

# The Prevalence of Obesity among Omani Adolescent Girls

Zuwaina AL-Mahrouqi

## ABSTRACT

**Introduction:** Adolescent girls are at a crucial stage of their life that prepares them for motherhood. Obesity during childhood and adolescents is increasing in recent years. The aim of this study was to assess the prevalence and levels of overweight and obesity among adolescent schoolgirls aged 15–18 years in Ibri Wilayat/ town, Oman.

**Materials and Methods:** This study was conducted in two main schools in Ibri Wilayat. Data were collected during the period from January - February 2016 of the academic year 2015-2016. A total of 421 female students were randomly selected from two schools to participate in this study. The participants' age range was 15–18 years of whom 60% were aged between 16–17 years. Their weight and height were measured and BMI was calculated.

**Results:** The majority of the participants (59%) had normal weight, while 14% were obese, 21% were overweight, 7% were underweight. There was also a tendency for the BMI to increase with age.

**Conclusions:** The trend for BMI to rise with age among teenagers suggests the possibility that it may continue in their adulthood. Suggested remedial measures include instituting daily physical activities and nutrition education to Omani schoolchildren and their families. Future research could be conducted to assess the factors that contribute in increasing the obesity rate among teenage girls

**Keywords:** Adolescent Girls, Obesity, Overweight, BMI, Arab, Oman

## INTRODUCTION

Obesity during childhood and adolescents is increasing in recent years. The diets of many have more processed foods with high calories and fat content, which has been proposed to be directly responsible for the rise in obesity.<sup>1</sup> The rising obesity in children could also be attributed to 'modelling,' the way young children learn by imitating their elders. Children are more likely to assimilate parental non-verbal behaviour than their spoken guidance. Thus, societies with high obesity levels tend to have adults with poor eating habits and sedentary behaviour<sup>2,3,4</sup>, which are imbibed by children who model on them.

A cross sectional study conducted in US and enrolled 432 students from eight rural high schools of North Carolina and Kentucky, found prevalence of obesity and overweight at 24% and 21%, respectively.<sup>5</sup> According to the WHO<sup>6</sup>, being overweight during childhood and adolescence is a strong predictor of continuing that trend in adulthood. The likelihood of adolescent obesity (80%) continuing into adulthood has been found to be higher than that of childhood obesity (20%).<sup>7</sup> More alarming than the increase in obesity

in adults is the sharply rising trend among children and adolescents. Among the indicators of rising childhood obesity in the last three decades is the increase in paediatric non-communicable health problems, mainly in Organization for Economic Cooperation and Development (OECD) countries.<sup>8</sup>

Adolescent girls are at a crucial stage of their life that prepares them for motherhood. If they remain physically inactive, consume unhealthy food and become overweight, this could lead to many complications in later life. Later in early adulthood, overweight women carry health risks, which can affect them and their offspring during pregnancy and motherhood. Therefore, efforts to prevent overweight and obesity from childhood itself may help avoid the problem continuing into adulthood.

A retrospective study in the Al Dhahira governorate of Oman<sup>9</sup>, revealed that 58.8% of the mothers who delivered babies in the period from 2000 to 2004 were overweight, which may have contributed to foetal mortality rates, which was 9.1 per 1000 for that period. The need to prevent avoidable infant deaths is another reason why adolescent girls need to be encouraged to maintain their Body Mass Index (BMI) at healthy levels.

It was stated that involving children and adolescents in research gives them the chance to participate in the process<sup>10</sup>, which may improve their community commitments. The present study has taken that role seriously by involving adolescent girls to participate actively in the research, to contribute in improving the general health of this age group and ultimately benefit the health of their peers as well. Adolescent girls are at the crucial stage of their life that prepares them for motherhood. If they become overweight, they run the risk of facing problems and complications during their maternal life, including becoming suboptimal role models for the next generation. Research studies on childhood and adolescent obesity are insufficient; this could be because the nature of the topic (girls' obesity) is a sensitive issue in Omani community. This highlights the importance of selecting this group as the main contributors to this study. To the researcher's knowledge, no study has been conducted to examine the BMI level among teenage girls in the wilayat.

Tutor, Department of Medicine, Oman College of Health Sciences (Al Dhahira Branch), Oman

**Corresponding author:** Dr. Zuwaina AL-Mahrouqi, P.O. Box 45, Post Code 516, Al Akhadar, Sultanate of Oman.

**How to cite this article:** AL-Mahrouqi Z. The prevalence of obesity among omani adolescent girls. International Journal of Contemporary Medical Research 2021;8(3):C10-C13.

**DOI:** <http://dx.doi.org/10.21276/ijcmr.2021.8.3.8>



Therefore, this study aimed to assess the prevalence and levels of overweight and obesity among adolescent girls aged 15–18 years in Ibbi Wilayat, Oman.

## MATERIAL AND METHODS

The current study is a part of large mixed method study that was conducted during the academic year 2015-2016 and in this paper the findings of one objective of the main study were discussed.

This was a quantitative study that was conducted in Ibbi. Al Dhahira Governorate has three Wilayats including Ibbi. There are many governmental schools available in Ibbi Wilayat; however, this study targeted the main females' schools with grades 10-12. Two main schools were selected randomly. School (1) had a total of 413 students in grades 10-12 and School (2) had 266 students. The schools' selection procedure was done online by using the Research Randomizer programme application.<sup>11</sup> A similar randomization procedure was employed to select the participants as well.

The ethical approval was obtained on the 13th October 2015 from Oman, Ministry of Education, and researcher visited the principals and the School Health Nurses of the selected two schools in Ibbi wilayat to discuss the aims and details of the study. Orientation about the aim and objectives of the study, and detailed consent forms and information sheets, were provided to all those were invited to participate.

This study was started from January- February 2016. The inclusion criteria were: the participants should be girls, Omani nationals, aged 15–18 years, enrolled in 10th, 11th or 12th grade in a government-run girls' school in Ibbi. The school should be large enough to have >200 students in grades 10–12 in total. Consequently, this study excluded boys, expatriates, girls younger and older than 15–18 years, those enrolled in grades lower than 10th, and those who, or whose parents had refused to sign the informed consent. Omani personal status law stipulates the age of 18 years for one to be deemed competent enough to make such decisions for oneself.<sup>12</sup> As current participants were not over 18, parental/caregiver consent was sought from all, in addition to their personal consent. The final number participants included in this study were N=442, enrolled in two girls-only schools in Ibbi town.

The anthropometric measurements (body weight and height) were carried out by the researcher using standardized procedures, assisted by the school nurses. Body weight was measured to the nearest 100 grams using an electronic Seca weighing scale, whose attached meter measured the height as well. To minimize measurement errors the participants were asked to remove heavy clothing including headscarves, as well as jewellery, and shoes. The scale was calibrated daily to maintain accuracy, reliability and validity of the measurements.<sup>13</sup> Height was measured to the nearest 0.1 cm with the participant standing straight and looking straight ahead, whereupon the headboard was lowered to the top of her head.

The WHO BMI interpretation was used.<sup>14</sup> According to the WHO<sup>14</sup>, the z-score cut-off point for being overweight is,

>1 standard deviation (equal to BMI 25 kg/m<sup>2</sup>) and that for obesity is >2 standard deviations (equal to BMI 30 kg/m<sup>2</sup>). In an international study, conducted<sup>15</sup> across six countries, (including the UK with a large sample size of 192,727 participants from age 0 to 25 years), BMI z-score charts were used to classify both overweight and obese subjects.

The study data was analysed using 'Statistical Package for The Social Sciences' (SPSS Version 23, IBM). BMI of all participants was calculated and plotted in the WHO z-score chart for girls aged from 5–19 years.<sup>14</sup> According to the BMI WHO z-score chart, the adolescent BMI cut-offs are: normal weight: <1SD, over weight: >1SD, obese: >2SD, and underweight: < -2SD.<sup>14</sup> Frequencies and percentages were calculated using SPSS.

## RESULTS

Initially a total of 442 participants (270 from School-1 and 172 from School-2) were selected. After 21 (5%) invitees withdrew from the study the number of participants who completed the study was 421 (response rate 95%). Table (1) shows the participants from each of the two selected schools: 62% were from School (1) and 38% from School (2). The study was conducted on girls aged 15 to 18 years ( $M = 16.4$  years,  $SD = 1.0$ ). Age range was 4 years (15–18 years) and 60% of the participants were in the 16 and 17 year old group. Lowest number of participants (16%) were from the 18-year-old group. Table (2) indicates the mean anthropometric characteristics of all the participants. The participants were categorized by BMI into four groups: underweight (7%),

School	Number	%
School (1)	259	62
School (2)	162	38
Total	421	100

Table-1: Distribution of Participants by School

Variable	Mean	*SD
Age/ year	16.4	1.0
**BMI (Kg/m <sup>2</sup> )	23.4	6.3
Weight (Kg)	57.8	16.0
***Height (cm)	160	50

\*SD = Standard Deviation, \*\* (BMI = Body Mass Index, Kg = kilogram, m<sup>2</sup> = square meter), \*\*\*cm = centimetre

Table-2: Anthropometric Summary of the 421 Participants

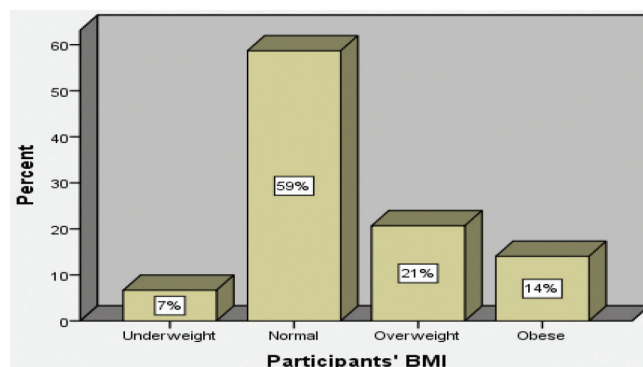


Figure-1: Distribution of BMI of Omani Adolescent Girls

normal weight (59%), overweight (21%) and obese (14%) (Figure 1). It was also noted that the participants' tendency for obesity increased with age.

## DISCUSSION

This study aimed to examine the prevalence of obesity and overweight among its participants. The results show high prevalence of obesity and overweight among 421 Omani teenage girls aged 15–18 years, who were students of two all-girls schools in the town of Ibri in Oman. The mean body weight of the participants was 57.8 kg, and 21% (87) were overweight and 14% (59) were obese. It is useful to compare these data with an earlier study conducted in 2010 on 442 Omani girls aged 15–18 years who were studying in the schools in the highly urbanized Muscat capital region.<sup>16</sup> That study found the average weight of the girls to be 5 kg lower than in the present study, and with much lower prevalence of overweight (12%) and obesity (9.2%).<sup>16</sup> The Muscat girls were also shorter by 1.7 cm (160 cm versus 158.3 cm in the present cohort). This difference may partly be due to differences in cut-off levels for overweight and obesity. The Muscat study researchers used IOTF cut-off value to measure BMI. The present study adopted, the WHO BMI z-score cut-off point.

Another possibility is that the Kilani study<sup>16</sup> was conducted in the highly urbanised Muscat capital region where physical activity in public is common. Muscat has extensive public parks, road-sidewalks suitable for jogging, swimming pools, gyms and popular beaches where public swimming is encouraged. The current study was conducted in the far less urbanized Ibri, and its traditional outlook and conservatism do not encourage female physical activity.

Another explanation of the differences between the findings of the Muscat study and the present one is the five-year time gap between them. The substantial increase in average body weight and obesity in Omani girls during the five-year period from 2010 to 2015 may be reflecting such a general increase in rural teenage obesity during this period. In addition, global rural obesity, which used to be lower, appears to be rising faster than urban obesity in the affluent regions of the world. In addition, five large American studies were reviewed with a total of 74,168 participants aged 2–19 years and reported that rural American children and teenagers were 26% likely to be obese than their urban counterparts.<sup>17</sup> Perhaps in high income countries such as Oman and the US, physical work is mechanized even in rural areas and the traditional physical activity organiser in rural areas, the large walkable distances, has been nullified by car ownership.

A study conducted in the mixed (urban, agricultural-rural and desert-rural) region of Al-Ahsa in Saudi Arabia on 15–19-year-olds (607 girls, N= 1,270) found that both girls and boys residing in desert-rural areas were less physically active and prone to obesity than their peers in A-Ahsa's urban and agricultural-rural regions.<sup>18</sup> Both Al-Ahsa's desert-rural environment and the Ibri region are similarly dry, and largely rural. Thus, everything else being equal, a rural desert climate might encourage an inactive indoor lifestyle contributing to

higher BMI.

The trend for rural obesity increase is less apparent in regions with low per capita income such as South Asia because of the lack of mechanisation in rural areas, which require rural South Asian women to be more physically active than their urban peers, though the gap is narrowing as the region's rural economy improves.<sup>19</sup>

Omani girls in the current study had lower mean weight (57.8kg) than a group of 14–19-year-old Kuwaiti girls (62.2 kg)<sup>20</sup> and matched the mean weight of Saudi girls aged 14–19 years.<sup>21</sup> Despite the Omani girls' lower weight, they were, at 160 cm, 2–4 cm taller than the 14–19-year-old girls from Kuwait, Iraq, and Saudi Arabia.<sup>20,21,22</sup> The reason for the Omani girls being taller despite weighing less than their Arab peers not clear. As mentioned earlier, the time-gap between various studies also should be kept in mind while comparing them, as Arab adolescent obesity is a recent and very dynamic phenomenon.

The above discussion shows that the prevalence of obesity and overweight among female adolescents is a global phenomenon and is a rising health threat in the Gulf Countries Council region including Oman. This calls for pro-active measures to facilitate behavioural changes in parents and adolescents by educating them, preventing miseducation by popular media, and making physical activity more socially and culturally desirable, and inactivity undesirable.

## Conclusion and Recommendations

Anthropometric measurements showed that more than one third of total participants were either overweight or obese among Omani girls aged 12-18 years in Ibri. This study used a comparatively large sample size (N=421) and the participants were randomly selected, so the findings can be generalized to similar population and age group within Al Dhahira Governorate. Replicate the study by enrolling girls aged from 12 years to 18 years to involve early adolescents in assessing the prevalence of overweight and obesity. The new study can involve several schools in different governorates in Oman. Future research could be conducted to assess the factors that contribute in increasing the obesity rate among teenage girls and take targeted remedial measures.

## REFERENCES

1. Schulte, E., Avena, N., and Gearhardt, A., Which Foods May Be Addictive? The Roles of Processing, Fat Content, and Glycemic Load. *PLoS one*, 2015; 10: 2.
2. Navia, B., López-Sobaler, A.M., Villalobos, T., Aranceta-Bartrina, J., Gil, Á., González-Gross, M., Serra-Majem, L., Varela-Moreiras, G. and Ortega, R.M., Breakfast habits and differences regarding abdominal obesity in a cross-sectional study in Spanish adults: The ANIBES study. *PloS one*, 2017; 12: 0188828.
3. Navarro, E., Funtikova, A.N., Fito, M. and Schröder, H., Prenatal nutrition and the risk of adult obesity: Long-term effects of nutrition on epigenetic mechanisms regulating gene expression. *The Journal of nutritional biochemistry*, 2017; 39: 1-14.
4. Stephens, J.D., Althouse, A., Tan, A. and Melnyk, B.M., The Role of Race and Gender in Nutrition



- Habits and Self-Efficacy: Results from the Young Adult Weight Loss Study. *Journal of obesity*, 2017; <https://doi.org/10.1155/2017/5980698>
5. Gustafson, A., Jilcott Pitts, S., McDonald, J., Ford, H., Connelly, P., Gillespie, R., Liu, E., Bush, H., Brancato, C., Babatande, T. and Mullins, J.,. Direct Effects of the Home, School, and Consumer Food Environments on the Association between Food Purchasing Patterns and Dietary Intake among Rural Adolescents in Kentucky and North Carolina, *International journal of environmental research and public health*, 2017; 14: 1255-1266.
  6. WHO. Obesity and Overweight From: <http://www.who.int/dietphysicalactivity/media/en/gsf Obesity.pdf> Accessed: 17 September 2017.
  7. Krebs, N.F. and Jacobson, M.S.,. Prevention of pediatric overweight and obesity. *Pediatrics*, 2003; 112: 424-430.
  8. Organisation For Economic Co-Operation and Development (OECD). Obesity Update 2017. From: [www.oecd.org/els/health-systems/Obesity-Update-2017.pdf](http://www.oecd.org/els/health-systems/Obesity-Update-2017.pdf) Accessed: 30 September 2017.
  9. Patel, P.,. Profile of Fetal Deaths in Dhahira Region, Oman. *Oman Medical Journal*, 2008; 23: 28-31.
  10. Shaw, C., Brady, L. and Davey, C.,. Guidelines for Research with Children and Young People. From: [www.ncb.org.uk](http://www.ncb.org.uk) Accessed: 12 November 2016.
  11. Social Psychology Network. Research Randomizer. From: <http://www.randomizer.org/> Accessed: 3 January 2015.
  12. Oman Legal Network.,. Personal Status Law of Oman (in Arabic). From: <http://www.omanlegal.net/vb/showthread.php?t=8872> Accessed: 2 February 2015.
  13. Boswell, C. and Cannon, S.,. *Nursing Research: Incorporating Evidence-Based Practice*. 2<sup>nd</sup>. ed. Boston: Jones & Bartlett Publishers, 2011.
  14. WHO. Growth reference 5-19 years. From: [http://www.who.int/growthref/who2007\\_bmi\\_for\\_age/en/](http://www.who.int/growthref/who2007_bmi_for_age/en/) Accessed: 20 December 2014.
  15. Cole, T., Bellizzi, M., Flegal, K., and Dietz, W.,. Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal*, 2000; 320: 1240-1243.
  16. Kilani, H., Al-Hazzaa, H., Waly, M.I. and Musaiger, A.,. Lifestyle Habits: Diet, physical activity and sleep duration among Omani adolescents. *Sultan Qaboos University Medical Journal*, 2013; 13: 510-519.
  17. Johnson, J.A. and Johnson, A.M.,. Urban-rural differences in childhood and adolescent obesity in the United States: A systematic review and meta-analysis. *Childhood Obesity*, 2015; 11: 233-241.
  18. Al-Nuaim, A.A., Al-Nakeeb, Y., Lyons, M., Al-Hazzaa, H.M., Nevill, A., Collins, P. and Duncan, M.J.,. The prevalence of physical activity and sedentary behaviours relative to obesity among adolescents from Al-Ahsa, Saudi Arabia: rural versus urban variations. *Journal of nutrition and metabolism*, 2012; 41: 7589.
  19. Tripathy, J.P., Thakur, J.S., Jeet, G., Chawla, S., Jain, S. and Prasad, R.,. Urban rural differences in diet, physical activity and obesity in India: are we witnessing the great Indian equalisation? Results from a cross-sectional STEPS survey. *BMC public health*, 2016; 16: 816.
  20. Allafi, A., Al-Haifi, A.R., Al-Fayez, M.A., Al-Athari, B.I., Al-Ajmi, F.A., Al-Hazzaa, H.M., Musaiger, A.O. and Ahmed, F.,. Physical activity, sedentary behaviours and dietary habits among Kuwaiti adolescents: gender differences. *Public health nutrition*, 2014; 17: 2045-2052.
  21. Al-Hazzaa, H. M., Abahussain, N. A., Al-Sobayel, H. I., Qahwaji, D. M., and Musaiger, A. O. Lifestyle factors associated with overweight and obesity among Saudi adolescents. *BMC Public Health*, 2012; 12: 354.
  22. Musaiger, A., Al-Mufti, B., and Al-Hazzaa, H.,. Eating habits, inactivity, and sedentary behaviour among adolescents in Iraq: Sex differences in the hidden risks of non-communicable diseases. *Food and Nutrition Bulletin*, 2014; 35: 12-19.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 24-02-2021; **Accepted:** 24-03-2021; **Published:** 30-03-2021