Staturo-weight Profile of Sickle Cell Children (Kenitra, Morocco)

A.Belala, I.Marc, S.Sadek, M.Mouden, S.Mouden D.Belghyti, K. El kharrim.

Abstract: ***Sickle cell disease, a genetic disease of hemoglobin, mono-mutational and autosomal recessive [1]. In Morocco, the whole epidemiology of hemoglobinopathies remains unidentified. The World Health Organization "WHO" estimates that in Morocco up to 6.5% are infected; A fact which suggests the existence of 30,000 cases of major forms of Thalassemia and sickle cell disease in Morocco. Several unpublished studies conducted by the Hospital for children of the universuty hospital center have shown that northwestern Morocco is a favorite haemoglobinopathies area and that the Gharb Chrarda Beni Hssein region (GCBH), seems the most affected region especially at the level of Kenitra city, at the commune of Mnasra which is a hotbed of thalassemia.The objective of this study was to evaluate the changes induced by the sickle cell disease on the growth of weight loss of sickle cell children and to assess their interaction with certain disease severity factors. The study is based on a sample of 32 sickle cell patients who are hospitalized at the pediatric level between 2012 and 2015 in the Kénitra provincial hospital. The results confirm unstable prevalence of the weight-of-weight status of the population according to the 2007 WHO growth references for the 1-month-61 month age group, with a prevalence of 21.73 % (N = 5), The study also revealed that meagerness affects 8.69% (N = 2), while overweight attains 0%. Based on these results, it was concluded that stool-weight loss is more severe in sickle cell children than normal children in comparison with the results of the study by Aboussaleh [2], El Hioui [3] ,and Sbaibi [4].***

***Keywords*: Sickle cell disease, haemoglobinopathie, Gharb Chrarda Beni Hssein region,**

I. INTRODUCTION

Sickle cell disease is a genetic disease anomalie qualitative de l'hémoglobine par mutation ponctuelle sur le gène codant la chaîne bêta de l'hémoglobine [5] that confronts the family with painful, iterative and unpredictable crises in the affected child, with the risk of death and expensive care costs[6]; Elle se caractérise par la polymérisation de l'hémoglobine S au sein du globule rouge, responsable d'une anémie hémolytique chronique, de crises vaso-occlusives osseuses (CVO) douloureuses et d'atteintes dégénératives touchant divers organes [7], et des situations d'hyperhémolyses [8]. La transfusion de globules rouges est un traitement majeur de la drépanocytose [9,10].

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***** Correspondence Author

A.Belala, Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP.

I.Marc, Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP.

S.Sadek, Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP.

D.Belghyti, Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP.

K. El kharrim. Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP.

II. THE BACKGROUND AND METHOD OF STUDY:

✓ Ground of Study

An anthropometric and socio-economic survey was conducted in March 2012 to 2015 at the Kenitra Provincial Hospital.

✓ Study method

Identification of gender-weighted deficit: The capture of size-based measures; weight; sex; date of birth and date of measurement via the WHO Anthro software makes it easy to generate bell curves.They illustrate the distribution of the Z-scores of the size-for-age index and the BMI calculated according to the growth references of WHO 2007.

These curves are shifted to the low values on the left compared to the reference population of the WHO 2007, so they signify the existence of the subjects in a state of insufficient stature and in a state of emaciation. And one can directly draw prevalences according to the gender and the age groups via the software WHO Anthro.

III. RESULTS AND DISCUSSIONS

III-1-Anthropometric characteristics

III-1-1-Overall results of anthropometric parameters

The following table shows that the sample consists of 39.13% of girls (N = 9) and 68.78% of boys (N = 14). The average age of the subjects is 3.68 years with extremes of 1 year and 5 years. The mean values of the ratio of z age-size score is -0.98 ± 1.29, that of the weight for age -0.43 ± 1.37 corporal totality index of -0.28 ± 1.42.(Table 1).

Table 1: Overall Results of Anthropometric Parameters

settings	girls n=9 average ± E type	boysn=14 average± E-type	Total population average± E-type
Weight (Kg)	13,77±3,03	15,21±3,59	14,65± 3,31
Size (Cm)	95,22± 10,24	95,35±11,62	95,30±10,86
Size for age (average Z-score)	-1,07±1,27	-0,85±1,38	-0,98±1,29

Weight for age (average Z rating)	-0 ,31 ±1,29	0,55±1,36	-0,43 ±1,37
BMI (average Z-score) (average)	-0,25±1,27	0,63±1,44	0,28±1,42

The average Z-score of the age-size of girls is lower than that of boys, suggesting that stature deficiency and thinness are more marked in girls than boys (Table 2).

Table 2: Prevalence of growth rate and underweight in sickle cell patients

	Total population	
	Effective	%
Weight for age (W/A) W/A<-2z score W/A≥-2z score	 1 22	 4,34% 95,65%

According to the size-to-age ratio, 21.73% of sickle cell disease has been found to be a growth rate indicator. Weight-for-age ratio was found in 4.34% of sickle cell patients aged between 1month and 61 month. Un retard de croissance (RC) chez les enfants drépanocytaires est fréquent et multifactorielle

III-2-Stomach Weight Growth

III-2-1 Size ratio for age

The size-to-age ratio commonly used to estimate leanness, according to the comparison of these results with baseline data [12].The figure shows that the size-for-age Z-dimension distribution is shifted to the left relative to the reference population with a flattening degree equal to Fischer -0.97, which explains the existence of subjects in a state of As well, 21.73% (T / A <-2z score) of sickle cell patients were underweight (Figure 1).

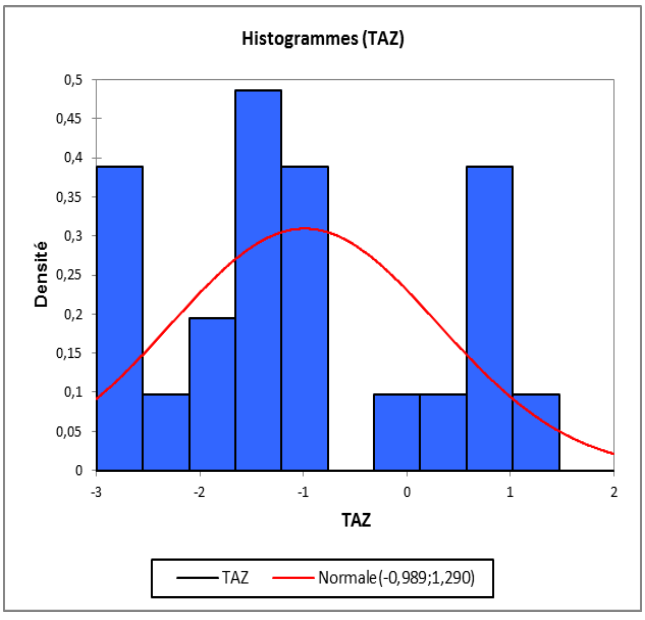

Figure 1: Distribution of the Z score of the ratio of height for age

III-2-2-Weight ratio for age

The diagram above illustartes the weight-for-age distribution Z is shifted relative to the reference population with a degree of flattening equal to -0.38, whose mean is 0 [14], this explains the existence of subjects in a state of poor stature in thinness (Figure 2).

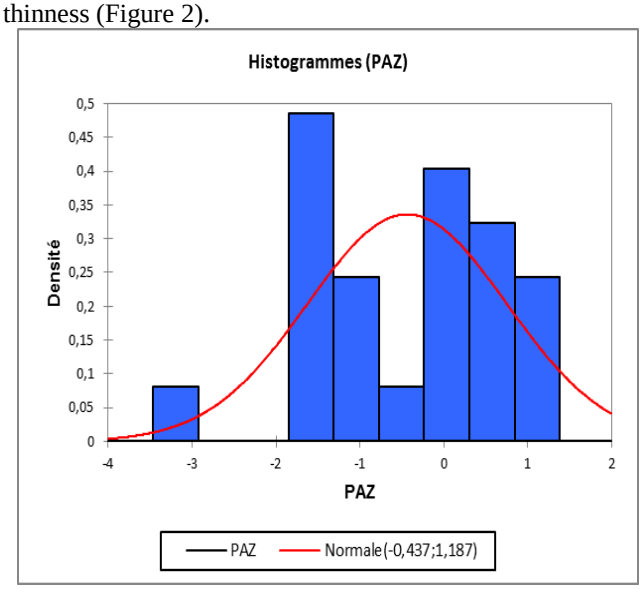

Figure 2: Distribution of Z weight-for-age ratio score

III-2-3- Body totality Indexes (BMI)

Measuring and interpreting growth in sickle cell children is very important for assessing the level of individual and collective health of nutritional status. The standards used for comparison purposes vary widely, as do the classification systems for the growth gap. To compare the height / age and weight / age ratios to the baseline we chose the Z-Score instead of the percentile or the percentage at the median. This method is the recommended approach for comparing distributions of nutritional indices assessed for empirical reference populations [15]. The following chart demonstrates that the prevalence of stature deficiency is 21.73% (N=5). And according to the IMC / AGE report we found that leanness affects 8.69 %% (N = 2), while overweight occupies 0%.It seems that switching to a family meal is not always beneficial for the child. The size deficit is a sign of growth rate that starts very early at the age of 3 and reflects early malnutrition. Food diversification and environmental health are the determining factors during this period (Table 3).

Table 3: The prevalence of malnutrition in sickle cell patients

	Indicators of malnutrition	Observed workforce	Malnourished workforce	prevalence	Nutritional status
Size for age	<-2 Cote Z	100	5	21,73%	Delay ofGrowth
BMI for age	>3 Cote Z	100	0	0%	Obese
	>2 Cote Z	100	0	4,34 %	En surpoids

	>1 Cote Z	100	9	29,13%	Possible risk of overweight
	0	100	7	0%	
	<-1 Cote Z	100	5	21,37%	
	<-2 Cote Z	100	2	8,69 %	Emaciated
	<-3 Cote Z	100	0	0%	Seriously Emaciated

III-3-Anthropometric identification of nutritional risk

In Morocco, there is scant work reporting levels of malnutrition prevalence among children with sickle cell disease [16], hence the importance of determining them to assess the severity of malnutrition, and the risk of different forms of malnutrition vary by age group and gender.It is important to conduct a study to determine the variability of these prevalences by age group and gender.

III-3-1-According to the weight Z-ratings for age (1month to 61months)

The graphs compare the curves of the anthropometric indices of sickle cell children with the normal curve of the reference population.If the curves of the indices are located to the left of the normal curve of the reference population with a flattening degree equal to Fischer at -0, 38, this indicates malnutrition or poor nutritional status compared to the reference population. On the other hand, when the index curves are located to the right of the normal curve of the reference population, this reflects the presence of over-nutrition relative to the reference population. The nutritional status is identical or similar to that of the reference population, when the curves are superimposed on the median line with that of the reference population (Figure 3). Cette retarde de croissance est du au mal nutrition des enfants drépanocytoses vus a sont état psychologique car la plupart des enfants sont présentant une dépression légère à modérée avec anxiété [17].

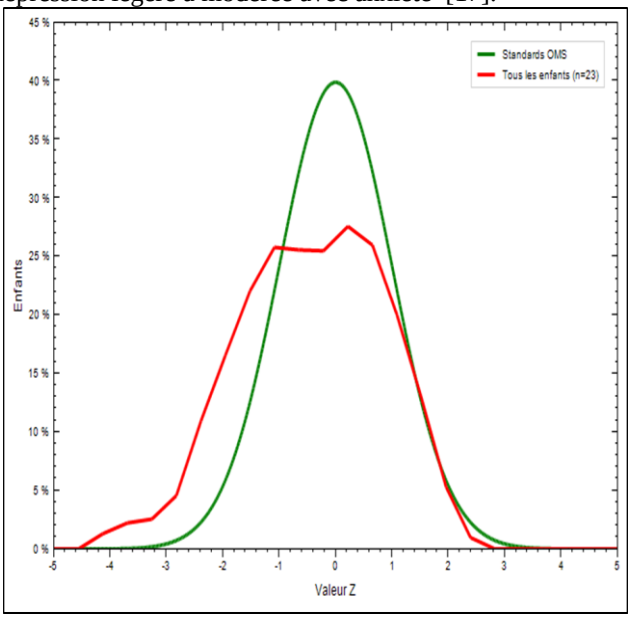

Figure 3: Distribution of weight Z-scores for age (n = 23) between 1-61months

From Figure 13 which represents the weight-to-age ratio for children with sickle cell age of 1 month to 61 months and the curve of the indices obtained are located to the left of the normal curve of the reference population, this indicates malnutrition or poor nutritional status compared to the reference population, and according to other studies confirms this growth rate especially with the homozygous form. [10,11, 12].Although the mechanisms are not yet fully understood, alteration of bone growth is evoked [12]. According to most authors, at birth, children with Sickle Cell Disease (SS) have a normal height, but a significant size impairment occurs around the age of five [13]. In a study conducted in Baltimore (USA) in sickle cell children, Henderson et al [14]found that 25% of these had weight, height, and weight / weight ratios. Smaller than the 5th percentile compared to the National Center for Health Statistics (NCHS) standard.The frequency of impaired growth increases with age, although sexual differences have not been found [15]. Other authors, however, reported more severe deficits in boys [17,18, 19]

III-3-2-Based on Z ratings of Age-Size

The anthropometric index curve is located to the left of the normal reference curve with a flattening degree equal to Fischer -0.97, the problem of child malnutrition manifested by growth rate, wasting or underweight, is very serious (Figure: 4).

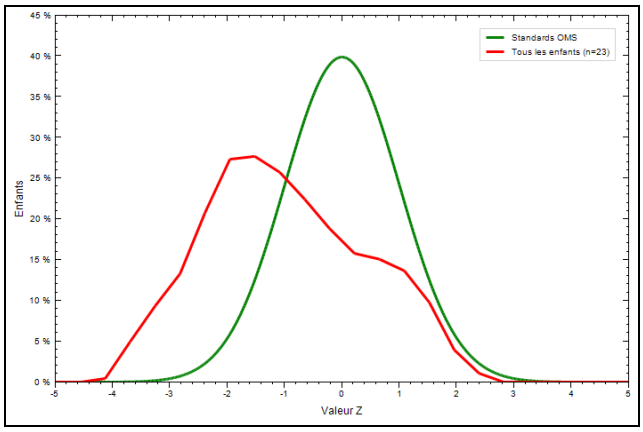

Figure 4: Distribution of size Z ratings for age (n = 23) between 1-61months

III-3-3-Based on Z-scores of BMI / age

Another method of assessing nutritional status is the examination of the age-specific BMI curve. It is noted that the index curve of the nutritional status has a particular and different look of the reference population, with an equal degree of flattening according to fischer -0.61, this indicates a malnutrition or a poor nutritional status related to the population under question (Figure 5).

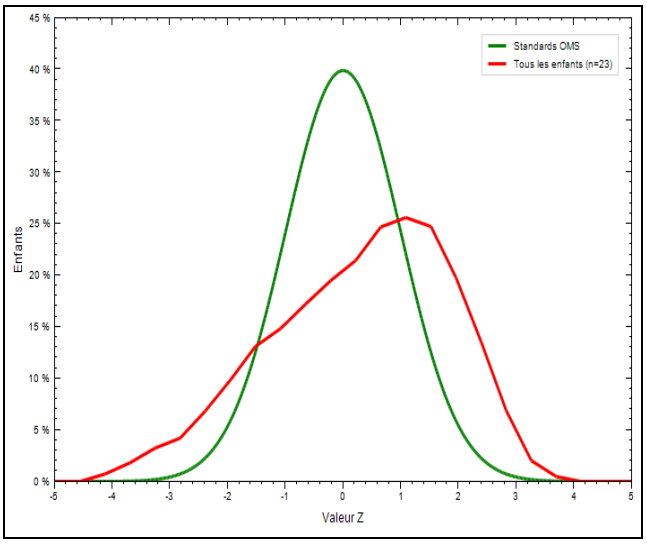

Figure 5: Distribution of Z-scores of BMI for age (n = 23) between 1-61months

IV. CONCLUSION

The results of the demographic and health surveys conducted at the Provincial Hospital of Kenitra in 2012 and 2015 revealed high levels of malnutrition in sickle cell patients. Malnutrition in children with sickle cell disease remains a serious health problem.The result of this analysis revealed a close association between sickle cell disease, growth rate and underweight

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AUTHORS PROFILE

A.Belala I.Marc, S.Sadek, D.Belghyti, K. El kharrim. Laboratory of Biotechnology and Environment,Biology department,Faculty of Sciences,IbnTofail University,BP. 133 Kenitra 14,000, Morocco.

S. Mouden Equip of Clinical and Cognitive Neuroscience and Health, Department of Biology, Faculty of Science, Ibn Tofail University, Kenitra, Morocco.

M.Mouden. Botanical and Plant Protection Laboratory, Department of Biology, Kenitra, Morocco.