

CHILDHOOD OBESITY: REFERRED CASES TO A TERTIARY HEALTH CENTER IN RIYADH, SAUDI ARABIA

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المهدف: دراسة نمط أسباب السمنة لدى الأطفال المحولين لهذه المشكلة إلى عيادة الغدد الصماء للأطفال للفترة من ديسمبر ١٩٨٩ إلى ديسمبر ١٩٩٤م. **طريقة الدراسة:** درست السجلات الطبية لكل الأطفال المحولين إلى عيادة الغدد الصماء بسبب زيادة الوزن، وتم قياس طول ووزن أولئك الأطفال عن طريق فريق طبي مدرب، وتحديد مقياس مؤشر كتلة الجسم [الوزن بالكيلو جرام ÷ الطول (بالمتر المربع)] لكل مريض وأطلقت كلمة السمنة على من يقع ضمن مقياس مؤشر كتلة الجسم أكثر من المحور الموي الخامس والتسعين حسب الجداول العالمية المنفق عليها، هذا وقد تم دراسة الفحوصات المخبرية والإشعاعية لكل مريض. **النتائج:** بلغ عدد العينة ٥٢ طفلاً تتراوح أعمارهم ما بين ٢-١٦ سنة (المعدل ٨) وكانت نسبة الذكور للإناث ١:١. وجد أن ٣٥ (٦٧٪) من المرضى مسعوديين و ١٧ (٣٢٪) غير مسعوديين وكان سبب السمنة غير مرضي لدى ٤٦ (٨٨٪)، وحلقت متلازمة برادر-ولي لدى ثلاثة مرضى (٨، ٥٪)، كما وجدت متلازمة لورنس-مون-بيدل لدى أحد المرضى وأحر لديه نقص هرمون الغدة الجار الكظرية الكاذب وثالث يعاني من نقص هرمون الغدة الدرقية. أوضحت نتائج الدراسة أن غالبية المرضى لديهم السمنة غير المرضية.

Objective: To show the pattern of etiology of childhood obesity referred to our endocrinology clinic between December 1989 and December 1994. **Subject and Methods:** All the children referred to our clinic at the above stipulated dates were studied. This is a retrospective medical records review of these patients. The patients' height and weight were measured by trained staff of the clinic. The Quetelet index also known as Body Mass Index (BMI) was calculated as weight (kg)/height (m)² for each patient. Laboratory data as well as results of clinical investigations were also obtained from the records of the patients. **Results:** 52 patients with ages ranging between 2 years and 16 years (median 8 years) were studied. Male : female ratio was 1:1.35 (67.3% of the patients were Saudis while 17 (32.7%) were non-Saudis. The etiology of obesity among the series were nutritional 46 (88.5%), Prader-Willi Syndrome 3 (5.8%), Laurence-Moon-Biedl Syndrome I (1.9%), pseudohypoparathyroidism I (1.9%) and hypothyroidism I (1.9%). The study showed that the majority of the patients had simple nutritional obesity.

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At present, there is no generally accepted objective definition of obesity for children and adolescents⁽¹⁾. Obesity could be defined as excessive accumulation of fat in the body and it is also accepted as weight greater than 120% of the ideal body weight; or a body mass index (BMI) greater than the 95th percentile for age and sex. Obesity has been

associated with many diseases like hypertension, diabetes mellitus, coronary artery disease, and skeletal system disease^(2,3). Saudi Arabia has witnessed a tremendous and an unprecedented economic boom in several sectors. This led to a change in the dietary intake and lifestyle of the population which may have led to evolution of obesity as a medical problem. Paediatricians as well as family physicians have a critical role to play in the promotion of cardiovascular health and also to adult diseases that have their origins in childhood⁽⁴⁾. This paper retrospectively reviews the medical records of 52 obese children referred to the paediatric endocrinology clinic of King Khalid University Hospital, Riyadh, between December 1989 and December 1994, for management. Pattern of the etiology of this clinical problem was explored.

Patients and methods

We retrospectively reviewed the medical records of all children referred for assessment of obesity in the paediatric endocrinology clinic over a period of 5 years (December 1989 - December 1994). The patients height and weight were measured by the trained staff of the clinic. The lever balance was made by SECA. The data collected includes age, sex, nationality, and family history of obesity. The Quetelet Index also known as body mass index (BMI) were calculated as:

$$\text{BMI} = \frac{\text{weight (Kg)}}{\text{height (m)}^2}$$

Comparison of the BMI of each patient with the reference values of the 95th percentile on the adapted Table was made⁽⁵⁾. Laboratory data which included haemoglobin (Hb), erythrocyte sedimentation rate (ESR), sodium (Na), potassium (K), glucose (glu), cholesterol (choles), triglycerides (TG), calcium (Ca), phosphorous (Ph), alkaline phosphatase (Alk. phosph.), thyroid stimulating hormone (TSH), free thyroxine (FT₄) were obtained. The records of adrenal ultrasonography as well as computed tomography of the pituitary gland and hypothalamus were also obtained in those patients whose condition warranted it. The data was fed into a microcomputer and analysed using the StatPac

Gold statistical analysis package programme.

Results

The total number of patients referred to the clinic was 56 but 52 of them satisfied our criterion as cases of obesity. The median of their ages was 8 years. 15(28.8%) of the patients were less than 5 years while 37 (71.2%) were above (Table 1). 35 (67.3%) were Saudis. 26 (50%) were males. 12 (23.1%) of our cases had a family history of obesity, 7 (13.5%) had a family history of diabetes mellitus while 1(1.9%) had a family history of hypertension. 50(96.2%) of them volunteered a history of increased appetite and 37 (71.2%) agreed to have had decreased activity. 3 (5.8%) of the patients agreed to history of skin application of corticosteroids.

Table 1. Age and sex distribution of the study population

Age	Sex		Total
	Male	Female	
< 5 years	8	7	15
> 5 years	18	19	37
Total	26	26	52

Ultrasound of the abdomen was normal in the 23(44.2%) of the 52 patients whose condition warranted the investigation. Computed tomographic scan of the brain was also normal in the 16 (30.8%) of the 52 patients whose condition also warranted the investigation. Bone age was appropriate in all subjects. The mean of the birth weight was 4 kg. The electrolytes were all within normal limits. The mean blood glu was 5 mmol/L, mean choles was 4.3mmol/L, and that of Tg was 1.5 mmol/L. All were within normal limits. The bone profile was normal in all the children except one who had pseudohypoparathyroidism. The mean cortisol level was 8.8 µg/dl within a range of (6.5 - 35.5). TSH, T3 and T4 were within normal range with the exception of the one with hypothyroidism. ACTH was not elevated in the 10 children whose condition indicated its measurement. From the etiological diagnosis, we were not able to diagnose pathology in 46 (88.5%) of the patients whom we labelled to have simple nutritional obesity while 3 had Prader - Willi

syndrome, 1 had Laurence - Moon - Biedl syndrome, 1 had pseudohypoparathyroidism and 1 with hypothyroidism (Table 2).

Table 2. *Etiology of obesity in the series presented*

Etiology	Number	Percentage
Simple nutritional obesity	46	88.5
Prader - Willi Syndrome	3	5.8
Laurence - Moon - Biedl Syndrome	1	1.9
Pseudohypoparathyroidism	1	1.9
Hypothyroidism	1	1.9
Total	52	100

Discussion

The use of BMI as a measure of adiposity or obesity in adult has been well established. A BMI of 25 to 29.99 is grade 1 overweight, a BMI of 30 to 39.99 is grade 2 overweight while 40 or greater constitutes grade 3 obesity⁽⁶⁾. Other methods like triceps skinfold thickness measurements are difficult to establish and reliability decreases as body fat increases. Inter-observer and intra-observer reliability is also difficult⁽⁷⁾. Underwater weighing or dual photon absorptiometry are methods that are cumbersome and cannot be used in clinical setting to measure adiposity. A lot of debate as to get a very reliable measure of childhood obesity is still going on but suggestion from the European Childhood Obesity Group and current practices of the National Centre for Health Statistics recommended that BMI greater than the 95th percentile for age and sex represents a reasonable index of adiposity in children and adolescents. This is what was used in this study^(5,8,9). There was a household survey which showed a high prevalence of overweight and obesity among Saudi subjects⁽¹⁰⁾. Some authors have suggested that there are two or possibly three critical periods for the development of obesity and its complication. These are early infancy, the period of rebound between 5 and 7 years and adolescence⁽¹¹⁾. In our study, 15 (28.8%) of our subjects were less than 5 years while 37 (71.2%) were above that age. Parents may show gratification to their children by giving them food. In a survey of eating behaviour within families, 25% of mother reported that they used food as a reward for their children⁽¹²⁾. It is

widely believed that this community is an affluent one. Obesity is the hallmark of affluence and since the socio-economic condition of the Saudi community has witnessed a tremendous growth over the last 2-3 decades, obesity is expected. This is similar to the report from Singapore where a significantly greater proportions of their cases were in the upper and middle social classes⁽¹³⁾. Genetic factors has also been strongly associated with obesity⁽¹⁴⁾. Higher birth weight and family history of the problem has been associated. The mean birth weight of our series was 4.0 kg.

Some chronic diseases of adults have been associated with childhood obesity. These are non-insulin dependent diabetes mellitus, hypertension and other cardiovascular diseases⁽¹⁵⁻¹⁷⁾. Thus, the need for careful management of childhood obesity is clearly indicated. Obese children are usually subjected to teasing among their peers. This further leads to withdrawal from play groups and then there is further inactivity and perpetuation of the obese state. This could give rise to internal psychological conflict, lower self-esteem and interpersonal sensitivity as they approach adulthood^(18,20). Unfortunately, we have no facility to assay the level of the hormone leptin in this hospital. The role of the hormone and how it affects children is still not very clear. Studies on the hormone is going on in many parts of the world. It has also been shown that congenital leptin deficiency is associated with severe early-onset obesity in humans⁽²¹⁾. Another study also showed that obese girls have higher leptin levels than boys. These authors also claimed that puberty further increased leptin levels in obese girls⁽²²⁾.

Saudi Arabia is a country where almost all families possess television. Some workers have also associated television viewing with childhood obesity⁽²³⁻²⁵⁾. This habit prevents energy expenditure and increases the tendency to take chocolates and other food materials at rest. Some children regard this as the only way of recreating. Childhood obesity should be regarded as a public health problem in Saudi Arabia as it leads to approximately 30% of adult obesity⁽²⁶⁾.

In conclusion, this study showed that simple nutritional disorder was found in 46 (88.5%), 3 (5.8%) had Prader - Willi syndrome while Laurence - Moon - Biedl syndrome, pseudohypoparathyroidism and hypothyroidism were diagnosed in the other

three patients respectively. Nutritional (simple, non pathological) obesity is therefore the most common form of obesity in childhood. Endocrine assessment is necessary to rule out pathological causes. Food intake of children should be carefully monitored and outdoor activities should be encouraged as preventive measures of the disease in the Kingdom. Successful weight control is very much challenging and extensive effort needs to be made to help prevent and treat this form of obesity⁽²⁷⁾.

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