
BMI status						
Underweight	9	2.3%	30	8.1%	39	5.1%
Normal	305	77.0%	279	75.2%	584	76.1%
Overweight	51	12.9%	34	9.2%	85	11.1%
Obese	31	7.8%	28	7.5%	59	7.7%
Take breakfast?						
No	217	53.3%	72	19.4%	289	37.1%
Yes	190	46.7%	300	80.6%	490	62.9%
Take milk Products at breakfast?						
No	318	78.1%	268	72.0%	586	75.2%
Yes	89	21.9%	104	28.0%	193	24.8%
Take halawa at breakfast?						
No	401	98.5%	361	97.0%	762	97.8%
Yes	6	1.5%	11	3.0%	17	2.2%
Take tea at breakfast?						
No	213	52.5%	111	29.9%	324	41.7%
Yes	193	47.5%	260	70.1%	453	58.3%
Take lunch?						
No	9	2.2%	5	1.3%	14	1.8%
Yes	398	97.6%	367	98.7%	765	98.2%
Take dinner?						
No	86	21.1%	25	6.7%	111	14.2%
Yes	321	78.9%	347	93.3%	668	85.8%
Take fruits daily?						
No	153	37.6%	129	34.7%	282	36.2%
Yes	254	62.4%	243	65.3%	497	63.8%

3.1.3 Distribution of the study sample by smoking, social, psychological, and other patterns of behavior.

The distribution of the study sample according to smoking, social, psychological and other patterns of behavior is shown in table: (3.1.3).

Only 5.6% of students declared smoking (all were males). The proportion of students who occasionally felt tired at school was 64.3% (68.3% of females and 59.9% of males) compared to 9.3% (10.6% of females and 7.9% of males) for those who often feel tired while those who never felt tired were 26.4% (21.1% of females and 32.2% of males). Feeling low concentration during the first three lessons is an important factor in school achievement where 27% of interviewed students (29% of females and 24.7% of males) declared often feeling low concentration during the first three classes.

The time that the family spends daily with their children was ≤ 1 hour for 50.3% of students (42% of females and 59.2% of males); one to two hours for 38% of students (42.2% of females and 33.5% of males) and 11.7% of families (15.8% of females and 7.3% of males) spend more than 2 hours. Most of students (72.3%: 82.5% of females and 61.5% of males) don't get any help from their parents for their lessons and homework compared to 18.8% (11.5% of females and 26.5% of males) get help for ≤ 1 hour, and 8.9% who get help for more than one hour. We notice that 93.1% of students (6% of females and 12% of males) finish all homework before sleeping (92% and 94.4% of females and males, respectively).

Stress at school affected about 32% of students but higher percentage of females (40.4%) were affected compared to males (23.1%). About 15% (12.5% of females and 16.7% of males) experience psychological stress at home.

About half of students sleep early (56.6% of females and 51.9% of males), and 86.7% of students wake up early (93.5% of females compared to 79.4% of males). Half of students sleep and wake up early (55.4% of females and 44.9% of males); whereas 4.3% (1.5% of females and 7.2% of males) sleep early and wake up late; 9.4% sleep late and wake up late (5.5% of females and 13.6% of males) but 36% (37.6% and 34.2% of females and males, respectively) of students sleep late and wake up early.

About 16% (16.7% of females and 16.1% of males) sleep for less than 7 hours compared to 28.3 % (30.3% of females and 26.1% of males) sleep from 7 to 8 hours but the highest percentage (31.9%) sleep from 8 to 9 hours (34.3% of females and 29.3% of males) while 23.4% (18.7% and 28.5% of females and males, respectively) sleep for more than 9 hours.

Table (3.1.3): Distribution of the study sample according to smoking, social, psychological and other patterns of behavior.

Factor	Females		Males		Total	
	count	%	count	%	count	%
Smoking?						
No	399	100%	331	88.5%	730	94.4%
Yes	0	0.0%	43	11.5%	43	5.6%
Feel tired?						
Never	86	21.1%	119	32.2%	205	26.4%
Occasionally	278	68.3%	221	59.9%	499	64.3%
Often	43	10.6%	29	7.9%	72	9.3%
Feeling low concentration in the first three lessons?						
No	289	71.0%	280	75.3%	569	73.0%
Yes	118	29.0%	92	24.7%	210	27.0%
Family time, hours						
≤ 1	167	42.0%	219	59.2%	386	50.3%
1-2	168	42.2%	124	33.5%	292	38.0%
> 2	63	15.8%	27	7.3%	90	11.7%

Daily hours of parental help						
0	329	82.5%	230	61.5%	559	72.3%
0-1	46	11.5%	99	26.5%	145	18.8%
> 1	24	6.0%	45	12.0%	69	8.9%
Psychological stress at home?						
No	349	87.5%	310	83.3%	659	85.5%
Yes	50	12.5%	62	16.7%	112	14.5%
Psychological stress at school?						
No	238	59.6%	286	76.9%	524	68.0%
Yes	161	40.4%	86	23.1%	247	32.0%
Finish all home works before sleeping?						
No	32	8.0%	21	5.6%	53	6.9%
Yes	367	92.0%	353	94.4%	720	93.1%
Sleeping behavior						
Sleep late	173	43.4%	180	48.1%	353	45.7%
Sleep early	226	56.6%	194	51.9%	420	54.3%
Wakeup behavior						
Wakeup late	26	6.5%	77	20.6%	103	13.3%
Wakeup early	373	93.5%	297	79.4%	670	86.7%
Sleep-wakeup behavior						
Sleep late-wakeup late	22	5.5%	51	13.6%	73	9.4%
Sleep late-wakeup early	150	37.6%	128	34.2%	278	36.0%
Sleep early-wakeup late	6	1.5%	27	7.2%	33	4.3%
Sleep early-wakeup early	221	55.4%	168	44.9%	389	50.3%
No. of night sleeping Hours						
< 7 hours	66	16.7%	60	16.1%	126	16.4%
7-8 hours	120	30.3%	97	26.1%	217	28.3%
8-9 hours	136	34.3%	109	29.3%	245	31.9%
≥ 9 hours	74	18.7%	106	28.5%	180	23.4%

3.1.4 Distribution of the study sample according to sedentary lifestyle.

Of all interviewed students, 29.1% have less than 0.5 hour of weekly physical activity (48.3% of females compared to 8.3% of males), 26% (33.5% of females and 17.9% of males) have 0.5 to 2 hours, 20.6% have 2

to 6 hours (9.6% of females and 32.6% of males) and 24.2% (8.6% of females and 41.2% of males) have more than 6 hours of physical activity per week.

Most students (79.5% of females and 76.5% of males) walked to school and 14.6% used bus or car (14.1% of females and 15.2% of males) but only 7.3% of students (6.4% of females and 8.3% of males) combined walking with bus, car or bicycle. Most students (88.6% of females and 78.6% of males) returned home walking while 11 % (7.9% of females and 14.4% of males) used bus or car and few of them (3.5% of females and 7% of males) walked and used other means of transport.

Only 3.5% (2% females and 5.1% males) don't watch TV at all, while 31% watch TV for less than one hour daily (25.6% females and 36.6% males). About 38% watch TV for 1 to 2 hours daily (36.9% of females and 38.2% of males), 18 % (23.4% of females and 12.3% of males) watch TV for 2 to 3 hours daily, and 10% watch TV for more than 3 hours daily (12.1% and 7.8% of females and males, respectively). 26% of students (33.1% of females and 18.4% males) don't use computer, on the other hand, 42% (37.1% of females and 47.3% of males) spend \leq 1 hour daily using computer, 20.2% (18.3% of females and 22.2% of males) spend 1-2 hours using computer, while 11.8% (11.5% of females and 12% of males) spend more than 3 hours, Table: (3.1.4).

Table (3.1.4): Distribution of the study sample according to sedentary lifestyle.

Factor	Females		Males		Total	
	Count	%	count	%	count	%
Weekly physical Activity, hours						
≤ 0.5	196	48.3%	31	8.3%	227	29.1%
0.5-2	136	33.5%	67	17.9%	203	26.0%
2-6	39	9.6%	122	32.6%	161	20.6%
> 6	35	8.6%	154	41.2%	189	24.2%
Method of transport to school						
Walking	322	79.5%	286	76.5%	608	78%
By bus or car	57	14.1%	57	15.2%	114	14.6%
Walking with any other method	0	0.0%	3	0.8%	3	0.4%
	26	6.4%	28	7.5%	54	6.9%
Method of transport back from school						
Walking	359	88.6%	294	78.6%	653	83.8%
By bus or car	32	7.9%	54	14.4%	86	11.0%
Walking with any other method	0	0.0%	3	0.8%	3	0.4%
	14	3.5%	23	6.1%	37	4.7%
Daily time spent watching TV, hours						
0	8	2.0%	19	5.1%	27	3.5%
0-1	102	25.6%	137	36.6%	239	31.0%
1-2	147	36.9%	143	38.2%	290	37.6%
2-3	93	23.4%	46	12.3%	139	18.0%
>3	48	12.1%	29	7.8%	77	10.0%
Daily time spent on computer, hours						
0	132	33.1%	69	18.4%	201	26.0%
0-1	148	37.1%	177	47.3%	325	42.0%
1-2	73	18.3%	83	22.2%	156	20.2%
>2	46	11.5%	45	12.0%	91	11.8%

3.2 Factors influencing school achievement.

3.2.1 Socio-demographic factors:

There were strong relationships ($P < 0.05$) between socio-demographic factors and school achievement (Table: 3.2.1). A strong association appeared between gender and overall average and all individual subjects, except Science. For type of locality, significant association was found with overall average and individual subjects except for Math, Technology, Religious Education, and Elective subject. Scores of General Science, Arabic Language, Social Civics, and Elective subject were not influenced by family size in the contrary to the remaining subjects and overall average. A strong relationship with all subjects in addition to the overall average was found with education of father and days of absence from school, and education of mother (except Physical Education). For family income, a significant association was found with overall average and all subjects but slightly significant with General Science and no association with Crafts & Arts. Table: (3.2.1).

Table (3.2.1): Significance of association (P value) of school achievement with Socio-demographic factors.

Factor	Subject ¹										
	Math	Science	Tech	Rel	Eng	Arabic	PE	Social Civics	Craft & Arts	Elec	Overall average
Gender	0.000	0.830	0.006	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
Type of locality	0.346	0.012	0.276	0.089	0.022	0.000	0.002	0.020	0.000	0.153	0.022
Family size	0.021	0.194	0.016	0.019	0.048	0.062	0.124	0.290	0.027	0.063	0.019
Education of father	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Education of mother	0.000	0.001	0.000	0.000	0.000	0.000	0.083	0.000	0.045	0.000	0.000
Income	0.013	0.055	0.005	0.000	0.000	0.008	0.035	0.001	0.107	0.004	0.000
Days of absence	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

¹ Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

3.2.2 BMI status and dietary habits

No association was found between BMI status and school achievement ($P > 0.05$, Table: 3.2.2.1). Taking breakfast had significant effect on student scores in Science ($P = 0.016$) but not the other subjects or the overall average (Table: 3.2.2.1). Students who take breakfast had higher scores in Science (mean = 70.4) than those skipping breakfast (mean = 69.0), (Table: 3.2.2.2). Taking Halawa at breakfast had significant association with Math ($P = 0.037$), Social Civics ($P = 0.019$), Crafts & Arts ($P = 0.011$), Elective course ($P = 0.034$), and with the overall average ($P = 0.022$). Students consuming Halawa at breakfast had lower scores than students who don't (Table: 3.2.2.1). The results showed no significant effect ($P > 0.05$) for taking milk products or taking tea at breakfast on school achievement of students.

Taking lunch was only associated with physical education ($P = 0.023$) where students who don't take lunch had higher scores (mean = 88.7) than those who take lunch (mean = 84.4). Taking dinner showed significant effects on scores of religious education ($P = 0.018$) and Arabic language ($P = 0.033$) where scores were higher in both subjects for students who take dinner (71.5 for Religious Education, and 65.9 for Arabic) than students skipping dinner (60.0 and 62.6 for Religious Education and Arabic, respectively). Significant association was found between taking fruits daily and scores of Technology ($P = 0.030$) and English ($P = 0.031$). Students who consumed fruits daily had higher scores in Technology (72.1) and English Language (58.5) compared to those who don't (mean = 69.5 Technology and mean = 55.6 for English).

Table (3.2.2.1): Significance of association (P value) of school achievement with BMI status and dietary habits.

Factor	Subject ¹										
	Math	Science	Tech	Rel	Eng	Arabic	PE	Social Civics	Craft & Arts	Elec	Overall average
BMI status	0.828	0.803	0.992	0.817	0.990	0.974	0.154	0.980	0.835	0.987	0.994
Take breakfast	0.997	0.016	0.473	0.400	0.820	0.249	0.221	0.834	0.968	0.692	0.751
Take milk products at breakfast	0.902	0.263	0.526	0.351	0.829	0.309	0.690	0.981	0.396	0.496	0.698
Take Halawa at breakfast	0.037	0.578	0.354	0.110	0.060	0.068	0.180	0.019	0.011	0.034	0.022
Take tea at breakfast	0.068	0.977	0.223	0.729	0.277	0.772	0.634	0.771	0.530	0.648	0.407
Take lunch	0.862	0.307	0.487	0.752	0.824	0.269	0.023	0.956	0.942	0.402	0.903
Take dinner	0.143	0.538	0.150	0.018	0.141	0.033	0.503	0.549	0.849	0.219	0.156
Take fruits daily	0.053	0.267	0.030	0.096	0.031	0.292	0.172	0.173	0.062	0.187	0.053

¹ Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

Table (3.2.2.2): Least-squares means (Adjusted means) of student grades ¹ (overall average and individual subjects) according to BMI status and dietary habits.

Factor	Subject ²											
	Math	Science	Tech.	Rel	Eng	Arabic	PE	Social Civics	Craft & Arts	Elec	Overall average	
BMI status ⁴												
Under weight	59.0 ^a	70.0 ^a	71.3 ^a	70.6 ^a	57.8 ^a	65.8 ^a	85.1 ^a	138.0 ^a	83.7 ^a	76.0 ^a	70.5 ^a	
Normal	58.7 ^a	69.7 ^a	71.0 ^a	69.2 ^a	57.6 ^a	65.3 ^a	84.7 ^a	138.8 ^a	83.6 ^a	76.0 ^a	70.4 ^a	
Over weight	59.4 ^a	70.5 ^a	71.0 ^a	69.1 ^a	57.5 ^a	65.7 ^a	83.8 ^a	140.5 ^a	83.7 ^a	76.0 ^a	70.7 ^a	
Obese	61.1 ^a	70.2 ^a	71.5 ^a	67.4 ^a	56.8 ^a	64.6 ^a	82.9 ^a	138.9 ^a	82.5 ^a	75.3 ^a	70.1 ^a	
Take breakfast?												
No	59.1 ^a	69.0 ^b	71.6 ^a	68.4 ^a	57.2 ^a	64.4 ^a	84.0 ^a	139.2 ^a	83.5 ^a	75.6 ^a	70.2 ^a	
Yes	59.2 ^a	70.4 ^a	70.7 ^a	69.4 ^a	57.5 ^a	65.7 ^a	84.7 ^a	138.6 ^a	83.5 ^a	76.0 ^a	70.5 ^a	
Take milk products at breakfast?												
No	59.1 ^a	69.6 ^a	71.4 ^a	68.6 ^a	57.3 ^a	64.8 ^a	84.3 ^a	138.8 ^a	83.3 ^a	75.6 ^a	70.2 ^a	
Yes	59.3 ^a	70.3 ^a	70.6 ^a	69.6 ^a	57.6 ^a	65.9 ^a	84.5 ^a	138.9 ^a	83.8 ^a	76.2 ^a	70.6 ^a	
Take Halawa at breakfast?												
No	59.4 ^a	70.0 ^a	71.2 ^a	69.2 ^a	57.6 ^a	5.4 ^a	84.5 ^a	139.4 ^a	83.6 ^a	76.0 ^a	70.5 ^a	
Yes	49.8 ^b	68.9 ^a	67.7 ^a	63.2 ^a	49.4 ^a	58.8 ^a	82.3 ^a	118.2 ^b	78.0 ^b	69.1 ^b	64.1 ^b	
Take tea at breakfast?												
No	60.4 ^a	69.9 ^a	71.8 ^a	69.1 ^a	58.1 ^a	65.3 ^a	84.3 ^a	139.1 ^a	83.7 ^a	76.0 ^a	70.7 ^a	
Yes	57.8 ^a	69.9 ^a	70.3 ^a	68.7 ^a	56.6 ^a	65.0 ^a	84.5 ^a	138.3 ^a	83.2 ^a	75.6 ^a	70.0 ^a	

3.2.3 Smoking, social, psychological and other patterns of behavior.

The results also showed significant effects of smoking status on the scores of six subjects (Math, $P = 0.008$; Religious Education, $P = 0.002$; Arabic language, $P = 0.005$; Physical education, $P = 0.001$; Social Civics, $P = 0.002$; and elective subject, $P = 0.003$) in addition to the overall average ($P = 0.004$). Students who don't smoke had higher mean scores (59.9 vs. 51.6 for math, 69.0 vs. 62.2 for Religious Education, 66.0 vs. 59.1 for Arabic language, 84.9 vs. 81.0 for physical education, 140.9 vs. 122.2 for Social Civics, 76.6 vs. 70.1 for Elective subject, and 70.1 vs. 65.5 for the overall average), (Table: 3.2.3.2).

Significant association ($P < 0.05$) was found between feeling low concentration in the first three lessons and all subjects except Science (Table: 3.2.3.1). The scores were higher for students who didn't feel low concentration in the first three lessons (Table: 3.2.3.2)

The time students spend with their families had no significant effect on overall average and all subjects except Arabic Language ($P = 0.027$) where students spending one to two hours daily with the family had higher scores (mean = 67.0) than spending less than one hour or more than two hours (63.9 and 65.9, respectively). Psychological stress at school had only significant effect on Arabic Language ($P = 0.037$), the higher scores were for the students not feeling stress at school (mean of 65.9 compared to 63.4). On the other hand, significant associations were found between psychological stress at home and scores of Math ($P = 0.003$), Science ($P =$

0.036), English language (P = 0.037), Social Civics (P = 0.034), Elective subject (P = 0.039) and overall average (P = 0.030). Mean scores were higher for students not feeling stress at home (59.7, 70.1, 57.9, 140.0, 76.2, 70.7) compared to mean scores of those feeling psychological stress at home (55.3, 68.5, 54.1, 131.9, 73.4, and 68.2).

Table (3.2.3.1): Significance of association (P value) of school achievement with smoking, social, psychological and other patterns of behavior

Factor	Subject ¹										
	Math	Science	Tech	Rel	Eng	Arabic	PE	Social Civics	Craft & Arts	Elec	Overall average
Smoking	0.008	0.613	0.086	0.002	0.147	0.005	0.001	0.002	0.698	0.003	0.004
Feel tired	0.532	0.278	0.981	0.399	0.971	0.167	0.634	0.735	0.145	0.537	0.849
Feeling low concentration in the first three lessons	0.002	0.364	0.000	0.001	0.000	0.000	0.556	0.001	0.013	0.002	0.000
Family time, hours	0.063	0.704	0.296	0.324	0.078	0.027	0.085	0.792	0.242	0.868	0.182
Daily hours of parental help	0.003	0.102	0.000	0.000	0.006	0.002	0.011	0.031	0.011	0.000	0.000
Psychological stress at home	0.024	0.036	0.079	0.155	0.037	0.072	0.859	0.034	0.720	0.039	0.033
Psychological stress at school	0.496	0.814	0.061	0.303	0.399	0.037	0.768	0.214	0.695	0.698	0.262
Finish all homework before sleeping	0.226	0.820	0.127	0.901	0.435	0.882	0.695	0.480	0.156	0.710	0.375
Sleeping behavior	0.752	0.845	0.844	0.121	0.986	0.278	0.478	0.531	0.385	0.716	0.943
Wakeup behavior	0.585	0.210	0.633	0.221	0.583	0.556	0.220	0.246	0.861	0.187	0.318
Sleep-wakeup behavior	0.207	0.520	0.072	0.049	0.396	0.313	0.217	0.256	0.212	0.012	0.107
No. of night sleeping hours	0.309	0.004	0.041	0.157	0.319	0.078	0.073	0.099	0.103	0.119	0.039

¹ Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

Table (3.2.3.2): Least-squares means (adjusted means) of students grades ¹ (overall average and individual subjects) by smoking, social psychological and other patterns of behavior

Factor	Subjects ²											Overall average				
	Math	Science	Tech.	Rel.	Eng.	Arabic	P.E.	Social Civics	Craft & Arts	Elec.						
Smoking status																
No	59.9 ^a	69.8 ^a	71.5 ^a	69.9 ^a	57.8 ^a	66.0 ^a	84.9 ^a	140.9 ^a	83.6 ^a	76.6 ^a						71.0 ^a
Yes	51.6 ^b	70.5 ^a	67.2 ^a	62.2 ^b	53.5 ^a	59.1 ^b	81.0 ^b	122.2 ^b	83.0 ^a	70.1 ^b						65.5 ^b
Feel tired at school?																
Never	59.2 ^a	69.3 ^a	71.0 ^a	70.4 ^a	57.7 ^a	67.0 ^a	84.7 ^a	140.6 ^a	82.5 ^a	76.8 ^a						70.8 ^a
Occasionally	59.9 ^a	70.2 ^a	71.2 ^a	68.8 ^a	57.5 ^a	64.6 ^a	84.4 ^a	138.9 ^a	84.0 ^a	75.6 ^a						70.4 ^a
Often	57.2 ^a	69.5 ^a	71.0 ^a	68.6 ^a	57.2 ^a	65.2 ^a	84.3 ^a	136.8 ^a	83.5 ^a	75.7 ^a						69.9 ^a
Often feel low concentration in the first three lessons?																
No	60.3 ^a	70.0 ^a	72.1 ^a	70.1 ^a	59.0 ^a	66.4 ^a	84.5 ^a	141.2 ^a	83.9 ^a	76.7 ^a						71.3 ^a
Yes	55.5 ^b	69.5 ^a	67.7 ^b	65.7 ^b	52.6 ^b	61.6 ^b	84.2 ^a	131.6 ^b	82.1 ^b	73.3 ^b						67.5 ^b
Family time hours																
< 1	57.6 ^a	69.7 ^a	70.2 ^a	68.3 ^a	56.0 ^a	63.9 ^a	84.0 ^a	138.0 ^a	83.0 ^a	75.6 ^a						69.6 ^a
1- 2	60.9 ^a	70.2 ^a	71.8 ^a	70.1 ^a	59.1 ^a	67.0 ^a	84.6 ^a	140.0 ^a	84.2 ^a	75.9 ^a						71.2 ^a
> 2	60.8 ^a	70.0 ^a	72.3 ^a	69.3 ^a	58.6 ^a	65.9 ^a	85.7 ^a	138.9 ^a	83.8 ^a	74.5 ^a						71.1 ^a
Daily hours of parental help																
0	60.4 ^a	70.0 ^a	72.6 ^a	70.5 ^a	58.5 ^a	66.3 ^a	84.8 ^a	140.7 ^a	84.0 ^a	77.2 ^a						71.4 ^a
< 1	56.2 ^{ab}	68.7 ^a	67.9 ^{ab}	65.1 ^b	54.5 ^{ab}	61.9 ^a	83.0 ^a	136.5 ^{ab}	82.9 ^{ab}	72.8 ^b						68.0 ^{ab}
> 1	53.3 ^b	70.7 ^a	64.6 ^b	64.5 ^b	52.7 ^b	62.0 ^a	83.6 ^a	128.6 ^b	80.6 ^b	71.2 ^b						66.6 ^b

No. of night sleeping hours	60.2 ^a	70.1 ^{ab}	71.4 ^a	68.7 ^a	57.9 ^a	64.8 ^a	85.1 ^a	138.0 ^a	83.6 ^a	76.2 ^a	70.6 ^a
< 7	59.0 ^a	69.6 ^{ab}	71.5 ^a	68.3 ^a	56.9 ^a	64.6 ^a	84.1 ^a	140.8 ^a	84.4 ^a	76.3 ^a	70.5 ^a
7-8	59.3 ^a	70.7 ^a	71.8 ^a	70.3 ^a	58.1 ^a	66.6 ^a	84.7 ^a	140.2 ^a	83.5 ^a	76.4 ^a	71.1 ^a
8-9	56.4 ^a	68.1 ^b	67.9 ^a	67.0 ^a	55.0 ^a	62.8 ^a	83.3 ^a	132.2 ^a	82.1 ^a	73.5 ^a	68.0 ^a

¹ All subject grades and overall average are out of 100 except Social Civics is out of 200.

² Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

³ Means with different superscripts are significantly different ($P < 0.05$) using Tukey's adjustment for multiple comparisons

3.2.4 Sedentary lifestyle

Weakly physical activity had significant effect on student scores in Physical Education ($P = 0.018$) and scores in Crafts & Arts ($P = 0.025$), (Table: 3.2.4.1); means of scores were higher for students having weekly physical activity of more than six hours (Table: 3.2.4.2). Neither method of transportation to school nor transportation back from school had significant effect on overall average or any of the subjects. Also neither time spent in watching television nor using computer showed any effect on any subject or on the overall average.

Table (3.2.4.1): Significance of association (P value) of school achievement with sedentary lifestyle

Factor	Subject¹										
	Math	Science	Tech	Rel	Eng	Arabic	PE	Social Civics	Craft & Arts	Elec	Overall average
Weekly physical activity, hours	0.932	0.466	0.718	0.718	0.920	0.509	0.018	0.325	0.025	0.758	0.630
Method of transport to school	0.68	0.435	0.216	0.771	0.721	0.930	0.953	0.497	0.886	0.985	0.618
Method of transport back from school	0.994	0.516	0.661	0.797	0.251	0.336	0.595	0.474	0.531	0.174	0.898
Daily time spent watching TV, hours	0.145	0.160	0.214	0.520	0.169	0.275	0.086	0.263	0.391	0.353	0.168
Daily time spent on PC, hours	0.850	0.866	0.698	0.987	0.279	0.868	0.815	0.906	0.903	0.991	0.930

¹ Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

Table (3.2.4.2): Least-squares means (Adjusted means) of students grades ¹ (overall average and individual subjects) according sedentary lifestyle

Factor	Subject ²											Overall average
	Math	Science	Tech	Rel	Eng	Arabic	P.E	Social Civics	Craft & Arts	Elec		
Weekly physical activity, hours	≤ 0.5	59.0 ^a	69.2 ^a	70.6 ^a	69.4 ^a	57.5 ^a	65.3 ^a	83.4 ^a	139.1 ^a	82.8 ^{ab}	76.0 ^a	70.2 ^a
	0.5-2	58.3 ^a	70.1 ^a	70.2 ^a	68.6 ^a	56.8 ^a	64.3 ^a	84.1 ^a	135.4 ^a	84.0 ^{ab}	75.1 ^a	69.7 ^a
	2-6	59.2 ^a	70.0 ^a	71.8 ^a	68.5 ^a	56.9 ^a	64.4 ^a	85.1 ^a	137.1 ^a	82.0 ^b	76.7 ^a	70.1 ^a
	> 6	59.7 ^a	70.4 ^a	72.0 ^a	69.3 ^a	57.9 ^a	66.4 ^a	85.7 ^a	142.4 ^a	84.7 ^a	76.0 ^a	71.3 ^a
Method of transport to school	Walking	58.3 ^a	69.7 ^a	70.4 ^a	68.8 ^a	57.0 ^a	65.1 ^a	84.4 ^a	137.8 ^a	83.6 ^a	75.9 ^a	70.1 ^a
	Bus or car	60.9 ^a	70.3 ^a	73.2 ^a	67.0 ^a	58.5 ^a	65.6 ^a	84.6 ^a	142.5 ^a	83.2 ^a	75.8 ^a	71.2 ^a
	Walking with any other method	61.4 ^a	70.8 ^a	71.5 ^a	68.6 ^a	57.3 ^a	65.6 ^a	84.3 ^a	139.5 ^a	83.8 ^a	75.6 ^a	70.8 ^a
Method of transport back from School	Walking	59.0 ^a	69.8 ^a	71.2 ^a	69.2 ^a	57.7 ^a	65.5 ^a	84.5 ^a	138.4 ^a	83.6 ^a	76.2 ^a	70.4 ^a
	Bus or car	59.3 ^a	70.5 ^a	69.6 ^a	68.6 ^a	54.3 ^a	63.0 ^a	84.0 ^a	143.3 ^a	82.5 ^a	73.4 ^a	69.8 ^a
	Walking with any other method	59.0 ^a	70.8 ^a	71.6 ^a	67.6 ^a	58.1 ^a	66.1 ^a	83.6 ^a	136.7 ^a	83.9 ^a	74.8 ^a	70.2 ^a
Daily time spent watching TV, hours	0	54.5 ^a	68.7 ^a	68.6 ^a	67.0 ^a	54.9 ^a	63.0 ^a	86.2 ^a	134.5 ^a	82.3 ^a	76.7 ^a	68.8 ^a
	0-1	58.4 ^a	69.3 ^a	70.2 ^a	68.5 ^a	56.4 ^a	64.5 ^a	83.8 ^a	135.7 ^a	83.4 ^a	75.0 ^a	69.5 ^a
	1-2	58.4 ^a	70.9 ^a	70.7 ^a	68.7 ^a	56.5 ^a	64.8 ^a	84.0 ^a	140.1 ^a	83.2 ^a	75.3 ^a	70.2 ^a
	2-3	60.5 ^a	70.2 ^a	73.2 ^a	70.2 ^a	59.7 ^a	67.3 ^a	84.7 ^a	142.4 ^a	83.4 ^a	77.3 ^a	71.7 ^a
	>3	63.4 ^a	70.0 ^a	73.2 ^a	71.3 ^a	60.5 ^a	67.2 ^a	85.8 ^a	144.8 ^a	85.4 ^a	77.6 ^a	72.7 ^a

Daily time spent on computer, hours	58.0 ^a	69.5 ^a	70.3 ^a	69.3 ^a	55.5 ^a	65.4 ^a	84.1 ^a	137.6 ^a	83.5 ^a	75.7 ^a	69.9 ^a
0	58.0 ^a	69.5 ^a	70.3 ^a	69.3 ^a	55.5 ^a	65.4 ^a	84.1 ^a	137.6 ^a	83.5 ^a	75.7 ^a	69.9 ^a
0-1	59.5 ^a	70.0 ^a	71.5 ^a	69.0 ^a	57.3 ^a	65.5 ^a	84.5 ^a	139.9 ^a	83.5 ^a	75.9 ^a	70.6 ^a
1-2	59.3 ^a	70.0 ^a	70.2 ^a	68.6 ^a	58.2 ^a	64.7 ^a	84.3 ^a	138.1 ^a	83.8 ^a	75.8 ^a	70.3 ^a
>2	58.6 ^a	70.3 ^a	71.8 ^a	69.0 ^a	59.7 ^a	64.3 ^a	84.9 ^a	138.3 ^a	82.9 ^a	76.2 ^a	70.6 ^a

¹ All subject grades and overall average are out of 100 except Social Civics is out of 200.

² Tech = Technology, Rel = Religious Education, Eng = English, PE = Physical Education, Elec = Elective Subject.

³ Means with different superscripts are significantly different ($P < 0.05$) using Tukey's adjustment for multiple comparisons

3.3 Factors associated with BMI

Fisher's exact test results showed significant relationship between BMI and Gender ($P = 0.001$). The percentage of males in the underweight category was higher than that for females (8.1% vs. 2.3%) but the percentage of females in the overweight category exceeded that for males (12.9% vs. 9.2%). The percentages of males and females in the obese category were about the same (7.8% for females and 7.5% for males), (Table: 3.3.1).

Table (3.3.1): Association between BMI status and gender.

Gender	BMI status								P value
	Underweight		Normal		Overweight		Obese		
	Count	%	Count	%	Count	%	Count	%	
Females	9	2.3%	305	77.0%	51	12.9%	31	7.8%	0.001
Males	30	8.1%	279	75.2%	34	9.2%	28	7.5%	

Statistically significant relationship was found ($P < 0.001$) between BMI status and taking dinner ($P = 0.003$ for females and 0.055 for males). Higher proportions of those who skip dinner were in the overweight and obese categories and lower proportion in the normal category compared to those who take dinner (Table: 3.3.2).

No association was found between BMI and any of the other studied factors ($P > 0.05$).

Table (3.3.2): Association between BMI status and taking dinner.

Take dinner	BMI status								
	Underweight		Normal		Overweight		Obese		P value
	Count	%	Count	%	Count	%	Count	%	
<u>All</u>									
No	1	0.9%	71	66.4%	16	15.0%	19	17.8%	0.000
Yes	38	5.8%	513	77.7%	69	10.5%	40	6.1%	
<u>Females</u>									
No	1	1.2%	54	65.1%	14	16.9%	14	16.9%	0.003
Yes	8	2.6%	251	80.2%	37	11.8%	17	5.4%	
<u>Males</u>									
No	0	0%	17	70.8%	2	8.3%	5	20.8%	0.055
Yes	30	8.6%	262	75.5%	32	9.2%	23	6.6%	

3.4 Factors associated with incidence of low concentration in the first three lessons

Significant association ($P = 0.001$) was found between feeling low concentration in the first three lessons and taking breakfast before going to school (Table: 3.4.1). Taking breakfast decreased incidence of low concentration in the first three lessons; 34.3% of students who don't take breakfast declared feeling low concentration in the first three lessons compared to 22.7% for those who take breakfast.

When gender was taken into account (Table: 3.4.1), the association between incidence of low concentration and taking breakfast was significant for females ($P = 0.001$) but not for males ($P = 0.362$). The percentage of females taking breakfast who feel low concentration was 35.9% compared to 21.1% for those who take breakfast.

Table (3.4.1): Association between feeling low concentration in the first three lessons and taking breakfast.

Take breakfast	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
No	190	65.7%	99	34.3%	0.001
Yes	379	77.3%	111	22.7%	
Females					
No	139	64.1%	78	35.9%	0.001
Yes	150	78.9%	40	21.1%	
Males					
No	51	70.8%	21	29.2%	0.362
Yes	229	76.3%	71	23.7%	

Students who don't consume fruits daily more often feel low concentration in the first three lessons compared to those who consume fruits daily (31.6% vs. 24.3%, $P = 0.036$). Fisher's exact test showed significant association between feeling low concentration in the first three lessons and taking fruits daily in males ($P = 0.044$), where the incidence of low concentration decreased among males consuming fruits daily (21.4%) and increased for those who don't (31.0%), (Table: 3.4.2). No association was found between feeling low concentration in the first three lessons and taking fruits daily for females ($P = 0.311$).

Table (3.4.2): Association between feeling low concentration in the first three lessons and daily consumption of fruits.

Daily fruit consumption	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
No	193	68.4%	89	31.6%	0.036
Yes	376	75.7%	121	24.3%	
Females					
No	104	68.0%	49	32.0%	0.311
Yes	185	72.8%	69	27.2%	
Males					
No	89	69.0%	40	31.0%	0.044
Yes	191	78.6%	52	21.4%	

There was strong positive association ($P = 0.001$) between feeling low concentration and feeling tired at school (Table: 3.4.3); of students who never feel tired at school, only 19% feel low concentration in the first three lessons compared to 28.1% for those who occasionally feel tired and 41.7% for those often feeling tired. However, the association was stronger for females ($P = 0.015$) than for males ($P = 0.063$).

Table (3.4.3): Association between feeling low concentration in the first three lessons and feeling tired.

Feel tired	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
Never	166	81.0%	39	19.0%	0.001
Occasionally	359	71.9%	140	28.1%	
Often	42	58.3%	30	41.7%	
Females					
Never	69	80.2%	17	19.8%	0.015
Occasionally	196	70.5%	82	29.5%	
Often	24	55.8%	19	44.2%	
Males					
Never	97	81.5%	22	18.5%	0.063
Occasionally	163	73.8%	58	26.2%	
Often	18	62.1%	11	37.9%	

Strong positive association ($P = 0.001$) was also found between feeling low concentration in the first three lessons and smoking (Table: 3.4.4). This relationship holds for males as none of the female students declared smoking; the percentage of smoker males who feel low concentration in the first three lessons was 46.5% which is more than those non smokers (21.9%).

Table (3.4.4): Association between feeling low concentration in the first three lessons and smoking.

Smoking	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
Non smoker	539	74.0%	189	26.0%	0.007
Smoker	23	53.5%	20	46.5%	
Females					
Non smoker	282	70.7%	117	29.3%	-
Smoker	0	0%	0	0%	
Males					
Non smoker	257	78.1%	72	21.9%	0.001
Smoker	23	53.5%	20	46.5%	

The results showed significant association between feeling low concentration in the first three lessons and psychological stress at school ($P = 0.001$). Students exposed to psychological stress at school had higher incidence of low concentration in the first three lessons (35.2% vs. 23.3%). The association was significant for both males ($P = 0.016$) and females ($P = 0.033$), (Table: 3.4.6). No association was found between feeling low concentration in the first three lessons and psychological stress at home (Table: 3.4.5).

Fisher's exact test showed significant relationship between wakeup habits and feeling low concentration in the first three lessons ($P = 0.042$). The incidence of low concentration was lower among students who wake up early (25.7%) compared with students, who don't wakeup early (35.9%), (Table: 3.4.7).

Table (3.4.5): Association between feeling low concentration in the first three lessons and psychological stress at home.

psychological stress at home	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
No	485	73.6%	17	26.4%	0.301
Yes	77	68.8%	35	31.3%	
Females					
No	250	71.6%	99	28.4%	0.319
Yes	32	64.0%	18	36.0%	
Males					
No	235	75.8%	75	24.2%	0.629
Yes	45	72.6%	17	27.4%	

Table (3.4.6): Association between feeling low concentration in the first three lessons and psychological stress at school.

psychological stress at school	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
No	402	76.7%	122	23.3%	0.001
Yes	160	64.8%	87	35.2%	
Females					
No	178	74.8%	60	25.2%	0.033
Yes	104	46.6%	57	35.4%	
Males					
No	224	78.3%	62	21.7%	0.016
Yes	56	65.1%	30	34.9%	

Table (3.4.7): Association between feeling low concentration in the first three lessons and wakeup early.

Wakeup early	Feel low concentration in the first three lessons				P value
	No		Yes		
	Count	%	Count	%	
All					
No	66	64.1%	37	35.9%	0.042
Yes	496	74.3%	172	25.7%	
Females					
No	14	53.8%	12	46.2%	0.072
Yes	268	71.8%	105	28.2%	
Males					
No	52	67.5%	25	32.5%	0.102
Yes	228	77.3%	67	22.7%	

3.5 Factors associated with daily intake of fruits

Fisher's exact test showed significant differences between daily intake of fruits and weekly physical activity ($P = 0.001$). The percentage of students who take fruits increased as physical activity increased as clearly noticed among males ($P = 0.001$) but not among females ($P = 0.140$), (Table: 3.5.1).

Significant association was found between taking fruits daily and daily time spent on computer ($P = 0.010$), but the relationship was significant for males ($P = 0.041$) not females ($P = 0.270$). The tendency of males to take fruits increased as the daily time spent using computer increased; (Table: 3.5.2). No association was found between taking fruits daily and the other studied factors ($P > 0.05$).

Table (3.5.1): Association between daily consumption of fruits and weekly physical activity.

Weekly physical Activity, hrs	Daily consumption of fruits				P value
	No		Yes		
	Count	%	Count	%	
All					
≤ 0.5	101	44.5%	126	55.5%	0.001
0.5-2	76	37.8%	125	62.2%	
2-6	58	36.0%	103	64.0%	
> 6	47	24.9%	142	75.1%	
Females					
≤ 0.5	85	43.4%	111	56.6%	0.140
0.5-2	46	33.8%	90	66.2%	
2-6	12	30.8%	27	69.2%	
> 6	10	28.6%	25	71.4%	
Males					
≤ 0.5	16	51.6%	15	48.4%	0.001
0.5-2	30	46.2%	35	53.8%	
2-6	46	37.7%	76	62.3%	
> 6	37	24.0%	117	76.0%	

Table (3.5.2): Association between daily consumption of fruits and daily time spent on computer.

Daily time spent on computer	Daily consumption of fruits				P value
	No		Yes		
	Count	%	Count	%	
All					
0	91	45.5%	109	54.5%	0.010
0-1	113	34.9%	211	65.1%	
1-2	46	29.5%	110	70.5%	
>2	29	31.9%	62	68.1%	
Females					
0	58	43.9%	74	56.1%	0.270
0-1	54	36.5%	94	63.5%	
1-2	24	32.9%	49	67.1%	
>2	14	30.4%	32	69.6%	
Males					
0	33	48.5%	35	51.5%	0.041
0-1	59	33.5%	117	66.5%	
1-2	22	26.5%	61	73.5%	
>2	15	33.3%	30	66.7%	

3.6 Factors associated with smoking

There was strong significant relationship between smoking and gender ($P < 0.0001$). All smokers were males and none of the female students declared smoking (Table: 3.6.1).

Table (3.6.1): Association between smoking and gender.

Gender	Smoking				P value
	Non smoker		Smoker		
	Count	%	Count	%	
Females	399	100%	0	0%	0.000
Males	331	88.5%	43	11.5%	

Significant relationship was found between smoking and taking breakfast ($P = 0.014$). Smoker males who take breakfast were 7.2% compared with 92.8% for non smokers, (Table: 3.6.2).

Table (3.6.2): Association between smoking and taking breakfast.

Take breakfast	Smoking				P value
	Non smoker		Smoker		
	Count	%	Count	%	
No	276	97.2%	8	2.8%	0.014
Yes	452	92.8%	35	7.2%	

The results showed strong relationship between smoking and sleeping early ($P = 0.001$). Lower percentage of male smokers sleep early (27.9%) compared with those who don't smoke (55.0%); (Table: 3.6.3).

Table (3.6.3): Association between smoking and sleeping behavior (for males only).

Smoking	Sleep early				P value
	No		Yes		
	Count	%	Count	%	
Non smoker	149	45.0%	182	55.0%	0.001
Smoker	31	72.1%	12	27.9%	

There was also significant relationship between smoking and waking up habits ($P = 0.002$). About 70% of male smokers wake up early. When sleep and wakeup habits were combined into a single variable (sleep-wakeup behavior), strong significant association was found with smoking ($P = 0.005$); 46.5% of smokers sleep late and wakeup early, 25.6% sleep late and wakeup late, 4.7% sleep early and wakeup late, and 23.3% sleep early and wakeup early (Table: 3.6.4). This resulted in significant association ($P = 0.004$) between smoking and number of night sleeping hours where higher percentage of male smokers had fewer sleeping hours than non-smoker males (Table: 3.6.5).

Table (3.6.4): Association between smoking and sleep-wakeup behavior by gender (for males only).

Smoking	Sleep-wakeup behavior								P value
	sleep late - wakeup late		sleep late-wakeup early		sleep early-wakeup late		sleep early-wakeup early		
	Count	%	Count	%	Count	%	Count	%	
Non smoker	40	12.1%	108	32.6%	25	7.6%	158	47.7%	0.005
Smoker	11	25.6%	20	46.5%	2	4.7%	10	23.3%	

Table (3.6.5): Association between smoking and number of night sleeping hours (for males only).

Smoking	No. of night sleeping hours								P value
	< 7 hours		7-8 hours		8-9 hours		> 9 hours		
	Count	%	Count	%	Count	%	Count	%	
Non smoker	45	13.7%	86	26.1%	98	29.8%	100	30.4%	0.004
Smoker	15	34.9%	11	25.6%	11	25.6%	6	14.0%	

Significant relationship ($P = 0.008$) was found between smoking and daily time spent on computer. Smokers spent more time on computers than non-smokers (Table: 3.6.6).

Table (3.6.6): Association between smoking and daily time spent on computer (for males only).

Smoking	Daily time spent on computer, hour								P value
	0		0-1		1-2		>2		
	Count	%	Count	%	Count	%	Count	%	
Non smoker	59	17.8%	165	49.8%	73	22.1%	34	10.3%	0.008
Smoker	10	23.3%	12	27.9%	10	23.3%	11	25.6%	

No association was found between smoking and the other studied factors ($P > 0.05$).

3.7 Factors associated with psychological stress at home

Results showed significant relationship between psychological stress at home and family time ($P = 0.019$). Students who spend more time with their family daily were less exposed to psychological stress at home (Table: 3.7.1).

Table (3.7.1): Association between psychological stress at home and time spent with family.

Family time	Psychological stress at home				P value
	No		Yes		
	Count	%	Count	%	
≤ 1	322	83.4%	64	16.6%	0.019
1-2	250	85.6%	42	14.4%	
>2	85	94.4%	5	5.6%	

Significant relationship was found between psychological stress at home and psychological stress at school ($P = 0.001$). The association was highly significant for females ($P < 0.0001$) but not for males ($P = 0.070$). Females exposed to psychological stress at home were more likely to be exposed to psychological stress at school; 64.0% of those who feel stress at home feel stress at school compared to 37.0% for those who don't have stress at home (Table: 3.7.2).

Table (3.7.2): Association between psychological stress at home and Psychological stress at school.

Psychological stress at home	Psychological stress at school				P value
	No		Yes		
	Count	%	Count	%	
All					
No	464	70.4%	195	29.6%	0.001
Yes	60	53.6%	52	46.4%	
Females					
No	220	63.0%	129	37.0%	0.000
Yes	18	36.0%	32	64.0%	
Males					
No	244	78.7%	66	21.3%	0.070
Yes	42	67.7%	20	32.3%	

Psychological stress at home was associated with wakeup behavior ($P = 0.010$). The result was shown among females ($P = 0.032$), where lower percentage of females exposed to stress wakeup early (11.5%) in comparison with those without stress (26.9%). No association was found between psychological stress at home and wakeup behavior for males ($P = 0.170$, Table: 3.7.3).

Table (3.7.3): Association between psychological stress at home and wakeup early.

wakeup early	Psychological stress at home				P value
	No		Yes		
	Count	%	Count	%	
<u>All</u>					
No	79	76.7%	24	23.3%	0.010
Yes	580	86.8%	88	13.2%	
<u>Females</u>					
No	19	73.1%	7	26.9%	0.032
Yes	330	88.5%	43	11.5%	
<u>Males</u>					
No	60	77.9%	17	22.1%	0.170
Yes	250	84.7%	17	22.1%	

Significant association between psychological stress at home and sleep-wake up behavior ($P = 0.022$). The higher percentage among those feeling psychological stress at home (50.0%) was for females who sleep early and wakeup late and the lowest (18.2%) was for those who sleep late and wake up late ($P = 0.014$ for females and $P = 0.139$ for males, Table: 3.7.4).

Table (3.7.4): Association between psychological stress at home and Sleep-wake up behavior.

Sleep-wakeup behavior	Psychological stress at home				P value
	No		Yes		
	Count	%	Count	%	
<u>All</u>					
Sleep late-wakeup late	60	82.2%	13	17.8%	0.022
Sleep late-wakeup early	238	86.2%	38	13.8%	
Sleep early-wakeup late	22	66.7%	11	33.3%	
Sleep early-wakeup early	339	87.1%	50	12.9%	
<u>Females</u>					
Sleep late-wakeup late	18	81.8%	4	18.2%	0.014
Sleep late-wakeup early	127	84.7%	23	15.3%	
Sleep early-wakeup late	3	50.0%	3	50.0%	
Sleep early-wakeup early	201	91.0%	20	40.0%	
<u>Males</u>					
Sleep late-wakeup late	42	82.4%	9	17.6%	0.139
Sleep late-wakeup early	111	88.1%	15	11.9%	
Sleep early-wakeup late	19	70.4%	8	29.6%	
Sleep early-wakeup early	138	82.1%	30	17.9%	

The results showed significant relationship between psychological stress at home and weekly physical activity ($P = 0.029$). 74.0% of females suffering psychological stress at home have physical activity for < 2 hours per week while 26.0% have physical activity for more than two hours per week (Table: 3.7.5).

No association was found between Psychological stress at home and the other studied factors ($P > 0.05$).

Table (3.7.5): Association between psychological stress at home and weekly physical activity

Psychological stress at home	Weekly physical activity, hours								P value
	≤ 0.5 hours		0.5-2 hours		2-6 hours		> 6 hours		
	Count	%	Count	%	Count	%	Count	%	
All									
No	207	31.4%	166	25.2%	132	20.0%	154	23.4%	0.029
Yes	20	17.9%	33	29.5%	28	25.0%	31	27.7%	
Females									
No	179	51.3%	114	32.7%	34	9.7%	22	6.3%	0.016
Yes	17	34.0%	20	40.0%	4	8.0%	9	18.0%	
Males									
No	28	9.0%	52	16.8%	98	31.6%	132	42.6%	0.400
Yes	3	4.8%	13	21.0%	24	38.7%	22	35.5%	

Chapter Four
Discussion, Conclusions and
Recommendations

Chapter Four

Discussion, Conclusions and Recommendations

This study aimed at investigating the relationship of some lifestyle determinants and body mass index with school achievement of ninth grade students in the district of Tulkarm (in Palestine) while accounting for socio-demographic factors (gender, type of locality, family size, educational level of parents and family income) and days of absence from school. BMI status (underweight, healthy, overweight, or obese) and lifestyle determinants act as important factors on human health especially during adolescence stage. Lifestyle determinants included dietary habits (take breakfast, take lunch, take dinner and take fruits), social, physical and other patterns of behavior (feel tired at school, feel low concentration in the first three lessons, smoking status, daily time spent with family, daily hours of parental help, psychological stress at school, psychological stress at home, finish all home work before sleeping, sleeping behavior, wakeup behavior, sleep-wake up behavior and number of night sleeping hours), and sedentary lifestyle (physical activity, method of transportation to and back from school, daily time spent watching TV and in using PC).

4.1 Factors influencing school achievement.

4.1.1 Socio-demographic factors:

Some studies found differences in achievement between males and females. Mills (1993) showed that the achievement of males in mathematical assignments was better than females. But this result is

inconsistent with the result of Kimball (1989) where females outperformed males in mathematics. Males achieved higher in science than females (Ajewole and Okebukola, 1998). On the contrary, Adegboye (1998) found no differences in science achievement between males and females. Females achieved better in history tests, language abilities as writing skills, vocabulary and word fluency than males (Wilberg and Lynn, 1999).

Family size plays an important role in school achievement. Mary and Keegan (2005), and Majoribanks and Kevin (1996) found a significant relationship between family size and school achievement where higher school achievement was associated with small size of family. Weak achievement was found for children coming from larger families (Goux and Maurin, 2005; Marks, 2006). Poor achievement in Reading and Verbal Intelligence and moderate achievement in Mathematics were associated with large family size (Wedge and Prosser, 1973). While Ferguson (1991) indicated that the association was moderate, other researchers indicated no relationship between family size and school achievement (Haan, 2005; Angrist et al., 2005)

Family education and good socioeconomic status were associated with high achievement of students (Phillips, 1998; Onocha, 1985; Teese, 2004; Marjoribanks, 2003). Lockheed et al., (1989) proved that higher achievement was related to higher socioeconomic status. The better school achievement was associated with good or higher socioeconomic status and well-educated parents which appeared clearly in Math (Howley ,1989 and House, 2002) in contrast with poor family that lack the essential needs.

Moser, (1999) found that the low level of parents' education negatively affected the level of their sons reading (60% of the children who belong to the group of lowest reading return to parents with low level of literacy compared to 2% for children who return to parents with high level of literacy).

Other studies found that parental education was positively associated with school achievement of students where education of parents improved students' achievement (Wang, et al., 1996; Grissmer, 2003; Taiwo, 1993; Musgrave, 2000). This finding is in agreement with Ferguson, (1991) who found that students of college educated parents were more likely to perform better. High education of mothers had positive impact on their children who obtained good Math and Reading achievement (Halle et al., 1997). Peters and Mullis, (1997) found that education of mother was more important than father's education as student achievement was influenced by level of mother's education by 20% higher than influence of father's education .

Occupation of parents also affects school achievement (Simon, 2004; Teese, 2004; Sharma, 2004; Dubey, 1999). Crane (1991) found that students with high Math scores tended to have parents with high occupational levels, the reason may be that they can provide their children with supplies and tools that enhance them to study. O'Brien and Jones (1999) showed that there was a positive association between mother's employment and child's achievement (70% of children whose both parents were workers were less susceptible to achieve low marks).

Poverty had a significant negative relationship with student achievement; students suffering from high poverty achieved lower in Math than those who suffered low poverty (Binkley and Williams, 1996; Peters and Mullis, 1997). Receiving welfare had negative impact on school outcomes (Zill et al., 1995) as students who obtained welfare had twice chances to fail in school.

4.1.2 BMI status and dietary habits.

In the current study, no association was found between BMI and school performance ($P > 0.050$). This result is consistent with the study of Abudayya et al., (2002) in Gaza Strip, and with other studies (Li Y et al., 2008; Florence et al., 2008; Crosnoe and Muller, 2004). However, it is not in agreement with the results of Bagully (2006) where the researcher found that low school achievement was associated with overweight students in standardized tests, especially Mathematics. Also Taras and Potts-Datema (2005) found a positive relationship between overweight and bad school achievement.

Significant relationship was found for BMI with gender. Most students (76.1%) had normal weight (77% and 75.2% of males and females, respectively), Higher percentage of females were overweight (12.9%) compared with males (9.2%). Obesity was nearly equally prevalent in males and females (7.8% of females and 7.5% of males), while higher proportion of male students were underweight (8.1%) compared to females (2.3%). The results differ from one study to other; a study

conducted among adolescent students aged 10-19 in Ethiopia (Yetubie et al., 2010) found that normal weight percentage was higher for females than males (70.5%, 66.4% of females and males respectively); but small difference was found for overweight (4.9% females of and 3.8% of males) while females had lower percentage of underweight (24.6%) than males (29.8%), the same finding as in the current study.

In the present study, no association was found for BMI with taking breakfast or taking lunch ($P > 0.05$). This is in disagreement with the results of other studies where students who take breakfast tended to have lower BMI compared with those skipping breakfast (Musaiger et al., 2005; Fiore et al., 2006), and those skipping breakfast were more likely to gain obesity or overweight especially within girls (Barton et al., 2005). Schanzenbach and Whitmore (2005) and Wolfe (1994) found that eating school lunch by students give them chance to be obese. Another study found that students participating in school breakfast and lunch program were more likely to be overweight (Melnik et al., 1998; Hofferth and Curtain, 2005).

A significant association was found in the current study between BMI and taking dinner ($P < 0.001$). Higher proportion of those who skip dinner were in the overweight and obese categories and lower proportion in the normal category compared to those who take dinner. This finding does not agree with Bowman (2006) who found that taking dinner was associated with higher BMI and also with high food calories consumed when watching TV for more than two hours.

In the current study, there was no relationship of BMI with daily time spent watching TV or with daily time spent using computer. In contrast to the study of Hill and Peter (1998) which indicated that sedentary behaviors as watching television and using computer were associated with overweight and increased risk of obesity. The more time spent in watching TV, the higher the BMI as it contributes to increased intake of food of high calories (Bowman, 2006) and reduced physical activity, Tucker and Friedman (1989), Tucker and Bagwell (1991), thus increases the chance of obesity the same as others who showed a correlation between watching TV and being obese (Robinson, 1998; Dietz and Gortmaker, 1986).

In the present study, no relationship was found between BMI and methods of transportation to and from school. Bassett et al., (2008) indicated in his study that active transportation had negative effect on obesity. Frank et al., (2006) proved that increased walking by 5% enhanced physical activity and reduced BMI.

In this study, there was no association between taking breakfast and school achievement ($P > 0.050$), except for Science. This result is in agreement with other studies (Lloyd et al., 1996; Dickie & Bender, 1982; Lopez et al., 1993 and vasiman et al., 1996) who found that school performances had no association with skipping or taking breakfast. Khan (2000) also found that students had the same performances in three subjects (Math, English and Science) without being affected with taking or skipping

breakfast. On the contrary, other studies proved a positive relationship between taking breakfast and school achievement (Musaiger et al., 2005; Pollitt et al., 1981; Connors & Blouin, 1983; Rampersaud et al., 2005; Simeon & Grantham-McGregor, 1989; Michaud et al., 1991; Chandler et al., 1995; Gregory 2005; Gagnard, 1986; Mathews, 1996; Gajre et al., 2008; Pollitt et al., 1982; Worobey & Worobey, 1999). Other researchers proved that consumption of breakfast improves school performance especially in mathematics, reading, vocabulary, cognitive tests, and memory (Briefel et al., 1999; Grantham-McGregor et al., 1998; Miller et al., 1998). Others found that students who omit breakfast suffer from academic problems, make more mistakes, perform badly in Math and were more likely to repeat a grade (Wyon et al., 1997; Alaimo et al., 2001; Kleinman et al., 1998).

In this study, the researcher found a significant relationship between taking fruits and school achievement; better performances in Math, Technology, English language and the overall average were associated with daily consumption of fruits had higher scores in technology (mean score of 72.1) and English language (mean score of 58.5) compared to those who don't (mean score of 69.5 in Technology and 55.6 in English). This result is in agreement with that of a study conducted by Abudayya et al., (2002) in Gaza Strip on 7th-9th grade students. They found that 72.6% of students who take fruits had good school achievement compared with 59.9% for those who don't, $P < 0.001$. Other studies in Canada also proved this association; Florence et al., (2008) found that taking fruits and vegetables

and good diet quality improved school achievement by decreasing the chance of failure in standardized reading and writing assessments. Implementation of the USDA Fresh Fruit and Vegetable Pilot Program in 107 schools resulted in improvement with student's attention and eating behaviors (Buzby et al., 2003).

4.1.3 Smoking, social, psychological and other patterns of behavior.

The results of the current study showed significant effects of smoking status on scores of six subjects (Math, $P = 0.008$; Religious Education, $P = 0.002$; Arabic language $P = 0.005$; Physical education, $P = 0.001$; Social Civics, $P = 0.002$; and elective subject, $P = 0.003$) in addition to the overall average ($P = 0.004$). High school grades were associated with non smoker students and poor school achievement appeared among smoker students. Students who don't smoke had higher mean scores (59.9 vs. 51.6 for Math, 69.0 vs. 62.2 for Religious Education, 66.0 vs. 59.1 for Arabic Language, 84.9 vs. 81.0 for Physical Education, 140.9 vs. 122.2 for Social Civics, 76.6 vs. 70.1 for Elective subject, and 70.1 vs. 65.5 for the overall average). Of the ninth grade students interviewed in this study, 5.6% were smokers (11.5% of males, 0% of females). According to the Palestinian Central Bureau of Statistics (PCBS, 2009), 4.0% of Palestinian smokers were within the age of 10-18 years (7.3% males, 0.6% females) which was higher in the West Bank than in Gaza (5.3%, 2.1%). Smoking percentage within secondary schools was 12.5% (24.5% of males, 1.1% of females) and 1.9% in elementary schools (3.5% of males, and 0.6% females), (PCBS, 2009).

A study conducted by the Palestinian School Health Center (2002) found the same result (smoking negatively affected school achievement): when evaluating the overall average, 53.8% of smokers (54.3% males and 52.4% females) had excellent and very good marks compared with 65.7% of non smokers (66.7 % males and 65.0% female), 18.1% of smokers (18.1% males, 17.9% females) had poor performance in comparison with 11.2% (11.8% males, 10.7% females) of non-smokers. In addition, numerous international studies found that smoking by students was significantly correlated with low school performances compared with good achievement of non smokers (Borland, 1975; Palmer, 1970; Collins et al., 2007; Ellickson et al., 2001).

This study found a relationship between feeling low concentration in the first three lessons and school achievement ($P < 0.05$); students who feel frequently low concentration in the first three lessons performed lower in overall average and individual subjects (except Science and Physical Education where no effect was found). This result is supported by the findings of other researchers as lack of concentration and attention resulted in poor school achievement (Keoghi et al., 2004; Eysenck, 2001; Needham, 2006).

The current study found that the incidence of low concentration in the first three lessons was negatively associated with taking breakfast and daily intake of fruits (the incidence of low concentration was lower among students taking breakfast and students taking fruits daily). This result is supported by those of Alansari, 2001(cited by Al-abbadi and Hussain,

2008) and Musaiger, 2005 who found that breakfast gives the individual the energy and nutrients to renew activity and improve the mental attendance and academic achievement while skipping or delay of breakfast causes laziness, sleep and relaxation, and lack of concentration and dizziness. Hungry students are more likely to suffer from attention problems (Murphy et al., 1998) or suffer from academic problems (Musaiger et al., 2005); also khan (2006) found that students of 6th and 7th grade had more concentration when they had breakfast. Buzby et al., (2003) found, by implementation of the USDA Fresh Fruit and Vegetable Pilot Program in 107 schools, that student's attention became better by provision of students with fruits and vegetables. Other studies found positive effect of taking breakfast upon concentration, energy intake, and motivation (Powell et al., 1998; Benton et al., 1998; Rango and Andrada, 1994) as cognitive function, memory and attention improved by taking breakfast. Wesnes (2003) showed that tardiness and attention problems decreased by taking breakfast. Others (Murphy et al., 1998; Public Media Center, 1998; Rampersaud et al., 2005) showed that taking breakfast can enhance cognitive function related to memory, test grades, and school attendance. Simeon (1998) showed that breakfast consumption improves the attention and memory processes. Eating breakfast strengthens student's attention and improves Math and Reading achievement (Minnesota Department of Children Families and Learning, 1998). It improves concentration and attention of students (Minnesota Department of Children Families and Learning, 1998; Gajre et al., 2008) and reduces tardiness (Meyers et al., 1989).

Concentration and attention improved by increasing physical activity (Symons et al., 1997; Taras and Potts-Datema, 2005; Kolbe et al., 1986). Spending 20 minutes by children in moderate walking enhanced attention and lead to improved school achievement (Hillman et al., 2009). Similarly, Symons et al., 1997 indicated that physical activity stimulates the concentration and increase academic achievement through better Mathematics, Reading and Writing scores.

The results of the current study showed that low concentration in the first three lessons, which negatively influenced school scores, was associated with psychological stress at school ($P = 0.001$). Students exposed to psychological stress at school had higher incidence of low concentration in the first three lessons (35.2% vs. 23.3%). The association was significant for both males ($P = 0.016$) and females ($P = 0.033$). Prevention of stress and enhancing self-esteem among adolescents can be obtained through being physically active (Bonhauser et al., 2005). However, no relationship was found in this study between psychological stress at school and school scores (except for Arabic language where students suffering from stress had lower grades). This contrasts with other results (Malik and Balda, 2006; Ford, 1993; Moore, 1997; Alatorre and Los Reyer, 1999; Bell, 1995; Dubois and Felner, 1992; Ganesan, 1995; Suldo et al., 2009; Rydell et al., 2010) who showed that students achieve worse due to exposure to academic stress. A study by Kouzma and Kennedy, 2004 found that the main sources of stress were exams and homework and time spent studying, which reduces the time spent with family or in sleeping

On the other hand, psychological stress at home was associated with low school achievement in some subjects as Math, Science, English, Social Civics, Elective course and with overall average. This result is in agreement with other researchers (Bell, 1995; Dubois and Felner, 1992; and Ganesan, 1995) who indicated that poor school achievement was associated with adolescents stress. However, different results were obtained by a study carried out on twenty-five undergraduate students at the University of North Carolina at Charlotte which showed no association between stress and student achievement; students with either high or low rate of stress had high achievement (Womble, 2003).

This study found no relationship between school achievement and sleeping behaviors, wakeup behavior and sleep-wake up behavior. But, the current study showed a significant relationship between wakeup behavior and incidence of low concentration which in turn negatively affected school scores. As shown in the results, 25.7% of students who wakeup early feel low concentration in the first three lessons compared to 35.9% for those who don't wake up early. Wolfson and Carskadon (2003) showed that sleeping for short time lead to stress, poor attention and increased student mistakes which correlated with lower school achievement. Similarly, Dahl (1999) found that attention and concentration problems were associated with lack of sleep and lead to poorer achievement. The study of Wolfson and Carskadon (2003) conducted on high-school adolescents showed that students with high school achievement had early sleep-wake up schedules compared to students with lower achievement.

Lack (1986) confirmed that students who achieve poor grades sleep late and wakeup late. Poor achievement was associated with late wakeup time (Johns et al., 1976; Smith et al., 1989; Trockel et al., 2000) and with late sleeping time (Medeiros et al., 2001; Smith et al., 1989; Trockel et al., 2000; Wolfson and Carskadon, 2003) and also with short sleeping period (Jean-Louis et al., 1996; Medeiros et al., 2001; Trockel et al., 2000; Pilcher and Walter, 1997; Wolfson and Carskadon, 2003; Kelly et al., 2001) and irregular sleep-wake schedules (Wolfson and Carskadon, 2003), also excessive sleepiness (Jean-Louis et al., 1996) which attributed with increased mistakes at school and thus associated negatively with school achievement (Kahn et al., 1989). So worse school achievement was influenced by insufficient sleep and irregular sleep behaviors (Blum et al., 1990; Link and Ancoli-Israel, 1995; Hoffmann and Steenhof, 1997; Wolfson and Carskadon, 1998, 2003; Shin et al., 2003; Millman, 2005). Waking up late in the morning maybe due to staying up at night to watch TV or to study which causes lack of enough time to eat breakfast and therefore being hungry throughout the morning and this affects the concentration (Al-abbadi and Hussain, 2008).

In this study, a strong significant relationship was found between daily hours of parental help and school achievement (overall average and individual subjects except science). Students who did not receive any parental help achieved better than those who received parental help. This finding is in agreement with the findings of (Cooper et al., 2000) who showed that older students who do best in school don't need parental help

in their lessons and strengthen their independence and learn to manage and organize their time and skills contrary to children in elementary school who need their parents role as teachers to facilitate difficulties in learning.

However, this result is inconsistent with findings of other researchers who confirmed the significance of parental help in homework (Balli et al., 1998; Conway and Houtenwille, 2008) where more parental help in learning resulted in higher school achievement (Cotton and Wikelund, 1989; Utah Education Association, 2008; Hixon, 2006 and Epstein 1995). Also, Olatoye and Ogunkola (2008) proved that school achievement, especially in science, improved by parental involvement the same as for mathematics, literacy and reading (Balli et al., 1998; Epstein, 2001; Faires et al., 2000; Hara and Burke, 1998; Quigley, 2000; West, 2000). Melhinsh et al., (2001) showed that best school achievement, school attendance, best skills, problem solving, and greater enjoyment at school were associated with the parental involvement in children's learning.

4.1.4 Association between school achievement and sedentary lifestyle.

In this study there was a positive relationship between weekly physical activity and school achievement in Physical Education and Crafts & Arts but no association was found for any of the other subjects or the overall average. A study by Tremblay et al., (2000) on children of 6th grade showed negative but weak relationship between physical activity and school achievement; Another study in England carried on adolescents (13-16years old) showed no association between physical activity and school

achievement, and in English the relationship was negative (Daley and Ryan , 2000). Another study in Hong Kong conducted on 333 Chinese children from primary school (8-12 years old) confirmed no association between physical activity of high level and school achievement (Yu et al., 2006). Trockel et al., (2000) demonstrated that high level of physical activity was negatively associated with school achievement, as students who had weekly physical activity for seven or more hours performed poorer than their peers who had weekly physical activity for six hours or less or not at all.

The result of this study is in disagreement with the findings of other researchers. Etnier et al., (1997) reported that more than 200 studies proved that physical activity improve learning (for example, Dwyer et al., 1996, 2001; Shephard, 1997; Taras and Potts-Datema, 2005). Others found that increasing time of physical activity (with reduction in class time) lead to improvement in school achievement (Cooper and Pat, 2003; Sallis et al., 1999; Keays and Allison, 1995; Shephard, 1996) especially in Math (Shephard et al., 1984; Shephard, 1997), and reading and writing and test scores (Symons et al., 1997; Feldman et al., 2003; Kolbe et al., 1986). Other researchers showed that high level sport positively affected English marks without any evidence in Math improvement (White and McTeer, 1990). Past study applied on 546 students from primary school between the years of 1970-1977 showed that high school achievement correlated with students who had weekly physical activity more than 5 hours compared

with students who only had 40 minutes weekly of school physical class (Shephard et al., 1984).

A study conducted in Australia on both genders from age 7-15 noted that school achievement was enhanced via physical activity (Dwyer et al., 2001). Increasing weekly physical activity by reduction of 240 minutes from academic time was associated with higher Math achievement (Shephard et al., 1984; Shephard, 1997). Spent time on physical activity out of school did not negatively affect school achievement (Carlson et al., 2008). On the other hand, time spending in physical activity was correlated with time spent in reading (Feldman et al., 2003).

The researcher found no relationship in the present study between daily time spent watching TV and school achievement. This finding is supported by a study conducted in Al- Riyadh (in Saudi Arabia) which demonstrated no association between long time watching TV and deterioration in school achievement; as there are types of TV programs that are positively associated and others negatively associated with school achievement (Al-meqren, 1994), so the various types of programs lead to different impact on school achievement. Anderson et al., (2001) found that watching educational programs was associated with higher achievement in high school for both genders. Others (Anderson et al., 2001; Wright et al., 2001; Rice et al., 1990 and Zill, 2001) found that watching violent programs correlated with lower school achievement (Wills et al., 2001). Other researchers found that watching TV was negatively associated with

school performances (Hancox et al., 2005; Zimmerman and Christakis, 2005; Borzekowski and Robinson, 2005); as longer time spent in watching TV, less time is spent in learning and doing homework (Sharif and Sargant 2006; Wiecha et al., 2001; Wolfe et al., 1984).

In this study there was no association between daily time spent on computer and school achievement. Previous research showed contrasted results; high school achievement was positively associated with using computer at home (Naevdal, 2007; Borzekowski and Robinson, 2005; Attewell and Battle, 1999; Papanastasiou et al., 2003); students who use computer at home gained high scores especially in Math, linguistic communication and English (Rocheleau, 1995; Attewell and Battle, 1999) in addition to Reading, and computer knowledge (Blanton et al., 2000). Also students of 7th grade gained higher level of technology skill (Sparks, 1986), while Wenglinsky (1998) found that the association was negative between using computers at home and math scores for 4th grade students, but slightly positive for 8th grade students. Also negative association was confirmed by Charles et al., (2008); students among 5th to 8th grade who used computer at home obtained worse achievement in Math and Reading.

4.2 Limitations of the study

The present study was carried out on ninth grade students in the district of Tulkarm. The results may differ for other grades or other districts. Other studies may be necessary to further clarify the effects of lifestyle determinants and BMI on school achievement in other districts and

different grades for results to be generalized on a wider population. Despite prior coordination with schools, there was a lack of commitment from some schools to make selected students available for interviews which slightly reduced the sample size. The researcher is an educator and she had carried the interviews and took student measurements herself. Although she did every effort to avoid any bias, there is always the risk of introducing researcher bias.

4.3 Conclusions

1. The results showed significant relationship between BMI and gender. The percentage of males in the underweight category was higher than that for females but the percentage of females in the overweight category exceeded that for males. However, no relationship was found between BMI and school achievement of ninth grade students in governmental schools of the district of Tulkarm.
2. Most ninth grade students in the present study take their breakfast before they go to school (62.9%) but the percentage was higher for males than for females (80.6% for males compared to 46.7% for females).
3. Feeling low concentration in the first three lessons negatively affected student scores.
4. There was no association between taking breakfast and school achievement but taking breakfast reduced the incidence of feeling low concentration in the first three lessons.

5. Also the incidence of feeling low concentration in the first three lessons was decreased by daily consumption of fruits, not smoking, absence of school stress and waking up early.
6. The results also showed significant negative effects of smoking on scores of several subjects (Math, Religious Education, Arabic Language, Physical Education, Social Civics and Elective subject) in addition to the overall average.
7. Significant associations were found between psychological stress at home and scores of Math, Science, and English Language, Social Civics, Elective subject and overall average .Mean scores were higher for students not feeling stress at home.
8. Weakly physical activity had significant effect on student scores in Physical Education and scores in Crafts &Arts; means of scores were higher for students having weekly physical activity of more than six hours.
9. Method of transportation to school and back from school had no significant effect on school achievement. Also neither time spent in watching television nor using computer showed any effect on any subject or on the overall average.
10. Students who did not receive parental help in doing homework had higher scores than those receiving help.
11. Sleeping 8 to 9 hours at night improved student achievement in Science and Technology and overall average.

4.4 Recommendations

1. The results of this study underline the importance of raising awareness among parents and school officials to encourage students to follow healthy lifestyle such as taking breakfast before leaving to school and consuming fruits on daily basis, to avoid smoking and have good sleep-wake up behavior in order to improve school achievement.
2. It is important for parents of students and other family members to spend more time together to strengthen family relations and avoid the factors which cause stress to students in order to improve school achievement.
3. Parents should encourage and enhance independence and self-reliance of their children and minimize their dependence on parental help in doing homework.
4. There may be a need for more studies (in other districts and with other age groups) to further investigate the impact of dietary habits on school achievement.
5. Decision-makers especially in the Ministry of Education should develop plans and adopt policies and strategies aimed at improving the nutritional and health status and social behaviors of students through education programs and promotion of nutrition and health in cooperation with the Ministry of Health, local community institutions and private sector institutions.
6. Children need knowledge, skills and attitude to prepare and choose healthy food and adopt healthy practices and this can be promoted by

integrating school lessons into the curriculum and at home by the family.

7. Parents should be involved in school activities, such as seminars, sport events and collective breakfast activities. This is important in order to improve and enhance their awareness of their children's health, nutrition and behaviors.
8. Type and nutritional quality of foods in school canteens should be monitored to prevent students from consuming unhealthy food at school canteens.

References

- Abudayya A, Shi Z, Abed Y, Holmboe-Ottesen G. 2002. Diet, nutritional status and school performance among adolescents in Gaza Strip. *Eastern Mediterranean Health Journal (La Revue de Santé de la Méditerranée orientale EMHJ) Vol. 17 No. 3.*
- Adegboye AO. 1998. Gender preferential treatment by parent and Nigeria family. *Journal of Education Studies.1 (1): 11.*
- Adeyemo DA. 2005. Parental Involvement Interest in Schooling and School Environment as predictors of Academic Self-efficacy among fresh Secondary School Student in Oyo State, Nigeria. *Electronic Journal of Research in Educational Psychology, 5-3 (1): 163-180.*
- Affenito SG, Thompson DR, Barton BA, Franko DL, Daniels SR, Obarzanek E, Schreiber GB, Striegel-Moore. 2005. Breakfast consumption by African-American and white adolescent girls correlates positively with calcium and fiber intake and negatively with body mass index. *Journal of the American Dietetic Association, 105: 938-945.*
- Ajayi, Taiwo. 1988. A system approach towards remediation of academic failure in Nigerian schools. *Nigeria Journal of Educational Psychology, 3, 1: 28-35.*
- Ajala N, Iyiola S. 1988. Adolescence psychology for Teachers. *Oyo: Abodunrin Rogba Publishers.*

- Ajewole GA, Okebukola, POA. 1998. The relative effectiveness discovery and expository instructional materials on retention of biological concepts. *Journal of Nigerian Education Forum, 11(1): 1.*
- Al-abbadi NA, Hussain SM. 2008. Dietary intake and its relation to academic and emotional intelligence for female students of King Faisal University in Al-Ahssa. *Food Sci. & Agric. Res. Center, King Saud Univ., Res. Bult., No. (164), pp. (5-43)*
- Alaimo K, Olson CM, Frongillo EA. 2001. Food insufficiency and American school – aged children’s cognitive, academic and psychosocial development. *Pediatrics, 108(1): 44-53.*
- Alatorre AS, Los Reyes R. 1999. Psychological stress, internalized symptoms and academic achievement of Hispanic adolescents. *Journal of Adolescent Research, 14: 343-358.*
- Al-Muqrin A. 1994. Impact of television viewing on academic delay for high school students in Riyadh, Al-Imam Muhammad bin Saud University. [Available at: www.edu.gov.sa/papers/index.php?action=showPapers&id=684]
- Anderson D R, Huston AC, Schmitt KL, Linebarger DL, Wright JC. 2001. Early childhood television viewing and adolescent behavior: the recontact study. *Monogr Soc Res Child Dev, 66: I-VIII, 1-147.*
- Anderson RE, Becker HJ. 2001. School investments in instructional technology. Irvine, CA, and Minneapolis, MN: Center for Research on

Information Technology and Organizations, University of California, Irvine, and University of Minnesota. [Available at http://www.crito.uci.edu/tlc/findings/report_8/startpage.htm]

Andersen RE, Crespo CJ, Bartlett SJ, Cheskin LJ, Pratt M. 1998. Relationship of physical activity and television watching with body weight and level of fatness among children: results from the third national health and nutrition examination survey. *JAMA*, **279 (12): 938-942**.

Angrist J D, Lavy V, Schlosser A. 2005 .New evidence on the causal link between the quantity and quality of children. NBER working papers 11835, National Bureau of Economic Research, Inc. [Available at: <http://ideas.repec.org/p/nbr/nberwo/11835.html>]

Aremu AO. 2000. Academic performance 5 factor inventory. *Ibadan: Stirling-Horden Publishers*.

Asikhia OA. 2010. Students and Teachers' Perception of the Causes of Poor Academic Performance in Ogun State Secondary Schools [Nigeria]: *Implications for Couselling for National Development European Journal of Social Sciences – Volume 13*.

Attewell P, Battle J. 1999. Home computers and school performance, *Information Society, 15: 1–10*.

Bagully MD. 2006. The impact of childhood obesity on academic performances. *Washington, DC*.

Bakare CGM. 1994. Mass Failure in Public Examinations: Some

Psychological Perspectives: *Monograph, Department of Guidance and Counselling, University of Ibadan, Ibadan.*

Balli SJ, Demo DH, Wedman JF. 1998. Family involvement with children's homework: An intervention in the middle grades. *Family Relations, 47(2): 149–157.*

Batty D. Lee, I. 2002. Physical activity for preventing strokes, *British Medical Journal, 325, pp. 350-351.*

Bassett DR, Pucher J, Buehler R, Thompson DL, Crouter SE. 2008. Walking, cycling, and obesity rates in Europe, North America, and Australia *Journal of Physical Activity and Health, 5: 795-814.*

Bell F. 1995. The relationship between academic achievement and stress from life change events of non-traditional college students. *Humanities and Social Science, 57:7.*

Bellisle F. 2004. Effects of diet on behaviour and cognition in children. *British Journal of Nutrition, 92: S227- S232.*

Binkley M, Williams T. 1996. Reading literacy in the United States (NCES 96-258). *Washington, DC: Office of Educational Research and Improvement.*

Blanton WE, Moorman GB, Hayes BA. 2000. Effects of participation in the fifth dimension on far transfer. Boone, NC: Laboratory on

technology and learning, appalachian state university college of education. [Available at: http://www.ced.appstate.edu/projects/5dClhse/publications/tech/effects/ef_method.html.]

Blum D, Kahn A, Mozin M, Rebuffat E, Sottiaux M, Van de Merckt C. 1990. Relation between chronic insomnia and school failure in preadolescents. *Sleep Res, 19: 194*.

Benton D, Parker PY. 1998. Breakfast, blood glucose, and cognition. *American Journal of Clinical Nutrition, 67(S): 772-778*.

Bonhauser M, Fernandez G, Puschel K, Yanez F, Montero J, Thompson B. 2005. Improving physical fitness and emotional well-being in adolescents of low socioeconomic status in chile: results of a school-based controlled trial. *HealthPromotInt, 20: 113-122*.

Borland B. 1975. Relative effects of low socio-economic status, parental smoking and poor scholastic performance on smoking among high school students. *Soc Sci Med, 9: 27-30*.

Borzekowski DLG, Robinson TN. 2005. The remote, the mouse, and the no. 2 pencil - The household media environment and academic achievement among third grade students. *Archives of Pediatrics & Adolescent Medicine, 159: 607-613*.

- Boutelle K, Neumark-Sztainer D, Story M, Resnick M. 2002. Weight control behaviors among obese, overweight, and non overweight adolescents. *Journal of Pediatric Psychology, 27: 531-540.*
- Bowman S, 2006. Television-viewing characteristics of adults: correlations to eating practices and overweight and health status, *Preventing Chronic Disease, 3(2): 1-11.*
- Briefel R, Murphy M, Kung S, Devaney B. 1999. Universal-free school breakfast program evaluation design project. Review of the literature on breakfast and learning. Final report. *Princeton, NJ, Mathematica Policy Research, USDA Contract No. 53-3198-7-006.*
- Buzby JC, Guthrie JF, Kantor LS. 2003. Evaluation of the USDA fruit and vegetable pilot program: report to congress. *Economic Research Service/USDA.*
- California Department of Education. 2002. State study proves physically fit kids perform better academically, News Release.
- Carlson SA, Fulton JE, Lee SM. 2008. Physical education and academic achievement in elementary school: data from the early childhood longitudinal study. *American Journal of Public Health, 98(4): 721–727.*
- Center for school health education and guidance. 2002. The prevalence of smoking among students in Palestinian schools. General directorate of educational planning.

- Chandler AMK, Walker SP, Connolly K, Grantham-McGregor SM. 1995. School breakfast improves verbal fluency in undernourished Jamaican children. *Journal of Nutrition*, **125(4): 894-900**.
- Charles T, Clotfelter Helen F, Ladd, Jacob L, Vigdor. 2008. Scaling the digital divide: Home computer technology and student achievement Duke University.
- Cohen B, Evers S, Manske S, Bercovitz K, Edward HG. 2003. Smoking, physical activity and breakfast consumption among secondary school students in a southwestern on tario community. *Canadian Journal of Public Health*, **94: 41-44**.
- Cole DA, Martin JM, Peeke LA, Seroczynski AD, Fier J. 1999. Children's over- and underestimation of academic competence: A longitudinal study of gender differences, depression, and anxiety. *Child Development*, **70(2): 459-473**.
- Collins BN. 2007. Adolescent environmental tobacco smoke exposure predicts academic achievement test failure. *Journal of Adolescent Health*, **41: 363–370**.
- Connors CK, Blouin AG. 1983. Nutritional effects on behaviour of children. *J Psychiatr Res*, **17: 198–201**.
- Conway KS, Houtenwille A. 2008. Parental effort, school resources, and student achievement, *J. Human Res*. [Available at http://www.unh.edu/news/cj_nr/2008/may/lw27pa-rents.cfm //]

- Cooper HM, Lindsay JJ, Nye B. 2000. Homework in the home: how student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, 25(4):464-87.
- Cooper Pat. 2003. Our journey to good health. School administrator.
- Cotton K, Wikelund KR. 1989. Parent involvement education. *School Improvement Research Series (SIRS) Journal*. [Retrieved from: <http://www.nwrel.org/scpd/sirs/3/cu6.html>.]
- Crane J. 1991. The epidemic theory of ghettos and neighborhood effects on dropping out and teenage childbearing. *American Journal of Sociology*, 96: 1226 - 1256.
- Crosnoe, Robert, Mulle C. 2004. Body mass index, academic achievement, and school context: Examining the educational experiences of adolescents at risk of obesity. *Journal of Health and Social Behavior: Vol 45, p. 393-407*.
- Dahl RE. 1999. The consequences of insufficient sleep for adolescents: links between sleep and emotional regulation. In K. L. Wahlstrom (Ed.), *Adolescent sleep needs and school start times*. Bloomington, Phi Delta Kappa International Foundation.
- Daley AJ, Ryan J. 2000. Academic performance and participation in physical activity by secondary school adolescents. *Percept Mot Skills*, 91: 531-534.

- Devereux P. J Academic, Salvanes KG. 2005. The more the merrier? The effect of family size and birth order on children's education. *The Quarterly Journal of Economics*, 120(2): pp.669–700. [Available at: <http://ideas.repec.org/a/tpr/qjecon/v120y2005i2p669-700.html>]
- Dickie NH, Bender AE. 1982. Breakfast and performance in school children. *Br J Nutr*, 48: 483–96.
- Dietz WH, Gortmaker SL. 1986. Do we fatten our children at the television set? Obesity and television viewing in children and adolescent, *Pediatrics*, 75: 807-812.
- Dubey KR. 1999. Effects of home environment on the mental development of children. *Journal of Social Psychology*, 174:221 - 236.
- Dubois D, Felner L. 1992. A prospective study of life. Stress, social support and adaptation in early adolescence. *Child Development*, 63(2): 542-557.
- Dwyer T, Blizzard L, Dean K. 1996. Physical activity and performance in children. *Nutr Rev*. 54: S27-S35.
- Dwyer T, Sallis JF, Blizzard L, Lazarus R, Dean K. 2001. Relation of academic performance to physical activity and fitness in children. *Pediatr Exerc Sci*, 13: 225-238.
- El-Desoki F. 2005 Scientific study calls for confronting poor academic achievement. *Journal of the statement*, page 4

- Ellickson PL, Tucker J, Klein DJ. 2001. High-risk behaviors associated with early smoking: results from a 5-year follow-up. *Journal of Adolescent Health, 28: 465–473.*
- Epstein JL. 1995. School-family-community partnerships: Caring for the children we share. *Phi Delta Kappan, 76(9): 701-712.*
- Epstein JL. 2001. Teachers involve parents in school work (TIPS): volunteers in social studies and art. In J. L. Epstein (Ed.), school, family, and community partnerships: preparing educators and improving schools (pp. 543-62). *Boulder, Colorado: Westview Press.*
- Etnier J L, Salazar W, Landers DM, Petruzzello S J, Han M, Nowell P. 1997. The influence of physical fitness and exercise upon cognitive functioning: a meta-analysis. *Journal of Sport and Exercise Psychology, 19(3): 249-277.*
- Eysenck MW. 2001. Principles of cognitive psychology. Hove, East Sussex: Psychology Press.
- Faires J, Nichols WD, Rickelman RJ. 2000. Effects of parental involvement in developing competent readers in first grade. *Reading Psychology, 21: 195-215.*
- Feldman DE, Barnett T, Shrier I, Rossignol M, Abenhaim L. 2003. Is physical activity differentially associated with different types of sedentary pursuits? *Arch Pediatr Adolesc Med, 157: 797-802.*

- Ferguson R. 1991. Paying for public education: New evidence of how why money matters. *Harvard Journal on Legislation*, 465 – 498.
- Fiore H, Travis S, Whalen A, Auinger P, Ryan S. 2006. Potentially protective factors associated with healthful body mass index in adolescents with obese and non obese parents: A secondary data analysis of the third national health and nutrition examination survey, 1988-1994. *Journal of the American Dietetic Association*, 106: 55-64.
- Florence MD, Asbridge M, Veugelers PJ. 2008. Diet quality and academic performance. *Journal of School Health*.78: 209–215.
- Ford DY. 1993. An investigation of paradox of under achievement among gifted black students. *Roeper Review*, 16(2): 78- 84.
- Frank LD, Sallis JF, Conway TL, Chapman JE, Saelens BE, Bachman W. 2006. Many pathways from land use to health. Associations between neighborhood walk ability and active transportation, body mass index, and air quality. *Journal of the American Planning Association*, 72; 1: 75-87.
- Gagnard A. 1986. Evaluation of breakfast cereals and cereal advertisement by a young adult audience. Paper presented at the annual meeting of the association for education in Journalism and mass communication.

- Gajre NS. 2008. Breakfast eating habit and its influence on attention-concentration, immediate memory and school achievement. *Indian Pediatrics, 45(10): 824-828.*
- Ganesan S.R. 1995. The effect of anxiety of academic achievement. *Journal of Educational Research and Extension, 31(3): 154-167.*
- General directorate of educational planning. 2002. The prevalence of smoking among students in Palestinian schools [Available at: www.mohe.gov.ps/.../Uploads/admin/smoking.doc]
- Goux D, Maurin E. 2005. The effect of overcrowded housing on children's performance at school. *Journal of Public Economics, 89(5-6): pp. 797-819.* [Available at: [http://ideas.repec.org/a/eee/pubeco/v89y2005i5-6p797-819.html.](http://ideas.repec.org/a/eee/pubeco/v89y2005i5-6p797-819.html)]
- Grantham-McGregor SM, Chang S, Walker S. 1998. Evaluation of school feeding programs: Some Jamaican examples. *American Journal of Clinical Nutrition, 67(4): 785S-789S.*
- Gregory WP. 2005. Does eating breakfast affect the performance of college students on biology exams? [Available at: amcbt.indstate.edu/volume_30/v30-4p15-19.pdf]
- Grissmer RH. 2003. Beyond helping with homework: parents and children doing mathematics at home. *Teaching Children Mathematics, 14: 120 - 131.*

- Haan MD. 2005. Birth order, family size and educational attainment. Tinbergen institute discussion papers 05-116/3, Tinbergen institute. Available at: <http://ideas.repec.org/p/dgr/uvatin/20050116.html>
- Halle T, Kurtz-Costes B, Mahoney J. 1997. Family influences on school achievement in low-income, *African American children*. *Journal of Educational Psychology*, **89**: 527–537.
- Hancox RJ, Milne BJ, Poulton R. 2005. Association of television viewing during childhood with poor educational achievement. *Archives of Pediatrics and Adolescent Medicine*, **159**: 614-8.
- Hara SR, Burke DJ. 1998. Parent involvement: The key to improved student achievement. *School Community Journal*, **8(2)**: 9-19.
- Hembree R. 1988. Correlates, causes, effects, and treatment of test anxiety. *Review of Educational Research*, **58**: 47-77.
- Hill JO, Peter JC. 1998. Environmental contributions to the obesity epidemic. *Science*, **280**: 1371–74.
- Hillman CH, Pontifex MB, Raine LB, Castelli DM, Hall EE, Kramer AF. 2009. The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. *Neuroscience*, **159**: 1044-1054.
- Hixon J. 2006. Critical issues supporting ways parents and families can become involved in schools. Cambridge: harvard family research project.

- Hoffamn W, Steenhof L. 1997. Sleep characteristics of Dutch adolescents are related to school performance. *Sleep Wake Res. The Netherlands*, **8: 51–55**.
- Hofferth SL, Curatin S. 2005. Poverty, food programs, and childhood obesity. *J Policy Anal Manage*, **24: 703-726**.
- House WH. 2002. Educational environment, social Class and cognitive development. *Journal of Social Psychology*, **68 (2): 160 - 167**.
- Howley G. 1989. The Motivation Factor: A theory of personal investment. *Journal of Personality and Social Psychology*, **44: 103 - 121**.
- Jacoby E, Cueto S, Pollitt E. 1996. Benefits of a school breakfast program among Andean children in Huaraz, Peru. *Food and Nutrition Bulletin*, **17: 54-64**.
- Jean-Louis G, Gizycki H, Zizi F, Friedman K, Spielman AJ, Taylor D, Fullilove R, Taub H. 1996. Psychosocial determinants of sleepiness and performance: consideration of gender differences. *Sleep Research*, **25: 101**. [Available at: researchrepository.murdoch.edu.au/.../02Whole.pdf.]
- Johns MW, Dudley HAF, Masterton JP. 1976. The sleep habits, personality and academic performance of medical students. *Medical Education*, **10: 158-162**.

- Kahn A, Van de Merckt C, Rebuffat E, Mozin MJ, Sottiaux M, Blum D, Hennart P. 1989. Sleep problems in healthy preadolescents. *Pediatrics*, **84**: 542–546.
- Kaur H, Choi W, Mayo M, Harris K. 2003. Duration of Television Watching is Associated with Increased Body Mass Index, *The Journal of Pediatrics*, **143 (4)**: 506-511.
- Khan A. 2006. *The relationship between breakfast, academic performance and vigilance in school aged children. Unpublished Masters by Research thesis, Murdoch University.*
- Keays J, Allison R. 1995. The effects of regular moderate to vigorous physical activity on student outcomes: A review. *Canadian Journal of Public Health*, **86**: 62-66.
- Kelly WE, Kelly KE, Clanton RC. 2001. The relationship between sleep length and grade-point-average among college students. *College Student Journal*, **Vol. 35(1)**: 84-86.
- Keoghi E, Bond FW, French CC, Richards A, Davis, RE. 2004. Test-anxiety, susceptibility to distraction and examination performance. *Journal of Anxiety, Stress and Coping*, **17(3)**: 241-252.
- Kimball MM. 1989. A new perspective on women's Math achievement, *psychological bulletin*. **105**, pp. 198-214.

- Kleinman RE, Murphy JM, Little M, Pagano M, Wehler CA, Regal K, Jellinek MS. 1998. Hunger in children in the united states: potential behavioral and emotional correlates. *Pediatrics*, **101(1): E3**.
- Kolbe LJ, Green L, Foreyt J. 1986. Appropriate functions of health education in schools: improving health and cognitive performance.
- Kouzma NM, Kennedy GA. 2004. Self-reported sources of stress in senior high school students. *Psychological Reports*, **94: 314-316**.
- Kurz KM, Peplinsky N, Welch CJ. 1994. Investing in the future: six principles for promoting the nutritional status of adolescent girls in developing Countries. Washington DC: *International Center for Research on Women, nutrition of adolescent girls' research program, 24p*.
- Lack LC. 1986. Delayed sleep and sleep loss in university students. *Journal of the American College Health*, **35(5): 105-110**.
- Lee S. 1994. Family-school connections and student's education: Continuity and change of family involvement from the middle grades to high school, Doctoral dissertation, Johns Hopkins University, Baltimore, MD.
- Lee VE, Chroninger RG. 1994. The relative importance of home and school in the development of Literacy skills for middle grade students. *Am. J. Educ. University of Chicago Press*. **3(102): 286-329**

- Li Y, Dai Q, Jackson JC, Zhang J. 2008. Overweight is associated with decreased cognitive functioning among school-age children and adolescents. *Obesity, 1809-1815.*
- Link SC, Ancoli-Israel S. 1995. Sleep and the teenager. *Sleep Res, 24a: 184.*
- Lloyd HM, Rogers PJ, Hedderley DI. 1996. Acute effects on mood and cognitive performance of breakfasts differing in fat and carbohydrate content. *Appetite, 27: 151-64.*
- Lockheed ME, Fuller B, Nyirongo L. 1989. Family effects on student's achievement in Thailand and Malawi. *Journal of Sociology of Education, 62: 239 - 256.*
- Lopez I, de Andraca I, Perales CG, Heresi E, Castillo M, Colombo M. 1993. Breakfast omission and cognitive performance of normal, wasted and stunted school children. *Eur J Clin Nutr, 47: 533-42.*
- Marjoribanks K. 1996. Family learning environments and students outcomes: A review. *Journal of Comparative Family Studies, 27(2): 373-394.*
- Marjoribanks K. 2003. Birth Order, Family environment, academic and affective outcomes. *Journal of Psychological Reports, 92: 1284 - 1298.*
- Marks G. 2006. Family size, family type and student achievement: cross-national differences and the role of socioeconomic and school factors" *Journal of Comparative Family Studies, 37(1): 1-24.*

- Mary E, Keegan. 2005. Social-demographic, school, neighborhood, and parenting influences on academic achievement of Latino young adolescents. *Journal of Youth and Adolescence*, 34(2): 163-175.
- Mathews R. 1996. Importance of breakfast to cognitive performance and health, *perspectives in applied nutrition*, 3: 204-212.
- Medeiros ALD, Mendes DBF, Lima PF, Araujo JF. 2001. The relationships between sleep-wake cycle and academic performance in medical students. *Biological Rhythm Researc*, 32(2): 263-270.
- Melhinsh E, Sylva C, Sammons P, Siray-Blatchford I, Taggart B. 2001. Social, behavioural and cognitive development at 3-4years in relation to family background. The effective provision of pre-school.
- Melnik TA, Rhoades SJ, Wales KR, Cowell C, Wolfe WS. 1998. Overweight school children in New York City: Prevalence estimates and characteristics. *International Journal Obesity*, 22: 7-13.
- Meyers A, Sampson AE, Weitzman M, Rogers BL, Kayne H. 1989. School breakfast program and school performance. *American Journal of Diseases of Children*, 143: 1234-39.
- Michaud C, Musse N, Nicolas JP, Me´jean L. 1991. Effects of breakfast size on short-term memory, concentration, mood and blood glucose. *Journal of Adolesc Health*, 12: 53–57.

- Milkie MA, Warner CH. 2011. Classroom learning environments and the mental health of first grade children. *Journal of Health and Social Behavior, 52(1): 4-22.*
- Miller G, Forgac T, Cline T, McBean L. 1998. Breakfast benefits children in the US and abroad. *Journal of the American College of Nutrition, 17: 4-6.*
- Millman RP. 2005. Excessive sleepiness in adolescents and young adults: causes, consequences, and treatment strategies. *Pediatrics, 115: 1774–1786. doi: 10.1542/peds.2005-0772.*
- Mills A. 1993. Gender differences in academically young students in mathematical reasoning patterns across age and sub-skills. *Journal of Education Psychology, 2: 340 – 346.*
- Moore BJ. 1997. Three case studies of gifted students who underachieve in high school. *Dissertation Abstract International Section A: Humanities and Social Science, 57(6-A): 3394.*
- Morakinyo A. 2003. Relative efficacy of systematic desensitization, self statement monitoring and flooding on students test anxiety. Unpublished PhD. Thesis. University of Ibadan.
- Moser C. 1999. A fresh start improving literacy and numeracy. *Suffolk: DfEE*
- Murphy JM, Pagano M, Nachmani J, Sperling P, Kane S, Kleinman R. 1998. The Relationship of school breakfast to psychosocial and

academic functioning: Cross-sectional and longitudinal observations in an inner-city sample. *Archives of Pediatric and Adolescent Medicine*, **152**: 899-907.

Murphy JM, Wehler CA, Pagano ME, Little M, Kleinman RF, Jellinek MS. 1998. Relationship between hunger and psychosocial functioning in low-income American children. *Journal of the American Academy of Child & Adolescent Psychiatry*, **37**: 163-170.

Musgrave CB. 2000. Environmental factors affecting attitude towards Science and Mathematics. *Journal of Educational Psychology*, **91(1)**: 382 - 394.

Musaiger Obaid A, Zaqzouq, Nasreen, Almannai, Mariam. (2005b). Dietary habits, lifestyle and obesity in adolescent girls in Jeddah city, Saudi Arabia (comparison between public and private schools). *Arab Journal of Food and Nutrition*, **6(13)** Proceedings of the Second Arab Conference for the obesity and physical activity, 13 - 15.12.2005 AD Kingdom of Bahrain from 0.205 to 212.

Naevdal F. 2007. Home-PC usage and achievement in English, computers and education, *49(4)*: 1112-1121.

Needham BL. 2006. Gender differences in the consequences of depressive symptomatology for educational attainment, social support, and health risk behavior during the transition from adolescence to young adulthood, PhD thesis, University of Texas.

- Nicklas TA, Bao W, Webber LS, Berenson GS. 1993. Breakfast consumption affects adequacy of total daily intake in children. *Journal of the American Dietetic Association*, **93(8): 886-891.**
- O'Brien M, Jones D. 1999. Children, parental employment and educational attainment: an English case study, *Cambridge Journal of Economics*, **23: 599-621.**
- Olatoye RA., Ogunkola BJ. 2008. Parental involvement, interest in schooling and academic achievement of Junior secondary school students in Ogun State, Nigeria. College teach. [Available at: www.cluteinstitute.com *Methods Styles J.*, **4(8): 33-39.**]
- Onocha, CO.1985. Pattern of relationship between home and school factors and pupil's learning outcomes in Bendel Primary Science Project. *Journal of Science Teachers Association of Nigeria (STAN)*, **23(1): 56-63.**
- Palestinian Central Bureau of Statistics. 2007. The 2006 Palestinian **family health survey**. [Available at: [http://www.pcbs.gov.ps/Portals/pcbs/Press Release /ArabicReport.pdf.](http://www.pcbs.gov.ps/Portals/pcbs/Press%20Release/ArabicReport.pdf)]
- Palestinian Central Bureau of Statistics. 2009. Palestinian Child-issues and Statistics. [Available at: [http://www.pcbs.gov.ps/Portals/pcbs/Press Release /children.pdf.](http://www.pcbs.gov.ps/Portals/pcbs/Press%20Release/children.pdf)]
- Palmer A. 1970. Some variables contributing to the onset of cigarette smoking in high school students, *Soc. Sci Med.***4: 359-366.**

Public Media Center and California Food Policy Advocates. 1998. Breakfast first, food for hungry minds.

Papanastasiou EC, Zembylas M, Vrasidas C. 2003. Can computer use hurt science achievement? The USA results from PISA, *International Journal of Science Education and Technology*, 12(3): 325–332.

Peters HE, Mullis NC. 1997. The role of family income and sources of income in adolescent achievement. In Duncan, Brooks-Gunn (Eds.), Consequences of growing up poor. *New York: Russell Sage Foundation, pp. 340-381.*

Phillips M. 1998. Family background, parenting practices and the black – white test score gap. The black – white test score gap. Washington, D.C., Brooking Institution Press.

Pilcher JJ, Walters AS. 1997. How sleep deprivation affects psychological variables related to college students' cognitive performance. *Journal of the American College Health*, 46(3): 121-126

Pollitt E. 1995. Does breakfast make a difference in school? *Journal of The American Dietetic Association*, 95(10): 1134-39.

Pollitt E, Cueto S, Jacoby ER. 1998. Fasting and cognition in well- and undernourished school children: A review of three experimental studies. *American Journal of Clinical Nutrition*, 67(4): 779S-784S.

Pollitt E, Leibel RL, Greenfield D. 1981. Brief fasting, stress and cognition in children. *American Journal of Clinical Nutrition*, 34: 1526–1533.

- Pollitt E, Lewis NL, Garza C, Shulman RJ. 1982. Fasting and cognitive performance. *Journal of Psychiatric Research, 17: 169-174*
- Malik PR, Balda S. 2006. High IQ adolescents under stress: Do they perform poor in academics. *Anthropologist, 8(2): 61-62*
- Powell CA, Walker SP, Chang SM, Grantham-McGregor SM. 1998. Nutrition and education: a randomized trial of the effects of breakfast in rural primary school children. *American Journal of Clinical Nutrition, 68: 873-9.*
- Quigley DD. 2000. Parents and teachers working together to support third grade achievement: Parents as learning partners. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.
- Rampersaud GC, Pereira MA, Girard BL, Adams J, Metzler JD. 2005. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescents. *Journal of the American Dietetic Association, 105: 743-760.*
- Rango MB, Andrada GN. 1994. Teacher's perceptions of the school breakfast program. State of Connecticut, department of education.
- Rice ML, Huston AC, Truglio R, Wright JC. 1990. Words from *Sesame Street*: learning vocabulary while viewing. *Dev Psychol., 26: 421-428.*
- Robinson T. 1998. Does television cause childhood obesity? *The Journal of the American Medical Association (JAMA), 279: 959-960.*

- Rocheleau B. 1995. Computer use by school-age children: trends, patterns, and predictors. *Journal of Educational Computing Research*, 12: 1-17.
- Roldan AT, Bautista V, Manalo R. 1994. A multidimensional study of nutritional status of adolescent Filipinos. *Washington DC: International Center for Research on Women, nutrition of adolescent girl's research program*, 5: 120.
- Roseville MN. 1998. School breakfast programs energizing the classroom. *Minnesota department of children families and learning*.
- Rydell RJ, Shiffrin RM, Boucher KL, Van Loo K, Rydell MT. 2010. Stereotype threat prevents perceptual learning. *Proceedings of the National Academy of Science*, 107: 14042–14047.
- Sa'ed S. 2009. The psychological Families and school problems for adolescences students. [Available at: <http://knol.google.com/k/d4asdrv9w95x/7>]
- Sallis J, McKenzie T, Kolody B, Lewis M, Marshall S, Rosengard P. 1999. Effects of health-related physical education on academic achievement: Project: Project SPARK. *Res Quart Exerc Sport*, 70(2): 127-134.
- Schanzenbach, Whitmore D. 2005. Do school lunches contribute to childhood obesity?" *Harris School Working Paper Series 05.13*.

- Sharma KR. 2004. Effect of early home environment on the mental development of down syndrome infants. *A J. Mental deficiency*, **85(1): 39-44.**
- Sharif I. 2007. Does watching television affect school performance?
[Available at:
http://findarticles.com/p/articles/mi_m0816/is_5_23/ai_n27284217/]
- Sharif I, Sargant JD. 2006. Association between television, movie, and video game exposure and school performance. *Pediatrics*, **118: 1061-1070.**
- Shephard R J. 1996. Habitual physical activity and academic performance. *Nutrition Reviews*, **54(4 supplement): S32-S36.**
- Shephard RJ. 1997. Curricular physical activity and academic performance. *Pediatric Exercise Science*, **9: 113-126.**
- Shephard RJ, Volle M, Lavalee M, LaBarre R, Jequier JC, Rajic M. 1984. Required physical activity and academic grades: a controlled longitudinal study. In: Limarinen and Valimaki, (editors). *Children and sport*. Berlin: *Springer Verlag*, **58-63.**
- Shin C, Kim J, Lee S, Ahn Y, Joo S. 2003. Sleep habits, excessive daytime sleepiness and school performance in high school students. *Psychiatry Clin. Neurosci*, **57: 451-453.**
- Simeon DT. 1998. School feeding in Jamaica: a review of its evaluation. *American Journal of Clinical Nutrition*, **67(S): 790S-794S.**

- Simeon DT, Grantham-McGregor S. 1989. Effects of missing breakfast on the cognitive function of school children of differing nutritional status. *American Journal of Clinical Nutrition*, 49: 646-53.
- Simon RL. 2004. Families. *Journal of Marriage and the Family*, 83(2): 594-606.
- Smith CS, Reilly C, Midkiff K. 1989. Evaluation of three circadian rhythm questionnaires with suggestions for an improved measure of Morningness. *Journal of Applied Psychology*, 74(5): 728-738.
- Sparks A. 1986. The effect of microcomputers in the home on computer literacy test scores. Central Missouri State University.
- Suldo SM, Shaunessy E, Thalji A, Michalowski J, Shaffer E. 2009. Sources of stress for students in high school college preparatory and general education programs: group differences and associations with adjustment. *Adolescence*, 44: 925-948.
- Sui-Chu Ho E, Willms JD. 1996. Effects of parental involvement on eighth grade achievement. *Sociology of Education*, 69: 126-141
- Stevenson DL, Baker DP. 1987. Family-school relation and the child's school performance. *Child Development*, 58: 1348-57.
- Symons CW, Cinelli B, James TC, Groff P. 1997. Bridging student health risks and academic achievement through comprehensive school health programs. *Journal of School Health*, 67(6): 220-227.

- Taiwo H G. 1993. Family environment and educational attainment of some school children in Western Nigeria. *Journal of the Science Teachers Association of Nigeria, 46(2): 107-116.*
- Tanti C, Stukas A, Halloran M, Foddy M. 2010. Social identity change: Shifts in social identity during adolescence. **Journal of Adolescence, 1-13.**
- Taras H, Potts-Datema W. 2005. Obesity and student performance at 27. school. *Journal of School Health, 75: 291–295.*
- Teese R. 2004. Staying on at school: Improving student retention in Australia. Centre for post compulsory education and life long learning, University of Melbourne.
- Tenconi MT, Pavan A, Macchi L, Roncarolo F, Bonfanti M, Devoti G, Sacco S. 2008. Smoking habits among 13-18 year old students in Lombardy, *Epidemiol Prev, 32(6): 294-300.*
- The World Health Organization. 2008. The determinants of health. Available at: <http://www.who.int/hia/evidence/doh/en/print.html>
- The Robert Wood Johnson Foundation. Healthy schools for healthy living. 2003.
- Tremblay MS, Inman JW, Willms JD. 2000. The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatr Exerc Sci, 12: 312-324.*

- Trockel MT, Barnes MD, Egget DL. 2000. Health-related variables and academic performance among first-year college students: implications for sleep and other behaviors. *Journal of American College Health, 49: 125-140.*
- Tucker L. and Bagwell M. 1991. Television viewing and obesity in adult females, *American Journal of Public Health, 81(7): 908-911.*
- Tucker L, Friedman G. 1989. Television viewing and obesity in adult males, *American Journal of Public Health, 79(4): 516-518.*
- Utah Education Association. 2001. Parental involvement strongly impacts student achievement, New Research Finds. [Available at: http://www.wnh.Edu/docs/Conway_Conway_May08.pdf.]
- Vaisman N, Voet H, Akivis A, Vakil E. 1996. Effects of breakfast timing on the cognitive functions of elementary school students. *Archives of Pediatric and Adolescent Medicine, 150: 1089-1092.*
- Wang J, Wildman L, Calhoun G. 1996. The relationship between parental influences and student's achievement in seventh grade Mathematics. *School Science and Mathematics, 96(8): 395 – 400.*
- Wedge P, Prosser N. 1973. Born to fail, London: Arrow books.
- Wenglinsky H. 1998. Does it compute? The relationship between educational technology and student achievement in Mathematics. Princeton, NJ: Educational Testing Service.

- Wesnes KA, Pincock C, Richardson D, Helm G, Hails S. 2003. Breakfast reduces declines in attention and memory over the morning in schoolchildren. *Appetite*, **41(3): 329-331**.
- West JM. 2000. Increasing parent involvement for student motivation. Armidale, New South Wales, Australia: University of New England (*ERIC Document Reproduction Service No, ED 44841*).
- White PG, McTeer WG. 1990. Sport as a component of cultural capital: Survey findings on the impact of participation in different sports on educational attainment in Ontario high schools. *Phys Educ Rev*, **13: 66-71**
- Wiecha JL, Sobol AM, Peterson KE. 2001. Household television access: associations with screen time, reading, and homework among youth. *Ambul Pediatr*, **1: 244-251**
- Wilberg S, Lynn R. 1999. Sex Differences in historical knowledge and school grades: A 26 nation study, *personality and individual differences*, **27, pp. 1221-1229**.
- Willms JD. 1986. Social Class Segregation and its Relationship to Pupils' Examination Results in Scotland, *Am. Sociol. Rev.*, **51: 224-41**.
- Wills TA, Cleary S, Filer M. 2001. Temperament related to early-onset substance use: test of a developmental model. *Prev Sci*, **2: 145-163**.
- Wilson NC, Parnell WR, Wohlers M, Shirley P. 2006. Eating breakfast and its impact on children's daily diet. *Nutrition & Dietetics*, **63: 15-20**.

- Wolfe D, Mendes M, Factor D. 1984. A parent-administered program to reduce children's television viewing. *J Appl Behav Anal*, 7: 267–272.
- Wolfe WS, Campbell CC, Frongillo EA Jr, Haas JD, Melnik TA. 1994. Overweight schoolchildren in New York State: Prevalence and characteristics. *Am J Public Health*, 84: 807-813.
- Wolfson AR, Carskadon MA. 1998. Sleep schedules and daytime functioning in adolescents. *Child Dev.*, 69: 875–887.
- Wolfson AR, Carskadon MA. 2003. Understanding adolescents' sleep patterns and school performance: a critical appraisal. *Sleep Med Rev.*, 7:491–506.
- Womble LP. 2003. Impact of stress factors on college students' academic performance. <http://www.psych.uncc.edu/Womble.pdf>.
- Worobey J, Worobey HS. 1999. The impact of a two-year school breakfast program for preschool-aged children on their nutrient intake and pre-academic performance. *Child Study Journal*, 29:113.
- Wright JC, Huston AC, Murphy KC. 2001. The relations of early television viewing to school readiness and vocabulary of children from low-income families: the early window project. *Child Dev.*, 72: 1347-1366.
- Wyon D, Abrahamsson L, Jartelius M, Fletcher R. 1997. An experimental study of the effects of energy intake at breakfast on the test

performance of 10 year-old children in school. *International Journal of Food Science and Nutrition*, 48(1): 5-12.

Yetubie M, Haidar J, Kassa H, Fleming Fallon L. 2010. Socioeconomic and demographic factors affecting body mass index of adolescent students aged 10-19 in Ambo (a rural town) in Ethiopia *International Journal of Biomedical Science*, 6(4): 321-326.

Yu CCW, Chan S, Cheng F, Sung RYT, Hau K-T. 2006. Are physical activity and academic performance compatible? academic achievement conduct, physical activity and self-esteem of Hong Kong Chinese primary school children. *Educational Stud*, 32: 331-341.

Zill N. 2001. Does Sesame street enhance school readiness? evidence from a national survey of children. In: Fisch SM, Fisch R, eds. *"G" Is for Growing: 30 Years of Research on Children and Sesame Street. Mahwah, NJ: Erlbaum 115-130.*

Zill N, Moore KA, Smith EW, Stief T, Coiro MJ. 1995. The life circumstances and development of children in welfare families: A profile based on national survey data. In P.L. Chase-Lansdale & J. Brooks-Gunn (Eds.), *escape from poverty: what makes a difference for children?* New York: *Cambridge University Press*, pp. 38-62.

Zimmerman FJ, Christakis DA. 2005. Children's television viewing and cognitive outcomes a longitudinal analysis of national data. *Archives of Pediatrics and Adolescent Medicine*, 159: 619-25.

Appendix

Study questionnaire

أخي الطالب /أختي الطالبة:

السلام عليكم ورحمة الله وبركاته

تقوم الباحثة ميادة دعمه بعمل هذه الدراسة ضمن متطلبات الحصول على درجة الماجستير وتهدف الدراسة إلى التعرف على عادات ونمط الحياة للطالب مثل (وجبة الفطور، النشاط البدني، التدخين، الوقت الذي يقضيه الطالب أمام التلفاز وفي استخدام الكمبيوتر وطريقة التنقل من وإلى المدرسة)، ودراسة تأثير هذه العوامل على التحصيل الأكاديمي وعلاقتها بالسمنة لطلاب المدارس .

ولأننا حريصون على صحة أبنائنا ولمساعدتهم على اكتساب عادات غذائية جيدة وعلى تحسين مستواهم الأكاديمي والصحي، وللحصول على نتائج موثوقة للدراسة ... يرجى الإجابة عن الأسئلة التالية، علما بان المعلومات التي يتم الحصول عليها لن تستخدم إلا لأغراض البحث العلمي فقط وسيتم التعامل معها بسرية مطلقه .

تعاونكم يساهم في إنجاح الدراسة

الباحثة

ميادة دعمه

أولاً : المعلومات الشخصية للطالب :

- 1- اسم الطالب
- 2- عمر الطالب :
- 3- الجنس : ذكر أنثى
- 4- مكان السكن : مدينة قرية..... مخيم
- 5- منطقة السكن : الشعراوية وادي الشعير الكفريات المدينة وضواحيها

ثانياً : معلومات عن العائلة :

- 1- هل تعيش في المنزل مع :
 كلا الوالدين احدهما فقط : الام غير ذلك.....
- الاب السبب :
- 2- عدد افراد الاسرة الذين يقيمون معك في المنزل (بما فيهم الاب والام) :

- 3- مستوى تعليم الاب : أمي أساسي (1 - 4) أساسي (5 - 10)
 ثانوي دبلوم بكالوريوس فاكتر

- 4- مستوى تعليم الام : امي أساسي (1 - 4) أساسي (5 - 10)
 ثانوي دبلوم بكالوريوس فاكتر

- 5- المهنة الرئيسية للاب : لا يعمل عامل مزارع تجارة واعمال اخرى
 موظف قطاع خاص موظف قطاع حكومي غير ذلك

- 6- المهنة الرئيسية للام : لا تعمل عاملة مزارعة تجارة واعمال اخرى
 موظفة قطاع خاص موظفة قطاع حكومي غير ذلك

- 7- متوسط دخل الاسرة : متدني (اقل من 1500) شيكل مرتفع (أكثر من 4000) شيكل
 متوسط (1500 - 4000) شيكل

ثالثاً : معلومات عن المدرسة :

- 1- اسم المدرسة :
- 2- المنطقة التي تتبع لها المدرسة :
 الشعراوية وادي الشعير الكفريات المدينة وضواحيها
- رمز الشعبة: , عدد طلاب الشعبة :

رابعاً : مؤشر السمنة :

الوزن (كغم)	الطول (سم)	مؤشر السمنة (كغم / م ²)

خامساً: أ- المعلومات المتعلقة بتناول الوجبات :

الرقم	السؤال	نعم	لا	ملاحظات
1	هل يقوم احد من افراد عائلتك بتحضير وجبة الفطور قبل خروجك إلى المدرسة ؟			
2	هل تتناول وجبة الفطور قبل الذهاب إلى المدرسة ؟			
3	إذا كنت تتناول وجبة الفطور كم من الوقت تخصص لتناولها ؟ (بالدقائق)			
4	هل يتناول أفراد الأسرة الآخرون الفطور قبل خروجهم من المنزل ؟			
5	هل تحتوي وجبة الفطور عادة على أصناف من الطعام تفضلها ؟			
6	ما نوع الأطعمة التي تتناولها ضمن وجبة الفطور؟ <input type="checkbox"/> حليب <input type="checkbox"/> جبن <input type="checkbox"/> بسكويت <input type="checkbox"/> خبز..... <input type="checkbox"/> بيض <input type="checkbox"/> زعتر..... <input type="checkbox"/> مربى <input type="checkbox"/> أصناف أخرى :			
7	هل تتناول الشاي مع وجبة الإفطار ؟			
8	إذا كنت تتناول الشاي مع وجبة الإفطار فكم كوباً تشرب ؟			
19	هل تشعر بالتعب اثناء الدوام المدرسي ؟ <input type="checkbox"/> ابدا <input type="checkbox"/> احيانا <input type="checkbox"/> بشكل متكرر			
10	هل تتناول الطعام في استراحة المدرسة إذ انتناولت الفطور في المنزل؟			
11	هل تتناول الطعام في استراحة المدرسة إذا لم تتناول الفطور في المنزل؟			

			هل تشعر بضعف التركيز في الثلاث حصص الأولى؟	12
			هل تعتقد بضرورة تناول وجبة الفطور قبل بداية اليوم الدراسي؟	13
			هل تعتقد أن وجبة الفطور تسبب السمنة؟	14
			هل تتناول وجبة الغداء عادة؟	15
			ما عدد مرات تناولك وجبة الغداء في الاسبوع مع : الاسرة الأصدقاء منفردا.....	16
			هل تتناول وجبة العشاء عادة؟	17
			هل تتناول وجبة العشاء مبكرا؟	18
			ما عدد مرات تناولك وجبة العشاء في الاسبوع مع : الاسرة الأصدقاء منفردا.....	19
			هل تتناول الفاكهة بشكل يومي ؟	20
			إذا كنت تتناول الفاكهة بشكل يومي فكم صنفا تتناول يوميا (بالمعدل)؟ معدل الحصص لكل الاصناف مجتمعة يوميا؟.....	21
			هل تتأثر بأصدقائك فيما يحبون من أطعمة ووجبات سريعة؟	22
			هل تلام من قبل أسرتك إذا اكلت من الطعام بشكل عام ومن الحلويات بشكل خاص؟	23
			عند زهابك إلى السوبرماركت مع الأسرة هل تشتري ما تريده من الشيبس والمشروبات الغازية والحلويات؟	24

ب-المعلومات المتعلقة بالنشاط البدني والنشاط اليومي :

الرقم	السؤال	نعم	لا	ملاحظات
1	هل تحرص المدرسة على الفقرة الرياضية بشكل يومي في طابور الصباح؟			
2	ما عدد حصص الرياضة الأسبوعية في المدرسة؟			
3	هل تعتقد أن حصص الرياضة في المدرسة كافية؟			
4	هل تمارس الرياضة في أوقات خارج الدوام المدرسي؟			
5	ما معدل ممارسة الرياضة في أوقات خارج الدوام المدرسي اسبوعياً			
6	ما الزمن المخصص لممارسة الرياضة خارج الدوام المدرسي اسبوعياً			
7	ما الطريقة المعتادة للذهاب إلى المدرسة ؟ <input type="checkbox"/> سيراً على الأقدام <input type="checkbox"/> بالسيارة او الحافلة <input type="checkbox"/> باستخدام الدراجة الهوائية <input type="checkbox"/> سيراً على الأقدام+بالسيارة او الحافلة <input type="checkbox"/> سيراً على الأقدام+باستخدام الدراجة الهوائية			
8	ما الطريقة المعتادة للعودة من المدرسة ؟ <input type="checkbox"/> سيراً على الأقدام <input type="checkbox"/> بالسيارة او الحافلة <input type="checkbox"/> باستخدام الدراجة الهوائية <input type="checkbox"/> سيراً على الأقدام+بالسيارة او الحافلة <input type="checkbox"/> سيراً على الأقدام+باستخدام الدراجة الهوائية			
9	كم من الوقت تقضي أمام التلفاز يومياً؟			
10	كم من الوقت تقضي في استخدام الحاسوب يومياً؟			
11	ما أكثر النشاطات التي تقضيها امام الحاسوب ؟ <input type="checkbox"/> ألعاب <input type="checkbox"/> واجبات <input type="checkbox"/> تصفح معلوماتي <input type="checkbox"/> مشاهدة أفلام			

ث- معلومات تتعلق بالتدخين :

الرقم	السؤال	نعم	لا	ملاحظات
1	هل تدخن ؟			
2	كم سيجارة تدخن باليوم ؟ العدد :.....سيجارة			
3	هل احد والديك او افراد عائلتك مدخن؟			
4	هل لديك اصدقاء مدخين؟			
5	هل يحاول والديك نصحك بعدم التدخين؟			
6	هل تعتقد ان التدخين يجعلك تشعر بالاسترخاء؟			

			هل تود الاقلاع عن التدخين؟	7
			ما طريقة حصولك على السجائر؟	8
		<input type="checkbox"/> شراء	<input type="checkbox"/> متوفر في المنزل	
		<input type="checkbox"/> من الأصدقاء		

ج- معلومات تتعلق بالعلاقات العائلية :

الرقم	السؤال	نعم	لا	ملاحظات
1	ما عدد الساعات التي يقضيها الآباء مع الأبناء في تأدية الواجبات المدرسية يوميا؟			
2	هل تنهي جميع واجباتك المدرسية ودروسك قبل النوم؟			
3	هل تحضر لوازلك و ثيابك المدرسية قبل النوم؟			
4	هل تنام مبكرا؟			
5	هل تستيقظ مبكرا؟			
6	عدد ساعات النوم ليلا؟			
7	ما عدد الساعات التي تنامها نهارا؟			
8	هل تأخذ مصروفا للمدرسة؟			
9	إذا كنت تأخذ مصروفا ، ما طبيعة المصروف ؟ <input type="checkbox"/> ايومي <input type="checkbox"/> اسبوعي <input type="checkbox"/> شهري <input type="checkbox"/> غير ذلك			
10	ما قيمة المصروف الذي تاخذه شهريا ؟			
11	ما عدد الساعات التي يقضيها الآباء مع الأبناء كجلسة عائلية يوميا؟			
12	هل تعاني من اي ضغوطات نفسيه في: <input type="checkbox"/> المدرسة <input type="checkbox"/> البيت			

سادسا : العلامات المدرسية للطالب في المواد التالية :

الرقم	المادة	علامة الفصل الأول	علامة الفصل الثاني	معدل العلامات
1	التربية الدينية			
2	اللغة العربية			
3	اللغة الانجليزية			
4	الرياضيات			
5	العلوم العامه			
6	العلوم الاجتماعية والمدنية والوطنية			
7	التكنولوجيا والعلوم التطبيقية			
8	الفنون والحرف			
9	التربية الرياضية			
10	المادة الإختيارية : (الصحة والبيئة /الاقتصاد المنزلي)			
المعدل العام				

جامعة النجاح الوطنية
كلية الدراسات العليا

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لطلبة الصف التاسع في محافظة طولكرم - فلسطين

إعداد

ميادة حسني محمد الدعمة

إشراف

د. جهاد عبدالله

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

2012م

ب

علاقة محددات نمط الحياة و مؤشر السمنة بالتحصيل المدرسي لطلبة الصف التاسع

في محافظة طولكرم - فلسطين

إعداد

ميادة حسني محمد الدعمة

إشراف

د. جهاد عبدالله

الملخص

اجريت هذه الدراسة بهدف التعرف علاقة محددات نمط الحياة و مؤشر السمنة بالتحصيل المدرسي لطلاب الصف التاسع في محافظة طولكرم ودراسة الأسباب المرتبطة بها. تمت هذه الدراسة على 781 طالب (407 إناث, 374 ذكور) بنسبة (52.1%, 47.9% إناثا وذكورا على التوالي) في مدارس محافظة طولكرم الحكومية. جمعت البيانات من خلال المقابلات الشخصية مع الطلبة, وتم استخدام التحليل الوصفي, الأنوفا و اختبار فيشر لتحليل النتائج. أشارت نتائج الدراسة إلى أن 62.9% من الطلبة (46.7% من الإناث, 80.6% من الذكور) يتناولون وجبة الفطور قبل توجههم الى المدرسة لكن لم أي تظهر علاقة بين تناول وجبة الفطور والتحصيل المدرسي, في حين أن 27% من الطلاب الذين شملتهم الدراسة كانوا يعانون من ضعف التركيز خلال الثلاث حصص الأولى بواقع (29% من الإناث 24.7%, من الذكور) حيث ظهر وجود علاقة قوية بين ضعف التركيز في الثلاث حصص الأولى وتدني التحصيل المدرسي في معظم المواد. وقد ارتبط ضعف التركيز باهمال تناول وجبة الفطور واهمال أكل الفاكهة بشكل يومي بالإضافة لممارسة التدخين, الشعور بالتعب في الدوام المدرسي, الضغوطات النفسية التي يتعرض لها الطلبة في المدرسة و الإستيقاظ متأخرا للدوام المدرسي. وبينت النتائج أن تناول الفاكهة اليومية من قبل الطلبة ساهم في تحسين أدائهم في كل من مادة التكنولوجيا, اللغة الانجليزية و المعدل العام. أما الطلبة الذين يعانون من تأثير الضغوطات العائلية فقد تدنى تحصيلهم المدرسي في بعض المواد إضافة إلى المعدل العام. حوالي 6% من الطلبة الذكور كانوا مدخنين في حين لو تكن أي من الإناث تمارس التدخين حيث ارتبط التدخين بضعف التحصيل العلمي. كما أشارت النتائج أن تحصيل الطلبة الذين

ج

اعتمدوا على انفسهم ولم يتلقوا اي مساعدة من ذويهم في دروسهم وواجباتهم المدرسية والذين كانت نسبتهم 72.3% (82.5% من الإناث، 61.5% من الذكور) أعلى في جميع المواد الدراسية من أقرانهم الذين تلقوا المساعدة باستثناء مادة العلوم العامة، وقد كان متوسط علامات الطلبة الذين تراوح معدل ساعات نومهم الليلية من 8-9 ساعات أعلى من الطلبة الذين ينامون عدد ساعات أقل أو أكثر من ذلك في كل من مادتي العلوم والتكنولوجيا فضلا عن المعدل العام. لم تكن هناك فروقات في التحصيل المدرسي بين الطلبة فيما يخص تناول وجبتي الغداء والعشاء، مؤشر السمنة للطلبة، ممارسة الرياضة، الوقت المستغرق يوميا في مشاهدة التلفاز و استخدام الحاسوب و طريقة التنقل من وإلى المدرسة.

على ضوء نتائج الدراسة لابد من نشر الوعي بين الطلبة والأهالي بضرورة اتباع انماط الحياة الصحية كتناول وجبة الفطور والتركيز على أكل الفاكهة بشكل يومي، تجنب ممارسة التدخين، الالتزام بالعادات الصحية فيما يخص النوم و الاستيقاظ والتمتع بقضاء أوقات مع العائلة كافية لتجنب العوامل المسببة للضغوطات النفسية للطلبة.