

## Growth indices abnormalities in hospital-admitted children

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### ABSTRACT

**Objective:** This study was performed among children admitted in a general training hospital to determine the frequency of abnormalities in growth indices in hospital-admitted children.

**Methods and materials:** Current study is a descriptive cross-sectional survey among 70 children admitted in a general training hospital. The height, weight, and head circumference were measured and recorded and the frequencies of abnormalities in growth indices in them were determined.

**Results:** The mean age in children was 18.66 months and 64.3% were male. 72.9% had normal weight, 21.4% less than normal, and 5.7% had higher than normal weight. Height was in normal range in 67.1% of children, less than normal in 28.6%, and higher than normal in 4.3%. Head circumference was normal in 81.4%, less than normal in 17.1%, and more than normal in 1.4% of subjects.

**Conclusions:** Finally, according to the obtained results, it may be recommended that if the same results be obtained in future studies, further investigations is needed to evaluate the causes of this high prevalence rate of abnormalities in growth indices in hospital-admitted children.

### Keywords

Height, Weight, Head circumference, Children

### Introduction

Growth changes are an essential event continuing across the life. There are five significant phases in human growth and development, Infancy -Toddler – Childhood- Adolescence or teenage and Adulthood[1]. Growth failure, or failure to thrive (FTT), is a descriptive term and not a specific diagnosis. Although definitions vary, Failure to thrive (FTT) is a common term used to describe lack of adequate weight gain in pediatric patients. Failure to thrive is important to recognize and treat because it can result in developmental delays and other long-term effects for the developing child[2]. For instance, some authors define FTT as height or weight less than the third to fifth percentiles for age on more than one occasion. Other authors cite height or weight measurements falling 2 major percentile lines using the standard growth charts of the National Center for Health Statistics (NCHS)[3].

Still others state that true malnutrition (weight <80% of ideal body weight for age) should be present to state a child is failing to thrive[2]. All authorities agree that only by comparing height and weight on a growth chart over time can FTT be assessed accurately[4]. The more recent definition “faltering growth” (FG) and malnutrition are more associated to express the disequilibrium among nutritional intakes and requirements of macro- and micronutrients. This imbalance obstacle overall growth, have impact on weight first, then length and head circumference[5]. Although measurements of head circumference are important in the evaluation of infants and toddlers, failure of the head to grow by itself is not part of the FTT entity[6].

Most studies are performed among healthy children and fewer studies are carried out among hospital-admitted children accordingly, current study was performed among children admitted in a general training hospital to determine the frequency of abnormalities in growth indices in hospital-admitted children.

## Materials and methods

Current study is an observational descriptive cross-sectional survey with sample size of 70 children with an age range from 1 month up to 84 months (7 years) attending to a general training Hospital in Tehran, Iran in 2006. Understudy variables included gender, cause of admission, age, weight, height, head circumference, and familial history of growth problems among understudy children. We evaluated deviation from percentiles of 90 and 10 among children which had performed according the growth chart related to each age.

We collected our data by a checklist which filled by researcher and limited to those variables mentioned in proposal. We used face to face asking to collect our required data from parents. Also the measurements performed by a single meter for height and head circumference and a single balance for weight.

Data analysis was performed among 70 subjects by SPSS (version 13.0) software [Statistical Procedures for Social Sciences; Chicago, Illinois, USA]. Chi-Square and Kruskal-Wallis tests were used for comparisons and were considered statistically significant at P values less than 0.05.

## Results

The mean age in children was 18.66 months and 64.3% were male. 72.9% had normal weight, 21.4% less than normal, and 5.7% had higher than normal weight. Height was in normal range in 67.1% of children, less than normal in 28.6%, and higher than normal in 4.3%. Head circumference was normal in 81.4%, less than normal in 17.1%, and more than normal in 1.4% of subjects. The most common chief complaint was respiratory problems (Table 1). Twenty percent had positive familial history of growth retardation. There were no statistically significant association between age, gender, familial history, and chief complaint with weight, height, and head circumference ( $P > 0.05$ ).

**Table 1- Chief complaints among understudy population**

|                    | frequency | percent | Valid percent | Cumulative percent |
|--------------------|-----------|---------|---------------|--------------------|
| <b>Respiratory</b> | 22        | 31.4    | 31.4          | 31.4               |
| <b>Neurologic</b>  | 20        | 28.6    | 28.6          | 60.0               |
| <b>GI</b>          | 15        | 21.4    | 21.4          | 81.4               |
| <b>urologic</b>    | 8         | 11.4    | 11.4          | 92.9               |
| <b>other</b>       | 5         | 7.1     | 7.1           | 100.0              |
| <b>total</b>       | 70        | 100.0   | 100.0         |                    |

## Discussion

This study demonstrated high frequency of deviation from normal range of height, weight, and head circumference in hospital-admitted children. Although, in a study in Croatia, it was reported that genetic factors have an important role in height, weight, and head circumference; but no statistically significant association is found in current study between familial history and height, weight, and head circumference. It may be due to a more extended range of age which was evaluated in our study. An study showed that there is a significant association between sex of newborns, gestational age, high risk pregnancy, height and weight of newborns with head circumference over time ( $p < 0.005$ ) [7]. In an investigation in France, no statistically significant association was found between gender and head circumference [8]. This matter is similar to the obtained results in our study.

As reported in a study in Brazil, gestational age have a significant role in normal growth in newborns. Based on this study preterm children had meaningful smaller head circumference in compare with full-term newborns [9]. In a study, it has reported that there is a statistically significant association between gastrointestinal situations of child and his growth indices [10]. In another study have illustrated that a proper Microbiota profiles in gastrointestinal system could help maturation and growth in newborns [11]. However, we did not find similar correlation between chief complaint in children and their growth indices situations. According to a study in Sudan, prevalence of weight more than normal was 9.5% [12] which is higher than our results. Also in another study it has been reported that weight in girls is less than boys [13], as well as our findings. However, this difference was not significant in our study.

Finally, according to our results and upon the high prevalence of deviation from percentiles among understudy children (one out of four children), it is recommended that further investigations with cluster sampling from Iran should be developed and if similar results were found, more assessment of etiologies and probable solution should be considered to reduce this rate.

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#### **Conflicts of Interest**

The authors declare that they have no conflicts of interest.

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