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ORIGINAL RESEARCH ARTICLE

Comparative Study of Height in Normal Growing Children (NGC) and Children with Sickle Cell Disease (SCD) in Portharcourt

Ewunonu EO *[1], Ndamati Ichechukwu[2]

1. Department of Anatomy, Ebonyi State University, Abakaliki, Nigeria
2. Department of Anatomy, University of Portharcourt, Nigeria

ABSTRACT

The height of 106 children in Portharcourt with sickle cell disease (SCD) was measured and compared with that of 106 normal growing children (NGC). The study shows children with sickle cell disease to be significantly physically retarded with smaller height compared to the normal growing children within the same locality.

Keywords: Portharcourt, Comparative, Sickle Cell Disease, Height, Normal Growing Children.

INTRODUCTION

Sickle cell anaemia is the most common genetic disorder worldwide[1, 2] as well as in Nigeria[3]. It is one of the commonest single gene disorders in man with variable distribution in different parts of the world and variable clinical manifestation.[1] It constitutes a significant health and social problem especially in Nigeria[4] which has the largest population of people with sickle cell disorder, with about 150,000 births annually.[5] It is the most frequent type of hemolytic anemia caused by an abnormal hemoglobin that results from a single amino-acid substitution (i.e. valine for glutamate) in position 6 of the beta-globin chain of the hemoglobin.[6] The alteration yields an unstable red blood cell that changes from the round shape of the sickle shape.[7] Such as red blood cells are easily destroyed as they pass through the spleen. Consequently, this may give rise to increased viscosity of blood, thereby causing occlusion of capillaries.[8]

Address for correspondence:
Dr. Ewunonu EO*
Department of Anatomy, Ebonyi State University, Abakaliki, Nigeria.
Phone no. +2348033388817
E-mail: ediojims02@yahoo.com

In Nigeria, the prevalence of sickle cell trait is about 25% while the homozygous state is found in about 3% of the population.[4] Also, the sickle beta-globin gene widely spreads through Africa, the Middle East, and the Mediterranean and probably too few countries in and around America.[2, 7]

Generally, many factors have been known to influence the manifestation and severity of sickle cell disease with increased crisis in sicklers. These include mainly environmental factors like pollution, poor sanitary conditions, poor personal hygiene and other poor social circumstances.[9-11]

One of the major defects in sickle-cell diseased children is growth retardation.[10-15] Others include delayed skeletal and sexual maturation.[14-17] The underlying cause of growth retardation in sickle-cell disease has not been confirmed but has been attributed to several factors such as increased resting metabolic rate[18] and deficiencies of various nutrients including folate, zinc, vitamin A, vitamin E and iron.[9, 19] Height is affected by repetitive infarctions in the joints of both large and small bones leading to abnormally angled digits and enlarged, malformed and occasionally frozen joints, particularly at the knees and ankles. Infection is the leading cause of death in affected children aged 1-3 years while stroke and trauma are the leading causes of death in affected children aged 10-12 years.[7]

This study is important since it creates awareness of the problems associated with sickle-cell disease in Portharcourt and elsewhere.

MATERIALS AND METHODS

The heights of 106 male and female sickle-cell diseased children were measured using tanner et al, (1963) technique. All observations were made and recorded. The subjects were patients registered at the Sickle-Cell Clinic of University of Portharcourt Teaching Hospital (UPTH), Portharcourt and none was deformed. Their ages were between 1 to 20 years.

Also, the same measurements were taken from 106 male and female normal, healthy children with the same age range of 1 to 20 years. They were students of the University of Portharcourt Nursery and Day Care Centre, as well as University of Portharcourt Demonstration Primary and Secondary Schools at Choba. Their respective heights were recorded and noted. The graph of mean values of the heights against ages for both normal and sickle-cell diseased children was subsequently plotted and observed.

RESULTS

Table 1: Mean Values of Height (cm) and Standard Error of Mean (SE) for Normal Growing Children and Sickle Cell Anemic Children by Age (Years)

Age (Yrs)	Frequency	Height (cm)			
		Normal Children		Sickle Cell Children	
		Mean	S.E.	Mean	S.E.
1	4	74.3	± 1.95	72.5	± 1.75
2	5	89.2	± 2.36	76.8	± 0.76
3	4	102.8	± 1.78	96.0	± 3.02
4	5	104.5	± 0.85	98.6	± 2.82
5	5	111.1	± 2.49	107.0	± 1.36
6	5	119.1	± 1.19	114.0	± 1.45
7	5	127.2	± 2.00	125.2	± 2.77
8	5	132.9	± 2.17	127.6	± 3.85
9	9	141.7	± 1.46	139.1	± 1.37
11	10	142.1	± 1.46	137.1	± 1.91
12	10	149.3	± 1.93	141.8	± 1.28
13	10	153.3	± 1.96	150.1	± 1.82
14	8	156.0	± 1.54	147.9	± 3.21
15	6	164.9	± 1.20	152.3	± 3.52
16	7	179.7	± 1.96	163.0	± 1.48
18	6	164.9	± 3.73	158.5	± 1.61
20	2	166.5	± 1.78	164.0	± 1.43

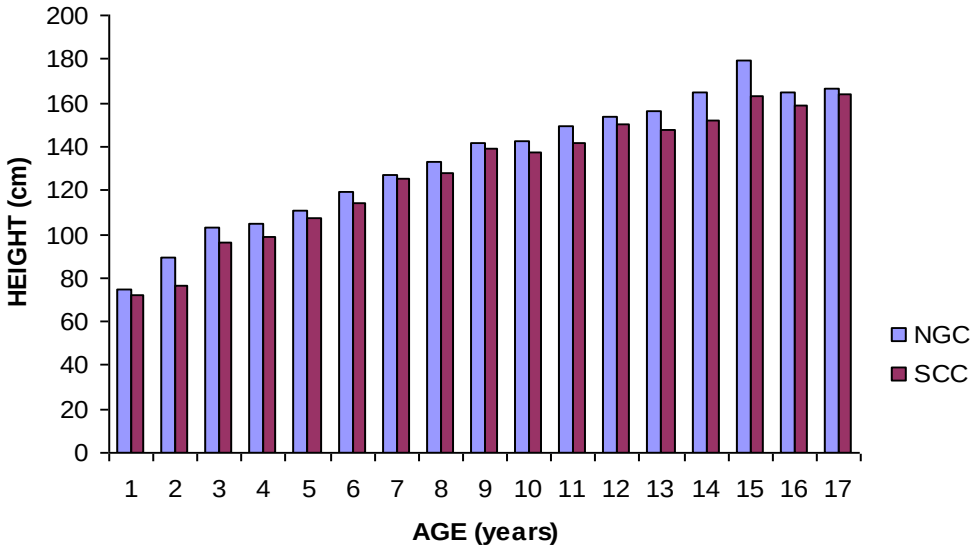

FIG.1: GRAPH OF MEAN VALUES OF HEIGHT (cm) AGAINSTAGE (years) FOR NORMAL AND SICKLE CELL ANAEMIC CHILDREN

Figure 1: shows that height of normal growing children was higher than those of the sickle-cell diseased children.

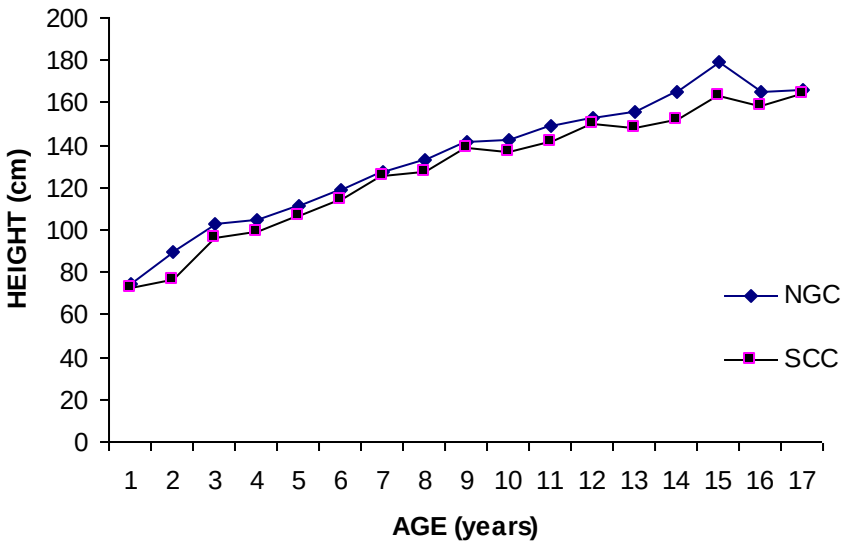

FIG 2: GRAPH OF MEAN VALUES OF HEIGHT (cm) AGAINST AGE (years) FOR NORMAL AND SICKLE CELL ANAEMIC CHILDREN

Figure 2: the graph of the mean values of the heights against ages for both normal and sickle-cell diseased children showed similar trends. However, that of the normal children was higher than that of the sickle-cell diseased children.

DISCUSSION

In this study, the graph of the mean values of the heights against ages for both normal and sickle-cell diseased children showed similar trends. However, that of the normal growing children is higher than that of the sickle-cell diseased children. This indicates that there was a significant growth retardation coupled with a significant delay in the attainment of adolescent growth spurts in sickle-cell diseased children. This could be attributed to the late onset of puberty with related late growth spurt observed in the sickle-cell diseased children[10, 12-14, 20] since the pubertal growth spurt occurred earlier in normal children (where it started at about the 14th year of age) than in the sickle-cell diseased

children (which started in the 15th year of age) in the present study.

The delayed physical and sexual development in the sickle-cell diseased children could emanate from chronic anaemia and low endocrine production since these are among some of the factors adduced as causing delayed physical and sexual development in sickle cell disease patients; a mean monarchial puberty age of 13.4 years among AA against 16 years in SS girls was earlier reported.[10, 21] Although, socioeconomic and genetic factors were implicated as important factors that may determine the time of onset of puberty, the present study is in line with the earlier finding that the disease generally affected growth if the growth retardation and late onset of puberty in the sickle-cell diseased children in Portharcourt is considered.[10-14, 20-21]

CONCLUSION

The present study shows growth retardation and late onset of puberty in the sickle-cell diseased children compared to the normal children in Portharcourt. This is relevant with respect to medical advice in the search for necessary prevention of sickle-cell disease among individuals. More awareness should therefore be created especially, in the area of genetic counseling and health education as these form significant measures in the understanding of the nature and relevant causative factors of sickle-cell disease in our society.

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