

ASSESSMENT OF BMI IN BETA THALASSEMIA MAJOR PATIENTS

Salva Shah¹, Mohtasim Billah¹, Adeel Basharat³, Muhammad Manzoor¹, Bina Khan⁵, Hiba Khan⁶

¹Department of Pathology, Bacha Khan Medical College, Mardan, KP, Pakistan

³Department of Medicine, Jinnah Medical College, Peshawar, KP, Pakistan

ABSTRACT

Background: Recurrent blood transfusions cause growth retardation in children with β -thalassemia major. The current research aimed to evaluate the nutritional health of individuals with beta-thalassemia major.

Objectives: The number one goals of this studies are to evaluate the dietary health of people with beta-thalassemia predominant, specializing in BMI and peak, and to identify elements contributing to growth retardation in this populace.

Duration and place of study: Department of Medicine, Jinnah Khan Medical College, Peshawar jan to dec 2015

Materials and Methods: One hundred thalassemia major patients, aged five to twenty, underwent anthropometry, and their BMI was computed. Patients were classified as underweight, normal weight, and overweight based on percentiles found in CDC charts. Patients were classified as short stature if their height fell below the age-specific 5th percentile. SPSS was used to analyze the data.

Results: Of the patients, 1% were overweight, 45% were normal weight, and 54% were underweight. 81% of the patients had little height.

Conclusion: Beta thalassemia major is quite common in causing growth retardation. To identify any drop in growth velocity and BMI derangement, height and weight should be consistently examined at regular intervals. If growth retardation is seen, the reason should be looked into. Iron excess, hypoxia, and chronic anemia are common causes of growth retardation.

Keywords: β -thalassemia major, Basal Mass Index(BMI), short stature

INTRODUCTION

The basal mass index, often in kilograms per square meter, is calculated by dividing the body weight by the height square. It defines the degree of adiposity based on the weight-to-height ratio rather than the frame size.

Numerous methods have been developed to evaluate underweight and obesity. BMI is a recommended metric, with a value of less than 18.5 for underweight people and more than 30 for obesity¹. Underweight

requires medical evaluation since it often indicates a disease condition².

There is a higher chance of death if one has a low BMI³. Injuries and infections, improper operation of many endocrine organs, distorted body image, and other psychological problems are all more likely to occur in underweight and malnourished individuals¹. According to research, there is a substantial inverse relationship between work-disabling morbidity and BMI⁴.

However, a high body mass index (BMI > 27) significantly increases the chance of acquiring health issues such as adult asthma, atopy, diabetes mellitus, hypertension, lipid abnormalities, and allergy symptoms^{1,5-10}. Additionally, there is a connection between mental problems, scoliosis, and asthma among underweight people¹¹.

Correspondence:

Dr. Salva Shah

Assistant Professor, Department of Pathology Bacha Khan Medical College Mardan.

Email: salvashah843@gmail.com

Cell: 0336-9124952

Date Received: April-12-2021

Date Accepted: May-24-2021

Date Revised: June-25-2021

Available Online: July-03-2021

This research aimed to measure the BMI of individuals with beta-thalassemia major, as growth abnormalities are one of their main clinical characteristics¹². The causes of growth retardation in individuals with thalassemia major are complex and include tissue hypoxia, hypogonadism, hypothyroidism, undernutrition, and adverse effects from desferrioxamine chelating therapy¹²⁻¹⁵.

METHODOLOGY

In 2015, this research was conducted in Peshawar. For the research, 100 β -thalassemia major patients who attended the Fatimid Foundation were chosen. The chosen patients required transfusions and were receiving chelation treatment to avoid iron excess. The research was approved ethically. A thorough medical history was obtained from the patients, including their age, gender, height, weight, and BMI. Patients were classified as underweight if their BMI was below the fifth percentile. Considering the patient's age and gender, BMI at various ages was computed and compared with standardized percentile curves for kids. Small stature was defined as a height below the fifth percentile. With SPSS 20.0, all of the analysis was completed.

RESULTS

There were 53 men and 47 females in our research. In this research, the age range was 5–20 years, with a mean age of 13.62 ± 3.78 . The patients' mean weight was 28.94 kg with a standard variation of 8.85 kg, and their mean height was 133.15 cm with a standard variance of 16.32 cm.

With an SD of 7.63 kg/m², the mean BMI was 16.47. Using CDC data, BMI percentiles for both genders were calculated for various age groups. In our research, 54% of the patients were underweight, and 1% were overweight. In kids under the age of ten, the incidence of underweight was 31%; in patients over ten, the frequency rose to 59%. Girls were underweight at 46%, whereas males were underweight at 62%. In this research, 81% of the patients were small.

DISCUSSION

The most prevalent anomaly caused by a single gene is beta thalassemia major. The global population with beta-thalassemia gene carriers is 3 percent. Among these patients, growth retardation is a prevalent issue. According to our research, the average height and weight of individuals with beta thalassemia were

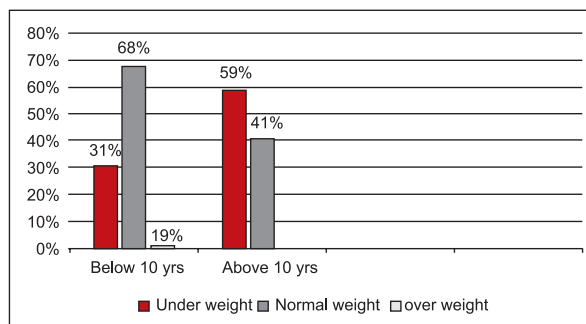


Fig 1: Frequencies of Nutritional Status at Different Ages.

Table 1: Mean Height, Mean Weight and BMI in Beta Thalassemia Major

Mean height	Mean weight	BMI
$133.15 \pm 16.32\text{cm}$	$28.94 \pm 8.85\text{kg}$	$16.47 \pm 7.63\text{kg/m}^2$

significantly below the WHO, Agrawal, CDC, and NCHS 50th percentiles. Other investigations have shown similar results, with a very high frequency of underweight observed in individuals with thalassemia major. 65.7% of thalassemic patients in Iran were under the fifth percentile for height, and 54.2% were under the fifth percentile for weight¹⁶. In China, 43.7% of these patients had weights below the third percentile, and 48% had heights below the third percentile¹⁷. 79% and 61% of patients, respectively, at the Iraqi Thalassemia Centre were underweight and taller than the fifth percentile¹⁸.

Chronic anemia, transfusional iron excess, hypersplenism, and chelation toxicity are the main causes of this delayed development. Hypogonadism, hypothyroidism, growth hormone deficiency, zinc deficiency, chronic liver disease, undernutrition, and psychosocial stress are other contributing variables¹⁹.

A Skordis N research found that children with beta-thalassemia major have a certain development pattern that is mostly normal up to the age of nine. At that point, there is a noticeable slowdown in growth and a reduction in the pubertal spurt²⁰. We found in our research that among individuals with beta-thalassemia major, obesity was not a significant issue. In contrast, low BMI and underweight were prevalent, especially in individuals over the age of 10. A statistically significant correlation was found between the age and length of sickness of thalassemic patients and their nutritional health. Due to the increased risk of death and morbidity that underweight patients face, this issue must

get more attention.

To develop an appropriate plan for research and therapy, growth should be routinely examined for signs of loss in growth velocity and any deviation in BMI. Given that the BMI reduction was more pronounced in individuals over the age of ten, endocrinopathies brought on by iron excess and potentially long-term chelation side effects may be the main causes of underweight.

REFERENCES

- Mahan LK, Escott-Stump S. Krause's Food, Nutrition, and Diet Therapy. 10th ed. Philadelphia: WB Saunders Company, 2000;370:493-4-511-3.
- Egbert AM. The dwindles. Failure to thrive in older patients. *Nutrition Reviews* 1996;54(1 Pt2):S25-30.
- Bray GA, Groy DS. Obesity. Part II-Treatment. *West J Med* 1988;149:555-71.
- Pryer JA. Body mass index and work-disabling morbidity. *Eur J Clin Nutr* 1993;47:653-7.
- Rabkin SW, Chen Y, Leiter L, Liu L, Reeder BA. Risk factors correlate with body mass index. *Can Med Assoc J* 1997;157(Suppl 1):26-31.
- Shaheen SD, Sterne JAC, Montgomery SM, Azima H. Birth weight, body mass index and asthma in young adults. *Thorax* 1999;54:396-402.
- Seidell JC, de Groot LC, van Sonsbeek JL, Deurenberg P, Hautvast JG. Associations of moderate and severe overweight with self-reported illness and medical care in Dutch adults. *Am J Pub Health* 1986;76:264-9.
- Birmingham B, Dyer A, Shekelle RB, Stamler J. Subscapular and triceps skinfold thicknesses, body mass index and cardiovascular risk factors in a cohort of middle-aged employed men. *J Clin Epidemiol* 1993;46:289-302.
- Jakicic JM, Donnelly JE, Jawad AF, Jacobsen DJ, Gunderson SC, Pascale R. Association between blood lipids and different measures of body fat distribution: effects of BMI and age. *Int J Obes Relat Metabol Dis* 1993;17:131-7.
- Huang SL, Shiao G, Chou P. Association between body mass index and allergy in teenage girls in Taiwan. *Clin Experiment Allergy* 1999;29:323-9.
- Lusky A, Barrel V, Lubin F, Kaplan G, Layani V, Shohat Z, et al. Relationship between morbidity and extreme values of body mass index in adolescents. *Int J Epidemiol* 1996;25:829-34.
- Kattamis C, Liakopoulou T, Kattamis A. Growth and development in children with thalassemia major. *Act Paediatr Scand* 1990; Suppl 1:111-7.
- Fuchs GJ, Tienboon P, Khaled MA, Nimsakul S, Linpisam S, Faruque ASG, et al. Nutritional support and growth in thalassemia major. *Arch Dis Child* 1997;76:509-12.
- Tienboon P, Sanguanserm Sri T, Fuchs GJ. Malnutrition and growth abnormalities in children with beta-thalassemia major. *Southeast Asian J Trop Med Pub Health* 1996;27:356-61.
- Saxena A (2003): Growth Retardation in Thalassemia Major Patients. *Int J Hum Genet*, 3(4): 237-246.
- Hashemizadeh H, Noori R. Assessment of physical growth in patients with beta-thalassemia major in Mashhad. *Scientific Journal of Iran Blood Trans Organ*. 2013;9(4):446-454.
- Huang YL, Liu S, et al. Relationship between growth disorders and iron overload in children with beta-thalassemia major. *Chinese Journal of Contemporary Pediatric*. 2008;10:603-6.
- Nazar BA, Abdulkader Al, Azhar H, et al. Growth Pattern and Sexual Maturation Rate in Beta-thalassemia Major Patients from Thalassemia Center Erbil. *The Iraqi Post-graduate Medical Journal*, 2013; 12:40-44.
- Spiliotis BE. β -Thalassemia and normal growth: are they compatible? *Eur J Endocrinol* 1998;139:143-4.
- Hammer LD, Kraemer HC, Wilson DM, Ritter PL, Dornbusch SM. Standardized percentile curves of body mass index for children and adolescents. *Am J Dis Child* 1991;145:259-63.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL