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Research article

Prevalence of Underweight, Stunting, and Wasting Among Preschool Children Aged 49- 72 Months in North East-Libya.

Abdelhamid M. S. Flailih and Tawfeg A. Elhisadi

Faculty of Medical Technology, Department of Public Health, Derna – Libya Corresponding author: email: drelhisadi@yahoo.com - Tel: (218) 927843258

Abstract

The prevalence of malnutrition among preschool children can be used to determine the need for nutritional surveillance, nutritional care, or appropriate nutritional intervention programs in a community. Information on nutritional status among children aged four to six years is limited, particularly in Libya. The aim of this study was to assess the prevalence of underweight, stunting, and wasting among preschool children aged 49-72 months. Three main government kindergartens in the city were used as source of sample collection. A total of 451 children (229 girls and 222 boys) were collected randomly to be the final sample size. Height was measured to the nearest 0.1 cm using a local made instrument against a wall. Weight was measured to the nearest 0.5 kg using a calibrated digital scale. Weight, height, and age data were used to calculate weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ), z-scores based on WHO standards 2006 reference data. This study revealed that 86.5% of preschool children have a normal weight for age (WAZ), while 13.1% considered as mild underweight, and 0.4% was moderate underweight. The result showed that there was no severe underweight among both gender. Mild stunting and mild underweight had a higher prevalence among girls at 24.0% and 14.0% respectively, compared with boys who had 12.6% and 12.2% respectively.

Keywords: preschool children, anthropometric parameters, nutritional status, underweight, stunting, wasting, z-score

Introduction

Malnutrition is one of the most important underlying causes of child mortality in developing countries, particularly among preschool children (1). A consistent, significant effect of both mild-to-moderate and severe malnutrition exists on mortality across diverse world populations (2). Thus, when attempting to reduce child mortality, monitoring and reducing the prevalence of malnutrition in vulnerable populations is essential. Low weight-for-age indicates a history of poor health or nutritional insult to the child, including recurrent illness and/or starvation, while a low weight-for-height is an indicator of wasting (i.e., thinness) and is generally associated with recent illness and failure to gain weight or a loss of weight (3). Knowing the levels of stunting, underweight, and wasting is important in determining the overall health of the community. A lack of knowledge on the nutritional needs of children and the benefits of breastfeeding contributes to childhood malnutrition (4). The extent of hunger has also been associated with low energy intake, low micronutrient intake and poor income levels, this affects growth patterns negatively. In South Africa (SA), estimates of under-five mortality during 2005 ranged between 69 and 76 per thousand, approximately 60 000 per annum (5). Children are classified as moderately underweight when the weight-for-age is below the median by -2SD. When the proportions are below the median by -3SD, this is regarded as severe underweight (6,7)

Materials and Methods

This study was conducted in Derna city located at North East of Libya among preschool children of both sexes during Kindergarten (KG) day, school year 2013/2014.Age ranged between 49 and 72 months with mean of 63.61months (±6.07). KGI consist of 171 (99 girls and 72 boys) and KGII consist of 280 (130 girls and 150 boys). The survey sample is based on basic anthropometry data (height and weight) among preschool children. Respondents were obtained from three government Kindergartens, namely, Alzhohor , Altefel Alnemothejy and Amena Bent-Wahb Kindergartens. Height measured to the nearest 0.1cm with a portable stadiometer. Weight was measured to the nearest 0.5 kg using a calibrated digital scale. Measurements were collected with participants in either thin socks or barefoot and with heavy clothing items removed. Each child was measured to 100 g to minimized error. Body mass index (BMI) was computed as weight in kilograms divided by the square of height in meters**.** Weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ), z-scores were calculated based Z-score indicators from the 2006 WHO growth standards. New cut-offs based on 2006 WHO standard: data were excluded if a child's HAZ was below – 6 or above + 6, WAZ was below – 6 or above +5, WHZ was below–5 or above +5, or BMIZ was below –5 or above +5.

Statistical analyses

All obtained data were statistically analyzed using the Statistical Package for the Social Sciences (SPSS) version 13.0 under Microsoft Windows 7 professional was used for data analysis. Descriptive statistics (mean, median, and SD), were calculated for each sex group. Data analysis was performed using the Emergency Nutrition Assessment© program (ENA for smart 2011). The anthropometric indices (WAZ, HAZ, and WHZ) was calculated as z-score).

Results:

A total number of 451preschool children 229 girls (50.8%) and 222 boys (49.2%) were included in this study. The distribution according to Kindergarten and gender, as shown in table 1 and figure 1.

Table 1: Distribution of children by Kindergarten name and gender.

KG* Name	Girls	Boy	Total	Percentage
El-Zohoor KG	20	20	40	8.9 %
Amena Bent-Wahb KG	132	115	247	54.8 %
Al-Tefel El-Nomothejy KG	77	87	164	36.4 %
Total	229	222	451	100 %

*Kindergarten

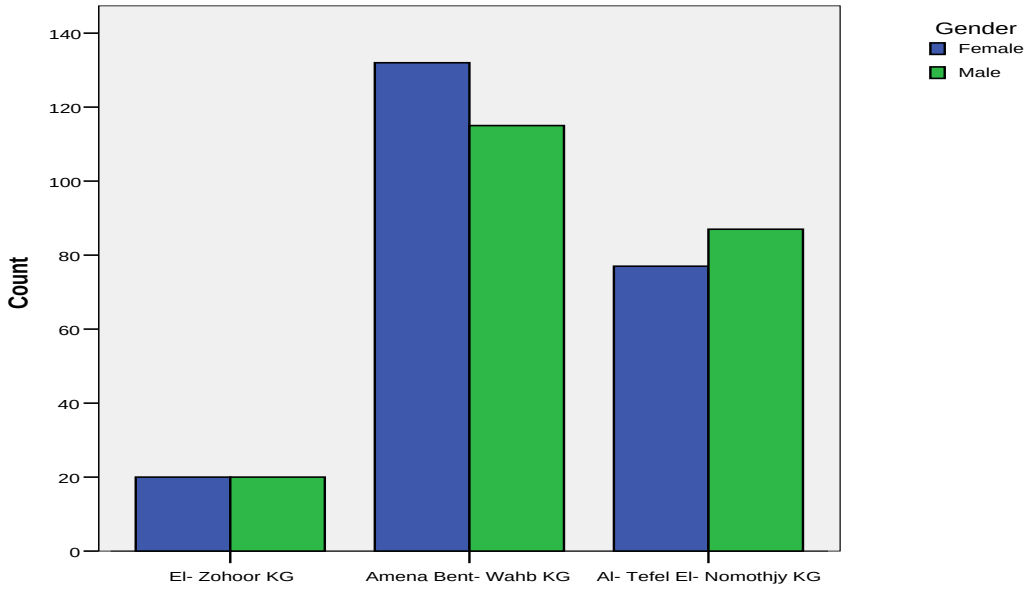

Figure 1: Distribution of children according to Kindergarten name and gender.

Variables such as age and anthropometric parameters (weight, height, and BMI) were measured for all subjects. The overall mean weight, height, and BMI of preschool children were 20.74 ±3.65 Kg, 1.09±0.055 m, and 17.206±2.22 kg/m^{2}respectively as shown in table 2.

Table 2: weight, height, and BMI profile of preschool children.

	Body weight (kg)	Body height (m)	BMI (kg/m^2)
Minimum value	13.0	0.95	11.46

Maximum value	45.0	1.27	34.93
Mean and ±SD	20.74 ±3.65	1.09±0.055	17.206±2.22

The overall mean weight, height, and BMI of girls were 20.34 ±3.18 Kg, 1.08±0.056 m, and 17.229±2.09 kg/m^2 respectively. As for boys the overall mean weight, height, and BMI were 21.159 ±4.045Kg, 1.106±0.052m, and 17.183±2.356 kg/m^2 respectively as shown in Table 3.

Table3: weight, height, and BMI profile of both sexes.

Parameter	Body weight (kg)		Body height (m)		BMI (kg/m)^2	
Sex	Girls	Boy	Girls	Boy	Girls	Boy
Minimum value	13.0	14.5	0.95	0.97	11.46	13.43
Maximum value	32.0	45.0	1.22	1.27	26.30	34.93
Mean and ±SD	20.34 ±3.18	21.159 ±4.045	1.08 ±0.056	1.106 ±0.052	17.229 ±2.09	17.183 ±2.356

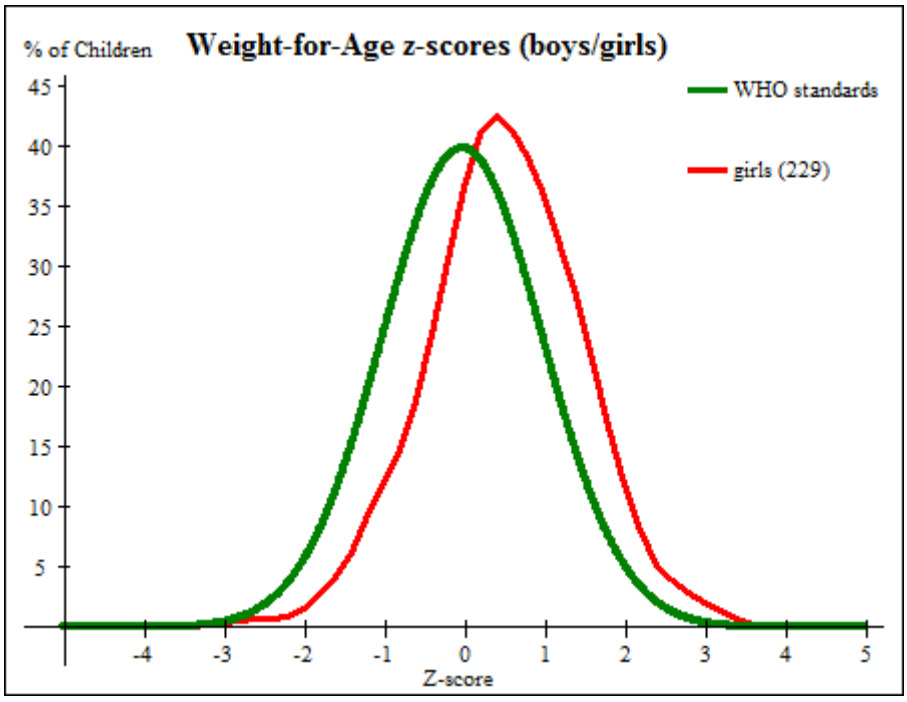

Figure 2: Comparison of the distribution of z-score for weight-for-age (z-score) of girls compared to WHO child growth standards.

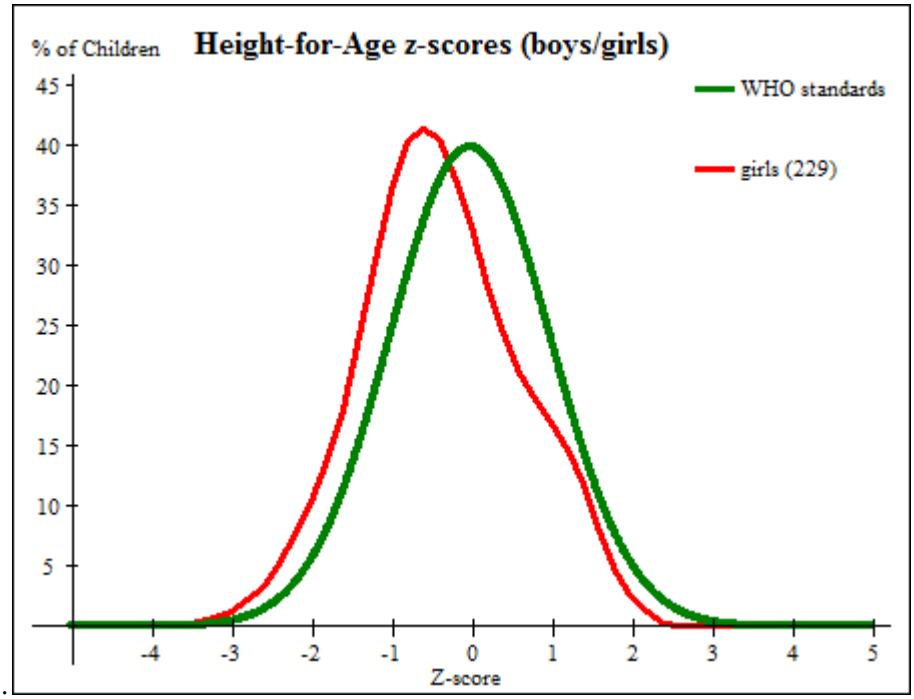

Figure 3: Comparison of the distribution of z-score for height-for-age (z-score) of girls compared to WHO child growth standards.

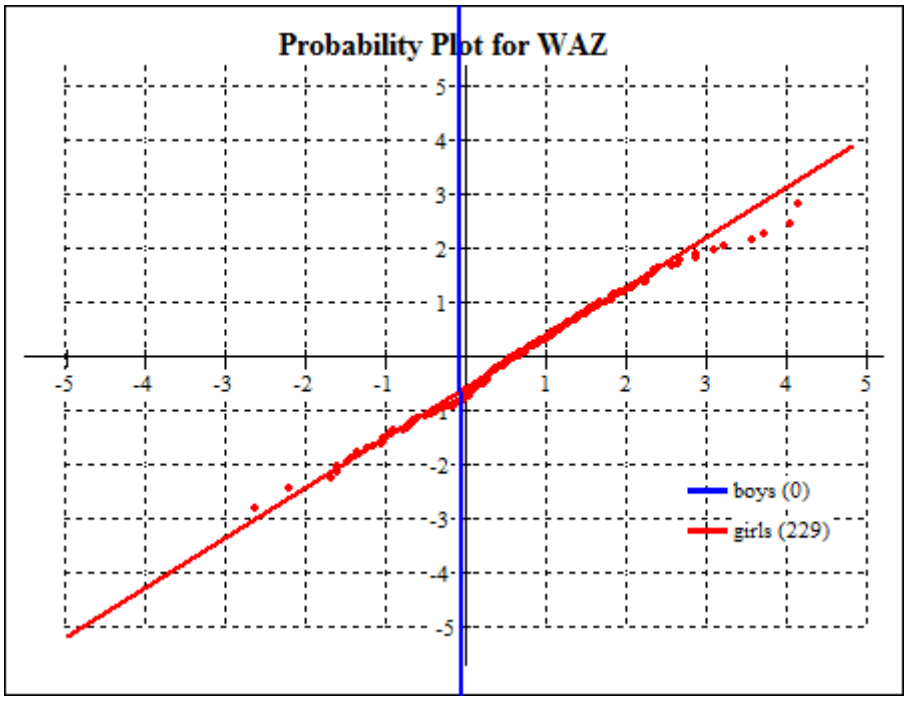

Figure 4: Probability plot for weight-for-age Z-score of girls.

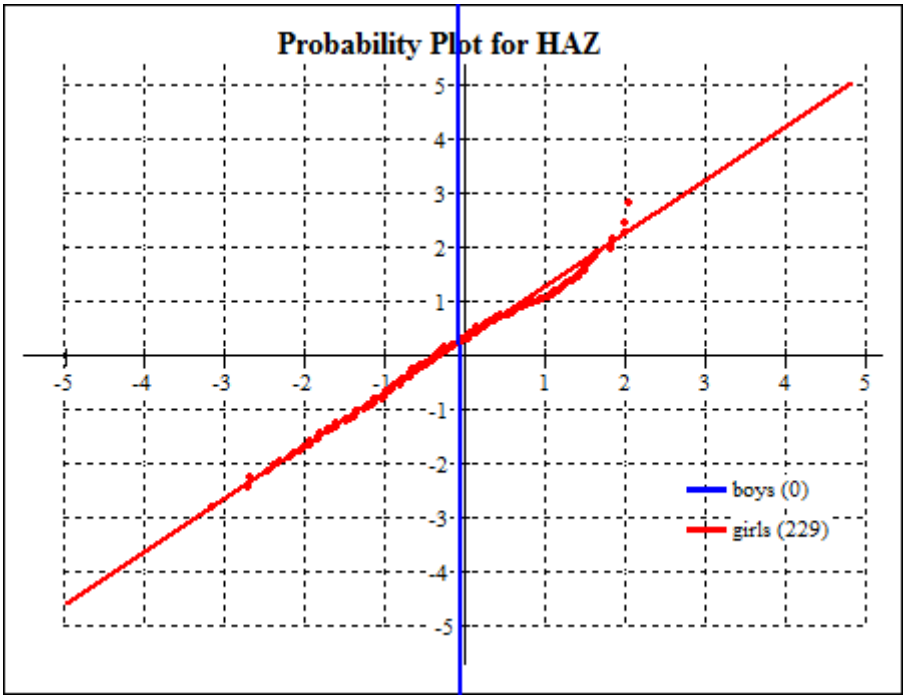

Figure 5: Probability plot for height-for-age Z-score of girls.

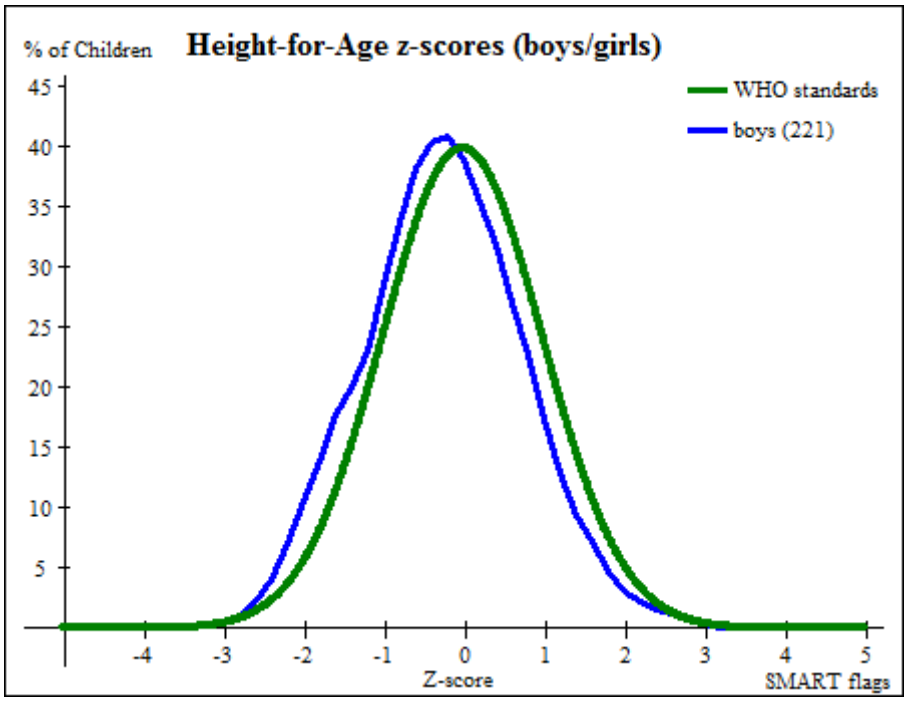

Figure 6: Comparison of the distribution of z-score for weight-for-age (z-score) of boys compared to WHO child growth standards.

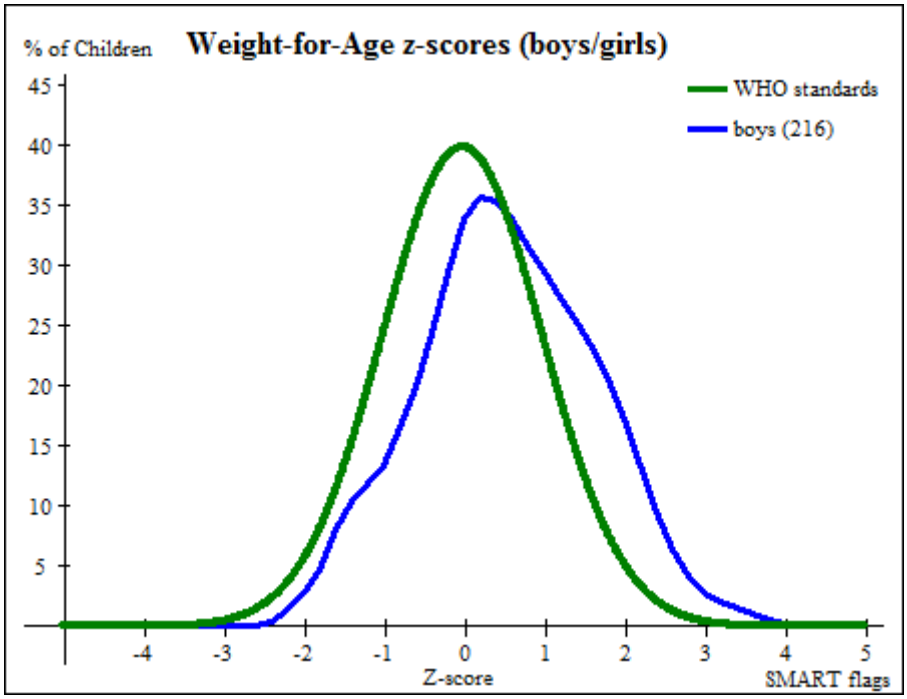

Figure 7: Comparison of the distribution of z-score for height-for-age (z-score) of boys compared to WHO child growth standards.

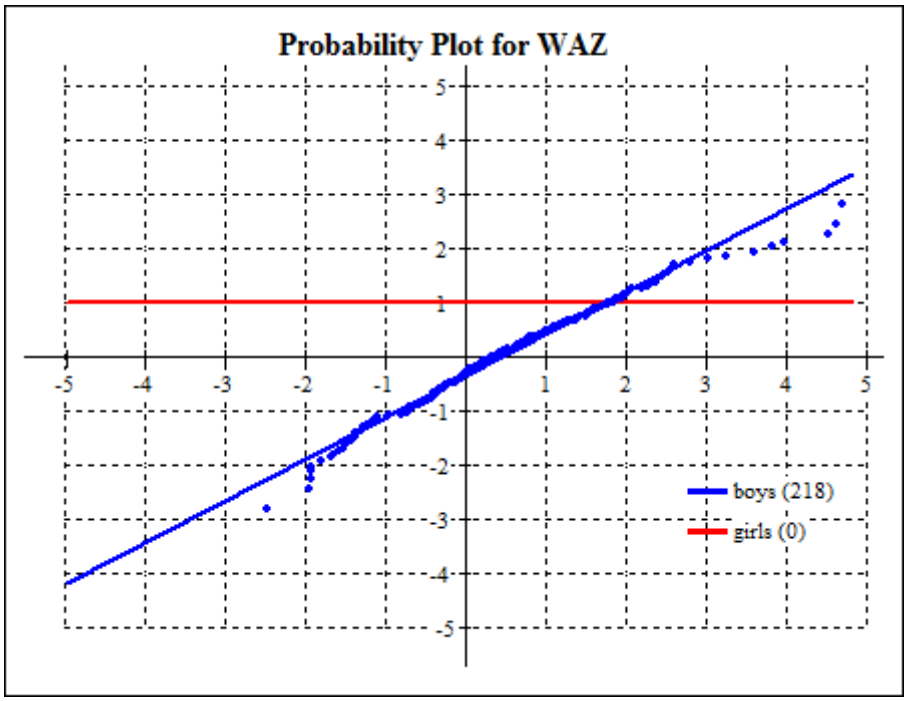

Figure 8: Probability plot for weight-for-age Z-score of boys.

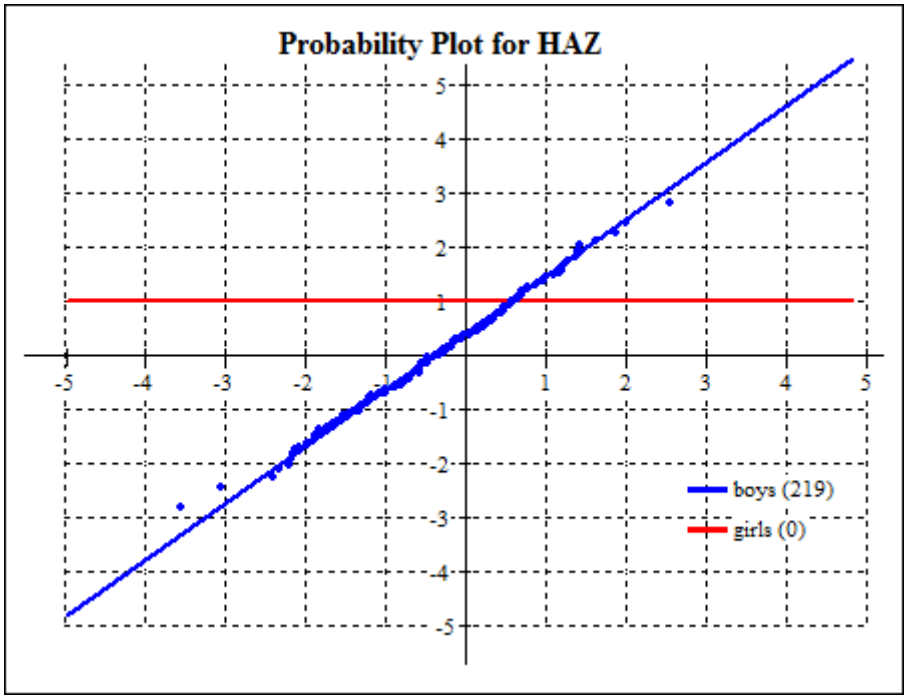

Figure 9: Probability plot for height-for-age Z-score of boys.

Discussion

Overall results of the three anthropometric indices stunting (HAZ), underweight (WAZ), and wasting (WHZ), revealed that 80.3%, 86.5% and 89.8% of the total 451children include in this study had normal (healthy) height-for-age, weight-for-age and weight-for-height respectively. Mild stunting and mild underweight had a higher prevalence among girls at 24.0% and 14.0% respectively, compared with boys who had 12.6% and 12.2% respectively. Mild wasting of boys 11.3% was higher than of girls 8.7%. Girls who had moderate underweight and moderate wasting was 0.9% and 0.4% respectively, whereas, no cases reported for boys. This study showed that, severe wasting and severe underweight were not recorded among preschool children in Derna.

This study revealed that 86.5% of preschool children have a normal weight for age (WAZ), while 13.1% considered as mild underweight, and 0.4% were moderate underweight. The result showed that there was no severe underweight among both gender as showing in table 4.

Table 4: Prevalence of underweight (WAZ), among preschool children.

Weight for age (WAZ)	No. of children	Percent (%)
Normal weight for age	390	86.5
Mild underweight	59	13.1
Moderate underweight	2	0.4
Sever underweight	0	0
Total	451	100

The Prevalence of underweight according to child's gender is given in Table 5 and figure 10. There were no cases of sever underweight for both genders, only 0.09% with moderate under weight. Mild underweight girls and boys were 14.0% and12.2% respectively. One-hundred and ninety five girls (85.2%) and 195 boys (87.8%) have normal weight for height.

Table 5: Prevalence of underweight (WAZ) according to gender.

Gender	Weight for age (WAZ)	No. of children	Percent
Girls	Normal weight for age	195	85.2
	Mild underweight	32	14.0
	Moderate underweight	2	0.9
	Severe underweight	0.0	0.0
	Total	**229**	**100**
Boys	Normal weight for age	195	87.8
	Mild underweight	27	12.2
	Moderate underweight	0.0	0.0
	Severe underweight	0.0	0.0
	Total	**222**	**100**
	Total	**451**	**100**

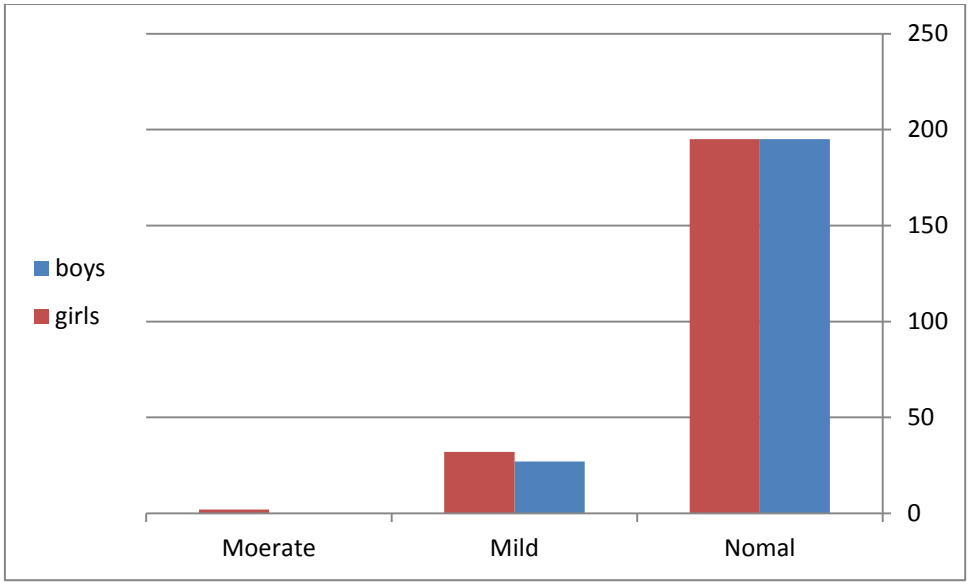

Figure 10: The prevalence of underweight among both sexes.

As shown in Table 6, the overall prevalence of normal weight-for-height, mild wasting, and moderate wasting among preschool children were 89.0%, 10.0%, and 0.2% respectively. The results showed that, sever wasting were not founded among children.

The prevalence of normal weight- for- height (WHZ), mild wasting, and moderate wasting of girls were 90.8%, 8.7%, and 0.4% respectively. The prevalence of normal weight- for- height, mild wasting, and moderate wasting for boys were 88.7%, 11.3% and 0.0% respectively and there is no cases of moderate wasting among boys.

Table6: Prevalence of wasting (WHZ) among preschool children.

Gender	Both genders		Girls		Boys	
Wasting (WHZ) %	No.	%	No.	%	No.	%
Normal height for weight	405	89.8	208	90.8	197	88.7
Mild wasting	45	10.0	20	8.7	25	11.3
Moderate wasting	1	0.2	1	0.4	0.0	0.0
Severe wasting	0.0	0.0	0.0	0.0	0.0	0.0
Total	451	100	229	100	222	100

No. = Number of children, %= Percentage

The prevalence of stunting among preschool children (both sexes) is giving in Table 7. The percentage of normal height for age, mild stunting, and moderate stunting of preschool children (both sexes) were 80.3%, 18.4%, and 1.3% respectively. The percentages of normal height for age, mild stunting, and moderate stunting for girls were73.8%, 24%, and 2.2% respectively. As for boys, the percentages of normal height for age, mild stunting, and moderate stunting were 86.9%, 12.6%, and 0.5% respectively.

Table7: prevalence of stunting (HAZ), among preschool children.

Gender	Both		Girls		Boys	
Stunting %	No.	%	No.	%	No.	**%**
Normal height for age (HAZ)	362	80.3	169	73.8	193	86.9
Mild stunting	83	18.4	55	24.0	28	12.6
Moderate stunting	6	1.3	5	2.2	1	0.5
Severe stunting	0.0	0.0	0.0	0.0	0.0	0.0
Total	451	100	229	100	222	100

Previous study in Libya ,revealed that 70% of children had normal weight, 4.3% were underweight, 3.7% were wasted, and 20.7% were stunted. The study concluded that Libya had a low prevalence of underweight and wasting, moderate prevalence of stunting, The study reported that 20.7% prevalence rate of stunting classifies the country as a moderate prevalence area rather than a low prevalence area (8).

A report by UNICEF 2002 reported that the percentage of children under five who are moderately to severely underweight ranges from a low of 3% in Lebanon to a high of 46% in Yemen.

The percentage of children who are severely underweight ranges from a low of near 0% in Lebanon to a high of 15% in Yemen. Algerian, Jordan, Libya and Tunisia are also in notably good shape at 1% of children under five severely underweight.

The average percentage of children under five suffering from moderate and severe wasting (when weight is compared to height) in the Arab World is 9%, on par with Developing Countries, slightly better than the average for Least Developed Countries which averages 10% and slightly worst than the average for the World which is 8%. The percentage ranges from a high of 17% in Somalia to a low of 2% in Jordan, Morocco, Qatar and Tunisia. Of note is that Mauritania and Egypt at 7% and 6% respectively are better off than the UAE, Kuwait and Saudi Arabia at 15%, 11% and 11% respectively.

The average percentage of children under five suffering from moderate and severe stunting (when height is compared to standards for age) is 28% in the Arab Countries, as compared to 32% for both the average for both Developing Countries and the World and 43% for Least Developed Countries. The percentage ranges from a high of 52% in Yemen to a low of 7% in the Occupied Palestinian Territory(OPT). Jordan and Qatar are also among the best cases at 8% and Mauritania and the Comoros Island are among the worst at 44% and 42% respectively (9). The 1.3% prevalence of moderate stunting is lower than The 10.9%, 12.9% reported from Saudi Arabia and Oman respectively. This study showed that, the prevalence of moderate and sever underweight was 0.4% and 0.0% respectively is very far from rates reported from Saudi Arabia (6.9%, and 1.3% respectively) (10,11).

Conclusion

According to WHO 2006 reference the overall age and sex combine rates of moderate of stunting (HAZ), wasting (WHZ), and underweight (WAZ) were low, 1.3%, 0.2%, and 0.4% respectively. The rates of mild of stunting, wasting, and underweight were 18.4%, 10.0%, and 13.1% respectively. In this study, the majority of the preschool children fall between ± 2.00 SD of the 2006 WHO reference, the prevalence of normal of stunting, wasting, underweight were86.5%, 89.8%, and 80.3% respectively.Severe malnutrition, sever stunting, and sever underweight not observed in this study.

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