

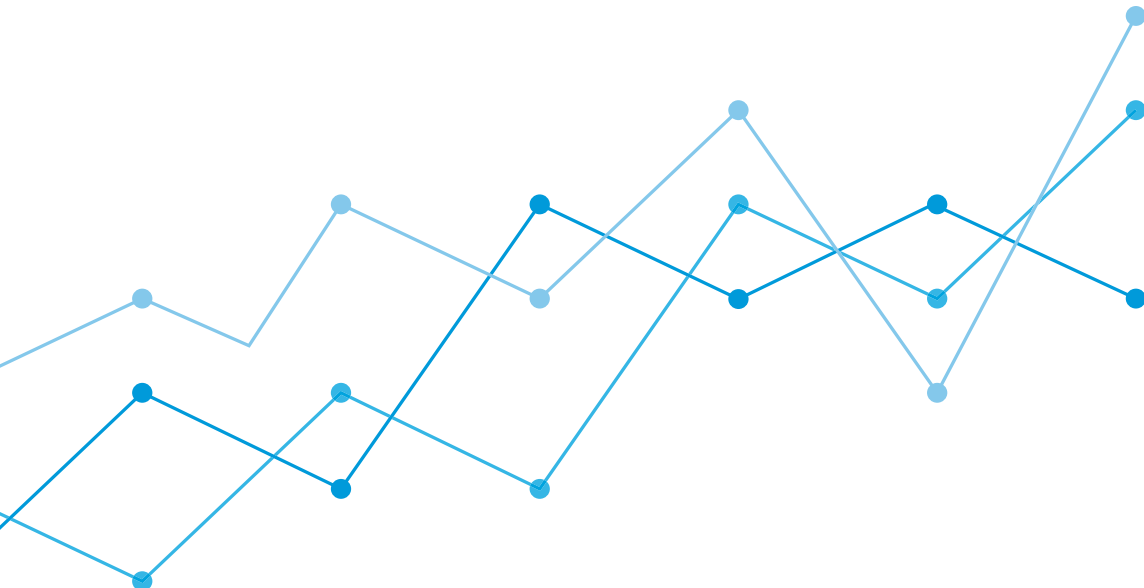


MINISTRY OF PUBLIC HEALTH

# GROWTH MONITORING CHARTS

## PROGRAM: STUDENTS AGES 5-19 YEARS

(ACADEMIC YEAR 2015-2016)





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## Introduction

There is evidence that the prevalence of overweight and obesity has increased over the years among children and adolescents in Gulf countries [1]. The increase in obesity prevalence among children and adolescents in the region could be associated with a number of factors including sedentary lifestyle, urbanization, changed family diet patterns and family history. Furthermore, lack of physical activity, and awareness about different types of food and its availability, and the perception among parents that the increased body weight is a sign of high social class, beauty, and prosperity could be contributing factors in the development of obesity [2]. Limited access to sports facilities and the weather conditions in the region may also adversely impact on the obesity prevalence [2]. Overweight and obesity prevalence is high among adults living in the State of Qatar and examining this prevalence among youth is essential in adopting comprehensive public health approaches [3, 4].

The Ministry of Public Health (MoPH) growth monitoring program aims at gathering accurate information about overweight and obesity among the younger population. The study makes use of the WHO new growth monitoring charts and is part of the Qatar national nutrition and physical activity action plan (2011-2016), the latter aims at reducing the burden of obesity and related chronic diseases such as cardiovascular disease, diabetes and high blood pressure in the state of Qatar among both citizens and residents.

The new growth charts program for school students includes taking accurate measurements of weight and height and calculating body mass index (BMI) to assess child health and allow for an early diagnosis of malnutrition, underweight, overweight, and obesity. The program was initiated as a pilot project during the school year 2014-2015 and was limited to independent schools. During the school year 2015-2016, private schools were also included. Training workshops for school nurses on how to carry out measurement and use the new growth charts were conducted in collaboration with the World Health Organization (WHO).

## Objectives

The objectives of this ongoing project are:

- Developing a database and surveillance system on weight and height distribution in schools.
- Early detection and diagnosis of overweight, obesity and underweight status among youth.
- Monitoring and evaluation on the effectiveness and cost-effectiveness of various programs aiming at addressing malnutrition.
- Reducing the burden of obesity and related non-communicable diseases.
- Encouraging students to take up healthy diet and to engage in physical activities.

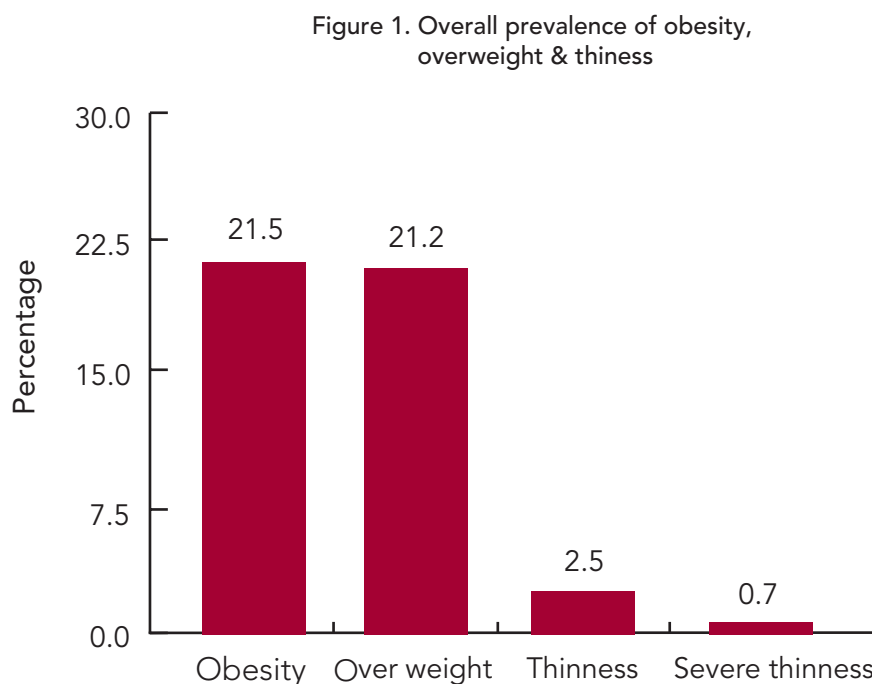
## Methods

This program is an expansion of a previously existing program applied in all primary care clinics in Qatar and initiated in 2010. The growth charts were recorded for the children under 5 years of age who sought care at the Primary Health Care Centers (PHCC) and Hamad Medical Corporation (HMC) clinics. In 2014-2015, a pilot program was implemented among independent school districts. In order to ensure the quality of the data collected, "Training of Trainers" workshops were held in 2013. The staff (physicians, health educators, nurses) from HMC, PHCC and MoPH were trained to develop the required skills as per WHO recommendations [5]. The program further included private schools during the school year 2015-2016. Data collected in the latter project are summarized in the present report.

The project included 164,963 students from 296 private and government schools aged 5-19 years in the State of Qatar, during school year 2015-2016. In 2016, Qatar's total population was around 2.4 million with approximately 308,700 individuals in the age group 5-19 years. School nurses trained through several workshops on the WHO method for collecting anthropometric measurements [5] examined 168,011 students. For the purpose of this analysis, 879 students were excluded because their age was out of the range. Additional 2169 students were excluded due to out of the range BMI; hence, 164,963 students were eligible for the study after removing the outliers i.e. missing age, partially or fully missing data to calculate BMI and data recording errors. Body height was measured in centimeters to one decimal place. Similarly, the body weight was measured in kilogram to one decimal place. The BMI was computed as weight in kilograms divided by the square of height in meters ( $\text{kg}/\text{m}^2$ ). For each student, the BMI ( $\text{kg}/\text{m}^2$ ) measurement was transformed into age and sex-specific BMI-z-score as per the WHO procedures. The BMI-z-score was categorized into severe thinness (BMI-z-score  $< -3$ ), thinness (BMI-z-score  $\geq -3$  to  $< -2$ ), normal (BMI-z-score  $\geq -2$  to  $< 1$ ), overweight (BMI-z-score  $\geq +1$  to  $< +2$ ) and obese (BMI-z-score  $\geq +2$ ). Furthermore, BMI-z-score was classified into two categories "not-overweight or obese" and "overweight or obese" using the BMI-z-score cut-off value of one. If z-scores for weight for age were below -6 or above +5, BMI-z-scores were below -5 or above +5 the values were excluded from the analysis considering them as outliers or values derived from recording errors [5].

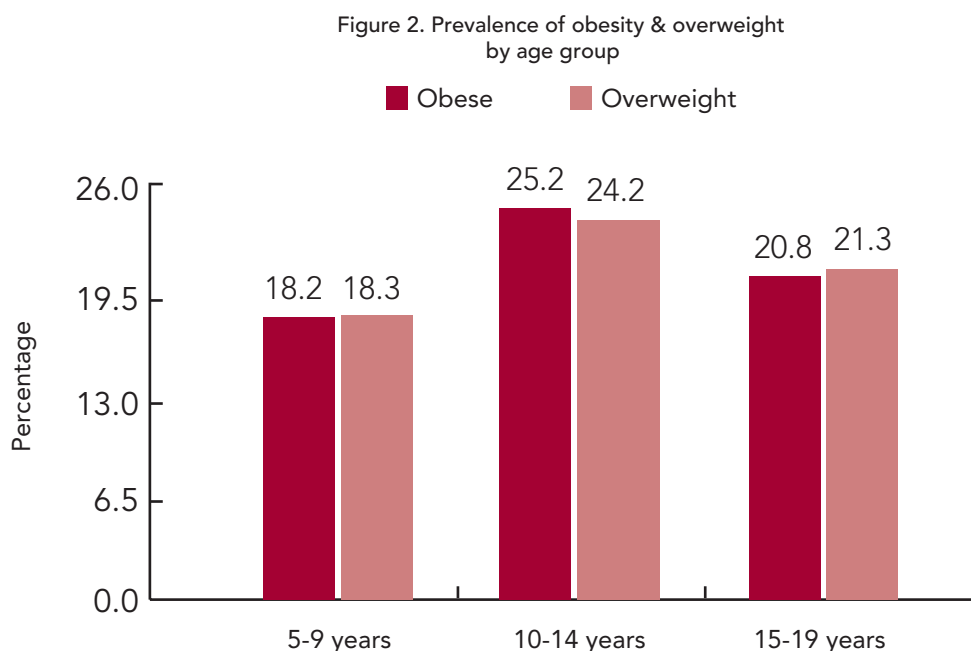
## Results

Forty-three percent of the total eligible students (N=164,963) were overweight and obese with almost equal proportion of overweight (21.2%) and obesity (21.5%) prevalence (Figure 1).

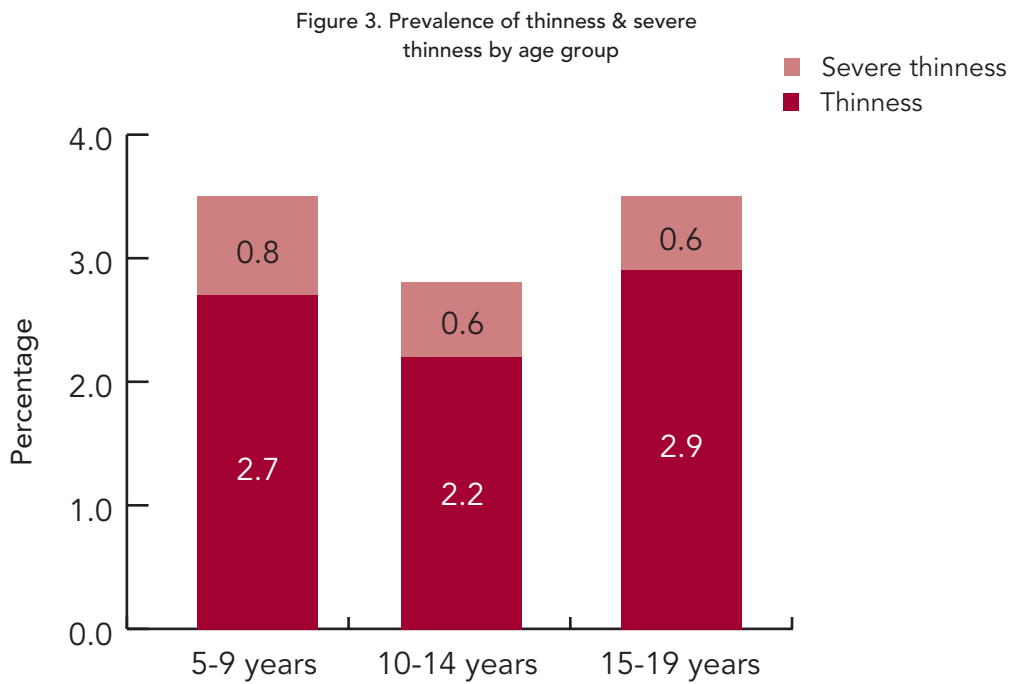


Combined overweight and obesity prevalence was 44.8% and 40.4% among males and females and 45.6% and 40.9% among Qatari and non-Qatari students respectively. The highest prevalence of overweight and obesity was found among Qatari males (47.3%) followed by Qatari females (44%), non-Qatari males (43.5%) and non-Qatari females (38.3%).

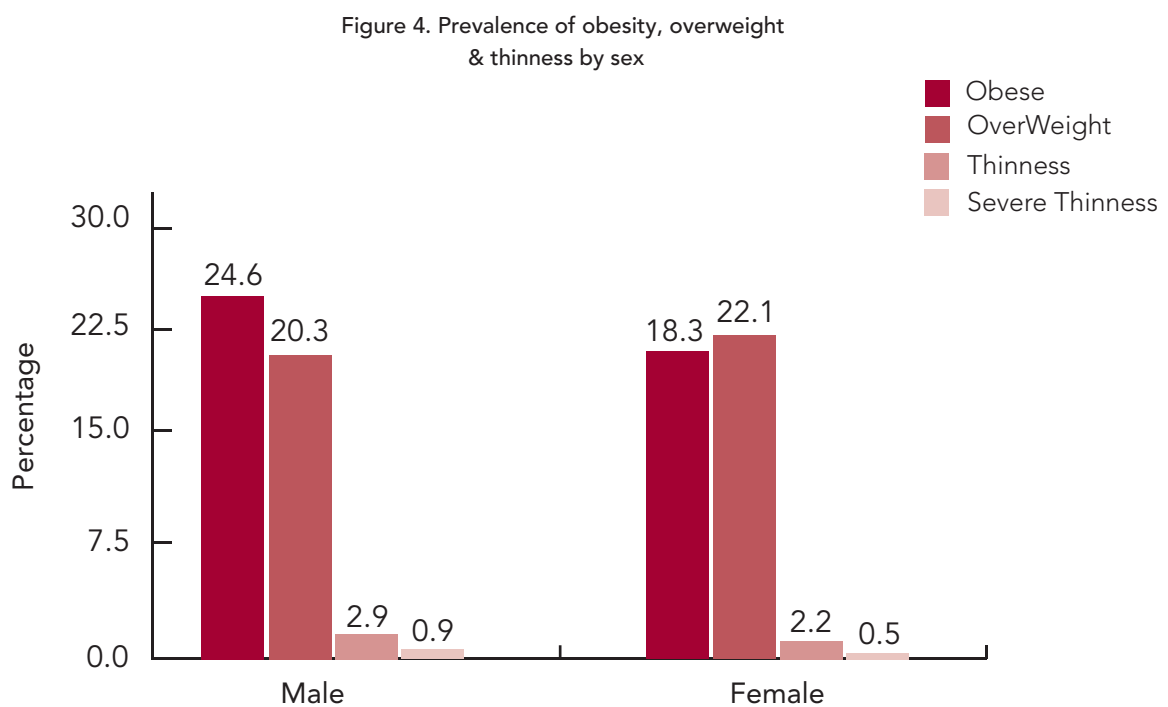
By age groups, a higher prevalence of overweight and obesity was seen among 10-14 year-old students (Figure 2).



A slightly higher prevalence of thinness was seen among 15-19 year-old students (Figure 3). The prevalence of thinness and severe thinness was low among all age groups as well as in overall sample (Figure 3& 4).



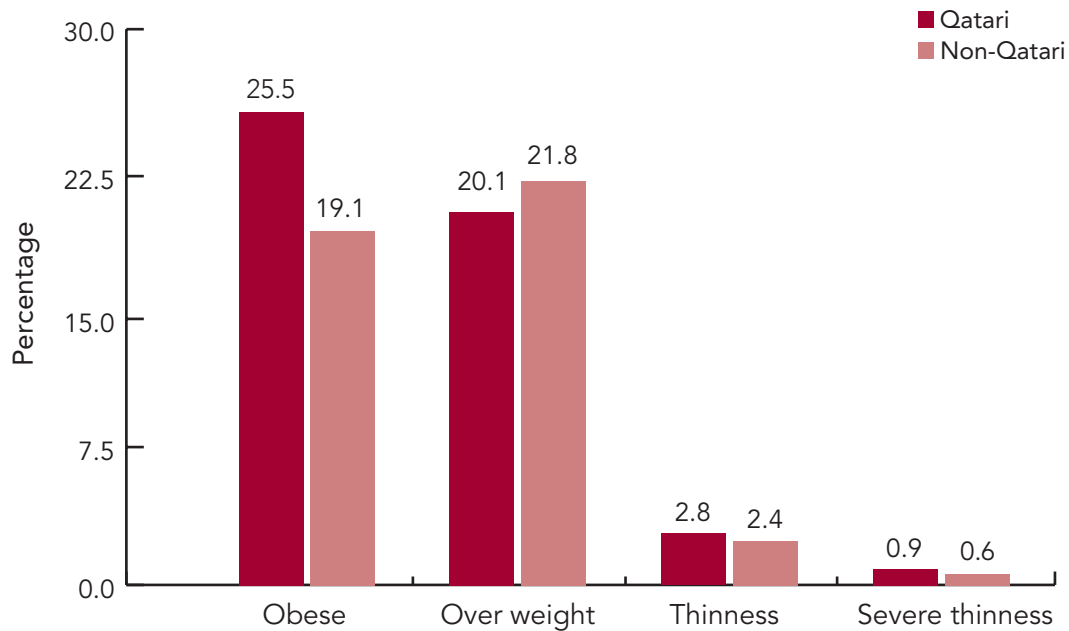
Considering the distribution by gender, the highest prevalence of obesity was found among male students while the highest prevalence of overweight was seen among females (Figure 4).





When considering nationality, a higher proportion of Qataris had obesity compared to non-Qatari while non-Qataris had a relatively higher prevalence of overweight (Figure 5).

Figure 5. Prevalence of obesity, overweight & thinness by nationality



When comparing figures by gender in the Qatari group, a higher prevalence of obesity was found among male Qataris and non-Qataris students. Furthermore, a higher proportion of females had overweight for both nationalities (Figures 6 & 7).

Figure 6. Prevalence of obesity, overweight & thinness among Qatari subjects by sex

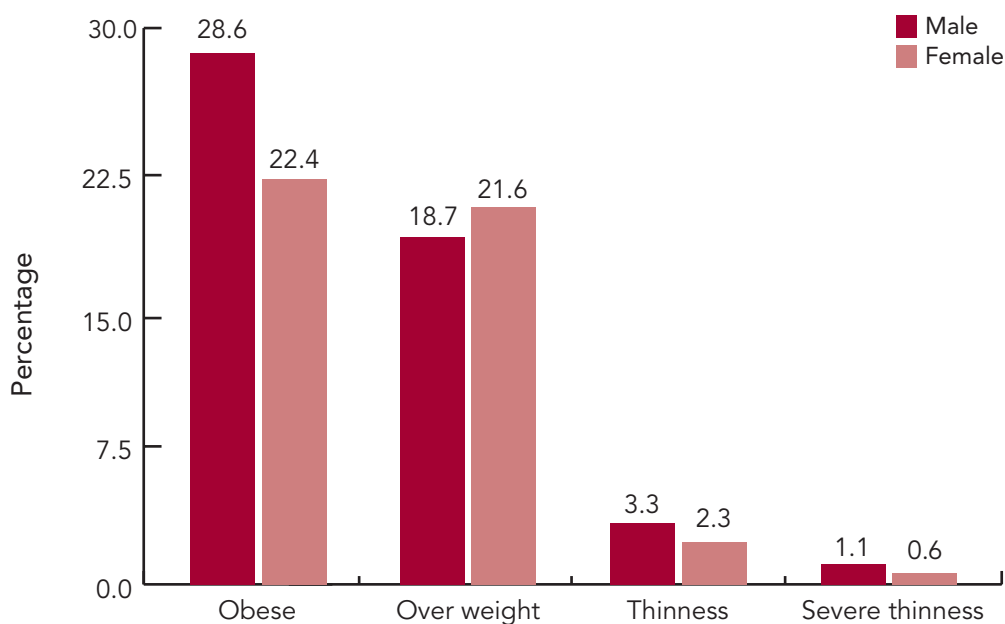


Figure 7. Prevalence of obesity, overweight & thinness among Non-Qatari subjects by sex

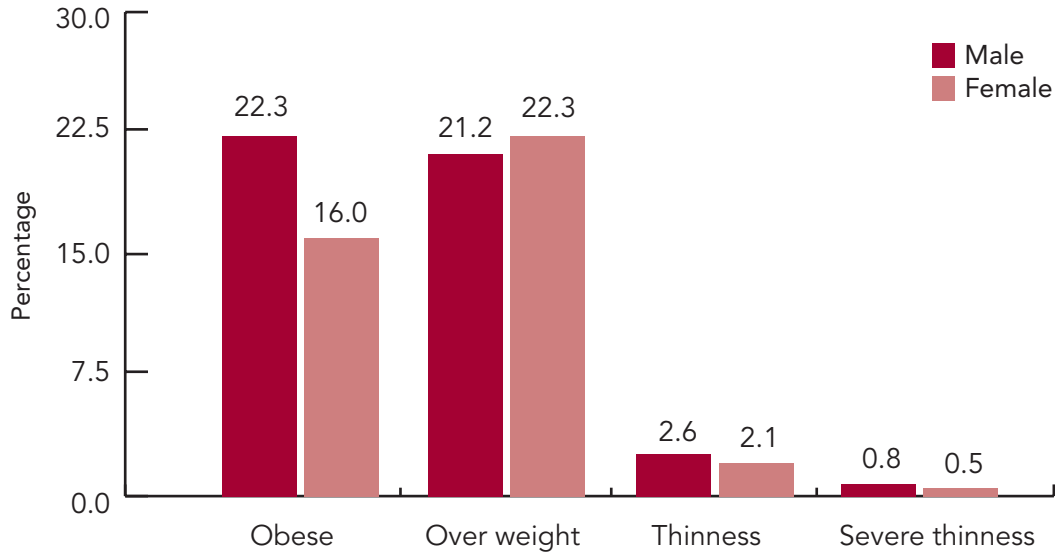


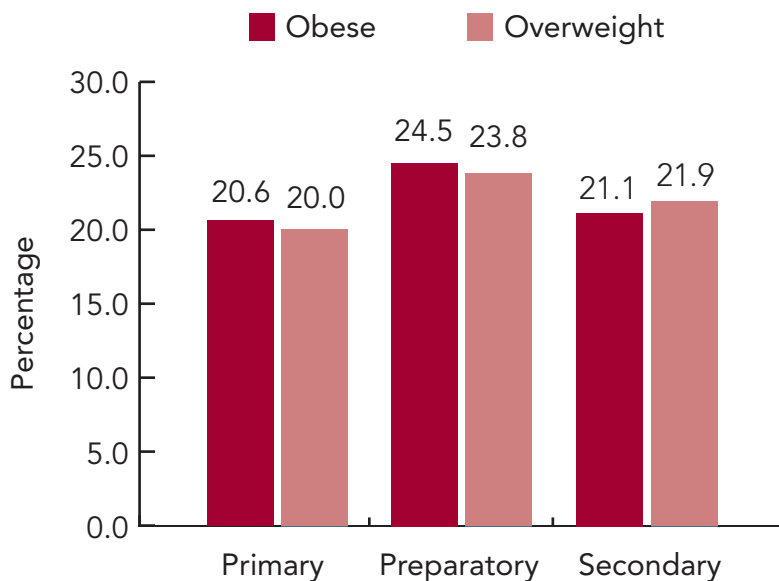
Table 1 summarizes the whole data set by age group, gender and nationality of the students.

### **Municipalities and School Types.**

Table 2 shows the characteristics of the sample by the school types and levels. Furthermore, the prevalence of overweight, obesity, and other levels of body weight are provided.

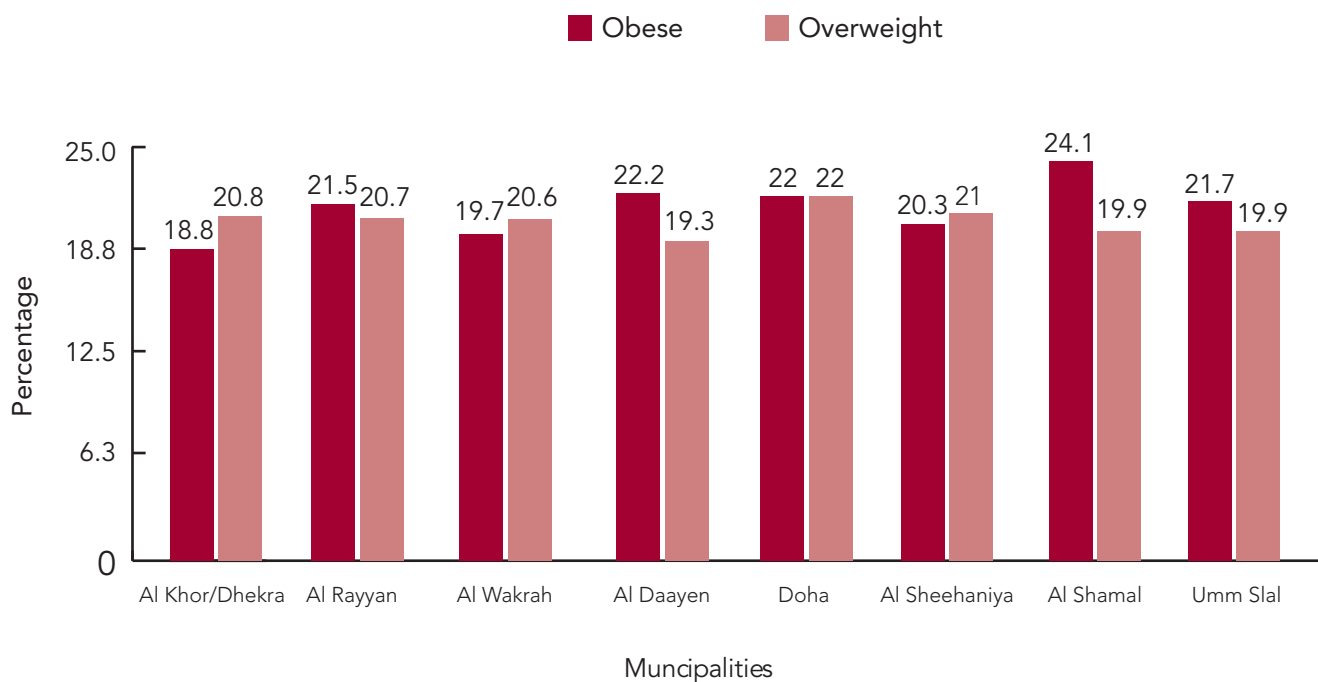
A higher prevalence of overweight and obesity was found among the students in preparatory school levels (Figure 8 & Table 2).

Figure 8. Prevalence of obesity & overweight by school levels



By regions, a higher prevalence of obesity was seen among the students who were attending schools in Al Raya'an, Al Daayen, Al Shamal and Umm Slal municipalities. In the Doha municipality, an equal prevalence of overweight and obesity was identified i.e. 22% (Figure 9 & Table 2).

Figure 9. Prevalence of overweight & obesity by municipalities



## Discussion & Conclusions

The results show a high prevalence of overweight and obesity among students in the State of Qatar. We found that the overall overweight and obesity prevalence among 5-19 years old students was 42.7% which is greater than the global prevalence of overweight and obesity (18%) reported by WHO in 2016 [6]. The results are somewhat similar to the Kuwaiti population-based survey results where overall prevalence of overweight and obesity was 19.8% and 26.2%, respectively [7]. Looking at the obesity alone, the prevalence among boys and girls in Qatar is higher than the overall North Africa/Middle East regional estimates of 2013 i.e. 8.4% for boys and 10.2 for girls (under 20 years of age) respectively [8]. Increased BMI, related factors, and difference of overweight and obesity prevalence by gender has been described in the previously published studies in the region [9-14]. Globally, WHO reports that the number of overweight or obese infants and young children (aged 0 to 5 years) increased from 32 million in 1990 to 42 million in 2013 [8]. The same report from WHO shows that the prevalence of overweight and obesity in developed countries has increased since 1980 from 16.9% in boys and 16.2% in girls to 23.8% in boys and 22.6% in girls in 2013 respectively [8]. Moreover, the developing countries have also observed the rising trend in overweight and obesity from 8.1% in 1980 to 12.9% in 2013 for boys and 8.4% to 13.4% in girls [8]. Obesity and other health behaviors during childhood and adolescence time period could lead to adulthood obesity; hence could lead to increased chronic disease-related morbidity and mortality. Present results for the State of Qatar are a reason of concern and a priority for public health policy in the country. Different types of surveillance approaches including the one described in this report can play an important role in improving or maintaining population health [15].

## Tables

Table 1. Distribution of BMI indicators by gender, age and nationality

Table 1. Distribution of BMI indicators by gender, age and nationality						
	Total Sample	Obese	Overweight	Normal	Thinness	Severe thinness
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Overall</b>	164,963	35,402 (21.46)	34,919 (21.16)	89,293 (54.13)	4,169 (2.53)	1,180 (0.71)
Age Groups (Years)						
<b>5 - 9</b>	70,690 (42.85)	12,854 (18.18)	12,918 (18.27)	42,453 (60.06)	1,897 (2.68)	568 (0.80)
<b>10 - 14</b>	67,017 (40.62)	16,894 (25.21)	16,202 (24.18)	32,004 (47.76)	1,483 (2.21)	434 (0.65)
<b>15 - 19</b>	27,245 (16.51)	5,652 (20.75)	5,797 (21.28)	14,829 (54.43)	789 (2.90)	178 (0.65)
Sex						
<b>Male</b>	82,971 (50.29)	20,385 (24.57)	16,826 (20.28)	42,631 (51.38)	2,375 (2.86)	754 (0.91)
<b>Female</b>	81,992 (49.70)	15,017 (18.32)	18,093 (22.07)	46,662 (56.91)	1,794 (2.19)	426 (0.52)
Nationality						
<b>Qatari</b>	60,016 (36.38)	15,308 (25.51)	12,086 (20.14)	30,394 (50.64)	1,691 (2.82)	537 (0.89)
<b>Non-Qatari</b>	104,403 (63.29)	19,987 (19.14)	22,724 (21.77)	58,589 (56.12)	2,463 (2.36)	640 (0.61)
Qatari						
<b>Male</b>	30,171 (50.27)	8,628 (28.60)	5,635 (18.68)	14,558 (48.25)	1,007 (3.34)	343 (1.14)
<b>Female</b>	29,845 (49.73)	6,680 (22.38)	6,451 (21.62)	15,836 (53.06)	684 (2.29)	194 (0.65)
Non-Qatari						
<b>Male</b>	52,616 (50.40)	11,714 (22.26)	11,154 (21.20)	27,974 (53.17)	1,365 (2.59)	409 (0.78)
<b>Female</b>	51,787 (49.60)	8,273 (15.97)	11,570 (22.34)	30,615 (59.12)	1,098 (2.12)	231 (0.45)
Numbers may not add up to provide 100% due to the missing data for some variables						

**Table 2. Obesity classifications based on the Level of Education, Municipality & Type of Schools**

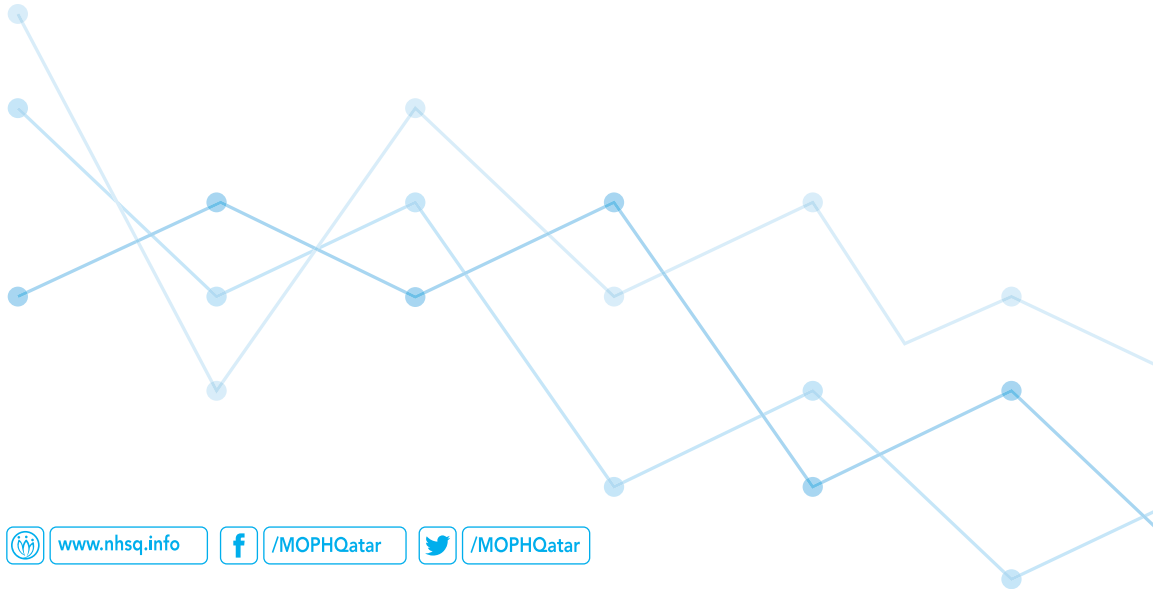
BMI levels	Obese	Overweight	Normal	Thinness	Severe thinness
	N (%)	N (%)	N (%)	N (%)	N (%)
<b>Level of Education</b>					
Primary	20,241 (20.57)	19,705 (20.02)	55,146 (56.04)	2,529 (2.57)	778 (0.79)
Preparatory	9,076 (24.55)	8,798 (23.79)	17,977 (48.62)	873 (2.36)	246 (0.66)
Secondary	5,515 (21.14)	5,704 (21.86)	14,038 (53.81)	687 (2.63)	144 (0.55)
<b>Municipality</b>					
Al Khor/ Dhekra	1,340 (18.76)	1,488 (20.83)	4,051 (56.70)	211 (2.95)	54 (0.75)
Al Rayyan	14,697 (21.45)	14,205 (20.73)	37,272 (54.39)	1,806 (2.63)	538 (0.78)
Al Wakrah	1,970 (19.73)	2,061 (20.64)	5,595 (56.03)	277 (2.77)	83 (0.83)
Al Daayen	1,254 (22.20)	1,093 (19.35)	3,111 (55.08)	153 (2.71)	37 (0.65)
Doha	14,375 (22.03)	14,342 (21.98)	34,644 (53.09)	1,478 (2.26)	404 (0.62)
Al Sheehaniya	888 (20.26)	921 (21.01)	2,428 (55.39)	111 (2.53)	35 (0.79)
Al Shamal	220 (24.04)	182 (19.89)	474 (51.80)	35 (3.82)	4 (0.44)
Umm Slal	638 (21.73)	583 (19.85)	1,596 (54.36)	96 (3.27)	23 (0.78)
<b>School Status</b>					
Government	18,708 (22.50)	17,028 (20.48)	44,016 (52.94)	2,572 (3.09)	816 (0.98)
Private	16,564 (20.34)	17,817 (21.87)	45,112 (55.39)	1,593 (1.95)	361 (0.44)

Numbers may not add up to provide 100% due to the missing data for some variables

## References

1. Badran M, Laher I. Obesity in Arabic-speaking countries. *Journal of obesity*. 2011 Nov 24;2011.
2. Abdul-Rasoul MM. Obesity in children and adolescents in Gulf countries: Facts and solutions. *Av Diabetol* 2012; 28:64-9
3. Al-Thani MH, Al-Thani AA, Al-Chetachi WF, Khalifa SA, Akram H, Poovelil BV, Almalki BA, Bakri AH, Arora P, Badawi A. Dietary and nutritional factors influencing obesity in Qatari adults and the modifying effect of physical activity. *J Obes Weight-Loss Medic*. 2015 Sep 10;1(007).
4. Al-Thani M, Al-Thani AA, Al-Chetachi W, Khalifa SE, Vinodson B, Al-Malki B, Bakri AH, Akram H. Situation of Diabetes and Related Factors Among Qatari Adults: Findings From a Community-Based Survey. *JMIR Diabetes*. 2017;2(1):e7.
5. Onis M. WHO Child Growth Standards based on length/height, weight and age. *Actapaediatrica*. 2006 Apr 1; 95(S450):76-85.
6. World Health Organization, Global Health Observatory (GHO) Data, Overweight and obesity, [http://www.who.int/gho/ncd/risk\\_factors/overweight\\_obesity/obesity\\_adolescents/en/](http://www.who.int/gho/ncd/risk_factors/overweight_obesity/obesity_adolescents/en/)
7. State of Kuwait, Ministry of Health. The Kuwait Nutrition Surveillance System, <https://www.moh.gov.kw/en/Ministry-Statistics>
8. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, Mullany EC et.al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2014 Aug 30; 384(9945):766-81. doi: 10.1016/S0140-6736(14)60460-8. Epub 2014 May 29
9. Mamtani R, Lowenfels AB, Sheikh J, Cheema S, Al-Hamaq A, Matthis SA, El-Nahas KG, Maisonneuve P. Adolescent prediabetes in a high-risk Middle East country: a cross-sectional study. *JRSM open*. 2014 Jul 8;5(8):2054270414536550.
10. Alkhateib M, Elzoghbi M, Saleh M, Qotba H. Influence of Sedentary Lifestyle on Body Weight in Qatari School Children. *J Saudi Soc for Food and Nutrition*. 2012 (1,2).
11. Rizk NM, Yousef M. Association of lipid profile and waist circumference as cardiovascular risk factors for overweight and obesity among school children in Qatar. *Diabetes, metabolic syndrome and obesity: targets and therapy*. 2012;5:425..
12. Al-Dossary S, Sarkis PE, Hassan A, El Regal ME, Fouda AE. Obesity in Saudi children: a dangerous reality/Obésité chez les enfantssaoudiens :uneréalitédangereuse. *Eastern Mediterranean Health Journal* 2010 09;16(9):1003-1008.
13. Al-Thani M, Al-Thani A, Al-Chetachi W, Akram H. Obesity and related factors among children and adolescents in Qatar. *Int J Basic Sci Med*. 2017;2(4):161- 165. doi:10.15171/ijbms.2017.30.
14. Al-Thani M, Al-Thani AA, Al-Mahdi N, Al-Kareem H, Barakat D, Al-Chetachi W, Tawfik A, Akram H. An Overview of Food Patterns and Diet Quality in Qatar: Findings from the National Household Income Expenditure Survey. *Cureus*. 2017;9(5):e1249. doi:10.7759/cureus.1249
15. Stone K, Horney JA. Methods: Surveillance. In *Disaster Epidemiology 2018* (pp. 11-23). <https://doi.org/10.1016/B978-0-12-809318-4.00002-2>





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