

Prevalence of Overweight and Obesity among Kuwaiti Children and Adolescents

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The objective of this paper was to find out the prevalence of overweight and obesity in preschool and school children, as well as adolescents in Kuwait. Data were obtained from the national surveillance programme on anthropometric information of children, adolescents and adults. The sample included in this study was as follows: 15149 children aged 1-72 months, 10130 children aged 6-9 years, 10893 children aged 10-13 years and 10512 adolescents aged 14-17 years. Findings showed that the prevalence of obesity was higher among females at age groups 1-72 months and 14-17 years, while the prevalence was almost equal in other age groups. As compared with previous studies, the prevalence of obesity is increasing, and therefore a programme to prevent overweight and obesity should be established.

Obesity is a major public health problem that plagues most countries. Obesity occurs in all socio-economic strata. However, in most industrialized countries, obesity has been shown to be most common among the lower socioeconomic groups. In developing countries, it is common among emerging elite groups. Obesity has been shown to be a significant contributor to a number of adverse health conditions. Among these are diabetes mellitus, gall bladder disease, hypertension, respiratory disease, heart disease, and other health problems. The development of obesity involves an interaction between genetic, psychological, socioeconomic and cultural factors and is not only due to overeating^{1,2}.

Obesity can begin at any age. However, overweight and obesity at childhood and adolescent period may be a risk factor for adult obesity. This is generally of lifelong and is associated with an increase in the number of fat cells. Some retrospective studies have suggested that there is a direct progression from a fat child to fat adult³.

Obesity, as used in the medical sense, is a term for excessive body weight due to excessive body fat. Several measures are used to determine obesity. Body mass index (BMI), fat-fold thickness, and relative weight are the most commonly used indicators, to determine obesity. BMI is the ratio of body weight measured in kilograms divided by the square of height measured in meters. Fat-folds have been taken at a number of body sites. The most common sites and those for which better standards exist are

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measurements of the thickness of fat layers of the triceps and the subscapular area on the back of the shoulder. Relative weight (as a measure of obesity) is usually defined as being more than 120% of the United States Metropolitan weight-for-height standards. BMI has been shown to be highly correlated with percent body fat and seems to be highly predictive of increased risk of morbidity and mortality from various chronic diseases. Thus, BMI has become the most widely recommended and used indicator of overweight and obesity.

The purpose of the this report was to find out the prevalence age of overweight and obesity in Kuwaiti infants, children and adolescents.

Subjects and Methods

As part of the on-going surveillance efforts of the Nutrition Unit, at the Ministry of Health, Kuwait, anthropometric data were collected from healthy Kuwaiti children during their attendance at the preventive health centers for routine childhood vaccinations ⁴. The children and adolescents were from different governorates classes. Weight and height data were also obtained from school age children attending primary, intermediate and secondary schools.

The Kuwait Nutrition Surveillance System was developed in collaboration with WHO consultants and uses WHO surveillance procedures and anthropometric cut-off points. The following data were collected for each enrolled subject: sex, birth date from the birth certificate or identification card, weight (recorded to the nearest 0.1 kg), using an electronic scale, and height (recorded the nearest 0.1 cm), using a CDC measuring board ⁵.

Kuwaiti children were compared to the American reference population, which was disseminated by both the USA National Center for Health Statistics (NCHS) and the Centers for Disease Control and Prevention (CDC). These reference values are also recommended by the World Health Organization (WHO).⁶ The criteria for a reference population are of critical importance. The sample size provides criteria related to the precision with which Z-scores was calculated. The sample size was as follows: 15149 children aged 0-72 months, 10130 children aged 6-9 years, 10893 children aged 10-13 years, and 10512 adolescents aged 14-17 years.

The Software Packages dBase IV0, Anthrol 1, Anthro 2 and SPSS 6 were used for the processing, calculation and statistical analysis of the data. The data were analyzed using the NCHS/CDC. Reference Populations and according to the recommendations of the WHO Expert Committee Report⁷. In children between the ages of 0-10 years, weight for height >2 SD is considered to be an indicator of obesity thinness was calculated as <-2 SD, while normal children where those between -2 SD and $+2$ SD. Reporting of prevalence-based data are commonly done by using a cut-off

value of (± 2) standard deviations to improve the precision of defining malnutrition ⁶.

BMI is recommended as an anthropometric indicator for thinness and overweight during adolescence because weight-for-age index is considered uninformative or even misleading and weight-for-height index changes dramatically with age and with maturational status. Therefore, BMI-for-age is recommended as the best indicator for use in adolescence. The recommended cut-off values of reference data for adolescents are summarized below ⁷:

Underweight:	BMI/Age.	<5 th Percentile
Normal:	BMI/Age.	5-85 th Percentile
Overweight:	BMI/Age.	\geq 85 th Percentile
Obese:	BMI/Age.	\geq 95 th Percentile BMI.

Results and Discussion

Table 1 shows the prevalence of overweight among children below 6 years of age. The results of this study showed a similar pattern to those reported by Al-Isa⁸ as girls had a higher prevalence of obesity than boys, as well as that reported by Afifi et al ⁹. The highest proportion of obesity among males was noted at age 6-11 months (8.3%) while that in females at age 12-23 months (12.4%).

The overall prevalence of obesity is relatively high; being 4.7% for males and 6.7% for females. The prevalence of low weight-for-height (≤ 2 SD) is less than expected, however, the prevalence of obesity (< 2 SD) is greater than expected for almost all age groups. The prevalence of obesity is consistently higher in females than in males.

A study of the growth patterns of Kuwaiti pre-school children⁸ showed that girls were taller than boys after the age of one year. The prevalence of obesity [Weight/Height > 2 SD] was greater among females (3.8%) compared to males (2.7%).

Previous reports of Kuwaiti pre-school children between 0-5 years of age¹⁰, showed that Kuwaiti children were shorter than American children according to NCHS/CDC reference standards. Forty seven percent (47%) fell below the 30th percentile of the USA reference population. However, the weights of Kuwaiti children were closer to their American counterparts. Overweight (110- $< 120\%$ standard wt/ht) was prevalent among 13.7% and obesity (120+ $\%$ standard wt/ht) among 5.2%¹⁰.

Table 2 shows weight-for-height data for Kuwaiti children aged 6 to 9 years according to sex. The overall prevalence of obesity (weight/height > 2 SD) was 8.1% for males and 8.8% for females. These percentages were higher

than those observed among the Kuwaiti children below 6 years of age (4.7% for males and 6.7% for females). Females tended to have higher weight-for-height than males. However, at age 9-10 years, the prevalence of obesity in males exceeded that of females.

Table 3 shows body mass index for Kuwaiti children aged 10 to 13 years according to sex. The prevalence of overweight (>85th percentile of BMI for age) was similar for both sexes, being 36.8% among males and 35.9% among females. The average BMI for both males and females increased progressively from 10 to 13 years with females displayed slightly higher BMI at each age interval.

Table 4 shows body mass index for Kuwaiti children aged 14 to 18 years according to sex. The prevalence of overweight (\geq 85th percentile of BMI/age) was comparatively higher and was more among females (31.1%) than among males (27.6%). About one third of Kuwaiti children aged 14-18 were overweight. This is consistent with the observed overweight among Kuwaiti children from the age group 10-13 years. The mean body mass index continued to increase during 14-17 years, but with more apparent among females.

These data demonstrate that from first months to ninth year, the prevalence of obesity was higher in females than in males. However, for the 9-10 age interval until 14-15 age interval, males had higher BMI's and greater prevalence of overweight. After age 15-16 years, females exceeded the males in prevalence of overweight. The prevalence of thinness at age 14-17 years in males was as much as 3 to 4 times greater than that in females.

Overweight and obesity appear to be increasing among Kuwaiti males and females. The data of this study indicate a potentially significant future public health problem, since many overweight adolescents may become an obese adults. This means that they will become at high risk for several chronic diseases, including hypertension, diabetes mellitus, osteo-arthritis, coronary heart diseases, and others in adulthood stage.

The combination of high incomes, an abundant food supply, easy access to high calorie fast foods, and decreased in physical activity may all responsible for the increase in overweight and obesity in Kuwaiti children and adolescents. Whatever the explanation, the trend toward increasing overweight and obesity is clearly evident from these, and other data, collected by the Ministry of Health, in Kuwait over the last several years. It is highly recommended to establish a programme to prevent obesity among young, school children and adolescents.

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Table 1. Prevalence of thinness, normal and overweight among Kuwaiti children aged less than 6 years based on weight for height Z-score data by sex

Age (months)	Sex	Weight for Height (Z-Score)					Sample size
		<-2 SD (Thinness)	\pm 2 SD (Normal)	>2 SD (Overweight and obese)	Mean Z-Score	SD Z-Score	
		(%)	(%)	(%)			
0-5	M	0.4	93.6	6.0	0.55	0.95	1134
	F	0.4	92.9	6.7	0.59	0.94	1157
6-11	M	0.6	91.1	8.3	0.52	1.06	700
	F	0.9	89.6	9.6	0.59	1.05	690
12-23	M	1.2	91.4	7.4	0.40	1.11	1016
	F	1.0	86.7	12.4	0.53	1.22	945
24-35	M	2.1	95.2	2.7	0.04	0.97	1181
	F	2.4	93.8	3.8	0.11	1.01	1225
36-47	M	1.7	95.9	2.4	0.14	0.99	839
	F	0.7	94.9	4.4	0.03	1.06	858
48-59	M	1.5	95.8	2.6	0.09	0.98	1293
	F	1.2	93.3	5.5	0.15	1.07	1338
60-71	M	1.3	94.0	4.6	0.06	1.01	1422
	F	1.5	91.8	6.7	0.10	1.12	1351
Total	M	1.3	94.0	4.7	0.14	1.05	7585
	F	1.2	92.1	6.7	0.28	1.09	7564

Table 2. Prevalence of thinness, normal and overweight among Kuwaiti children aged 6 to 9 years based on weight for height Z-score data by sex

Age Groups (in months)	Sex	Weight for Height (Z-Score)					Sample size
		<-2 SD (Thinness)	±2 SD (Normal)	>2 SD (Over- weight and obese)	Mean Z-Score	SD Z-Score	
		(%)	(%)	(%)			
6-6.9	M	2.1	91.9	6.0	0.01	1.13	1419
	F	1.6	90.6	7.8	0.17	1.20	1244
7-7.9	M	1.7	92.9	5.4	0.03	1.10	1361
	F	1.2	90.1	8.7	0.24	1.28	1361
8-8.9	M	1.5	88.7	9.8	0.18	1.27	1409
	F	1.3	88.6	10.1	0.26	1.28	1243
9-9.9	M	1.7	86.4	11.9	0.30	1.38	1189
	F	1.5	89.8	8.7	0.19	1.28	904
Total	M	1.7	90.2	8.1	0.11	1.22	5378
	F	1.5	89.7	8.8	0.22	1.26	4752

Table 3. Prevalence of underweight and overweight among Kuwaiti children aged 10-14 years based on body mass index by sex

Age (years)	Sex	Body Mass Index for Age					Sample size
		Under weight (%)	Normal (%)	Over-weight and obesity (%)	BMI Mean	BMI S.D.	
10-10.9	M	7.5	56.5	36.0	18.70	3.69	1371
	F	8.3	56.4	35.3	18.98	3.95	1380
11-11.9	M	8.0	55.1	36.9	19.51	3.02	1456
	F	6.6	58.1	35.3	19.87	4.17	1471
12-12.9	M	7.2	54.7	38.1	20.50	4.42	1467
	F	4.6	57.9	37.5	21.14	4.49	1468
13-13.9	M	9.2	55.1	35.8	20.81	4.43	1155
	F	2.8	61.7	35.6	21.87	4.56	1125
Total	M	7.9	55.3	36.8	19.85	4.22	5449
	F	5.7	58.4	35.9	20.40	4.42	5444

Table 4. Prevalence of underweight and overweight among Kuwaiti children aged 14-17 years based on body mass index by sex

Age Groups (in years)	Sex	Body Mass Index for Age					Sample size
		Under weight	Normal	Over- weight and obesity	BMI Mean	BMI S.D.	
		(%)	(%)	(%)			
14-14.9	M	8.2	59.0	32.8	21.64	5.06	1128
	F	1.7	65.3	33.0	22.62	4.79	1143
15-15.9	M	9.5	62.9	27.6	21.56	4.86	1410
	F	3.1	64.1	32.8	22.90	5.02	1420
16-16.9	M	10.0	64.2	25.8	21.83	4.14	1485
	F	2.2	68.5	29.3	23.09	4.71	1452
17-17.9	M	10.1	65.0	24.9	22.22	4.54	1167
	F	2.4	68.1	29.5	23.37	4.75	1307
Total	M	9.5	62.9	27.6	21.80	4.72	5190
	F	2.4	66.5	31.1	23.01	4.83	5322