



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

**DIFFERENCES IN SEVERITY OF  
DEPRESSION SYMPTOMS IN OVERWEIGHT  
AND OBESE PALESTINIAN ADOLSCENTS.  
EFFECTS OF WEIGHT, SEX AND AGE**

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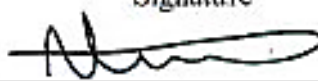
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## **Dedication**

I dedicate my thesis to my family, my husband Mohamed and my son Taim.

## **Acknowledgements**

This project would have been difficult to accomplish without the support and encouragement of many people. First, I would like to thank the academic staff who accompanied me in my educational journey, firstly Dr. Fayez Mahamid and Dr. Amjed Abo Jedi.

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Finally, I offer special thanks to children and adolescents that helped achieve and conclude this thesis.

## **Declaration**

I, the undersigned, declare that I submitted the thesis entitled:

**DIFFERENCES IN SEVERITY OF DEPRESSION SYMPTOMS IN OVERWEIGHT AND OBESE PALESTINIAN ADOLSCENTS. EFFECTS OF WEIGHT, SEX AND AGE.**

I declare that 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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**Date:** \_\_\_\_\_

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**ABSTRACT**

**Background:** Depression is of the most significant obesity- related psychological disorders. Previous studies have found a bi-directional relationship between obesity and depression symptoms among children and adolescents. Most of these studies were conducted in Western countries. Their findings regarding the effects of gender and age on this relationship were inconsistent. This study has examined the relationship between weight and depression symptoms in addition to the effects which gender and age have on depression among Palestinian children and adolescents.

**Methodology:** Data were collected from 90 Palestinian school students aged 9-16. Of these, 30 had normal weight, 30 had over-weight and 30 were obese (defined by CDC curves). About half of the participants were girls, and about half of them had an obese family member. After a school nurse measured their BMI, the participants completed depression, demographic and weight test questionnaires.

**Results:** After data analysis, it was found that over-weight and obese participants exhibited worse depression (of all types) than those with a normal weight but the differences between them were insignificant. The only gender effect found was in the mood and body image scale. Of all obese participants, the girls exhibited worse symptoms than boys. In contrast, only the overweight participants showed a small opposite trend. Regarding age, effects were found only in depression total scale and in inactivity symptoms. In these scales, of all overweight participants, adolescents exhibited worse symptoms than children, while the opposite trend was found among obese participants.

**Conclusion:** These findings showed that over-weight and obese Palestinian children reported suffering from depression and thus interventions should take this into account. In particular, it seems that over-weight boys or adolescents need more direct help/ intervention to lose weight while obese girls or children who feel more helpless about their weight need more medical and emotional support.

**Keywords:** Depression; over-weight; obesity; body-image; weight-stigma; adolescents; collective culture; gender-roles.

# **Chapter One**

## **Introduction**

The prevalence of overweight and obesity almost doubled worldwide since the 1980s and continues to grow in all age groups and thus constitute a global problem (Skinner et al., 2015). These are conditions determined by the Body Mass Index - BMI. BMI is a measure based on a calculation of a person's weight in relation to height taking into account the person's sex and age. In adults the World Health Organization (WHO) defines, a BMI of 25-29.9 as 'over-weight' and one that is over 30 as obesity. In children and adolescents, overweight is defined as a BMI of 85% or more in relation to age and sex and obesity is defined as 95% or more (Luppino et al., 2010). Obesity is a result of an interaction of genetics and environmental factors. Significant risk factors for obesity are having an obese parent (Wu, 2000), unhealthy family life style and low physical activity (Lee, & Yoon, 2006). Obese children have a five times higher risk becoming obese adults than normal weight children (6 young). About 80% of obese adolescents remain obese in adulthood (7 young). Among children and adolescents, obesity has been found to increase the risk of varied medical and mental health problems (Abdeen et al., 2012) with possible long-term effects. Psychologically, obesity has been found as related to low self-esteem, anxiety, loneliness, low quality of life and Depression (Kumar & Kelly, 2017). One of the main reasons for these symptoms is the prevalent weight stigmas that blames obese children or adolescence for their over-weight and perceive them negatively in light of it (Palad et al., 2019). As a consequence, obese children and adolescence are often victims of teasing and harassment by family and peers and experience social exclusion (Haqq et al., 2021).

Specifically, obesity has been found to have a bi-directional relationship with Depression in this age group (De Wit et al., 2010; Incledon et al., 2011; Mannan et al., 2016; Muhlig et al., 2016). Depression symptoms in children or adolescents might include anger or hostility, changes in sleep or appetite, hopelessness, difficulty concentrating, lack of motivation and feelings of worthlessness (DSM-5, American Psychiatric Association, 2013). Depression is more common about girls and tends to get worse as children, especially girls, get older. These differences are a result of the hormonal changes adolescents go through at this age that affects their level of stress and how they cope with it. Depression can significantly interfere with the adolescent's

development, school achievement and relationships (Rao & Chen, 2009). It also increases their risk of death as a result of suicide. Older adolescents, 15-19 years old were found to conduct one of the highest number suicides in the U.S. in 2021 (WHO, 2021b).

Obesity was found to increase levels of Depression, through victimization, social rejection, low self-esteem and loneliness (Haqq et al., 2021). In addition, Depression increases the risk of obesity. The reasons for that are the Depressive symptoms might increase appetite and sedentary behavior and thus result in gaining weight (Mannan, 2016). Studies examining this issue found inconsistent effects of gender and age on the relationship between obesity and Depression. Some studies found that these relationships are stronger among females (Korczak et al., 2013; Muhlig et al., 2015; Lindberg et al., 2020; Wyshak, 2007). However, in other studies, no differences between genders were found in the relationship between obesity and Depression (Kubzansky et al., 2012; Lindberg et al., 2020; Mannan et al., 2016). Regarding the effect of age, some studies conducted with obese children aged 6-18, found that their Depressive symptoms became more severe, the older they got (Lindberg et al., 2020; Muhlig et al., 2015). However, in a longitudinal study, no interaction between age and weight was found for level of Depression (Kubzansky et al., 2012). The current study will examine this issue further.

In addition, most studies were conducted in Western individualistic cultures. The current study attempted to overcome these shortcomings and broaden our understanding of the bi-directional relationship between obesity and Depression to Palestinian children and adolescents who are part of a more collectivistic community. The traditional Arab family and community is collectivistic patriarchal, where the expectations of the individual is to preserve the family's and community's harmony by following social norms (Dwairy, 2004). Women have a lower status than men and children are expected to obey their parents without question and they receive little emotional support or comfort from them (Jerassi, 2012). Rates of over-weight and obesity have been increasing among Arabs, as in Western countries. Studies in Palestine have found relationships between obesity and body dissatisfaction, low body image and low quality of life (Latzer et al., 2007; Mousa et al., 2010). However, Depression was not studied in this context. The prevalence of Depression and suicidality among Depressed youth is

high among Arabs (Daradas et al., 2016). This might result from the stigma against mental illness perceiving it as bringing shame to the family and the lack of encouragement to express emotions. These perceptions often result in resistance to turn to professional help and attempts to deal with the symptoms within the family. This might delay proper treatment and put the child or adolescent at risk. Thus, interventions that can identify Arab children or adolescents at risk to develop Depression, as overweight or obese ones, are very significant. For this purpose, the current study examined the relationship between obesity and Depression among young and old male and female Palestinian adolescents.

## **Chapter Two**

### **Literature Review**

The current chapter will present a summary of previous research on overweight and obesity as well as on Depression in children and adolescents and the relationship between obesity and Depression – its etiology and possible related demographic factors.

#### **2.1 Obesity in Adults**

Obesity is a complex syndrome that is caused by biological-genetic and environmental factors. The traditional view holds that obesity is a result of consuming more energy than the body uses. This energy is then stored in fat cells, making them larger and changing the nutrient signaling responsible for obesity. However, more recent studies show that the quantities of food are less important than the quality of the nutrients it includes to the development of obesity and comorbid conditions. In addition, studies conducted in families and with twins, found that 70% of obesity variation is a result of genetic factors (Lin & Li, 2021). Genetic research has found that some cases of obesity are a result of single specific genes (Hinney et al., 2007; Kendall & Serrano, 2006; Phillippas & Clifford, 2005; Price, 2002; Stunkard et al., 2003). However, some cases are caused by a combination of several genes and the most severe obesity is often a result of genetic abnormalities in other organs or systems that affect weight (Lin & Li, 2021). It was found that biological-genetic factors, like having an obese family member, are a particularly significant risk factor for obese people (i.e BMI over 40) (Hinney et al., 2007; Price & Lee, 2001).

In 2016, 39% of adults aged 18 years or over worldwide were overweight and 13% were obese (WHO, 2021c). In contrast to the past, when obesity and overweight were mostly a common problem in countries with high socioeconomic status (WHO, 2021c; Nestle, 2006), today it is on the rise even in countries in low and mediocre socio-economic status. The main reason for this trend is social environmental changes in behavior patterns that result in people switching to unhealthy lifestyles, characterized by imbalanced diet rich in carbohydrates, fat and sugar, and by inadequate amounts of physical activity (WHO, 2021c). Treatments offered for obesity range from lifestyle modification – to change diet and add exercise, cognitive or behavioral therapy to

support the change of eating behaviors, anti-obesity medication, or Bariatric surgery (Lin, & Li, 2021).

Obesity often has varied physical and mental comorbidity disorders associated with it. Obesity increases the risk of a range of illness that is linked to high mortality. These include Type 2 Diabetes, chronic Kidney disease, cardiovascular diseases, metabolic syndrome, hypertension, fatty liver disease, musculoskeletal disorders and certain types of Cancer and breathing problems, sleep apnea, and labor complications (Avni et al., 2019; Puhl et al., 2007; Wyatt et al, 2006). Obesity was also found to be related to poor quality of life (Schwimmer et al., 2003), stigmatization (Latner, & Stunkard, 2003; Puhl, & Latner, 2007), and stereotyping (Puhl, & Latner, 2007; Schwartz & Puhl, 2003).

## **2.2 Obesity in Children and Adolescents**

The global prevalence of overweight and obesity among children and adolescents has also increased dramatically in the last thirty years. The measurement of overweight in this age group is more complex as the BMI is compared to scales according to age and sex. Thus, overweight is defined as a BMI of 85% or more in relation to age and sex and obesity is defined as 95% or more (Luppino et al., 2010). It is estimated that about 38 million children under the age of 5 were defined as overweight or obese in 2021 (WHO, 2021c). When comparing over time, in 2016 18% of children aged 5-19, were defined as overweight, more than four times the 4% of youth found in this condition in 1975. A similar percentage of boys and girls in this age group (18% and 19% respectively) were found as over-weight and 8% and 6% respectively were found as obese (WHO, 2021c). A recent study showed that overweight children are more likely to change their BMI category than either normal weight or obese children. Thus this is the category of children that any prevention or treatment intervention will be most effective with (Lee, & Yoon, 2018).

Childhood obesity is a result of an interaction of genetic, biological, environmental, socioeconomical and cultural factors. One contributing factor to child obesity is obesity in the family. A child with one obese parent has a triple risk to become obese themselves and a child with two obese parents has a 10 times higher risk to become obese (Wu, 2006). One of the reasons for this finding is the heredity of the condition

(Whitaker et al., 1997). Another reason for it is that they reflect the family lifestyle during childhood. The parent-child interaction has influence on the child's food choices, food preferences, mealtimes, dining out, degree of physical activity (Lee & Yoon, 2018). When parents are not obese, the likelihood of them exhibiting a healthy lifestyle is higher, which can reduce the risk of obesity in their children (Vaisse et al., 2000). In general, the feeding style of parents and the degree they expose their children to high fat, sweet snacks and drinks and large portions sizes – were found to increase the risk for obesity among children/adolescents (Banfield et al., 2016). In addition, habitual eating or eating without hunger in response to the presence of food or an emotional state was found as associated with obesity through disinhibited eating (Lee & Yoon, 2018). Girls exhibiting such behaviors have a 4.6 higher risk of being over-weight than those who don't (Fisher, & Birch, 2002). Another risk factor to obesity if the exposure of children to television, the use of computer games and tablets and the reduced physical activities were all found to increase levels of obesity (Kumar & Kelly, 2017). There are also findings of an association between shortened sleep or poor sleep quality and obesity (Jang et al., 2016).

Concurrent with an increase in childhood obesity (Abdeen et al., 2012; Tayem et al., 2012), there is an increase in reports of obesity-related diseases such as type 2 Diabetes, high blood pressure, obstructive sleep apnea and Asthma, which were previously considered more common in adults. The severity of these diseases is related to the severity of the obesity (Nelson et al., 2006). Those who develop Diabetes during adolescence have more rapid deterioration of Glycemic control and progression of disease (Kumar & Kelly, 2017). Childhood obesity also increases the risk of mortality from comorbid diseases as cardiovascular illnesses, type 2 Diabetes, hypertension or stroke (Lee & Yoon, 2018). It also increases the risk of various musculoskeletal problems that might impair mobility and create joint pain and extremity misalignment (Kumar & Kelly, 2017).

In addition, there are concerns about psychosocial consequences of obesity, including low self-esteem, anxiety, Depression and low quality of life (Kumar & Kelly, 2017). Despite this, in contrast to eating disorders, obesity is not defined as a mental disorder in the Diagnostic and Statistical Manual of Mental Disorders (5<sup>th</sup> Edition, DSM-5, American Psychiatric Association, 2013). The reason given for this decision is that

there is insufficient evidence that obesity is a result of behavioral and psychological patterns (DSM-5, 2013). However, it is recognized that obesity in children and adolescents increase their risk of suffering mental health issues, particularly mood disorders (McElroy et al., 2004; Rajan, & Menon, 2017).

### **2.2.1 Obesity, weight stigma, body image**

One of the reasons obesity results has such psychological effects is the strong stigmatization of being over-weight. Weight stigma is defined as the attribution of negative beliefs (bias) based on weight which can result in social exclusion or other actions taken against people with excess weight (Palad et al., 2019). This stigma might be directed towards over-weight or obese children or adolescents who do not fit social norms for body size. This stigma can be triggered by a person's attitudes and views about obesity and how people reach that stage. One of the strongly held beliefs that strengthen this stigma is that obesity is self-inflicted. In other words, that it is a result of a mismanagement of a person's diet and inability to control his food intake relative to activity level. This perception was found to be oversimplified as obesity is a multi-factorial condition resulting from not just behavioral or environmental factors but also genetic and biological ones (Haqq et al., 2021). Most programs to prevent or treat child obesity contribute to these stigmas by focusing on the child's control to change his weight by changing his behaviors. These programs also emphasize the negative elements of being overweight and by that contribute to the feeling of these children of being different and inadequate (Harriger & Thompson, 2012).

Aside from food intake, another assumption was that one of the main reasons for the increase in obesity in the last two or three decades was the sedentary lifestyle of many children and adolescents. Many blamed the advances of computers, phones and tablets to why kids are less active. Another long-standing belief is that by blaming people for their weight and harass them about it, you are motivating them to lose weight. However, the opposite was found. Shaming a person over their weight, might have serious psychological negative effects and might result in unhealthy eating behaviors (Haqq et al., 2021).

Over-weight or obese children and adolescents might have to face this stigma when interacting with educators, family members, medical care providers and peers. This stigma might result in criticizing, harassing and differential treatment which has the risk of resulting in victimization, social inequality, marginalization, and adverse health outcomes (Haqq et al., 2021). Over-weight children and adolescents are negatively stereotyped and socially marginalized by their peers, compared to those with normal weight (Puhl, & Latner, 2007). Social marginalization is defined as social exclusion of peers as a result of viewing them as undesirable or different (Robinson, 2006). Overweight adolescent females expressed in qualitative interviews being treated differently and excluded (Harriger & Thompson, 2012). Although heavy children experience social rejection by peers already in elementary school, being over-weight becomes a more significant and consequential stigma in early adolescence. During this age, it is especially important for youth to fit in with others and their physical appearance will have an influence on their social status (Juvonen et al., 2017). Young adolescents who are over-weight suffer more ridicule, bullying and social rejection by their peers compared to those with normal weight. In a sample of 6<sup>th</sup> and 7<sup>th</sup> graders, who are over-weight or obese, about a third reports at least one weight discrimination experience by peers by the 7<sup>th</sup> grade (Juvonen et al., 2017). In older adolescents' weight stigma is manifested in teasing, avoiding, exclusion from social activities, negative rumors, verbal threats and physical harassment (Haqq et al., 2014). Similarly, in another sample of students, 27% reported weight related teasing (Lampard et al., 2014). These weight stigma behaviors were found as persistent. More than eighty percent of children and adolescents reported stigma behaviors lasting more than a year and more than a third reported such behaviors that lasted more than two years. Over-weight and obese children and adolescents also experience more bias and discrimination compared to their peers. The psychological impact of these experiences often results in these youth conducting unhealthy diets and adopt unhealthy eating behavior in their attempt to fit in. This increases their risk to develop eating disorders. They were also found as related to weight gain and thus a negative feedback loop was created where children/adolescents were being teased or bullied about their weights, which resulted in weight gain, which in turn worsen the treatment they received (Haqq et al., 2014).

It was consistently found that weight stigma related behaviors by family or peers has short- and long-term effects of the children and adolescents that are exposed to it. The behaviors exhibiting weight stigma were found as related to low self-esteem, social anxiety, loneliness, Depression, suicidal ideation and reduced quality of life (Goldfield et al., 2010; Haqq et al., 2014; Juvonen et al., 2017; Puhl & Heuer, 2009). These results were particularly found when either peers or parents exhibited verbal shaming, exclusion or teasing. The psychological consequences (i.e. the Depression) were worse, the more often and more severe the weight related teasing and exclusion the children or adolescents experienced (Haqq et al., 2014). In a study with middle school students in Amsterdam, it was found that victimization by peers mediated the relationships between overweight or obesity and psychosocial problems. The indirect effect was stronger for those with obesity than for those with overweight. This difference was explained as a result from a connection between the degree of vergence from the norm and severity of teasing and from the rate of teasing to psychosocial issues (Van Vuuren et al., 2019). In addition, the relation between weight discrimination and emotional problems a year or two later, was found to be mediated by body dissatisfaction. In other words, students with a higher BMI in 6<sup>th</sup> grade, were more likely to experience weight-based peer discrimination in 7<sup>th</sup> grade which predicted higher levels of body dissatisfaction. This in turn predicted higher levels of emotional distress in 8<sup>th</sup> grade. Youth appear to feel the social burden of weight. They have fewer friends and experience more weight discrimination. As a result, they might associate friend's social approval to their weight and appearance and thus become dissatisfied with their weight as a result of their peers' behaviors (Juvonen et al., 2017).

Body weight dissatisfaction in early adolescents is an important risk factor of eating disorders. Being thin is perceived as positive worldwide and many normal weight adolescents, especially girls, perceive themselves as overweight and try to lose weight. However, the higher their BMI, the worse the body dissatisfaction of young adolescent girls. Another risk factor for body dissatisfaction among adolescent girls is negative relationship and communication with parents (Al-Sabbah et al., 2009). Body image is defined as an individual's subjective evaluation of his/her appearance (Thompson et al., 1999). People with body image disturbance often experience dissatisfaction with their weight or body shape. Body image dissatisfaction is defined as a subjective negative evaluation of one's physical appearance (Presnell et al., 2004). Children and adolescents

who are over-weight or obese exhibit more body dissatisfaction than those with normal weight. Approximately 60% of adolescent girls and 30% of adolescent's boys in the United States express body image dissatisfaction (Eapen et al., 2006). Body dissatisfaction is often related to low self-esteem and Depression, especially among over-weight and obese youth. The low self-esteem in these adolescents result both from the social stigma and from external control belief – that they should be able to lose weight (Harriger & Thompson, 2012).

### **2.3 Depression in Adults**

Depression is the most common psychiatric disorder today. According to the DSM-V (2013), in order for an adult to get a diagnosis of depression, the following criterion needs to be met: the individual must be experiencing five or more symptoms during the same 2-week period and at least one of the symptoms should be either (1) depressed mood (most of the day, nearly every day) or (2) loss of interest or pleasure in all, or almost all, activities most of the day. Other symptoms include: Changes in weight without dieting or changes in appetite;

a slowing down of thought and a reduction of physical movement; fatigue or loss of energy; feelings of worthlessness or excessive or inappropriate guilt; diminished ability to think or concentrate, or indecisiveness; recurrent thoughts of death, recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

To receive a diagnosis of depression, these symptoms must cause the individual clinically significant distress or impairment in social, occupational, or other important areas of functioning. The symptoms must also not be a result of substance abuse or another medical condition (DSM-V, 2013).

It is estimated that 5% of the worldwide population suffer from Depression (Institute of Health Metrics and Evaluation, 2021). Depression is caused by an interaction of genetics and biological, social and psychological factors. For example, physical changes and health, i.e. Cardiovascular changes, might influence level of Depression. Adverse life events (as trauma, loss of a loved one) increase the risk of Depression (WHO, 2021b). Depressive symptoms might become chronic or recurrent, with fifty percent of

those suffering from depression experiencing depression at least twice in their lives, and about 70% of the depressed will continue with future episodes (Sokolva, 2003).

Depression might cause substantial impairments in the person's functioning, lower quality of life and worsen physical health (WHO, 2021b). It leads to impaired daily quality of life, which is manifested in difficulty in basic tasks such as personal hygiene and going to work (Kramer et al., 2005). In one American study, it was found that nine percent of individuals with Depression had difficulty with work, home or social activities - which got worse with the worsening of their Depressive symptoms (Pratt & Brody, 2014). According to another study (Kessler et al., 2003) the greatest impairment people with Depression experienced was in the social domain and the least one was in the work domain. Depression affects physical health through several pathways. First, through its effects on sleep and decreased/ increased appetite (which might affect body weight) (Andresson et al., 2007; DSM-V, 2013; Iversen, & Wessely, 2003; Katon, 2003). Second, Depression might result in an increase in unhealthy behaviors that increase the incidence and severity of medical conditions and health in general (e.g. smoking, substance abuse, sedentary lifestyle, and over-eating) (Katon, 2003; Lehman et al., 2001). Depression might also lower compliance with medical regimens which might also cause worsening of existing medical illnesses and risk complications. Third, the neurochemical processes occurring during Depression might cause alterations in the functioning of the Central Nervous System, immune, endocrine and cardiovascular systems (Miller, 1998) - which might increase the person's susceptibility to inflammatory diseases as well as intensify pain and other physical symptoms (Kiecolt-Glaser, & Glaser, 2002). Lastly, severe Depression can also put the person's life in danger as it increases the risk of suicide (Vahia, Sonavane, Gandhi, & Vahia, 2000). According to the World Health Organization, over 700 000 people die as a result of suicide every year and suicide is the fourth leading cause of death in 15-29-year-olds (WHO, 2021b).

#### **2.4 Depression in Children and Adolescents**

When children or adolescents experience Depression, their mood might be more irritable than sad. In addition, in order to diagnose Depression in this age group, they need to exhibit at least four of the following symptoms: Anger or hostility, changes in sleep or appetite, hopelessness, difficulty concentrating, poor school performance,

tearfulness or frequent crying, lack of motivation, motor agitation, unexplained aches or pains, feelings of worthlessness and guilt, fatigue and suicidal thoughts or Suicidal attempt (DSM-5, 2013). The diagnosis of depression in children and adolescents is more complex, not just because of the different symptoms but also because of children's difficulty in expressing their emotions. As such, the risk of their condition worsening before being diagnosed is higher (Wardle et al., 2006). In most cases, Depression has recurrent episodes through-out the person's life (Sokolva, 2003). It is caused by genetics, biology and environment (Dopheide, 2006; Stice & Marti, 2006). A particularly vulnerable time to developing Depression is during the transition from childhood to adolescence. This transition involves physical, cognitive, social, sexual psychological complex changes that increase their risk to develop Depression. Elevated risk for the disorder begins in early adolescence (11-12 years of age) and worsens through adolescence (Rao & Chen, 2009).

Globally, according to a meta-analysis of 29 studies, in 2020 and 2021, 12.9% and 25.2% of children and adolescents (average age of 13), respectively, suffered from clinical Depression (Racine et al., 2021). Female adolescents have a double or triple risk of developing Depression than males. This difference has been found in many countries and across multiple generations (Rao & Chen, 2009). Higher levels of Depression among females was also found recently in a global study (Racine et al., 2021). This gender difference appears in early to middle adolescence and remains into adulthood. Explanations for it include hormonal changes, increased stress or use of less effective coping methods, socialization experiences and interpersonal orientation (Rao & Chen, 2009). Another characteristic that increased Depression prevalence was age. It was globally found that older adolescents (i.e. 16-17) exhibit worse Depressive symptoms than younger ones (Racine et al., 2021).

Childhood Depression impairs developmental processes, social functioning and school achievements. It can result in low self-esteem, low school attendance, social isolation and increased risk of suicide (Dopheide, 2006; WHO, 2021a, 2021b). In 2013, 27% of American adolescents 15-19 seriously thought about suicide, 8% made at least one suicide attempt and 2.7% made a suicide attempt requiring medical attention. In 2014, 2.1 children out of 100,000 American children aged 10-14, died as a result of suicide (Curtin, 2016). Depression in children and adolescents is also associated with problems

with social relationships and school performance, as well as in social, emotional and cognitive development. Depression in childhood is also associated with psychosocial problems in adolescence – as suicidal behaviors, delinquency and alcohol and drug abuse. It is also associated with reduced functioning in adults – at work, family or social life ((Rao & Chen, 2009).

## **2.5 Relationship of Depression with Obesity**

One of the conditions found to be related to Depression is Obesity (i.e. Goodman & Whitaker, 2002; Stunkard et al., 2003). Studies examining this issue has looked at both directions of this relationship. On the one hand, it was found that the impaired sleeping and eating that is part of Depression, tends to increase Depressed people's adoption of unhealthy lifestyle. They prefer eating high carbohydrate, high sugar, comfort foods and avoid physical activity. These behaviors place them at increased risk of weight gain and obesity (Privitera et al., 2013). In parallel, several studies found that people who are obese, are at a higher risk to develop Depression, compared to those with normal weight (Carpenter et al., 2000; Fleiti, 1993; Roberts et al., 2000). Roberts et al. (2000), also showed that obesity predicts future (one year later) Depression.

Historically, most studies on the relationship between obesity and Depression were conducted with adults. The focus of research on children and adolescents, in this context, has been growing due to the increase in the prevalence of obesity in youth. Similar to adults, studies show there is an association between obesity and Depression among children and adolescents. In a meta-analysis of studies examining this issue, more than half of the cross-sectional studies (5 out of 8) found significant correlations between obesity or over-weight and Depression in this age group (Muhlig et al., 2015). In addition, in a study that compared between high school students of normal weight, over-weight and obese – BMI was correlated with severity of Depressive symptoms (Kubzansky et al., 2012). The relationships between obesity and Depression in children and adolescents is also apparent in similarities in some of the clinical presentations of these conditions. First, both affect sleep. Overweight and obese children are at higher risk for sleep apnea and decreased nighttime sleep (Barlow & Diez, 1998; Gupta et al., 2002). Children and adolescents with Depression, also suffer more from insomnia and difficulty falling asleep (Emslie et al., 2001). Second, they both affect the person's self-image. Depression results in feelings of guilt and shame and contributes to negative

self-esteem (Weiss et al., 1992). Obesity too often results in body image issues, particularly among female adolescents (Franklin et al., 2006; Witherspoon et al., 2013).

This relationship was found to be bi-directional. On the one hand, childhood or adolescent obesity were found to predict subsequent Depression (De Wit et al., 2010; Goldfield et al., 2010; Goodman, & Whitaker, 2002; Muhlig et al., 2015; Stunkard et al., 2003; Swallen et al., 2005). In a meta-analysis of 13 studies, adolescents who are obese, had a 40% higher risk to be Depressed at a second measurement (Mannan et al., 2016) and as adults, than those who are not (Anderson et al., 2007; Herva et al., 2006). One of the reasons offered for this direction of the relationship, is the stigmatization of obesity (Goldfield et al., 2010; Puhl & Heuer, 2009).

In parallel, adolescents with symptoms of Depression, were found to gain weight dramatically through a year of study (Inclendon et al., 2011). In a meta-analysis of 13 studies, adolescents who were Depressed, had a 70% higher risk to be obese at the second measurement, compared to those who were not (Mannan et al., 2016). In addition, Depressive symptoms during childhood or adolescence increase the risk of obesity in adulthood (Blaine, 2008; Franko et al., 2005; Goodman & Wwhitaker, 2002). As found for adults, children and adolescents who are Depressed, tend to be less active, adopt more sedentary behaviors and increase eating unhealthy comfort foods and eating in general. All this might increase their weight (Reeves et al., 2008). In addition, emotional distress often lead to increased food consumption, especially comfort food-including high fats and sugars and irregular meal times, which might result in weight gain.

Children/adolescents experiencing emotional distress might use food and over-eating as a maladaptive coping mechanism to suppress negative emotions and avoid dealing with them. This increases their risk of obesity (Incelton et al., 2011; Lee & Yoom, 2018).

In addition to studies investigating one direction of this relationship, other studies looked at factors that might affect both obesity and Depression. For example, one explanation offered was that obesity is a pro inflammatory state (Ferrante, 2007) and thus increase the risk of Depression which is perceived as a dysregulation of the inflammatory system (Kim et al., 2007; Nemiary et al., 2012).

In some studies, the relationships between over-weight and Depression were affected by gender and age. For example, in a meta-analysis of cross-sectional studies, it was found that these relationships are stronger among females (Muhlig et al., 2015). Similarly, in a study of obese children ages 6-18, Depression was more common among girls than among boys (Lindberg et al., 2020). In addition, female obese adolescents had a higher risk to develop Depression in adulthood than normal weight ones (Korcak et al., 2013). It was also found that girls exhibited worse Depressive symptoms when their BMI was high, while for boys, the opposite was found - their Depression was the worst, when their BMI was normal (Carpenter et al., 2000; Heo et al., 2006). In parallel, studies showed that women with childhood Depression are at higher risk to develop over-weight and obesity as young adults, compared to those not Depressed (Korcak et al., 2013; Wyshak, 2007). However, in other studies, no differences between genders were found in the relationship between obesity and Depression (Kubzansky et al., 2012; Lindberg et al., 2020; Mannan et al., 2016).

Another demographic factor that was found to affect the relationship between obesity and Depression in children and adolescents, though not consistently, is age. In a study that was conducted with obese children aged 6-18, their Depressive symptoms were more severe, the older they got (Lindberg et al., 2020). Similar findings were found in a meta-analysis of cross-sectional studies (Muhlig et al., 2015). However, in a longitudinal study that followed high school students with different weights (normal weight, over-weight, obese) for five years, it was found that the relationship between their weight and distress was stable over the years. In other words, even though the heavier weight and obese groups exhibited worse Depressive symptoms, the relative intensity of their distress, compared to youth with lower weight, didn't change the older they grew (Kubzansky et al., 2012).

## **2.6 Arabs countries and Palestinians**

The current study was conducted among Palestinian children and adolescents. As such, the literature on obesity, Depression and the relation between them in children and adolescents will now be presented as it relates to Arabs in general, Arab countries and Palestinians. The traditional Arab society is collective. The basic premise in such cultures is that people are connected between them and that the community protects them and they are loyal and committed to their family and community their whole life

(Triadis, 1995). According to Schwartz (1990), a collective society is characterized by mutual duties and expectations of people according to their status. Each individual is one ingredient of the group, and all are working towards a shared destiny. Sense of belonging to the group constitute a central part of the individual's sense of identity. In order to preserve the family harmony, conformity, obedience to authority figures, respect of others and behaviors that follow family and social norms – are emphasized (Haj-Yahia, 2006). Control of negative emotions and avoidance of expression them in public is also encouraged (Oyserman et al., 2002). In a collective culture, as the traditional Arab society, universal values of caring for others, conservativeness and safety in the sense of keeping the harmony – are emphasized. Specifically, in the Arab culture, the individual adapts his values and expectations to those of the family and society, works to preserve the family harmony and the good family name, stay modest and work to satisfy the family's needs even at the expense of their own (Gerassi, 2012).

The traditional Arab society is patriarchal in which the common parenting style is authoritative (Gerrasi, 2012). This parenting style is manifested in a parent who demand full obedience to their wishes and demands and enforce strict discipline even without explanations of the existing rules. Such a parent will use punishment – even physical one to control his or her child's behavior and will rarely express affection or comfort towards them (Baumrind, 1991). Arab parents, especially Arab fathers, demanded they'd be respected and that their demands be followed. These behaviors were a result of a perception that only adults have the experience to protect the children (Haj-Yahia, 1995). Disobedience to parents or teachers was perceived as a serious offense. When such disobedience was committed by girls outside of the house environment, it was perceived as especially severe as in this society, women as well as girls were controlled by the men (Dwairy, 2004).

This opening to the Western way of life, also exposes Arab youth to body ideals and issues of weight, they might be less aware of in their own society that focuses in the group and not the appearance of an individual.

### **2.6.1 Obesity among Arabs countries and Palestinians**

In parallel to the data presented above from Western countries, Middle Eastern Arab countries are also seeing an increase in prevalence of obesity with 25% to 36.4% of men and 33% to 53.1% of women in these countries exhibiting obesity (Badran & Lahran, 2011; Elulu et al., 2014). Among Palestinian adults, 46% were found to be over-weight, 60.25% of men and 47.15% of women. Specifically, among Muslim Palestinian, only 35.1% have normal weight and 13.8% exhibit over-weight (Central Bureau of Statistics, 2019). The Palestinian society is exposed to varied risk factors for obesity. They experience low income and education, they belong to a minority group, they are in the process of urbanization and are exposed to unhealthy foods and sweetened drinks which are easily accessible in. For example, it was found that only 17.6% of Arab adults reported avoiding drinking sweet drinks and only 27.5% declared that their eating habits are influenced by studies and information regarding healthy diets. In addition, only 41.3% of Arab adults expressed a wish to lose weight and only 27.8% take part in physical activity on a regular basis (Central Bureau of Statistics, 2019).

In a large meta-analysis of studies conducted in Arab countries in the Middle East, it was found that around 14 to 24% of children 6-19 years old are over-weight and 6% to 21% are obese. The five countries with the highest prevalence of overweight children and adolescent boys were Egypt, Libya, Kuwait, KSA, and Syria (prevalence ranging from 28.2 to 20.1%). For obesity, Kuwait was by far the top country with a prevalence of 34.8 and 20.5% for male and female children and adolescents, respectively (Farrag et al., 2017). In another meta-analysis of Arabic speaking countries (Badran, & Lahran, 2011), two to sixteen percent of boys and two to eighteen percent of girls exhibited obesity. This study also showed that half (42% boys, 63% girls) of school age children exhibiting obesity continued to be obese as adults (Badran & Lahran, 2011). In a study (Al-Laham et al., 2019) conducted in northern Palestine, it was found that 14.5% and 15.7% of children aged 6-12 were over-weight and obese respectively, according to a BMI measurement. The prevalence of overweight and obese boys and girls were similar (14% and 15% were overweight and 18% and 14% were obese respectively). In addition, this study found that older children (ages 9-12) had a lower risk of being over-weight and obese than the younger ones. Maternal BMI and living place (city, village, refugee camp) were related to the children's over-weight and obesity (Al-Lahham et al., 2019).

Among Palestinian children, 19% of first grade students and 37% of seventh grade students were found to be obese in the 2017/2018 school year (Avni et al., 2019). One of the factors that increase their risk of obesity is their low participation in physical activity. It was found that more than 22% of Palestinian youth (in grades 6 to 12) do not engage in any physical activity on a regular basis. This issue was more problematic among girls – as 26% of them reported lack of physical activity, while only 17% of boys provided a similar report. This gap between the sexes, in lack of physical activity, was already apparent in sixth grade, and widened at later ages (Tesler et al., 2019). In another study conducted with older (15-19 years old) Palestine adolescents living in Hebron, 14% were found to be over-weight and 4% were obese, with no differences in prevalence between genders (Badrasawi et al., 2019).

Similar to the findings in Western countries, being overweight or obese is related to body dissatisfaction. For example, in the United Arab Emirates (UAE), 66% of adolescent girls (aged 13-18 years old) expressed weight dissatisfaction (Eapen et al., 2006). In addition, the rate of body image dissatisfaction in Palestine was found as 12% (Latzer et al., 2007). Social variables, including Westernization and exposure to the media have been offered as explanations to body image dissatisfaction among youth in Arab societies (Mousa et al., 2010). In a study conducted with Adolescent girls from Jordan, aged 10-16, level of BMI predicted degree of body image dissatisfaction. The risk of body image dissatisfaction was tripled among girls who were overweight compared to those with normal weight. In addition, degree of body image dissatisfaction was also related to age, with degree of dissatisfaction becoming worse the older the girls got. This was explained as related to changes in weight girls experience as part of puberty. Lastly, being exposed to negative comments about their weight from family and or peers, increased their risk to exhibit body image dissatisfaction (Mousa et al., 2010). In a study conducted in Palestine (West Bank and Gaza) with adolescent children (12-18 years old) it was found that although only around 17% were classified as overweight or obese (13% overweight and 4% obese), almost a third (32.1%) expressed dissatisfaction with their weight. Of those reporting dissatisfaction with their weight, 56% of boys and 74% of girls were not overweight. Girls who expressed dissatisfaction with their weight also felt lonelier and more reported a lower life satisfaction (Al Sabbah et al., 2008). However, in a different study conducted with older Palestine adolescents, dissatisfaction with weight was related to

being over-weight or obese but not to psychological symptoms as low self-esteem, Depression or anxiety (Badrasawi et al., 2019). However, negative body image was associated with Depressive symptoms among older adolescents (17-19 years old) from Jordan (Ismayilova et al., 2013).

### **2.6.2 Depression in children and adolescents among Arabs countries and Palestinians**

In a systematic literature review of studies conducted in Arab countries, it was found that between 4% and 32% of the adolescents tested, exhibited Depressive symptoms (Daradas et al., 2016). Several factors unique to the Arab culture makes it harder to diagnose and treat mental illnesses as Depression. First, in the traditional conservative society, mental illness is still, at least to some degree, perceived negatively, as bringing shame on the family. This perception makes it harder for parents to seek professional help for their child's distress. As such, symptoms are often dealt with in the family (Dardas et al., 2016). As a result, Arab adolescents who experience Depressive symptoms would prefer to talk to family members or peers and not to professionals. Fear of lack of confidentiality was named as a significant reason not to reach out to professional help by Arab adolescents. They also perceived self-disclosure of emotional difficulties as weakness (Gilat et al., 2010). Lack of timely diagnosis and treatment increase the risk of suicide among Arab youth. In a study conducted with Palestine adolescents (12-16 years old) 24% expressed suicide ideation and 25% reported on a previous suicide attempt. A relationship was found between level of Depressive symptoms and suicide ideation (Ghrayeb et al., 2014).

In addition, Arab families often don't have the resources or mental health professionals available for them to get help, even if they were open to it. This might delay even further the diagnosis of the child's Depression and prolong their suffering (Abdullah, & Brown, 2011; Dardas et al., 2016). In addition, many Arabs still believe that supernatural forces (as evil eye or black magic) cause mental illness symptoms. As they don't view them as a real illness they don't seek professional help (Dardas et al., 2016). Similar to other countries, in Arab countries and in Palestinian adolescents, girls exhibit a higher prevalence of Depression, but to a larger extent (Benatov et al., 2017; Dardas et al., 2016). This gender effect was explained as stemming from the still prevalent traditional patriarchal gender-role norms, where girls are expected to internalize their

distress and avoid expressing anger or distress outwards (Benatov et al., 2017; Cinamon, 2009; Dardas et al., 2016).

Similarly, Arab adolescents expressed worse Depression as they got older (Dardas et al., 2016). However, a study that compared adolescents between two Arab countries found less consistent findings. In Egypt, similarly to the findings described elsewhere, female adolescents and older ones, exhibited worse Depression. However, in Oman, male adolescents exhibited slightly worse Depression (though the difference was not significant) and age effected the severity of Depressive symptoms only among females. Different explanations were offered to the differences between the findings in the two countries. It is possible that for each gender different factors affect the severity of the Depressive symptoms. It might be that girls are more affected by trauma than boys. It might be that girls are more affected by social support from parents and/or teachers and this support is manifested differently in each country (Afifi, 2006).

## **2.7 Statement of Problem**

As presented above, studies conducted in Western cultures have demonstrated a bi-directional relationship between obesity and Depression (Mannan et al., 2016; Muhlig et al., 2015). Explanations offered for it focused on one direction of the relationship or attempted to find factors that influenced both. In spite of this vast body of literature, these conditions are still treated separately as the understanding of the risk factors for the combination of them is still lacking or inconsistent. For example, important elements critical in identifying children or adolescents who are in particular at risk to develop this combination are demographic characteristics as sex and age. However, the findings regarding their effects on the strength of the relationship between obesity and Depression is inconsistent. Thus, it is important to study this question further to be able to identify those at the highest risk. In addition, most of the research done in this issue up to now has been conducted in Western individualistic societies and is thus less applicable to traditional eastern cultures. As traditional collectivistic cultures perceive gender roles, social norms and mental illness differently (Daradas et al., 2016), it stands to reason that Depression in general and the relationship of obesity to it will be manifested differently in such a society. In particular, as the status of girls is lower in such societies, it is important to examine whether among adolescent girls in collectivistic societies, such as the Palestinian in one, who exhibit over-weight or

obesity, suffer more from Depressive symptoms. Another question that was left unresolved in the literature and will be tested in the current study is whether and to what degree is this relationship affected by age. This again will allow better identification of adolescents who need emotional support and tailor any intervention provided to them to take cultural issues into account.

## **2.8 Statement of Importance**

The findings of this study will allow overcoming shortcomings in the existing literature as it comes to the effects of the demographic factors gender and age on the relationship between obesity and Depression that were found inconsistently. Aside from possibly helping the theoretical understanding of this association, these findings might first help in identifying over-weight or obese children and adolescents that are at higher risk to develop Depression and offer them the treatment they need. As Depression has vast short and long term effects on all life domains, it is important to try to prevent its occurrence or offer early intervention. Similarly, as obesity has varied physical and mental health comorbidities, the findings will help in identifying adolescents who suffer from Depression who are at risk to develop obesity and offer them early intervention.

In addition to these general contributions, the current study also added to the literature by focusing on a collectivistic culture – instead of the mostly individualistic Western culture countries tested thus far. As the way of life, attitude towards emotional expression and coping methods are quite different in a traditional collectivistic culture, our findings will broaden existing knowledge to this type of cultures. The current study focused on Palestinian Muslim children and adolescents, a community holding a collectivistic culture that tends to stigmatize emotional distress and mental illness (Dardas et al., 2016). Our findings will provide information on the relationship between obesity and Depression in this type of population and how gender and age relate to it. The question of gender is particularly relevant to explore in a collectivistic culture like the Palestinian in one. As there are generally defined gender roles in this society and women have lower status, it is important to see how this cultural characteristic is manifested in the effects of gender on the relationship between obesity and Depression. Our findings will allow identifying young and old adolescents living in collectivistic cultures who are at risk to develop this combination of conditions – either over-weight/obese adolescent who are at risk to develop Depression or those with Depression

who are at risk to develop obesity. This identification will help provide them the support and treatment they need in a way that will be tailored to their culture and beliefs. As traditional societies tend to avoid reaching to professional help and deal with mental illness or psychological issue in the family or the community, early identification is particularly important to avoid delay in treatment.

## **2.8 Research goals**

The goals of this study were; to compare between over-weight, obese and normal weight children/adolescents in their Depressive symptoms; To examine the effect of gender on the relationship between weight and Depression; to examine the effect of age on the relationship between weight and Depression.

## **2.9 Research questions**

The proposed investigation was directed to answer the following questions:

1. Are the Depressive symptoms of Palestinian children and adolescents who are overweight and obese (according to CDC TABLES) worse than in those with normal weight?
2. Are the Depressive symptoms of Palestinian children and adolescents who are obese worse than those who are over-weight?
3. Does gender influence the relationship between obesity and Depressive symptoms among Palestinian children and adolescents?
4. Does age influence the relationship between obesity and Depressive symptoms among Palestinian children and adolescents?

## **2.10 Research hypotheses**

Based on the literature reviewed, the following hypotheses were suggested:

1. Palestinian Children and adolescents who are obese will have worse symptoms of Depression than those who have normal weight. Those with over-weight will be in between them.
2. Gender affects the relationship between obesity and symptoms of Depression. Over-weight and Obese girls will have worse symptoms of Depression than over-weight and obese boys. This difference will be larger in the obese subjects.

3. Age affects the relationship between obesity and symptoms of Depression. Over-weight and Obese adolescents will have worse symptoms of Depression than over-weight and obese children. This difference will be larger in the obese subjects.

## **Chapter Three**

### **Methodology**

The current chapter will present the research that was conducted – the study design, the sample used, the procedure, the questionnaires used to collect the data and the analysis used to test the research hypotheses.

#### **3.1 Study Design**

The study was experimental (with a comparison between three independent groups (that are different from one another in their weight) and correlational with test of relationships between variables).

#### **3.2 Study Population**

The study population included Palestinian children who live in Kfar Qarea and Um Al-Fahem, in the ages of 9–16 who are normal weight (under 85%), over-weight (85-97%) and those who are obese (97% or more) according to the CDC curves.

#### **3.3 Study Sample**

The sample included 90 Palestinian youth who live in Kfar Qarea and Umm Al-Fahem aged 9-16 ( $M=13.07$ ,  $SD=2.07$ ) years participated in the study. Forty eight of the participants were girls. Thirty participants were of normal weight, thirty were overweight and thirty were obese. Table 1 presents demographic, family and weight related information on the participants in each of the groups. As can be seen, all three groups were of similar ages and with similar number of siblings. In the normal weight group participated more girls and youth living in a village, compared to the other two over-weight groups, which had similar numbers of boys and girls and participants living in the village or city. The number of participants who have had a family member who was obese was higher the more over weight the participants were.

**Table 1**

*Demographic and background information of participants in each group (Means (SD) or prevalence)*

	Total	Normal weight (n=30)	Overweight (n=30)	Obese (n=30)
Age	13.07 (2.07)	13.97 (2.17)	13.73 (1.84)	13.4 (2.21)
Girls	53%	70%	46.7%	43.3%
Siblings	2.47 (1.07)	2.57 (1.17)	2.4 (1.04)	2.43 (1.04)
Village/city	39%	73%	50%	60%
Obesity family	55.6%	26.7%	66.7%	73.3%

### **3.4 Tools**

Two self-report measures were utilized to gather data for this study:

#### **1. Depression symptoms scale (see appendix A):**

In order to measure the severity of the participants' Depression symptoms, The Children's Depression Inventory (CDI2) (Kovacs, 1978) was used. This scale is intended for children between the ages of 7 and 17 (Kovacs, 1992). It contains 28 items, measuring four types of Depression symptoms: negative self-esteem (6 items), inactivity (8 items), difficulties in interpersonal relationships (5 items) and symptoms of negative mood and body (9 items) (for example: "Feeling sad". On each item, participants were asked the frequency they experienced what is described in the item on a three point likert scale (All the time, most of the time, rarely). Five scores were calculated for each participant for this scale – for each sub scale and a total score by summing the rating they provided. In a previous study with the English version of the questionnaire, the CDI exhibited good internal consistency with alpha 0.71-0.89 of the sub scales (Kovacs, 1992). The questionnaire was translated and back translated from English into classic Arabic by two independent persons at the same time. The use of classic Arabic was chosen so this translation could be used in other Arab areas with different dialects. The internal reliability of the full questionnaire in the current study was  $\alpha=.87$  and the sub scales were: difficulties in interpersonal relationships  $\alpha=.52$ , inactivity  $\alpha=.68$ , negative self esteem  $\alpha=.64$  and mood and body image  $\alpha=.7$ .

## 2. **Demographic and Weight Questionnaire (DWQ)** (see appendix B)

Contained 11 demographic and personal information items about: age, sex, residence, siblings, family members who are obese, visiting a dietitian, weighting frequency, degree of satisfaction with weight, any diagnosed illnesses.

### **3.5 Procedure**

After the study protocol received the ethics approval by the IRB (in 2019) , the principals of the four Palestinian governmental schools in ((Two schools are located in the city of Umm al-Fahm, and two schools in Kafr Qara))chosen for the study were approached. After receiving their approval to conduct the study with their students, school nurses and teachers helped identify students that fit the weight criteria in the three groups (normal weight, over-weight, obese) required for the study according to their medical diagnoses kept in their school nurse's medical file.. All participants were accepted for the study after receiving their parents consent. We Sorted the students according to the CDC curves of child BMI (see appendix C) to three groups: two research groups - overweight group in the range 85%-97% , obesity group over 97%, and control normal weight was in the range 25-85%. In order to examine the distribution of participants' bmi relative to the curves, an average bmi was calculated to each age group separately for boys and for girls. These values are presented in table 2. Then each of these values was compared to the CDC curves for boys and for girls to assess how close to the curve each of them are. The graphs with these values are presented at appendix D and the values marked in table 2 signifies values close to the 97<sup>th</sup> obesity curve.

**Table 2***Average BMI by age, weight group, sex*

Age	Overweight		Obese	
	Girls	Boys	Girls	Boys
9	19.23 n=1		22.54 n=1	22.7 n=1
10		20.15 n=1	24.79 n=3	26.2 n=1
11		21.8 n=1		
12	22.53 n=3	22.19 n=2	25.15 n=1	28.5 n=1
13	25.31 n=1	23.63 n=2	30.68 n=2	27.77 n=2
14	25.18 n=3	25 n=4	32.3 n=1	28.65 n=6
15	25.03 n=4	24.83 n=3	28.62 n=4	28.75 n=2
16	27.07 n=2	26.64 n=3	28.65 n=1	29.46 n=4

Data collection was conducted during the 2021 school year in the schools, with each student individually at a private time scheduled with their teacher. During the study session, the participants' height and weight were measured by a school nurse before hand and the children filled The Children's Depression Inventory (Kovacs, 1992) and the Demographic and weight Questionnaire (DWQ). Children who struggled with reading the questionnaire were read the questions. Data collection took close to a year due to covid restrictions.

### 3.6 Statistical Analysis

In order to test the research hypotheses, ANNOVA analyses were used to compare between the weight groups in each Depression score, and test the effects of gender, and age. Also Pearson correlations were conducted between age and each of the Depression scores.

### 3.7 Ethical Consideration

The researcher obtained the ethical approval from the Institutional Audit Committee (IRB) at An-Najah National University (2019). Children and adolescents in Palestinian schools in who were recruited to the study and they and their parents were provided with a detailed explanation of the type and purpose of the study, the duration of the session and that all the informaiton collected will be kept confidential. They were

assured that the children would not be harmed in any way and that they will be able to leave the study at any point without a problem if they feel uncomfortable. Both the consent of the children and the parents were received. Thus the authority to start conducting the research is realized.

## Chapter Four

### Results

The current chapter will present the research findings. First, descriptive statistics will be presented. Then the findings of each of the hypotheses will be presented and finally some additional analysis that will help explain our findings will be provided.

#### 4.1 Descriptive statistics

The current study had five dependent variables: Depression symptoms total score and scores in the Depression four sub scale. ∴ Table 3 provides descriptive statistics of each one. As can be seen in the table, participants exhibited relatively low levels of total Depression score (maximum score on the scale is 84), difficulties in interpersonal relationships (maximum score 15), inactivity (maximum score 24), negative self esteem (maximum score 18) and mood and mood and body image (maximum score on the scale 27).

**Table 3**

*Descriptive statistics for Depression scores*

	M	SD	Min	Max
Depression symptoms total	16.54	8.4	0	37
Difficulties in interpersonal relationships	2.96	2.19	0	13
Inactivity	4.73	2.67	0	11
Negative self esteem	2.78	2.02	0	7
Mood and body image	6.08	3.41	0	14

#### 4.2 Relationship between Depressive symptoms and weight

The first research hypothesis was that obese Arab children will exhibit the highest Depression and those with normal weight will exhibit the lowest, while over-weight children will exhibit Depression symptom level in between. In order to test this hypothesis the scores the

participating children received in the total Depression score and in each of the four Depression symptoms was compared between the three weight groups using an ANOVA analysis. Table 4 present this analysis.

**Table 4***Comparison of Depressive symptoms between weight groups*

	Normal (n=30)		weiiht Overweight (n=30)		Obesity (n=30)		F
	M	SD	M	SD	M	SD	
Depression symptoms total	7.8	4.6	20.07 <sup>a</sup>	4.46	21.77 <sup>b</sup>	7.45	***54.17
Difficulties in interpersonal relationships	1.33	1.34	3.53 <sup>a</sup>	1.25	4.0 <sup>b</sup>	2.46	***19.31
Inactivity	2.43	1.97	5.7 <sup>a</sup>	1.95	6.06 <sup>b</sup>	2.43	***26.4
Negative self esteem	1.16	0.95	3.56 <sup>a</sup>	1.99	3.6 <sup>b</sup>	1.9	***20.6
Mood and body image	2.86	2.17	7.26 <sup>a</sup>	2.13	8.1 <sup>b</sup>	3.16	***26.85

Comments: \*\*\* $p < .001$ <sup>a,b</sup> – Averages in the same line with different letters signify significant different in Tukey post hoc tests ( $p < .01$ )

As can be seen in table 4, in each of the Depression symptoms, significant differences were found between at least two groups: Depression symptoms total ( $F(2, 87) = 54.17, p < 0.01$ ), difficulties in interpersonal relationships ( $F(2, 87) = 19.31, p < .001$ ), inactivity symptoms ( $F(2, 87) = 26.40, p < 0.01$ ), negative self esteem ( $F(2, 87) = 20.6, p < 0.01$ ), mood and body image ( $F(2, 87) = 26.85, p < 0.01$ ).

In order to identify the groups that are significantly different in each Depression measure Post Hoc Tukey tests were conducted comparing between each two groups in each measure. The Tukey HSD tests showed that: the mean value of total Depression symptoms in the normal weight group ( $M=7.8, SD=4.6$ ) were significantly different at  $p < .001$  than in the overweight group ( $M=20.07, SD=4.46$ ) and from those in the obesity group ( $M=21.77, SD=7.45$ ). However, the differences between the total Depression symptoms in the overweight and obese groups were not significantly different.

Similarly, the Tukey HSD tests showed that the mean value of difficulties in interpersonal relationships in the normal weight group ( $M=1.33, SD=1.34$ ) were significantly different at  $p < .001$  than in the overweight group ( $M=3.53, SD=1.25$ ) and from those in the obesity group ( $M=4.0, SD=2.46$ ). However, the differences between difficulties in interpersonal relationships in the overweight and obese groups were not significantly different.

Similarly, the Tukey HSD tests showed that the mean value of inactivity in the normal weight group (M=2.43, SD=1.97) were significantly different at  $p<.001$  than in the overweight group (M=5.7, SD=1.95) and from those in the obesity group (M=6.06, SD=2.43). However, the differences between inactivity in the overweight and obese groups were not significantly different.

Similarly, the Tukey HSD tests showed that the mean value of negative self esteem in the normal weight group (M=1.16, SD=0.95) were significantly different at  $p<.001$  than in the overweight group (M=3.56, SD=1.99) and from those in the obesity group (M=3.6, SD=1.9). However, the differences between the negative self esteem in the overweight and obese groups were not significantly different.

Similarly, the Tukey HSD tests showed that the mean value of mood and body image symptoms in the normal weight group (M=2.86, SD=2.17) were significantly different at  $p<.001$  than in the overweight group (M=7.26, SD=2.13) and from those in the obesity group (M=8.1, SD=3.16). However, the differences between mood and body image symptoms in the overweight and obese groups were not significantly different.

In summary, the first research hypothesis was confirmed. Overweight and obese Palestine inside children and adolescents exhibited higher Depressive symptoms of all types than normal weight ones.

#### **4.3 Gender, weight and Depression**

The second research hypothesis was that over-weight and obese girls will have worse symptoms of Depression, of all types, than over-weight and obese boys. This difference will be larger in the obese subjects. In order to examine this hypothese, a two way ANOVA analysis was conducted with the overweight and obese sample (without the subjects with normal weight) with each of the Depression symptoms as dependent variable and gender, weight group and the interaction between them as independent variables. Table 5 presents this comparison.

**Table 5**

*Comparing Depressive symptoms between genders and over-weight and obesity groups – Means and standard deviations*

	Overweight		Obese	
	Female (n=14)	Male (n=16)	Female (n=13)	Male (n=17)
Depression symptoms total	20.93 (4.2)	19.31 (4.67)	24.69 (6.56)	19.53 (7.48)
Difficulties in interpersonal relationships	3.79 (1.12)	3.31 (1.35)	4 (2.46)	4.31 (1.6)
Inactivity	6.21 (2)	5.25 (1.84)	7.07 (2.78)	5.29 (1.86)
Negative self esteem	4.14 (2.25)	3.06 (1.65)	4.08 (1.66)	3.24 (2.05)
Mood and body image	6.79 (1.81)	7.69 (2.36)	9.23 (2.49)	7.24 (3.42)

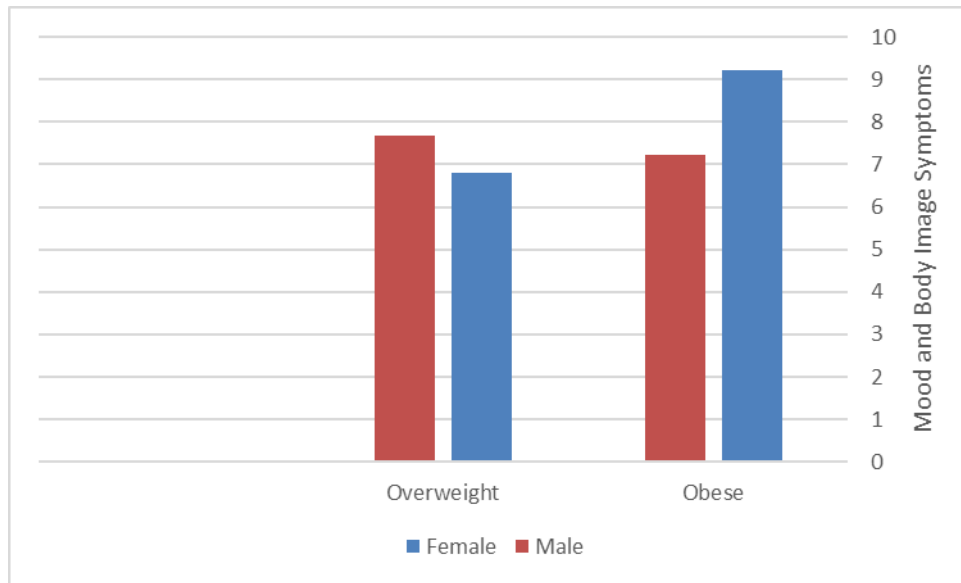
The ANOVA analysis for the total Depression symptoms, inactivity and negative self esteem found an effect of gender (Depression total -  $F(1,56)=4.86$ ,  $p=.03$ ; inactivity-  $F(1,56)=6.22$ ,  $p=.02$ ; negative self esteem –  $F(1,56)=3.71$ ,  $p=.06$  (marginal significance) – manifesting higher levels of Depression among females than males, but no effects of category or an interaction effect between category and gender.

The ANOVA analysis for mood and body image symptoms found no category or gender effects but found a significant interaction between category and gender ( $F(1,56)=4.5$ ,  $p=.04$ ). Figure 1 presents this interaction. As can be seen, among the obese participants, obese females exhibited worse mood and body image symptoms than male ones. Among the overweight participants, a small opposite trend was found.

Hypothesis 2 was confirmed only for mood and body image symptoms.

**Figure 1**

*Difference in mood and body image symptoms between overweight/obese males and females*



#### **4.4 Age, weight and Depression**

The third research hypothesis was that Age affects the relationship between obesity and symptoms of Depression. Over-weight and Obese adolescents will have worse symptoms of Depression than over-weight and obese children. This difference will be larger in the obese subjects. In order to examine this hypothesis, first Pearson correlations were calculated between age and each of the Depression symptoms separately in each weight groups. Table 6 presents these analyses. As can be seen, none of the correlations has been significant.

**Table 6**

*Pearson correlations between age and Depression scores for each weight group*

	Normal weight	Overweight	Obese
Depression symptoms total	-.12	.28	-.21
Difficulties in interpersonal relationships	-.21	.12	-.02
Inactivity	.04	.13	-.29
Negative self esteem	.003	.12	-.34
Mood and body image	-.15	.27	-.04

Second, the sample was divided into participants who were 9-13 years old (about a third of the sample) and those who were 14 to 16 years old. Then a two way ANOVA analysis was conducted with the overweight and obese sample (without the subjects with normal weight) with each of the Depression symptoms as dependent variables and age, weight group and the interaction between them as independent variables. Table 7 presents this comparison.

**Table 7**

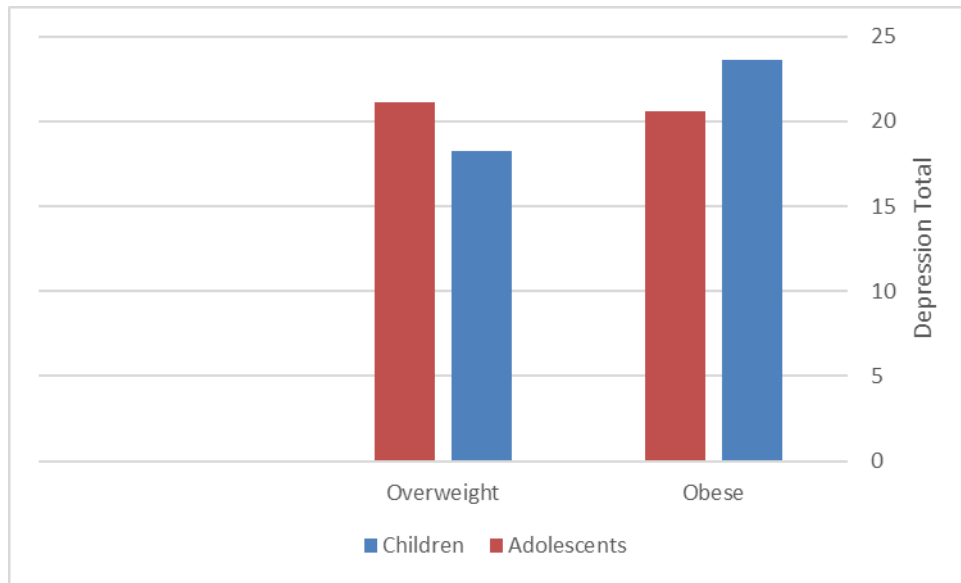
*Comparing Depressive symptoms between age and weight groups*

		Overweight		Obese	
		Child (n=12)	Adolescent (n=18)	Child (n=11)	Adolescent (n=19)
Depression		18.27	21.11	23.58	20.56
symptoms total		(4.1)	(8.55)	(5.9)	(8.26)
Difficulties	in	3.36	3.63	3.92	4.06
interpersonal		(1.36)	(2.08)	(1.31)	(3.04)
relationships					
Inactivity		5.45	5.84	7.08	5.39
		(1.69)	(2.67)	(2.5)	(2.2)
Negative self esteem		3.18	3.79	4.17	3.22
		(2.23)	(1.99)	(1.47)	(2.1)
Mood and body		6.27	7.84	8.42	7.89
image		(2.24)	(3.41)	(2.35)	(1.66)

The ANOVA analysis for total Depression symptoms found no category or age effects but found a marginally significant interaction between category and age group ( $F(1,56)=3.3, p=.075$ ). Figure 2 presents this comparison. As can be seen, among overweight participants, adolescents exhibited worse total Depression symptoms than children, while the opposite trend was found for obese participants.

**Figure 2**

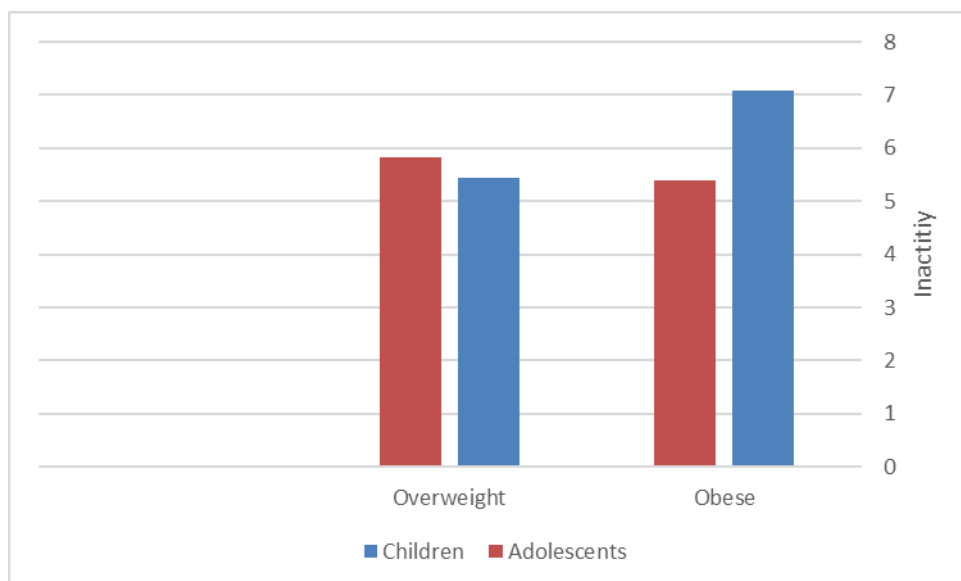
*Difference in total Depression symptoms between overweight/obese children and adolescents*



Similarly, the analysis for inactivity symptoms found no category or age effects but found a marginally significant interaction between category and age group ( $F(1,56)=3.3$ ,  $p=.075$ ). Figure 3 presents this comparison. As can be seen, among overweight participants, adolescents exhibited slightly worse inactivity symptoms than children, but among obese, children exhibited much worse symptoms than adolescents.

**Figure 3**

*Difference in inactivity symptoms between overweight/obese children and adolescents*



The analyses for the other three Depression symptoms – difficulties in interpersonal relationships, negative self-esteem and mood and mood and body image symptoms, didn't have any effects – category, age or the interaction between them.

In summary, hypothesis 3 was partially confirmed for total Depression and inactivity symptoms.

#### 4.5 Additional analysis

In order to understand our findings further, several additional analysis were conducted. First, as obesity in the family is a known risk factor for obesity in children (i.e. Al-Lahham et al., 2019), the effect of having an obese family member on the relation between weight and Depression was tested. In order to examine this, an ANOVA test was conducted with each of the Depression scores as a dependent variables and weight group, obese family member and the interaction between them as independent variables. Table 8 presents this comparison.

**Table 8**

*Comparing Depressive symptoms between weight groups and having an obese family member*

	Normal weight		Overweight		Obese	
	Obese family (n=8)	No obese (n=22)	Obese family (n=20)	No obese (n=10)	Obese family (n=22)	No obese (n=8)
Depression symptoms total	5.75 (2.82)	8.55 (4.94)	20.25 (4.69)	19.7 (4.16)	23.75 (5.67)	16.38 (9.4)
Difficulties in interpersonal relationships	1.25 (1.67)	1.36 (1.26)	3.5 (1.29)	3.6 (1.35)	4.55 (2.36)	2.5 (2.2)
Inactivity	1 (0.93)	2.95 (2.01)	5.95 (2.09)	5.2 (1.62)	6.45 (2.48)	5 (2.07)
Negative self esteem	1.13 (0.83)	1.18 (1.01)	3.5 (2.19)	3.7 (1.64)	3.91 (1.74)	2.75 (2.19)
Mood and body image	2.38 (2.45)	3.05 (2.1)	7.3 (2.39)	7.2 (1.62)	8.82 (2.32)	6.13 (4.39)

The analysis for the total Depression score found a main effect of group ( $F(2)=45.66$ ,  $p<.001$ ) but no effect of having an over-weight family member. However, the interaction between weight group and having an over-weight family member was significant ( $F(2,84)=5.43$ ,  $p=.006$ ).

The analysis for Difficulties in interpersonal relationships score found a main effect of group ( $F(2)=13.39, p<.001$ ) but no effect of having an over-weight family member. However, the interaction between weight group and have an over-weight family member was significant ( $F(2,84)=3.12, p=.05$ ).

The analysis for the inactivity score found a main effect of group ( $F(2)=25.35, p<.001$ ) but no effect of having an over-weight family member. However, the interaction between weight group and have an over-weight family member was significant ( $F(2,84)=4.5, p=.014$ ).

The ANOVA analysis for negative self esteem found a main effect of group ( $F(2)=15.31, p<.001$ ) but no significant effects of having a family member who is over weight or interaction between weight group and having an over-weight family member.

The analysis for the mood and body image score found a main effect of group ( $F(2)=28.17, p<.001$ ) but no effect of having an over-weight family member. However, the interaction between weight group and have an over-weight family member was significant ( $F(2,84)=2.99, p=.055$ ).

Second, as satisfaction with weight is known to be related with body image issues and eating disorders and thus as a possible factor affecting the weight of adolescents (i.e Badrasawi et al., 2019), this variable was tested as a possible factor affecting the relationship between weight and Depression. In order to examine this question, first, satisfaction with weight was compared between the three weight groups using an ANNOVA analysis. It was found that participants who were over-weight has a significantly lower satisfaction with their weight ( $M=1.47, SD=0.82$ ) than both those with normal weight ( $M=2.53, SD=0.73$ ) and those with obesity ( $M=2.63, SD=1.16$ ) – with no significant difference between them.

Second, Pearson correlations were calculated between satisfaction with weight and each of the Depression scores separately for overweight and obese boys and girls. Table 9 presents this analysis.

**Table 9***Pearson correlation between satisfaction with weight and depressive symptoms by gender*

	Over-weight Boys satisfaction with weight	Over-weight Girls satisfaction with weight	Obese Boys satisfaction with weight	Obese girls satisfaction with weight
Depression symptoms total	#-.47	-.05	-.18	.31
Difficulties in interpersonal relationships	-.3	.1	-.23	-.1
Inactivity	-.28	-.29	-.09	*.64
Negative self esteem	-.35	-.02	-.06	.22
Mood and body image	-.3	-.46	-.12	.007

\* $p < .05$ , # $p = .063$ 

In these analyses, it was found that for over-weight boys satisfaction with weight was only correlated with the total Depression score with marginal significance ( $r(32) = .47$ ,  $p = .063$ ) and for obese girls satisfaction with weight was significantly correlated with inactivity ( $r(26) = .64$ ,  $p = .02$ ).

## **Chapter Five**

### **Discussions and Conclusions**

The goals of the current study have been to investigate the relationship between weight and Depression among Palestinian children and adolescents and the effects of gender and age on it. The current chapter will present research findings, offer explanations for them based on the literature, present theoretical and practical conclusions, discuss methodological limitations and provide suggestions for future research.

#### **5.1 Differences in Depression between weight Groups**

The first research hypothesis suggested that Depression levels would be worse in children/adolescents who are over-weight and even more so in those who are obese – compared to those who have normal weight. Our findings showed that the Depression symptoms (of all types) of over-weight and obese Palestinian children and adolescents were worse than that of normal weight children/adolescents. These findings are similar to those found in previous studies (i.e. Stunkard et al., 2003). As the current study included only one point of data collection, there is no definitive way to conclude the direction of this relationship. In other words, according to the literature it is possible that over-weight or obesity are a result of the Depression (Privitera et al., 2013) or vice versa (Roberts et al., 2000). One finding that might support the second direction is one showing that over-weight or obese children/adolescents, with an obese family member, exhibited worse Depression symptoms (on most scales) than those without one. As such, it is possible that in these families overeating and an unhealthy lifestyle are more common which might then increase their children's risk for over-weight/obesity with a comorbidity of Depression.

It is important to note that, in contrast to our hypothesis, no differences were found between the over-weight and obesity group participants in the severity of any of the Depression symptoms. This finding might indicate a lack of direct relationship between weight and Depression among Palestinian youth. In other words, it seems that the effect of over-weight on Depression occurs no matter what the extent of the over-weight is and that there is no relation between this extent and the severity of their Depression. A possible explanation for this finding is a methodological limitation that resulted in similarities in the weights of some of the participants in the two over-weight groups.

Among boys, most of those defined as over-weight, had a bmi that was very close to the 97 percentile defined as obese. Among girls, half of those defined as obese had a weight that was very close to the 97 percentile. As the number of participants was not large as is, these small weight differences might have made it harder to identify differences between the over-weight and obese participants in level of Depression. Aside from the methodological explanation, it is possible that children/adolescents are especially sensitive at this age to any body changes and thus it matters less the extent of the over-weight, only its existence. As previous studies showed, the main reason found for the effect of over-weight or obesity on Depression was through lowering self-esteem and stigmatization (i.e. Goldfield et al., 2010). For this effect the extent of over-weight might be less significant. It should be stressed that as this study was conducted with a different population, a collectivistic culture, it might also be that this finding is specific to this type of culture. In other words, it is possible that in these cultures, any difference from others is apparent and cause for concern as it harms the family or group harmony and it doesn't matter the extent of the difference. In order to check the specificity of this finding to this type of culture, future studies in other populations are needed.

## **5.2 Effects of Gender on the Relationship between weight and Depression**

Similar to most previous studies done globally and in Arab countries (i.e Daradas et al., 2016; Raccine et al., 2021), Palestinian girls exhibited worse Depression symptoms than boys. This was manifested in total Depression and in inactivity symptoms and negative self esteem. These findings support previous studies and might be a result of the gender norms in the Arab society that increase the risk of girls to develop Depression (i.e. Daradas et al., 2016).

Regarding the effect of gender on the relationship of weight with Depression, it was found that it only effected its relationship with mood and body image symptoms. Among the obese participants, girls exhibited worse mood and body image symptoms than boys. Among the overweight participants, a small opposite trend was found where boys exhibited worse symptoms than girls. It seems that this pattern of finding parallel that of previous studies among girls severity of Depression is related to high BMI, while among boys it's related to normal or close to normal BMI (i.e. Heo et al., 2006). However, when one looks at the bmi distribution of the participants, one can notice that the average bmi of most boys in the over-weight group, across age groups, were close to

the 97th percentile signifying obesity. As such, it seems, that even boys defined in this study as over-weight had a weight that was very close to being defined as obese. Thus the interaction finding actually shows that in both genders, their body image is affected by being very over-weight – and this effect is more extreme for girls. This finding is supported by that of a previous study showing a strong relationship, in both genders, between obesity in adolescents and low body image (Gouveia et al., 2014). Our findings show that for Palestinian adolescents as well, both boys and girls are sensitive to stigmatization around their weight and thus it affects their body image similarly.

In a similar fashion, gender didn't effect the relationship between weight and Depression in any of the other Depression symptoms, in contrast to our hypothesis. However, the findings regarding the relationship between satisfaction with weight and Depression in each gender and weight group might point to a different process occurring in each gender group. For over-weight (close to obese) boys, satisfaction with weight was found as negatively related to total Depression score. As such, it seems that for them, being over-weight, despite wishes and maybe even attempts to lose weight, is a cause of Depression. In other words, they might feel a sense of failure and low self esteem due to their lack of success to reach the weight they have wanted to be in (Goldfield et al., 2010). In contrast to them, for girls, the only Depression symptom found as related to satisfaction with weight was inactivity which was positively related to it. It was found that many obese girls are unsatisfied with their weight and don't have a desire to lose weight and this feeling is related to their inactivity. This finding might show that obese adolescent girls might get to a point of giving up hope to lose weight and stop even trying. They might hate the way they look but feel helpless to do anything about it.

### **5.3 Age, weight and Depression**

The second demographic variable tested in relation to weight and Depression is age. In general, age and Depression symptom severity were not found as related in any of the weight groups, and symptoms. In addition, Depression symptoms severity was not significantly different between children and adolescents in any of the Depression symptoms. However, in support of our hypotheses, two marginally significant interaction effects were found between age and weight groups – for total Depression score and for inactivity symptoms. In both cases, among overweight participants, adolescents exhibited worse total Depression symptoms than children, while the opposite was found

for obese participants. These findings appear to present an opposite trend to previous findings (i.e. Lindberg et al., 2015; Muhlig et al., 2016) – in that the relationship between weight and Depression is stronger for younger children and not for older.

One possible explanation for these findings is that over-weight and obesity are perceived differently by children/adolescents. It might be that overweight is seen as a state that is easier to fix or correct by a change of life style than obesity which requires more extensive and encompassing treatment. As such, when it comes to over-weight, adolescents might believe that they should be able to reduce their weight on their own (or with some guidance) and if they can't it is their own failure. Children are probably less susceptible to this bias as they might tend to rely more on their parents to decide on their diet and any changes to it. As a result, over-weight adolescents might feel more depressed than children.

However, when it comes to obesity, which is perceived more as a situation they can't cope with on their own – they are helpless about – a different process will come into play. In this case, children might present worse Depression as they will suffer worse stigmatization and be more affected socially by the way they look. This might be especially significant in the current study where the children were relatively older – 9-12, early adolescence, when they develop their sense of self and body image (Marmorstein et al., 2014). As such, obesity might have a particularly strong affect on level of Depression.

The difference in inactivity between the age groups might be also attributed to the Covid 19 pandemic and social distancing limitations and lockdowns that occurred during the study. Studies conducted all over the world showed that during this period, children/adolescents reduced their physical activity dramatically and spent most of their time in front of screens (Androutsos et al., 2021; Pietrobelli et al., 2020). The reduction of physical activity was especially significant in those who were over-weight or obese even before the pandemic (Ng et al., 2020). Older adolescents might have been better able to be creative in finding ways to stay active, even during the pandemic. For example, in a study with Irish adolescents (15-17 years old), it was found that close to 20% of them used the time off school to take walks outside and exercise at home alone or on zoom. Having more free time and being bored resulted in them being more active than before (Ng et al., 2020).

#### **5.4 Limitations and Suggestions for Future Studies**

This study has a number of methodological limitations one should take into account.

First, the study's sample was not representative and included only Palestinian Muslim children and adolescents aged 9-16. Thus the findings could not be generalized to the population of Palestine or the Arab world. In addition, the children in each weight group were not sampled randomly but were provided for the study by the schools where the study took place. As such, they do not necessarily represent Palestinian children or Arab children in these weight groups. It is possible that over-weight and obese children or adolescents that their schools are aware of their condition are those who are currently seeking treatment or who suffer consequences as a result of their state. Thus in the future it is important to sample from wider groups of children and choose among them those in the different weight groups.

Second, the study was conducted during the Covid-19 pandemic and thus the data was affected by the special circumstances created by the pandemic and the limitations designed to cope with it. As this situation has had many effects on all areas of life, these findings can not be generalized to regular routine times. Thus similar studies will need to be done in the future to confirm our findings or compare ours with those obtained in regular times. Such a comparison will also allow understanding more about the effects of stress, such as a pandemic, on weight and Depression, as it will allow differentiating between the findings related to it and those which do not.

Third, the study included collection of data only at one point in time. This prevented us from being able to make conclusions regarding the direction of the relationship between obesity and Depression and examine changes in each of these over time and their mutual effects. It is important in a future research to conduct a longitudinal study with at least two data points that will allow answering these questions. In particular it might be important to conduct separate longitudinal studies that will focus on children or adolescents who suffer from obesity or from Depression and examine the degree they develop the other condition over time. Such studies will allow differentiation between the two possible associations or directions of the relationship between obesity and Depression. This type of study, will also help understanding how changes in development in each gender affect the arousal of Depressive symptoms among over-

weight or obese adolescents, as well as over-weight or obesity among those who suffer from Depression.

Fourth, the questionnaire used in this study, the Depression scale, was not validated for use in the Arab language as there is no Arabic Depression scale. This is the first time a translation of the scale was used and examined. Future studies are needed for further testing of its reliability and validity. In addition, only the children's assessment of their level of Depression was collected. This evaluation could have been biased or skewed, especially when the child himself/herself was depressed. As such, in the future it is important to also have a parent or teacher fill Depression scales on the child to get a full assessment of their condition. In addition, as the parent child relationship was found to be a significant factor affecting obesity and Depression and the relationship between them, including deeper examination of the parent's perspective on the child's condition and their relationship might be important.

Fifth, the study was conducted only in one culture group – collectivistic. It didn't conduct direct comparison between adolescents in collectivistic and individualistic cultures and thus the research conclusions might be limited. Future studies need to conduct direct comparisons between the two.

In addition to the studies mentioned above, that will be designed to overcome methodological limitations, several other future studies can be recommended to broaden its findings. First, as body image was found as an important factor in this study, future studies should include measures of body image and also maybe social anxiety or stigma. Understanding not just how the adolescents feel about his/her body but also how s/he feels others see them or what s/he is scared of in this regard might help understand this issue further and offer proper treatment/intervention. In particular knowing more about the degree of victimization or social exclusion the child experiences and how that influences the way they perceive themselves, can help understand this whole issue better. In addition to questioning the adolescent themselves about their social experiences, using both quantitative and qualitative research methods, it might be helpful to include peers in these discussion. Maybe conducting focus groups of adolescents on how obese adolescents are perceived and whether they would want to be friends with them or how they feel about them, might shed light on this important issue. Focusing

just on those inflicted with the condition provides only one view and doesn't provide the full picture.

Second, examining the lifestyle, BMI and body image of other family members – especially the parents but also siblings, might help the understanding of this relationship and provide a better intervention. As shown in this study, having an obese family member strengthened the relationship between weight and Depression. Thus examining the whole family and understanding how the whole family deals with this issue is important to be able to help them. Especially if parents and or siblings exhibit weight stigma and tease their sibling on their weight, this might make their emotional state worse. Thus examining this issue further might be important.

## **5.5 Conclusions**

In summary, the study findings showed that similarly to other western and Arab countries, Palestinian children and adolescents who are over-weight or obese are more Depressed than those who have a normal weight. As this study is not longitudinal, there is no way of knowing for sure the direction of this relationship but in light of the effect found for having an obese family member, it seems likely that over-weight or obesity is the one effecting the children/adolescents' Depression. In other words, that at least some Palestinian families adopt unhealthy eating habits or are more accepting to being over-weight, which increase the risk of their children to be over-weight and obese. Being over-weight or obese puts these youth at risk for developing internalizing disorders like Depression as a result of stigmatization. Similar findings were found for the two the over-weight and obesity groups, which might show that at least in this population the extent of the over-weight is less relevant to the severity of their Depression. Just them being different than others is what results in Depression.

Regarding the effect of gender, we found similar relationships between weight and Depression in both boys and girls. In other words, young and old adolescent boys who are over-weight or obese also experience Depression and not just the girls. In particular, when overweight boys are unsatisfied with their weight and maybe feel they should be able to lose it, their Depression levels are high. This group of boys experiences Depression out of a sense of personal failure of not being able to lose weight and feel their being over-weight is on some level their "own fault". Their body represents for

them their inability to change how they look and thus their body image is worse than over-weight girls. Obese girls exhibited worse body image than obese boys. This group of participants were also not satisfied with their weight but they felt helpless to change it. As they gave up the idea of losing weight they were not physically active at all.

Regarding age differences, this study showed different patterns among the over-weight and obese participants. For the over-weight participants, it was found that older adolescents exhibited worse Depression than young ones. However, for obese youth, the opposite pattern was found. This pattern is different than the one found in many previous studies that had showed that the relationship between weight and Depression increased with age. Similar to the findings regarding gender, these findings help us understand more deeply how Depression symptoms are developed differently in young and old adolescents when it comes to being over-weight. Among over-weight participants, older adolescents experience worse Depression than younger ones. This group wish they could lose weight and feel it's their own fault they are not thinner. The younger adolescents have less control on their diet and life style and thus take less self-blame for their weight and feel less Depressed. Among obese participants, who feel more helpless regarding their weight, the factor that affects their Depression is often the degree of stigmatization and how sensitive they are to it. Younger adolescents are at a more sensitive age to these issues and are thus more Depressed when obese.

## **5.6 Recommendations**

These findings point to the importance of identification and treatment of Depression among Palestinian children/adolescents who live in attending treatment for over-weight or obesity. The study clearly showed that among over-weight and obese Palestinian children and adolescents (9-16 year old) experience worse Depression symptoms than those with normal weight. As such, it is critical to offer psychological treatment and emotional support as part of any weight loss intervention program for youth. Especially as these adolescents' families might encourage them to avoid seeking professional help and deal with the problem in the family, it is very important to identify them early, before the problem escalates. Identification of those at risk to develop Depression and providing early intervention, might save these youth from severe impairment and even death from suicide later on, if their Depression goes untreated.

Specifically, The different process each gender experiences needs to be taken into account when designing future intervention. For adolescent boys, it is important to find a way to help them take control and provide them with tools that will allow them to reach the weight they aspire too. Working with them on reaching that goal will probably significantly reduce their emotional distress and Depression. For girls, the situation is more complex as they feel helpless to change their weight. As such, discussions can be made with them regarding available medical options to reduce their weight. However, in parallel, it will be important to help them psychologically cope with their feelings around their body and the shame they feel around it and gain back a sense of control over it.

In addition to the adaptation to each gender, it is important to tailor the intervention offered to each age group according to its specific needs. Younger adolescents need tools to deal with stigmatization and social pressures, while older adolescents might need help taking control and losing weight on their own.

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## Appendixes

### Appendix A

### Depression Scale

تصميم: د. مارييا كوفاكس

الاسم/الهوية: _____ تاريخ الولادة: (اليوم) / (الشهر) / (السنة) _____ العمر: _____ الصف: _____ الجنس: ذكر أنثى (ضع دائرة حول خيار واحد)	نموذج تقرير التقييم الشخصي النسخة المختصرة
---	---

يمر الأطفال أحيانا بمشاعر وأفكار مختلفة عن بعضهم البعض.

في عرضه للمشاعر والأفكار، يقسمها هذا النموذج لمجموعات. اختر جملة واحدة تطرح أفضل وصف لك خلال الأسبوعين الماضيين من كل ثلاثة جمل ضمن كل بند. بعد أن تختار جملة من ضمن المجموعة الأولى انتقل إلى المجموعة التالية.

لا يوجد إجابات صحيحة أو خاطئة. فقط اختر الجملة التي تصف حالك في الفترة الأخير. ضع علامة x عند الجملة التي تختارها. ضع العلامة بداخل المربع الموجود بجانب الجملة التي تريد اختيارها.

هذا مثال على كيفية التعامل مع هذا النموذج. قم بتجريبه. ضع علامة بجانب الجملة التي تصفك بالشكل الأمثل.

مثال:

أقرأ الكتب دائما

أقرأ الكتب أحيانا

لا أقرأ الكتب أبدا

تذكر أن الجملة التي عليك اختيارها هي التي تصفك بالشكل الأمثل خلال الأسبوعين الماضيين

<b>البند 1</b> <input type="checkbox"/> أشعر بالحزن كل فترة وأخرى <input type="checkbox"/> أشعر بالحزن في أوقات كثيرة <input type="checkbox"/> أشعر بالحزن طوال الوقت	<b>البند 6</b> <input type="checkbox"/> أكره نفسي <input type="checkbox"/> لا أحب نفسي <input type="checkbox"/> أحب نفسي
<b>البند 2</b> <input type="checkbox"/> لا تحصل الأمور معي كما يجب <input type="checkbox"/> أنا غير متأكد أن أموري ستحصل كما يجب <input type="checkbox"/> ستحصل أموري كما يجب	<b>البند 7</b> <input type="checkbox"/> كل الأشياء السيئة تحصل بسببي <input type="checkbox"/> أشياء سيئة كثيرة تحصل بسببي <input type="checkbox"/> الأشياء السيئة التي تحصل لا تكون بالعادة بسببي
<b>البند 3</b> <input type="checkbox"/> أقوم بعمل معظم الأشياء بشكل مقبول <input type="checkbox"/> أقوم بعمل الكثير من الأشياء بشكل خاطئ <input type="checkbox"/> أقوم بعمل كل شيء بشكل خاطئ	<b>البند 8</b> <input type="checkbox"/> لا أفكر بقتل نفسي <input type="checkbox"/> أفكر بقتل نفسي لكن لن أفعل ذلك <input type="checkbox"/> أريد أن أقتل نفسي
<b>البند 4</b> <input type="checkbox"/> أستمتع بعمل الكثير من الأشياء <input type="checkbox"/> أستمتع بعمل بعض الأشياء <input type="checkbox"/> لا أستمتع بعمل أي شيء بتاتا	<b>البند 9</b> <input type="checkbox"/> أشعر بالرغبة بالبكاء يوميا <input type="checkbox"/> كثيرا ما أشعر بالرغبة بالبكاء <input type="checkbox"/> أشعر بالرغبة بالبكاء بعض الأحيان
<b>البند 5</b> <input type="checkbox"/> أنا مهم بالنسبة لعائلتي <input type="checkbox"/> أنا لست متأكد من أنني مهم بالنسبة لعائلتي <input type="checkbox"/> عائلتي أفضل حالا بدوني	<b>البند 10</b> <input type="checkbox"/> أشعر بالعصبية طوال الوقت <input type="checkbox"/> أشعر بالعصبية كثيرا من الوقت <input type="checkbox"/> قليلا جدا ما أشعر بالعصبية

يتبع بالصفحة التالية...

تذكر أن الجملة التي عليك اختيارها هي التي تصفك بالشكل الأمثل خلال الأسبوعين الماضيين	
<p>البند 11</p> <p><input type="checkbox"/> أحب التواجد حول الناس</p> <p><input type="checkbox"/> كثيرا ما لا أحب التواجد حول الناس</p> <p><input type="checkbox"/> لا أحب التواجد حول الناس أبدا</p>	<p>البند 20</p> <p><input type="checkbox"/> لا أستمتع بالمدرسة أبدا</p> <p><input type="checkbox"/> أستمتع بالمدرسة بين الحين والآخر</p> <p><input type="checkbox"/> أستمتع بالمدرسة كثيرا من الأحيان</p>
<p>البند 12</p> <p><input type="checkbox"/> لا أستطيع اتخاذ القرارات بشأن أمور الحياة</p> <p><input type="checkbox"/> من الصعب علي اتخاذ القرارات</p> <p><input type="checkbox"/> من السهل علي اتخاذ القرارات</p>	<p>البند 21</p> <p><input type="checkbox"/> لدي الكثير من الأصدقاء</p> <p><input type="checkbox"/> لدي بعض الأصدقاء، لكن أتمنى أن يكون لدي المزيد</p> <p><input type="checkbox"/> لا يوجد لدي أي أصدقاء</p>
<p>البند 13</p> <p><input type="checkbox"/> مظهري مقبول</p> <p><input type="checkbox"/> مظهري يبدو سيئا من بعض النواحي</p> <p><input type="checkbox"/> مظهري بشع</p>	<p>البند 22</p> <p><input type="checkbox"/> دراستي تسير بشكل جيد</p> <p><input type="checkbox"/> دراستي أسوأ مما كانت عليه</p> <p><input type="checkbox"/> أدائي سيء جدا بمواد دراسية كنت أتقنها جيدا</p>
<p>البند 14</p> <p><input type="checkbox"/> يجب أن أضغط نفسي كي أنجز وظائفتي المدرسية دائما</p> <p><input type="checkbox"/> كثيرا ما أضغط نفسي كي أنجز وظائفتي المدرسية</p> <p><input type="checkbox"/> لا يوجد لدي مشاكل عند أدائي وظائفتي المدرسية</p>	<p>البند 23</p> <p><input type="checkbox"/> لا أستطيع أن أكون جيدا كبقية الأطفال</p> <p><input type="checkbox"/> أستطيع أن أكون جيدا كبقية الأطفال إن حاولت ذلك</p> <p><input type="checkbox"/> أنا جيد كبقية الأولاد</p>
<p>البند 15</p> <p><input type="checkbox"/> أواجه مشاكل في النوم كل ليلة</p> <p><input type="checkbox"/> أواجه مشاكل في النوم كثيرا من الليالي</p> <p><input type="checkbox"/> أنام بشكل جيد</p>	<p>البند 24</p> <p><input type="checkbox"/> لا يوجد من يحبني حقاً</p> <p><input type="checkbox"/> لست متأكدا إن كان هناك أي شخص يحبني</p> <p><input type="checkbox"/> أنا متأكد أن هنالك شخص يحبني</p>
<p>البند 16</p> <p><input type="checkbox"/> أشعر بالتعب بين الحين والآخر</p> <p><input type="checkbox"/> أشعر بالتعب كثيرا من الأوقات</p> <p><input type="checkbox"/> أشعر بالتعب بشكل دائم</p>	<p>البند 25</p> <p><input type="checkbox"/> من السهل علي التفاعل مع الأصدقاء</p> <p><input type="checkbox"/> كثيرا ما أتجادل مع أصدقائي</p> <p><input type="checkbox"/> أتجادل مع أصدقائي طوال الوقت</p>
<p>البند 17</p> <p><input type="checkbox"/> لا أحب الأكل معظم الأيام</p> <p><input type="checkbox"/> لا أحب الأكل في كثير من الأيام</p> <p><input type="checkbox"/> أأكل بشكل جيد جدا</p>	<p>البند 26</p> <p><input type="checkbox"/> دائما أنام خلال النهار</p> <p><input type="checkbox"/> كثيرا ما أنام خلال النهار</p> <p><input type="checkbox"/> قلما أنام خلال النهار</p>
<p>البند 18</p> <p><input type="checkbox"/> لا أشعر بالقلق حول الأوجاع</p> <p><input type="checkbox"/> أشعر بالقلق حول الأوجاع كثيرا من الأوقات</p> <p><input type="checkbox"/> أشعر بالقلق حول الأوجاع طوال الوقت</p>	<p>البند 27</p> <p><input type="checkbox"/> معظم الأيام أشعر بأنني لا أستطيع التوقف عن التهام الطعام</p> <p><input type="checkbox"/> كثيرا ما أشعر أنني لا أستطيع التوقف عن التهام الطعام</p> <p><input type="checkbox"/> أأكل للطعام طبيعي</p>
<p>البند 19</p> <p><input type="checkbox"/> لا أشعر بالوحدة</p> <p><input type="checkbox"/> كثيرا ما أشعر بالوحدة</p> <p><input type="checkbox"/> أشعر بالوحدة دائما</p>	<p>البند 28</p> <p><input type="checkbox"/> من السهل علي تذكر الأشياء</p> <p><input type="checkbox"/> تذكر الأشياء صعب علي قليلا</p> <p><input type="checkbox"/> من الصعب جدا علي تذكر الأشياء</p>

## Appendix B

### Demographic and Weight Questionnaire

رقم المشترك (رقم خاص بالباحث): \_\_\_\_\_

#### استمارة تفاصيل شخصية

1. BMI (خاص بالباحث): \_\_\_\_\_
2. الجيل: \_\_\_\_\_
3. الجنس: انثى / ذكر
4. عدد الاخوة: \_\_\_\_\_
5. مكان السكن: قرية \ مدينة
6. هل يوجد في البيت اشخاص لديهم وزن زائد او سمنة؟ نعم / لا.
7. هل لديك امراض صحيه؟ نعم | لا
8. هل قمت بزيارة اخصائي تغذية؟ نعم | لا .
9. اقوم بفحص وزني:
  - يوميا
  - اسبوعيا
  - شهريا
  - احيانا متباعدة

10. درجة الرضا من وزنك:

غير راضي بتاتا ولا ارغب بتغيير وزني

غير راضي لكن ارغب بتغيير وزني

راضي بشكل معتدل

راضي جدا

11. هل لديك تشخيص من قبل مختص من التشخيصات المذكورة:

عسر تعليمي

تشتت انتباه وحركة مفرطة

صعوبات اجتماعيه

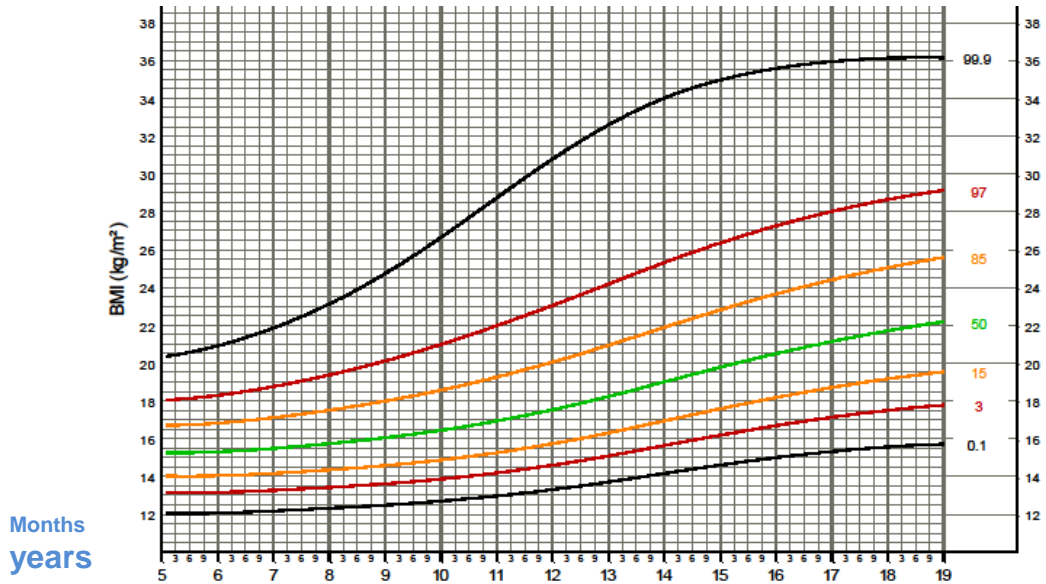
وزن زائد/سمنة

اخر

## Appendix C

### CDC BMI curves for boys and girls 5-19 years old

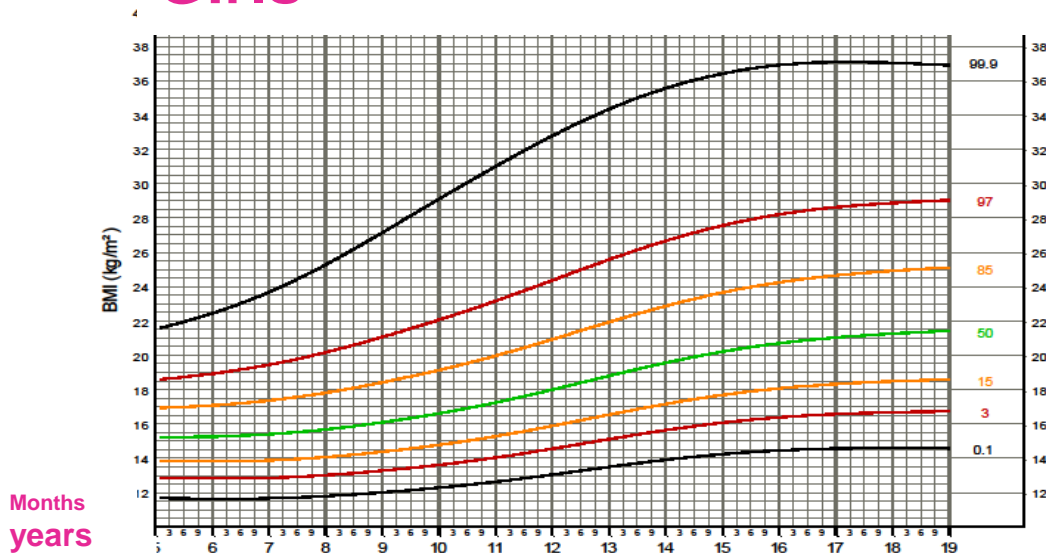
#### Boys



age

מקור: WHO Reference 2007

#### Girls



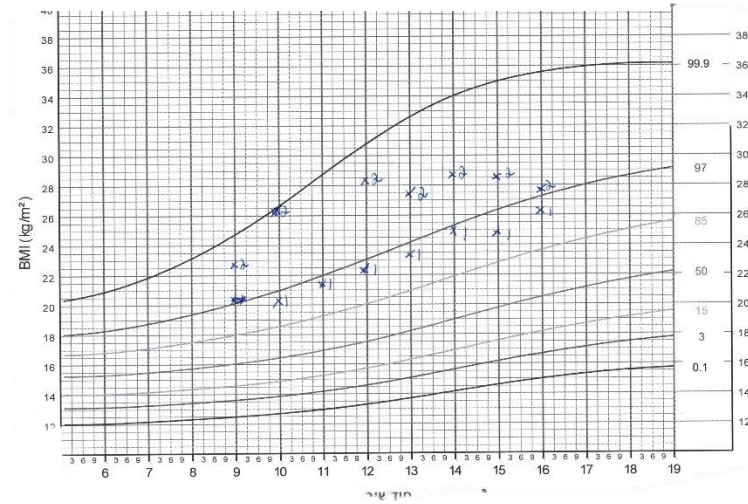
age

מקור: WHO Growth Reference 2007

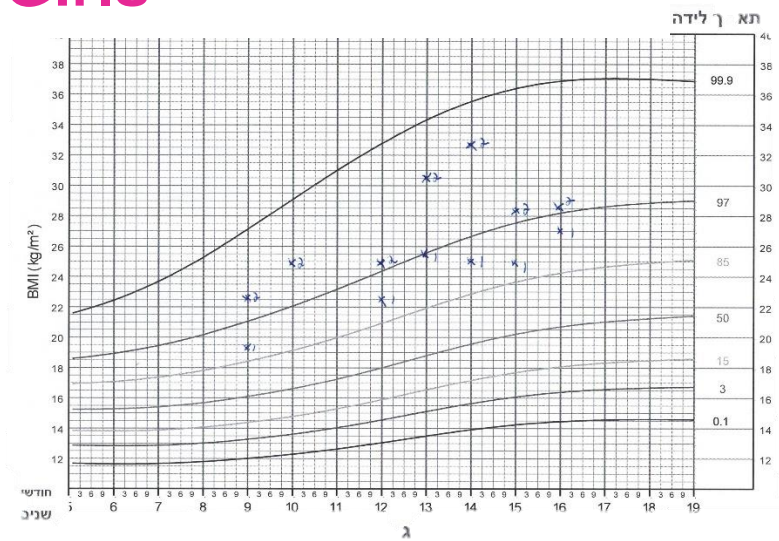
## Appendix D

### Average BMI by age relative to CDC curves by gender

## Boys



## Girls





جامعة النجاح الوطنية

كلية الدراسات العليا

## الاختلافات في شدة أعراض الاكتئاب لدى المراهقين الفلسطينيين الذين يعانون من زيادة الوزن والسمنة

إعداد

هديل اغبارية

إشراف

د. فايز محاميد

د. امجد ابو جدي

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في علم النفس الإكلينيكي، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس - فلسطين.

2022

الاختلافات في شدة أعراض الاكتئاب لدى المراهقين الفلسطينيين الذين يعانون من زيادة

الوزن والسمنة

إعداد

هديل اغبارية

إشراف

د. فايز محاميد

د. امجد ابو جدي

## الملخص

**خلفية الدراسة:** واحدة من أهم الاضطرابات النفسية المرتبطة بالسمنة هي الاكتئاب. وجدت دراسات سابقة علاقة ثنائية الاتجاه بين السمنة وأعراض الاكتئاب بين الأطفال والمراهقين. أجريت معظم هذه الدراسات في الثقافات الغربية وكانت النتائج المتعلقة بآثار الجنس والعمر على هذه العلاقة غير متناسقة.

**أهداف الدراسة:** كانت لفحص العلاقة بين أعراض الوزن والاكتئاب وتأثيرات الجنس والعمر عليها بين الأطفال والمراهقين الفلسطينيين.

**منهجية الدراسة:** تم جمع البيانات من 90 طالبًا فلسطينيًا تتراوح أعمارهم بين 9-16 عامًا: 30 طالب ذوي الوزن الطبيعي، و30 يعانون من زيادة الوزن، و30 يعانون من السمنة المفرطة (بناءً على منحنيات مراكز مكافحة الأمراض والوقاية). كان حوالي نصف المشاركين من الفتيات وحوالي النصف كان لديه فرد من العائلة يعاني من السمنة. قامت ممرضة المدرسة بقياس مؤشر كتلة الجسم للمشاركين، وبعدها قاموا بملاء مقياس أعراض الاكتئاب والاستبيان الديموغرافية.

**نتائج الدراسة:** أن المشاركين الذين يعانون من زيادة الوزن أو السمنة أظهروا اكتئابًا أسوأ (في جميع الأعراض) من أولئك الذين يتمتعون بوزن طبيعي - مع عدم وجود اختلافات كبيرة بينهم. تم العثور على تأثير الجنس الوحيد في مقياس المزاج وصورة الجسم. من بين المشاركين الذين يعانون من السمنة

المفرطة، ظهرت على الفتيات أعراض أسوأ من الأولاد. بين المشاركين الذين يعانون من زيادة الوزن، تم العثور على اتجاه معاكس صغير. فيما يتعلق بالعمر، وجد التأثير فقط في المقياس الكلي للاكتئاب وأعراض الخمول. في هذه المقاييس، بين المشاركين الذين يعانون من زيادة الوزن، أظهر المراهقون أعراضًا أسوأ من الأطفال، في حين تم العثور على الاتجاه المعاكس للمشاركين الذين يعانون من السمنة المفرطة.

**استنتاجات الدراسة:** أظهرت هذه النتائج أن الأطفال والمراهقين الفلسطينيين الذين يعانون من زيادة الوزن أو السمنة يعانون من الاكتئاب، وبالتالي يجب أن تأخذ التدخلات ذلك في الاعتبار. على وجه الخصوص، يبدو أن الأولاد أو المراهقين الذين يعانون من زيادة الوزن يحتاجون إلى مزيد من المساعدة المباشرة لفقدان الوزن بينما تحتاج الفتيات أو الأطفال البدنيين الذين يشعرون بالعجز تجاه وزنهم إلى مزيد من الدعم الطبي والعاطفي.

**الكلمات المفتاحية:** الاكتئاب، الوزن الزائد، السمنة، صورة الجسم، المراهقون.

