

## Growth Pattern of Preschool Children in Dakahlia

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**Abstract: Objective:** The aim of this study was to compare the growth patterns of Dakahlia preschool children with the Egyptian growth reference charts. **Background:** Growth and maturation of children is a dynamic and complex biological process, influenced by both genetic and environmental factors. **Methods:** This research included 1500 children of both sexes, aged between 3-6 years apparent healthy 3-6 years from nearby nurseries. All children included in this research were subjected to; complete history taking and clinical examination including; assessment of body weight, height and body mass index. **Results:** 1.93% of the sampled children were underweight and 0.13% were severely underweight. 1.9% of the sampled children were underweight (<5<sup>th</sup> percentile), while 1.4% of the sampled children were overweight (>97<sup>th</sup> percentile). Height among males was higher than that among females (112.3±9.2 and 108.3±8.42 cm) respectively, the same occur with weight (17.62±3.42 kg and 16.72±3.32 kg) respectively. **Conclusion:** Nutritional status is an integral component of the overall health of an individual and provides an indicator of the well-being of children living in a particular region.

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**Key term:** Body weight, Child, Overweight, Preschool.

### 1. Introduction

Malnutrition is one of the major public health problems in developing countries. The term malnutrition refers to both under-nutrition as well as over-nutrition. Improving nutrition in early childhood in developing countries is a long-term economic investment.<sup>1</sup>

Poor nutrition can affect child development starting from prenatal period to early gestation and throughout childhood. Child development is multidimensional and comprises several interrelated domains including motor, cognitive, social and emotional development. Over 200 million children under 5 years in developing countries are not fulfilling their development potential. These disadvantaged children are likely to do poorly in school and subsequently have low income.<sup>2</sup>

There are a lot of factors that might explain the cause of malnutrition as, insufficient supplies of food, prevalence of infectious diseases, lack of breast feeding, country instability, war time and poor food security. In Egypt, nearly a third of all Egyptian children are malnourished. Poverty, high food price and lack of nutritional knowledge are the main causes of Egyptian child malnutrition especially in rural Egypt.<sup>3</sup>

The problem of malnutrition among children in Egypt was previously discussed.<sup>4</sup> However, scanty information exists regarding malnutrition among children in Dakahlia.

This study aimed to compare the growth patterns of Dakahlia preschool children with the Egyptian growth reference charts.

### 2. Subjects and Methods:

#### Study design

A cross-sectional study was conducted on a sample of children in preschool age between April 2016 and May 2017 in Dakahlia Governorate.

#### Study population

This study included 1500 Egyptian children in age of (3 – 6 years) covering the 3 socioeconomic classes so that the sample taken from each socioeconomic class is near to the percent of population for this class.

#### Data collection procedure

The study was approved by Ethical Committee; and written prepared consent with justification about the reason, methods, results, and complications was obtained from the parents of each participant.

After having got the agreement consent, the researcher measured the height, and weight for each child. The researcher himself did all measurements and the assistant did the registration; and then the students were asked to take the questionnaire to their homesto be filled by one of their parents or guardians and to bring back the next day.

The filled questionnaires were collected on the next day and defaulters were asked to bring it on the following day.

### Inclusion and exclusion criteria

Children aged between 3 and 6 years were included, while students less than 3 or more than 6 year of age were excluded. Children with chronic illness as well as those on corticosteroid therapy or growth hormone replacement therapy and children with chromosomal disorders were excluded.

### Instruments of the study

#### Questionnaire

A self-administered questionnaire was used. The questionnaire had two sections; the first section was filled in the school by the assistant, including personal information: age, grade, gender, date of birth, school name in addition to anthropometric measurements. The second section was filled by one of the parents. The section was concerned about frequency of eating fast food, drinking carbonated beverages, information about the sedentary/activity level of individual, socioeconomic status of family, and information about parents such as weight, height.

#### Anthropometric measurements

The researcher personally took different anthropometric measurements at the examination room, after instructing the students to take off heavy clothes.

**Weight:** One suitable weight balance measuring to nearest 0.5 kg was used. children were weighed while wearing light clothes.

**Height:** Height measurement is the measure from the crown of the head (the superior point) to the bottom of the feet. Height is always measured standing. Remove shoes, hat and bulky clothing such as coats/jackets and sweaters, remove or undo hair styles and hair accessories that interfere with taking a measurement. Suitable metallic meter scale measuring to the nearest 0.5 cm, fixed on the scale was used.

Body mass index (BMI) was calculated as weight in kilograms divided by the square of the height in meters [weight in kg/(height in m)<sup>2</sup>].<sup>5</sup>

Mid arm circumference (MAC) is the circumference of the left upper arm, measured at the mid-point between the tip of the shoulder and the tip of the elbow (olecranon process and the acromium). MAC is used for the assessment of nutritional status.

Head circumference (HC) is a measure of the largest area of a child's head or the distance around the back of the head with the tape measure held above the eyebrows and ears.

#### Outcome definitions

Height, weight and body mass index were plotted on the Egyptian growth charts instructed by the faculty of medicine Cairo University and National Research Center.

#### Statistics analysis

The gathered data were structured, tabulated and statistically examined using SPSS software (Statistical

Bundle for the Sociable Sciences, version 19, SPSS Inc. Chicago, IL, USA). For quantitative data, the mean and standard deviation were determined. For qualitative data, which explain a categorical group of data by rate of recurrence, percentage of every category, comparability between two teams and much more was done using Chi-square test ( $\chi^2$ ).

### 3. Results

Regarding weight for age, we found that, 1.93% of the sampled children were underweight and 0.13% were severely underweight (**Table 1**).

Regarding BMI for age, we found that, 1.9% of the sampled children were underweight (<5<sup>th</sup> percentile), while 1.4% of the sampled children were overweight (>97<sup>th</sup> percentile) (**Table 2**).

In current study, most participating children (95.2%) have mid arm circumference (MAC) >12.5 cm and 4.73% of them have MAC 11.5-12.5 cm while one child has MAC <11.5 cm (**Table 3**).

**Table (1): Distribution of children as regard to their weight for age**

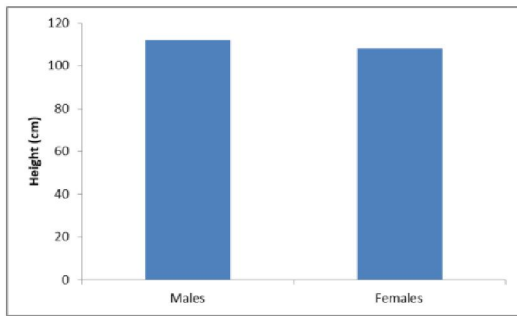
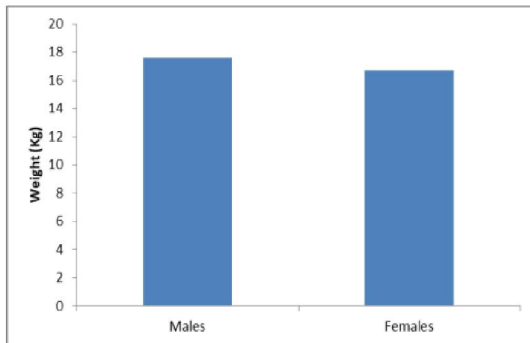
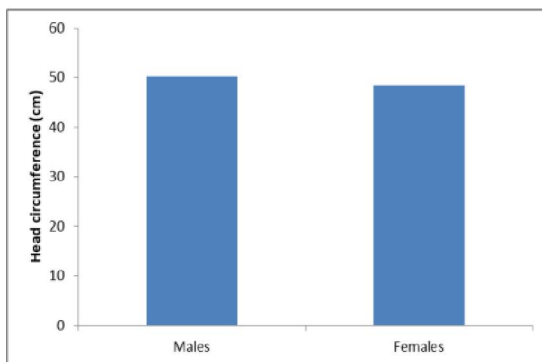
Weight for age	No	%
< 3	2	(0.13%)
3 -	29	(1.93%)
5 -	52	(3.5%)
10 -	181	(12.1%)
25 -	382	(25.5%)
50 -	477	(31.8%)
75 -	274	(18.3%)
90 -	95	(6.3%)
95 -	5	(0.3%)
97 -	2	(0.13%)
> 97	1	(0.7%)

**Table (2): Distribution of children as regard to their BMI for age**

BMI for age	No	%
3	10	(0.7%)
5	18	(1.2%)
10	44	(2.9%)
25	188	(12.5%)
50	553	(36.9%)
75	333	(22.2%)
85	187	(12.5%)
90	95	(6.3%)
95	51	(3.4%)
97	21	(1.4%)

**Table (3): Distribution of children as regard to their mid arm circumference**

Mid arm circumference	No	%
< 11.5 cm	1	0.07
11.5 – 12.5 cm	71	4.73
> 12.5 cm	1428	95.2

**Figure 1: Comparison between males and females regarding height****Figure 2: Comparison between males and females regarding body weight****Figure 3: Comparison between males and females regarding head circumference**

In the present study, we found that the height among males was higher than that among females (112.3±9.2 and 108.3±8.42 cm) respectively, (P-

value= 0.0001) (**Figure 1**) the same occur with weight (17.62±3.42 kg and 16.72±3.32 kg) respectively (P-value= 0.0001) (**Figure 2**).

The results of the present study reported mean values of head circumference (HC) to be significantly lower among girls than boys (48.51±1.16 vs 50.21±1.32 cm) (P-value= 0.0001) (**Figure 3**).

#### 4. Discussion

Regarding weight for age, we found that, 1.93% of the sampled children were underweight and 0.13% were severely underweight. In matching with us, it was declared that, in preschool children of Amritsar (Punjab), the prevalence of wasted and severely wasted was 2.00% and 0.5%, respectively.<sup>6</sup> While in contradiction to our study, it was found that 1.08 % of the children were underweight and 0.6% were severely underweight.<sup>7</sup>

Anthropometric measurement in our study showed that, 4.53% of the studied children were stunted (<5<sup>th</sup> percentile) and 1.6% were severely stunted (<5<sup>th</sup> percentile). Against our results, larger percentage was found previously, as it was declared that, according to height for age, out of 100 children, 80 were normal while 17 were stunted and 3 only were severely stunted. The demographic health survey also documented that 34% of the children were moderately stunted and 15% were severely stunted as demonstrated by low height for age.<sup>7</sup> This may be due different constitutional length in different countries and could also be affected by socioeconomic status that affects child nutrition.

Regarding BMI for age, we found that, 1.9% of the sampled children were underweight (<5<sup>th</sup> percentile), while 1.4% of the sampled children were overweight (>97<sup>th</sup> percentile). On comparing our present data with prevalence rates of developed countries, it was apparent that the prevalence of overweight and obesity in children was lower than the prevalence in developed countries. For example, in United States have reported the prevalence of obesity as 14.80%.<sup>8</sup> Whereas it was reported that about 32.70% of children were obese.<sup>9</sup>

As regard to anthropometric measure by head circumference (HC). HC has been sparingly used to assess the prevalence of undernutrition among preschool children.<sup>10</sup> This circumference is a reflection of cranial growth and is also considered to be an indicator of past nutritional status (e.g., marginal cases of protein energy malnutrition) and development of the brain and brain size.<sup>11</sup>

The results of the present study reported mean values of HC to be significantly lower among girls than boys (48.51±1.16 vs 50.21±1.32 cm p<0.01). Similar studies had earlier reported that mean HC values were significantly lower in girls than boys.<sup>12</sup>

The age and sex-specific HC mean comparison with the WHO reference showed that most of the children remained undernourished, except girls aged 2 years and 5 years.<sup>11</sup>

Some Indian studies have also reported that mean HC values were lower than the WHO/NCHS reference population among urban pre-school children of Faizabad, Uttar Pradesh,<sup>13</sup> Punjabi pre-school children<sup>14</sup> and Bengalee pre-school of Midnapore, West Bengal.<sup>15</sup>

In the present study, we found that the height in cm among males was higher than that among females (112.3±9.2 and 108.3±8.42 cm) respectively, the same occur with weight (17.62±3.42 kg and 16.72±3.32 kg) respectively. Similar results were announced by a cohort study conducted in Ethiopia with sample size of 1065, and proved a significantly higher prevalence of under nutrition among girls as compared to boys.<sup>16</sup>

### Conclusion

Nutritional status is an integral component of the overall health of an individual and provides an indicator of the well-being of children living in a particular region. In this regard, the importance of the nutritional status of children in the developing countries should be emphasized, not only for the improvement of health of children in the coming generation, but also for the overall development of the concerned region in near future.

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