

Quality Of Life In Normal And Obese School Aged Children

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Abstract:

Background:Obesity in childhood could affect quality of life in different patterns. There is little existing information about the health related quality of life (HRQOL) of obese children in Egypt. The aim of this study was to evaluate the effect of obesity onHRQOL.

Methods: This cross sectional study was carried out on 182 children aged from eleven to fourteen years selected from public governmental schools at EL-Mansoura City from September 2018 to January 2019 . They were assigned into two groups : study group (n= 102) ; boys (n=48) girls (n=54) and control group (n=80); boys (n=42) girls (n=38).Only obese children of nutritional cause of obesity were included. The body mass index of obese children $\geq 95^{\text{th}}$ percentile and that of the normal weight children equal to 5^{th} percentile to less than 85^{th} percentileaccording to Centers for Disease Control and Prevention growth charts. Their weight and height were assessed by StandardWeight and height measuring scale and BMI was calculated by dividing weight (Kg) by height squared (m^2) (kg/m^2). HRQOL was assessed by Pediatric quality of life inventory Generic core scale version 4(PedsQL TM).

Results: The results showed that Mean \pm standard deviation of weight and BMI of study and control groups were significantly different. The scores of all domains of HRQOL between both groups were significantly different. There was a negative correlation between all the scores of HRQOL and BMI.

Conclusion: The obesity in children had a negative impact on their quality of life.

Keywords: Children; Health related quality of life; Obesity.

Introduction

The prevalence of overweight and obesity in children and adolescents has risen in both developed and developing countries in recent decades^[1]. Similarly, findings from a national survey of Iranian school children aged 6–18 indicated that about one in five students (20.2 % of girls and 22.9 % of boys) were either overweight or obese^[2].

Statistics from the Centre for Disease Control and Prevention (CDC) show that 11.3% of children and adolescents aged 2–19 are at or above the 97th percentile of BMI-for-age growth charts, 16.3% are at or above the 95th percentile, and 31.9% are at or above the 85th percentile^[3,4]. By these definitions, nearly one third of individuals between the age of 2 and 19 years are either overweight or obese^[3].

Several factors have been found to be associated with weight gain in children and they were categorized into three main categories: genetic, behavioral and environmental factors. In addition to genetic factors which increase the children's susceptibility to obesity, behavioral factors including unhealthy eating habits and dietary pattern, sedentary lifestyle and lack of physical activity

were also found to be associated with overweight and obesity in children^[5].

Moreover, the environmental factors (parents, peer, school and community) can per se influence children's dietary intake and physical activity and consequently their weight status^[6].

Also, the increase in childhood overweight and obesity is attributable to the shift towards lifestyles characterized by increased intake of energy-dense foods, decreased physical activity levels due to the increasingly sedentary nature of many forms of recreation, changing modes of transportation, and increasing urbanization as well as changes due to socio-economic development^[7].

Overweight and obese children experience more health complications than lean children of the same age^[8]. Overweight and obesity are reported to be associated with increased risk of development of cardiovascular diseases, high blood pressure, dyslipidemia, type 2 diabetes, and asthma during childhood^[9-14]. Health consequences of overweight and obesity are not just limited to physical health; overweight and obese children experience problems including body dissatisfaction, negative body image,

low self-esteem, depression, stigmatization and social marginalization which can influence their psychological and social health issues [15,16]. Furthermore, there is evidence indicating obese children and adolescents have impaired HRQoL [17,18,19].

A recent comprehensive review suggests that increasing weight status has a moderate to strong negative influence on overall HRQoL in pediatric populations [20]. The same review found an inverse linear relationship between HRQoL and BMI for most studies [20]. Subsequent studies analyzing the effect of age further, suggest the association of lower HRQoL and obesity is weak and/or absent in very young children (aged 2–5 years) but appears more in school years, and steadily strengthens with age [21]. Numerous studies report that females have lower HRQoL scores in one or more domains [22] which is most often physical functioning. [22] In contrast, other studies have found no significant gender-effects on HRQoL. [23]

According to existing literature, except for sex and age, other factors including socio-economic status, depressive symptoms, negative self-image, social support, peer

victimization and teasing as well as other chronic conditions were found to be associated with the HRQoL of children and adolescents [24-27]. In this context, according to children self-reports, obesity was one of the chronic conditions which impaired overall HRQoL even more than certain chronic diseases [28]. In both community and clinical settings, obese children and adolescents have impaired HRQoL, compared to their normal weight counterparts [29,18,19,30,23]; the HRQoL impairment in overweight and obese children has been frequently addressed in different domains of HRQoL depending on the sex, age and degree of obesity of the subjects [29,18,19,30,23]. According to findings of a review physical and social functioning were subscales most affected by childhood overweight and obesity, followed by the emotional functioning subscale [20].

Due to difficulty of curing obesity, prevention could be the key strategy for controlling the current epidemic of obesity. Most approaches have focused on changing the behavior of individuals on diet and exercise. However, successful approaches to reduce obesity need to take into account the social and cultural contexts in which obesity occur. [31] Primary

preventive efforts are likely to have optimal effects if started in early childhood, and if designed to include parents. Great success in obesity prevention is likely to be achieved by creating supportive environment and promoting the healthy dietary, habits and physical activities^[32,33]

The objective of this study was to assess the relation between obesity and different domains of quality of life in children

Subject, materials and methods

Subjects:

Study design:

It is an observational study with cross sectional design.

Participants:

The study was carried out on 182 children from both genders aged from eleven to fourteen years selected from public governmental schools at El-Mansoura City over the period from September 2018 till January 2019. The children were assigned into study group (n= 102); girls (n=54) and boys (n=48) control group (n=80) ; girls (n=38) and boys (n=42). Only obese children of nutritional cause of obesity were included in this study, while obese children due to other causes such as genetic syndromes, endocrinal diseases and hormonal disorders were excluded. Also those who have any psychiatric

disorders, self-reported history of a neurological disorder, past or current diagnosis of developmental disability, mental retardation, learning disorder, attention deficit hyperactivity disorder, cardiovascular or chest pulmonary diseases, metabolic disorders (hypertension or diabetes mellitus), visual and auditory impairments were excluded.

Informed consent was taken from all selected participants' parents and they received comprehensive information regarding the nature of questionnaire, objective and the expected benefit of the study.

Measurement procedures:

Anthropometric measurements: weight (kg) and height (cm) were measured with the child barefoot and wearing light clothing using the Standard Weight and height measuring scale. The height was recorded to the last completed 0.1 cm and the weight was recorded to the nearest 100 grams. Body mass index (BMI) of each child was calculated as: $BMI = \text{Weight (kg)} / \text{Height (m)}^2$; then it was determined according to age and gender specific charts (Centers for Disease Control and Prevention growth charts) (CDC growth charts).

All domains of health related quality of life (physical, emotional, social, school functioning, psychosocial and total scores) were assessed using the Arabic version of child self-report Pediatric Quality of Life Inventory Generic Core Scale version 4.0 (PedsQL™).

The PedsQL includes 23-items consisting of physical, emotional, social and school functioning domains, items are reversed scored and linearly transformed to a 0–100 scale, so that higher scores indicate better HRQoL. To reverse score, transform the 0—scale items to 0–100 as follows: 0 =100, 1= 75, 2 = 50, 3 =25, and 4 = 0.

Data analysis:

Collected data were recorded then tabulated and analyzed statistically by SPSS (Statistical Package for the Social Sciences) version 22.

Results

In this study, 102 obese children and 80 normal weight children were assigned into two groups.

Study Group (Group A):

102 obese children were included in this group. The data in table (1) presented their mean age (12.67±1.09) years, mean weight (84.98±11.83) kilograms (Kg), mean height (157.4±6.97) centimeters (cm), and mean BMI (34.16±2.86) Kg/m².

Control Group (Group B):

80 normal weight children were included in this group. The data in table (1) presented their mean age (12.63±1.1) years, mean weight (55.6±6.44) kilograms (Kg), mean height (159.2±9.69) centimeters (cm), and mean BMI (21.93±1.48) Kg/m².

There was no significant difference between both groups in their ages and heights where their t and P-values were (0.23, 0.81) and (1.45, 0.14) respectively, while there was a significant difference between both groups in their weights and BMI where their t and P-values were (19.99, 0.0001), and (34.69, 0.0001) respectively.

Table(1): General characteristics of children in both groups (A&B).

General characteristics	Study Group (Group A)		Control Group (Group B)		Comparison		S
	Mean	±SD	Mean	±SD	t-value	P-value	
Age (yrs)	12.67	±1.09	12.63	±1.1	0.23	0.81	NS
Weight (Kg)	84.98	±11.83	55.6	±6.44	19.99	0.0001	S
Height (cm)	157.4	±6.97	159.2	±9.69	1.45	0.14	NS
BMI (Kg/m ²)	34.16	±2.86	21.93	±1.48	34.69	0.0001	S

*SD: standard deviation, P: probability, S: significance, NS: non-significant.

Concerning the quality of life in comparison between both groups there was significant difference in the Mann-Whitney test in all domains of the PedsQL. The mean and standard deviation of the study group in the physical domain were (41.51±17.32) respectively, while for the control group were (83.15±10.03) respectively and the data presented in table (2) and fig.(1).

The mean and standard deviation of the study group in the emotional domain were (29.55±15.51) respectively, while for the control group were (75.87±15.44) respectively and the data presented in table (2) and fig.(2).

The mean and standard deviation of the study group in the social domain were (26.12±25.05) respectively, while for the control group were

(86.31±14.4) respectively and the data presented in table (2) and fig.(3).

The mean and standard deviation of the study group in the school functioning domain were (35.83±23.31) respectively, while for the control group were (82.43±12.77) respectively and the data presented in table (2) and fig.(4).

The mean and standard deviation of the study group in the psychosocial domain were (30.5±17.89) respectively, while for the control group were (81.53±9.93) respectively and the data presented in table (2) and fig.(5).

The mean and standard deviation of the study group in the total score were (34.42±16.47) respectively, while for the control group were (81.88±7.59) respectively and the data presented in table (2) and fig.(6).

Table(2): Mean and ±SD , Mann-Whitney test between both groups, Pediatric Quality of Life Inventory (Child Report)- Physical, Emotional , social, School functioning, Psychosocial and total scores.

<u>Pediatric Quality of Life Inventory (Child Report)-</u>	<u>Physical</u>		<u>Emotional</u>		<u>Social</u>		<u>School functioning</u>		<u>Psychosocial</u>		<u>Total score</u>	
	<u>Study Group</u>	<u>Control Group</u>	<u>Study Group</u>	<u>Control Group</u>	<u>Study Group</u>	<u>Control Group</u>	<u>Study Group</u>	<u>Control Group</u>	<u>Study Group</u>	<u>Control Group</u>	<u>Study Group</u>	<u>Control Group</u>
<u>Mean</u>	41.51	83.15	29.55	75.87	26.12	86.31	35.83	82.43	30.5	81.53	34.42	81.88
<u>±SD</u>	±17.32	±10.03	±15.51	±15.44	±25.05	±14.4	±23.31	±12.77	±17.89	±9.93	±16.47	±7.59
<u>S</u>	<u>S</u>		<u>S</u>		<u>S</u>		<u>S</u>		<u>S</u>		<u>S</u>	

*SD: standard deviation, S: significance, S: significant

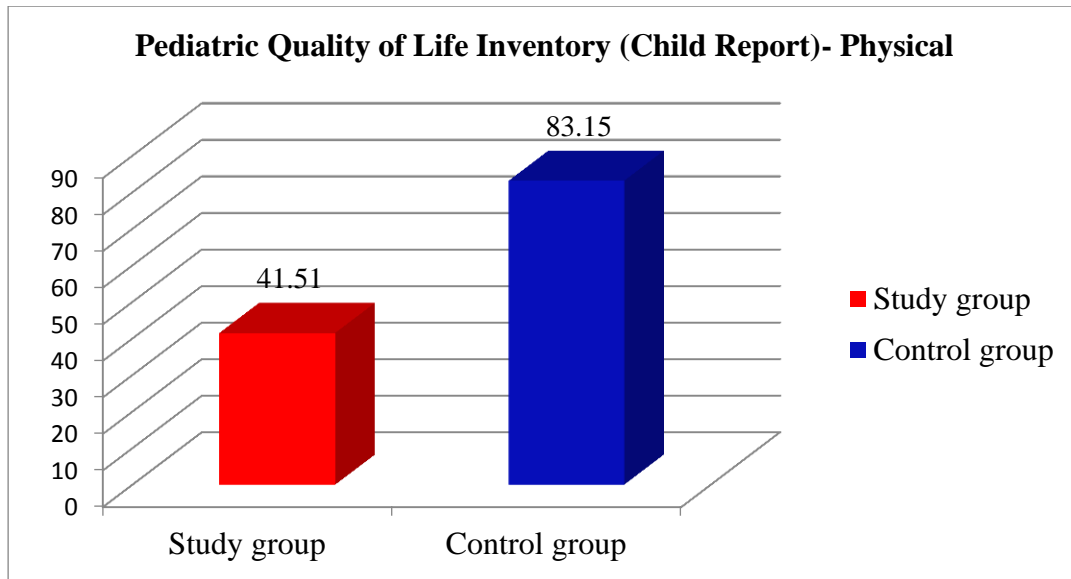


Fig.(1): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- Physical domain for both groups.

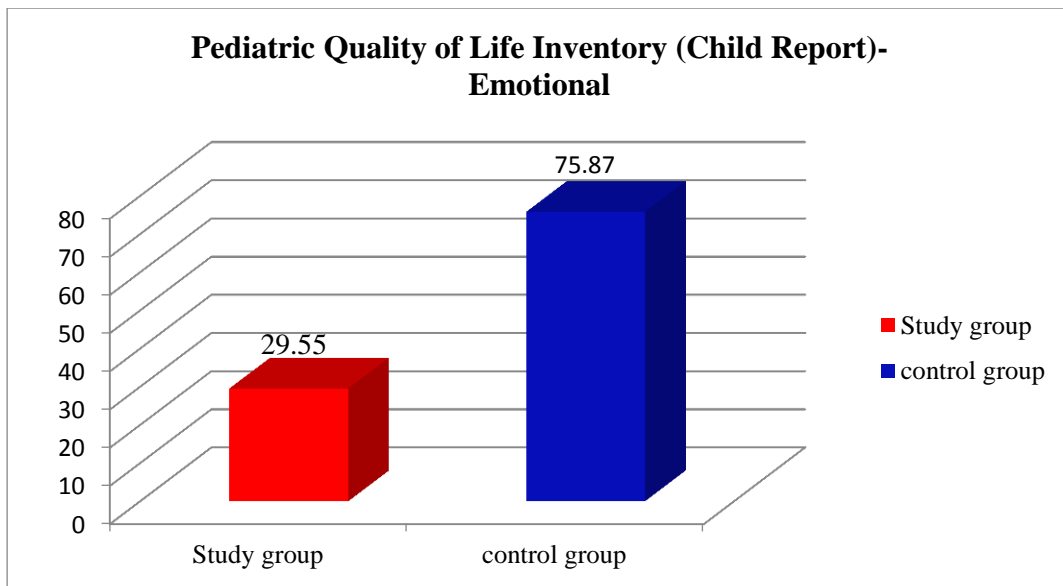


Fig.(2): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- Emotional domain for both groups.

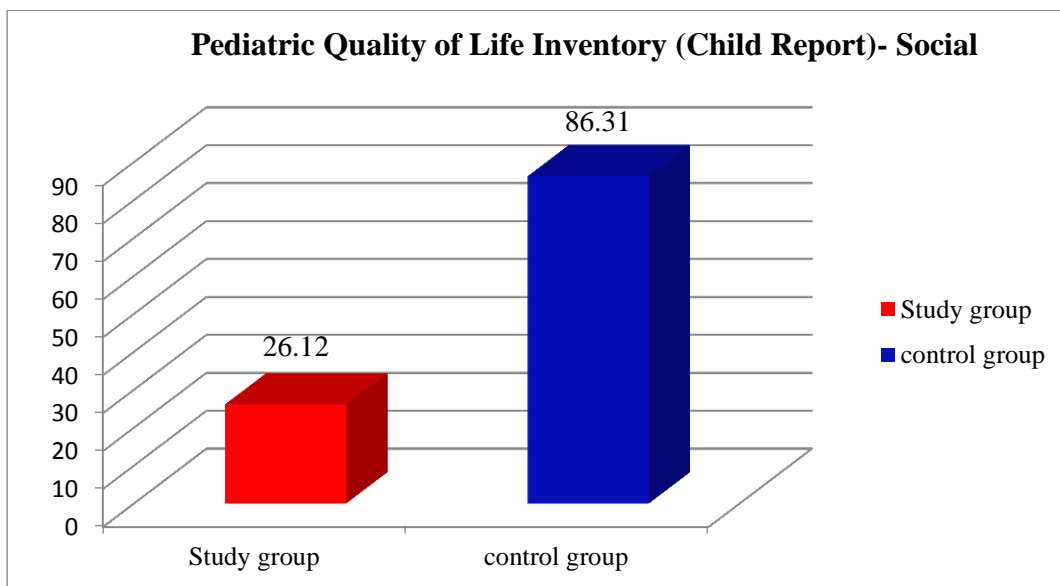


Fig.(3): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- Social domain for both groups.

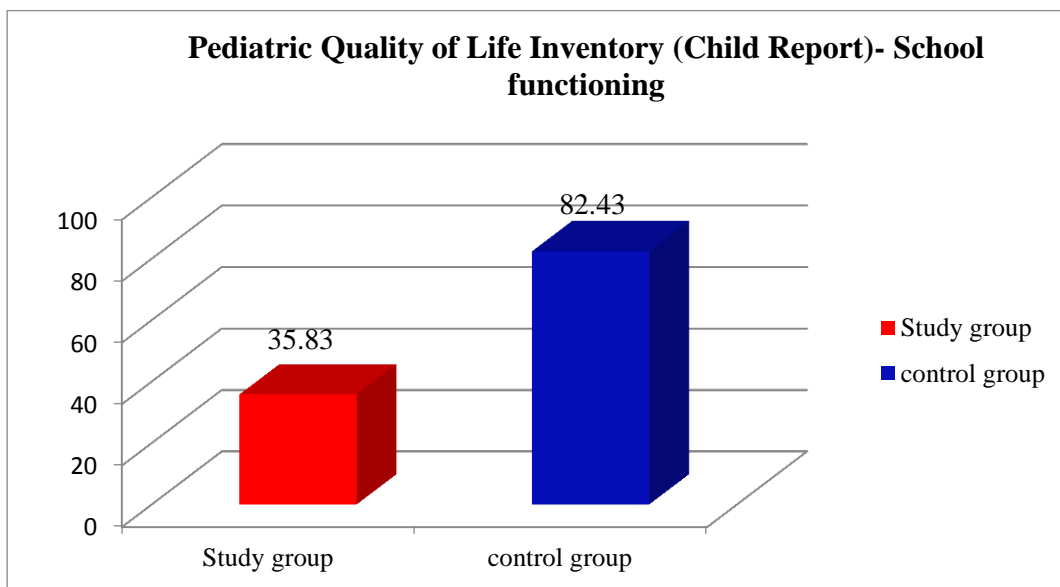


Fig.(4): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- School functioning domain for both groups.

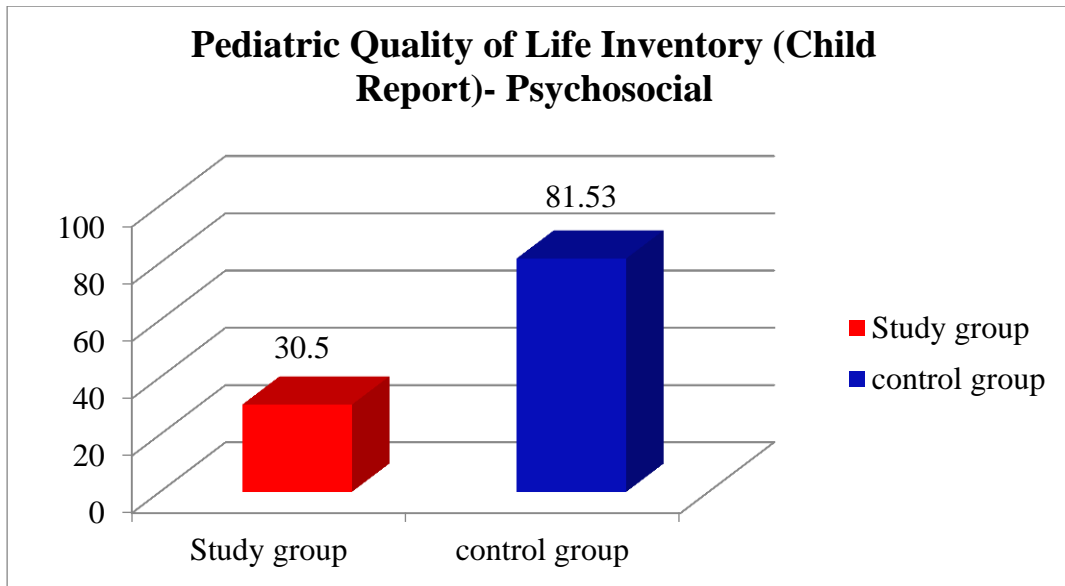


Fig.(5): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- Psychosocial domain for both groups.

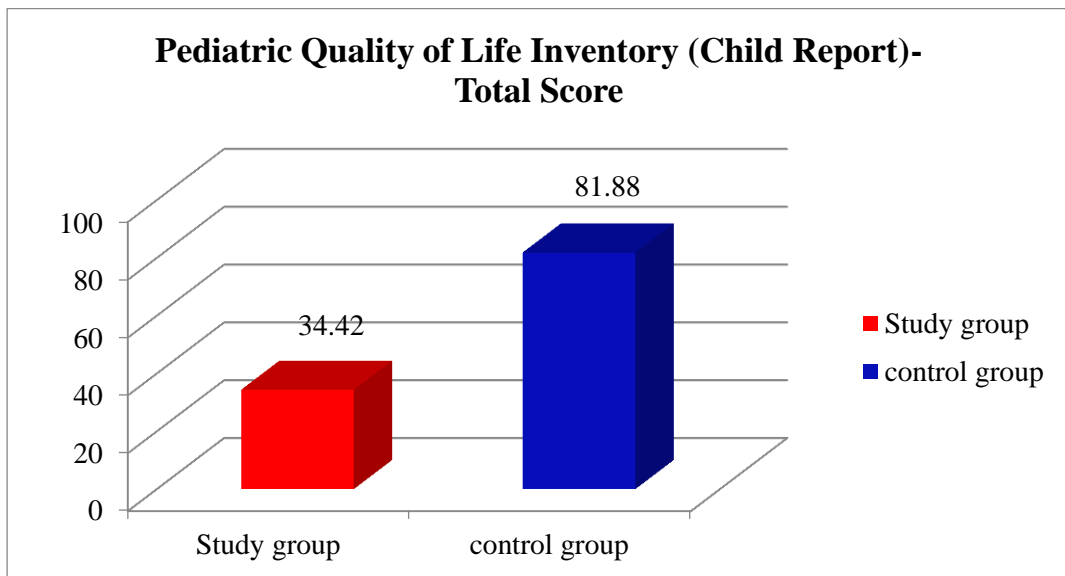


Fig.(6): Shows mean values of Pediatric Quality of Life Inventory (Child Report)- Total score for both groups.

Discussion

Overweight and obesity are a serious public health problem associated with various impairments and medical disorders [34-36]. Although overweight and obesity are not as strongly associated with morbidity in childhood, they are linked to low physical activity, underachievement in school, low self-esteem, social exclusion, and low quality of life [20,37,38,39,40,41]. Further, being obese early in life is a strong predictor of obesity later in life [34,42,43].

Obesity leads to different patterns and magnitudes of impairments in relation to the health related quality of life in overweight and obese children who show considerably reduced health related quality of life with psychosocial, physical and social functioning domains being mostly affected.^[44] Since childhood overweight and obesity can lead to such problems, efforts to examine health related quality of life in overweight and obese children should be recommended.^[45]

In the present study, obese children reported poorer quality of life as regards the physical, emotional, social, school functioning, psychosocial and total scores of quality of life than normal children, which suggests that obesity has a negative impact on the children's daily life. The decreased physical health summary can be explained by restrictions associated with the excess weight for obese children (like difficulty running and doing exercise) also the physical limitations due to excess body weight leads to decrease in caloric expenditure

with the potential consequence of further mismatch in energy balance leading to additional weight gain. Also the decreased psychosocial health summary can be explained as Obesity is one of the most disparaging and least socially adequate conditions in childhood. Obese children are exposed to labeling of obese teasing and bullying from other students. Also, the cultural and society constrains and the enthusiastic promotion of slim body size by the media as a symbol of normality, beauty, prosperity good health and alimentary happiness. These findings are consistent with the study done by **Khairy et al. (2016)**^[46] in Egypt who examined the effect of obesity on quality of life in children aged from 6 to 12 years using also the Pediatric quality of life inventory Generic Core Scale version 4 and stated that obese and overweight groups reported impairment in all HRQoL dimensions in comparison to normal weight group. They suggested that the physical score was decreased because the excess weight may lead to a decrease in their physical functional health status, the emotional score was decreased and they explained that by the impact of obesity on emotional health in children being attributed to cultural and social pressure of the community which consider slim appearance a main beauty landmark and the social score was decreased and explained by that obese children are more likely to feel that they are socially rejected because of their increased weight.

The present findings are also in agreement with the study done by

Riazi et al. (2010)^[30] in the United Kingdom, who stated that obese and overweight children aged from 5 to 16 years reported impairment in all HRQoL domains when compared with the normal weight group.

Abdel-Aziz et al. (2014)^[47] in their study assessed HRQOL and psychiatric co-morbidities in obese children and adolescents aged from 7 to 16.5 years and their relationship to body mass index (BMI) in Egypt and found that the children and adolescents reported significant impairment not only in total scale score, but also in all domains : physical, psychosocial, emotional, social, and school functioning in comparison to normal weight children and adolescents. Also found that obese children suffering from feelings of anxiety and depression, exhibiting aggressive or immature behavior, having role limitations in their schoolwork and social activities and having low self-esteem as reported by their parents.

In a study by **Fiveash et al. (2003)**^[48] found that obese children had Lower scores in social functioning compared to underweight, normal weight and overweight groups . In another study by **Pinhas-Hamiel et al. (2006)**^[50] demonstrated that obese children significantly had poorer quality of life related to physical functioning and social domains compared to normal weight children and these results are also consistent with our results.

Farajpour et al. (2018)^[51] in their study assessed the relationship between BMI and quality of life in elementary school children aged from 8 to 12 years in Tehran, Iran and found that the physical , social and

total scores of HRQOL were significantly lower for obese children in comparison with normal weight children .The authors suggested that poorer HRQOL scores in obese children could be a cause of negative effects of obesity outcomes. Also, higher BMI can predict higher levels of disordered eating attitudes and behaviors, which lead to lower levels of HRQOL (**Mitchell et al., 2016**)^[57].

Hovsepian et al. (2017)^[53]; in their study, found that the emotional and school functioning domains had a negative association with obesity, **Hughes et al. (2007)**^[23] in the United Kingdom found that the physical health was significantly impaired in obese children aged 8–12 years. Also, **Wille et al. (2010)**^[44] in Germany stated that overweight and obese children reported impaired emotional well-being.

Wallander et al. (2013)^[29], in USA found that obese children had significantly impaired social functioning compared with normal weight children. Also, **Chang and wang et al. (2013)**^[54], in Hong Kong found that normal weight children had significantly higher scores in school functioning than overweight and obese children and the difference was statistically significant.

In contrast the present results are not consistent with **Hovsepian et al. (2017)**^[53] study, who found that there was no significant difference in physical and social domains between weight groups. Also inconsistent with **Farajpour et al. (2018)**^[51] who found that in emotional and school functioning, these relations weren't significant and emotional and

school functioning dimension seem unaffected. The lack of differences in emotional subscale scores across weight categories is consistent with **khodaverdi et al. (2011)**^[55]. The authors suggested that obese children despite physical and social difficulties, keep up their emotional health and endeavors for understanding the nature and determinants of constancy to create preventive interventions to advance HRQOL of them (**Rapp-Paglicci et al., 2004**)^[56].

Also, the present findings is not in agreement with **Kunkel et al. (2008)**^[45] in Brazil who found that the normal, overweight and obese groups have good emotional score with non-significant statistical differences among the two groups.

Our findings are also not consistent with those in the study done by **Williams et al. (2005)**^[58] in Australia, who found that both normal and overweight groups have very good school functioning score with non-significant statistical differences among the two groups.

Araujo et al. (2017)^[59] using a generic instrument (Autoquestionnaire Qualite de Vie Infant Image (AUQUEI) for QoL evaluation, observed no significant difference in QoL scores between children with different body weights, in all domains evaluated (independence, leisure, function and family). This finding corroborates previous studies which did not observe significant variation in QoL scores using the instrument KINDL between different categories of BMI in a population study conducted in American children and adolescents

(**Ariff et al., 2006**)^[60]. The study of **Bass and Beresin. (2009)**^[61] also found no significant impact on the QoL scores of referred Brazilian children with obesity, using the AUQUEI questionnaire.

Friedlander et al. (2003)^[62] reported that higher BMI scores were associated with lower Psychosocial Health Summary scores, but not Physical Health Summary scores. The authors suggested that obesity in children is more closely associated with perceived limitations in psychological health rather than in physical health.

In conclusion, even in the absence of co-morbid disease, obese children and adolescents reported impaired HRQOL. It is critical for physicians, parents, and teachers to be aware of the risk for impaired QOL in these children and adolescents. We propose that studies of targeted interventions to treat obesity in children and adolescents should include an assessment of HRQOL before, during, and after the intervention. Such clinical trials would provide the opportunity to evaluate the comprehensive effects of an intervention, not just on weight status, but also on the HRQOL of those children and adolescents.

Our study had some limitations. Since the study was cross-sectional, we cannot make causal inferences about relationships between excess weight and HRQOL. For example, we cannot rule out the possibility that HRQOL might induce changes in lifestyles, which in turn lead to weight gain. The generic HRQOL instruments used to study the excess body weight may be less sensitive than condition-

specific instruments. Obesity specific instruments may capture specific experiences perceived by obese individuals, such as social discomfort when swimming in public or shopping for clothes. Also, the data available for this study did not include some variables that may be important determinants of the association of body weight and HRQOL, such as binge eating disorder (BED) and the duration of excess weight

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