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Research Article

**ANALYSIS OF FREQUENCY OF ETIOLOGICAL FACTORS OF
SHORT STATURE IN CHILDREN**¹Ayesha Sabir, ²Qamar Uz Zaman, ³Bushra Madni, ⁴Rashida Javed, ⁵Sadia Rasheed,
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Abstract:

Introduction: The growth of a child is a dynamic process and shows general health of that child. Short stature by definition is height or length less than 2 SD or below 3rd centile. This study describes the etiology of short stature in children because early recognition and treatment will not only result in normal height gain but will also avoid complications.

Objective: To determine the etiology of short stature in children.

Study Design: Cross sectional study.

Place And Duration Of Study: Department of paediatrics, Jinnah hospital Lahore over a period of six months i.e. April to September 2016.

Subjects And Methods: A total of 385 patients of short stature were enrolled in the study. All patients underwent detailed medical history and physical examination followed by required investigations. Data were analyzed in SPSS version 20. Age and height were presented as mean and standard deviation while etiology of short stature was presented as frequency and percentage.

Results: The mean of children was 8.30±3.67 years. Among 385 children 189 were male and 196 were female. Regarding etiology, 131 children had normal variant short stature, 91 had 3rd degree malnutrition, 51 had celiac disease and 112 had hypothyroidism.

Conclusion: Most common etiology of short stature in children was normal variant short stature followed by hypothyroidism, 3rd degree malnutrition and celiac disease.

Keywords: Short stature, Hypothyroidism, Malnutrition

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INTRODUCTION:

Short stature by definition is height or length less than 2 SD or below 3rd centile. Normal development and growth are one of the major concerns of the parents and are very important during childhood. Short stature is a major problem world wise but more so in developing countries. Decreased childhood growth resulting in short stature could be caused by many factors like genetic, nutritional, environmental, endocrinal and systemic causes.

There are many types of short stature but most important are normal variants of growth and pathological causes. The pathological causes include endocrinal disorders like growth hormone deficiency, hypothyroidism, cushing syndrome and chronic diseases like severe malnutrition, rickets, cystic fibrosis, celiac disease, chronic renal disease. There are many genetic syndromes which are associated with short stature like turner syndrome, Down syndrome, Noonan syndrome and Russel silver syndrome. By definition 2.5% of the population is short. However, the number of children with poor linear growth is higher given the frequency of chronic diseases of childhood. The Utah Growth Study is the largest population-based survey of growth in children published to date. These investigators assessed height and growth velocity in nearly 115,000 American children. Among the 555 children with short stature only 5% had an endocrine disorder.

Although a lot of researches are available on this topic but there is a huge variation in different factors like genetic /syndromic causes (2.4% -51.8% i.e.21.5 times higher) and normal variant short stature (37.38% - 60.60% i.e. 1.62 times higher) in different population. Due to these variable statistics it is very important to know the exact etiology of short stature in children from our selected population. This cross-sectional study was designed to describe the etiology so earlier recognition will not only help in the treatment but also decrease morbidity.

Objective:

To determine the frequency of etiological factors of short stature in children.

PATIENTS AND METHODS:

This was a cross sectional study conducted over a period of six months from April 2016 to September 2016 in department of paediatrics, Jinnah Hospital Lahore. Sample size of 385 calculated with 95% confidence interval, 2% margin of error and taking expected percentage of celiac disease i.e. 3.6% (least among all) contributing factors leading to short stature

in children. Non probability sampling technique was used. Children of age 2 year to 14 year of either gender who presented with short stature were included in study while children with syndromic causes were excluded from the study.

DATA COLLECTION AND ANALYSIS:

After approval from hospital ethical committee and informed written consent from the patient /guardian of the patients, 385 cases were enrolled in the study from paediatric department of Jinnah Hospital Lahore. Detail history and clinical examination was carried out and demographic information including name, age, gender, standard height, weight were included. Then patients were screened for normal variant short stature (by history, clinical examination and x ray left wrist), 3rd degree malnutrition (by clinical examination and growth charts. Blood samples were obtained in sterile condition and was sent to hospital laboratory for analysis of hypothyroidism and celiac disease. All this information was recorded by using specially designed performa.

The diagnostic criteria for short stature was considered as height below 3rd centile for individuals (with reference to growth chart) of the same sex and chronological age in a given population with growth.

Considering etiology , normal variant short stature (bone age determined by x ray of left hand and wrist) familial short stature (bone age appropriate for chronological age) and constitutional short stature (delayed bone age), 3rd degree malnutrition (Weight less than 60% of the expected weight for age and sex by using age appropriate growth charts), Celiac disease was labelled if anti tissue transglutaminase >10u/ml and upper GI endoscopy with histological analysis (villous flattening) of the duodenum and hypothyroidism if TSH is >10mU/L, free T4 level is <4ug/dl.

Data were entered and analyzed through SPSS version 20. Age and height were presented as mean and standard deviation while etiology of short stature was presented as frequency and percentage.

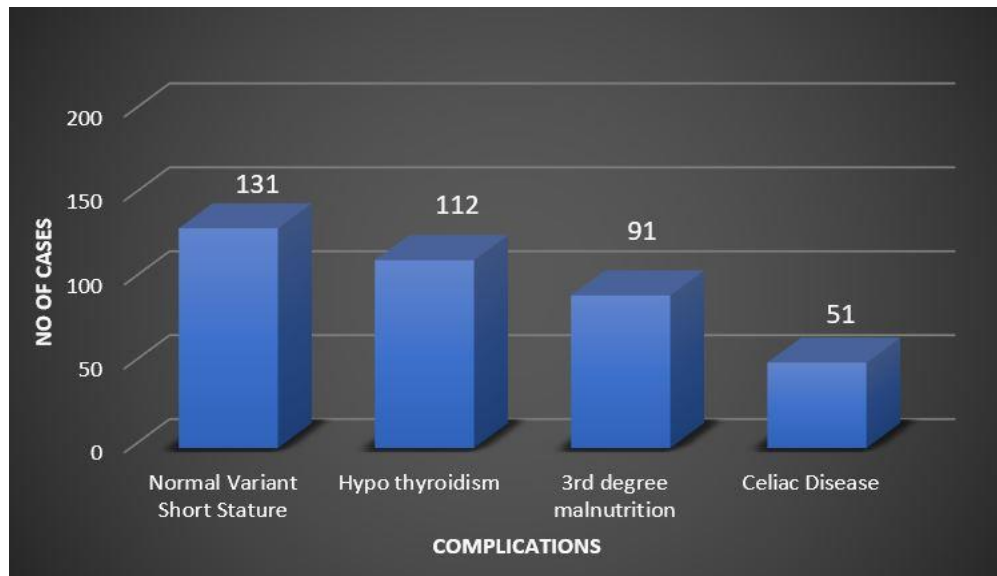
RESULTS:

In our study, 335 children were enrolled with median age of 8.30±3.67years. There were 189 males and 196 females. (Table 1).

The most frequent etiological factor was normal variant short stature in 131 children, 3rd degree malnutrition was present in 91 cases, celiac disease 51 cases and 112 had hypothyroidism. (Fig. 1).

Table 1: Characteristics of children

| | |
|--------------------------|----------------|
| Total number of children | 385 |
| Age (years) | 8.30±3.67 |
| Male | 189 |
| Female | 196 |
| Weight | 27.53±10.95 kg |
| Height | 1.15±0.21m |

**DISCUSSION:**

Short stature is a term applied to a child whose height is 2SD or more below the mean for children of that sex and chronological age (and ideally of the same racial-ethnic group). Short stature may be either a variant of normal growth or caused by a disease.

Pakistan is a developing country and nutritional deficiency is prevalent in the children. 33% of children under 5 years of age are underweight, while 53% are stunted. This cross-sectional analysis precisely presented the list of etiological factors of short stature. The most common etiology remained is normal variant short stature i.e. 34%.

Hypothyroidism is found in 23.64% while in other studies it ranges from 4% to 17%. The percentage is higher in our population as compared to other studies.

It can possibly be attributed to endocrinal causes which are more common in our setup. A study was conducted in Pakistan to look for causes of short stature and leading cause was growth hormone deficiency and Vitamin D deficiency. The proportion of children with growth hormone deficiency was 69% and vitamin D deficiency was 63%.

A Saudi study reported genetic short stature was present in 51.8% of the children, while in local studies normal variant short stature is seen in 34% and 30%. In Utah growth study non endocrinological causes predominate, endocrine contribution was less than 4% in children with short stature. In the same study protein energy malnutrition and malabsorption was responsible for 10% of short cases and similarly 12.7% in Indian Bhadada study.

The percentage of celiac disease is 13.25% while a study in India calculated it as 3.6% - 10%. The gross difference between endocrinological causes, celiac and malnutrition from international studies can be due to poor follow up and non-compliance.

CONCLUSION:

We concluded that the most common etiological factor of short stature was normal variant short stature, followed by hypothyroidism, 3rd degree malnutrition and celiac disease.

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