



**PREVALENCE AND ASSESMENT OF MALNUTRITION AND ASSOCIATED FACTORS  
AMONG CHILDREN (6-59) MONTHS IN FTEEHALAGALEEN, KHARTOUM STATE,  
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### ABSTRACT

Malnutrition is a serious problem because it causing death of 3.5 million children under five years old per year in the world as well as it rank the third level in the world of the disease burden in this age group. This study counducted to asses the prevalence of malnutrition and associated factors among (6-59) months children in FteeehaALagaleen using newly developed WHO growth standards. A community based cross sectional study was conducted, in FteeehaALagaleen, Khartoum state, Sudan, on November 2017. 110 children aged (6-59) months were studied for nutritional status, Socio-demographic measures were obtained from structured questionnaires and followed by Anthropometric assessment using standard method Z score for anthropometric data calculated by WHO Anthro. Descriptive statistics was calculated using SPSS 20, and ENA smart for calculation of Z score using anthropometric measures. We found that (44.5%) of children were stunting, (23.7%) of children were wasting, (40.9%) of children were underweight. Among Sociodemographic factors maternal education and monthly income were found to be had greater impact on nutritional status of children. Study concluded that the prevalence of malnutrition among children (6-59)months in FteeehaALagaleen was relatively high and also the study found significant association between size at birth and under weight.

**KEYWORDS:** Malnutrition, Children, Wasting, Underweight.

### INTRODUCTION

Malnutrition refers to deficiencies, excesses, imbalances, in person's intake of energy and nutrients.

The term malnutrition includes three broad groups of conditions: Under nutrition which includes wasting (low weight for height), stunting (low height for age) and underweight (low weight for age), Micronutrient-related malnutrition which includes micronutrient deficiencies (a lack of important vitamins and minerals) or micronutrient excess and overweight –obesity and diet related on communicable diseases.

Childhood under-nutrition in the form of chronic and acute malnutrition coexist in many populations in developing countries. Unlike acute malnutrition which is associated with immediate crisis such as periodic food shortages, chronic malnutrition is due to inadequate nutrition over prolonged periods of time resulting from latent poverty, chronic food insecurity, poor feeding practices and repeated episodes of health problems such as infection or poor health services in unhealthy environment.<sup>[1,2]</sup> Malnutrition is a serious problem

because it causes the deaths of 3.5 million children under five years per year in the world as well as it's the third level in the world of the diseases burden in this age group. More than 25% under five years old children in the developing world are malnourished which accounts for about 143 million children. Under nutrition conversely has been estimated to be an underline cause for about half of all child deaths worldwide. Several studies have reported that poverty, inadequate access to a balance diet and underlying diseases (tuberculosis, malaria, diarrhea, etc.) contribute to high levels of malnutrition.<sup>[3,4]</sup>

This research will be done because malnutrition is a big problem that has distributed in recent decades among children in different regions in Sudan and has a mass effect in community development and welfare. also there is no active researches has done in this field.

### MATERIALS AND METHODS

#### Study design

The study utilizes community based cross sectional descriptive study design. Assessment of nutritional status

and prevalence of malnutrition among children (6-59) months in FteehALagaleen, Khartoum state, Sudan, 2017.

### Study Area

The locality represent a small Sudan as it is inhabited by 53 different tribes from all over the country, some of them have come to the area 400 years ago and some have immigrated to the locality for different reasons. The Jebel Awlia locality is considered the largest locality in Khartoum State with 942,429 inhabitants and is equal to the total population of River and Northern states population combined together. Jebel Awlia locality has 4 administrative units AlAzharai, Al-Nasr, Al-Kalakla, Jebel Awlia. The study area conducted in Jebel Awlia locality South Khartoum state (the capital of Sudan).

### Study Population

The study population was all children age between (6-59) months in Jebel Awlia locality. All children age (6-59) months and children have no congenital malformations were included in the study. children whose full birth date (months and years) were not obtained and also those whose weight or height were not measured were excluded from the study.

### Sample size & sampling

Sample frame systemized random sampling technique, area was divided firstly into four quarters and one quarter was selected randomly the first house was chosen randomly by throwing rock and then escaping three houses in the row of houses and choose the fourth one. The sample size was estimated based on the prevalence of malnutrition in children under five years old which was 15% (WHO standard prevalence) and a rounded to 196 sample size were included at 95% confidence interval

$$n = (z^2 \times p \times (1-p)) / d^2$$

$$= 1.96^2 \times 0.15 \times (1-0.15) / 0.05^2$$

n: sample size, z: confidence level, d: standard error, p: prevalence of disease

### Data Collection

Cross sectional data of 110 (6-59) years old children was obtained from FeteahAlagaleen area in Khartoum state. Categorical data was collected in 2017 from mothers in the area.

The questionnaire was obtained depending on literature review. Quality checks were done by supervisors and researchers through all the work from the questionnaire writing and data collection until writing the report. The questionnaire was first prepared in English, translated into Arabic and then retranslated back to English to check for its consistency.

Data collector was trained on how to fill each part of the questionnaire and anthropometry measurement.

The questionnaire consisted of socio demographic and economic characteristics, determinants of malnutrition and wasting, child health caring practice and child anthropometry.

### Anthropometric component

In this component of the questionnaire, height and weight measurement of the child is taken, digital weight scale was used to measure weight of children, those who were below 24 months was weighed by Brand infant scale. The height of children was measured using a calibrated height measuring board, a child who cannot stand (6-8) months was measured in supine position using ruler.

### Variables

1. Independent variables Sex, Age in months, Age of mother, Educational level of mother and father, Weight of child, Height of child, Father's and mother's job.
2. Dependant variables Type of family, Number of children, Complementary feeding, Age at weaning, Age of child at birth, Vaccination Mode of delivery, Diarrhea, Pneumonia and Fever.

### Data Analysis

The data presented as tables and graphs. The results analyzed by differences between percentages and simple correlation taking P-value <0.05 as limit of significance, using the SPSS programme version 19 and ENA Smart program using WHO anthro. WHO anthro was used to convert weight and height and age of child into weight for age Z score (WAZ), weight for height Z score (WHZ), and height for weight Z score (HAZ). Z score standardization = observed value / media reference value / standard deviation of reference population.

### 3.7 Ethical consideration

Written consent will be obtained from each participating person, also a consent will be obtained from the department of community medicine- university of Khartoum and Khartoum state ministry of Health.

**3.8 Limitation of Study:** Sample size included in this study was 110 due to lack of time, transport facilities and man power. Facing technical problems and financial problems.

## RESULTS

### Sociodemographic characteristics

A total of 110 cases are included in this study with over all response rate of 100%, females was found to be (59.1%) and males about (40.9%), this study indicated that (80%) of cases has family size greater than three, concerning maternal education (4.5%) Only has mothers that cannot read and write and (50%) has mothers reach university level, concerning paternal education (4.5%) only has fathers that cannot read and write and majority of father's occupation free works (50%), majority of mothers occupations were house wives. Tables(1,2,3,4)

**Child characteristics and caring practices**

The total of mothers who were delivered normal vaginal delivery about (56.3%) and who were delivered by cesarean section about (42%), age in months of children is divided into categories (6-12)months, (13-24)months,(25-36)months,(37-59)months were found to be(23.6%),(34%),(19%),(24%) respectively. about (17.3%) of child their size at birth was found to be less than 2.5 kilograms, (44.5% ) of babies are weaned before they complete two years of age and (40%) of cases are given accessory meals before they complete six months of age, (21.8%) of cases took complementary foods (iron and vitamins). (5.5%) of cases were not received or complete their dose of vaccine, percentage of children who were faced health problems such as diarrhea and fever were found to be (15.5%), (12.6%) respectively. Table2,3,4,5.

**Determinants of malnutrition**

In order to investigate the association of independent variables with malnutrition, those variables showed association with out come variables at p value less than. 05 in the uni-variate for multivariable logistic regression analysis. The multi variate logistic regression analysis was used by taking all factors into account and only one of the contributing factors remained to be significantly and independently associated with malnutrition. Weight at birth was showed statically significant association to underweight. Probable determinants of stunting in this study are found to be size at birth, we found that it has no significant association to stunting (P value =.459), another probable determinant is educational level of mother which has no significant association to stunting (P value =.230), and level of stunting was found to be(44.5%).

**Determinants of wasting**

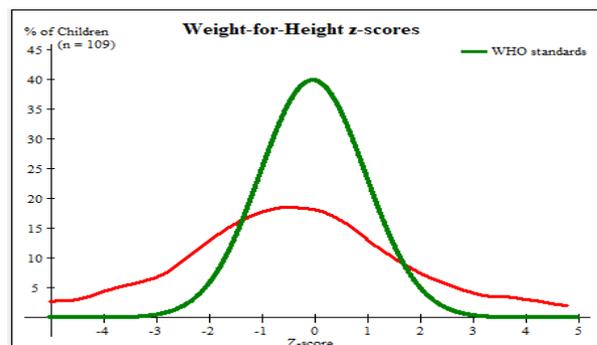
Probable determinants of wasting are size at birth which is found that has no significant association to wasting (P value =.136), educational level of mother was found also to have no significant association to wasting (P value =.431), monthly income, diarrheal episodes were found they have no significant association to wasting with (P value =.601, P value =.201) respectively, level of wasting was found to be (23.6%). Determinants of underweight status: Probable determinants are fathers education, monthly income and age at weaning which are found to be that they have no significant association with underweight with (P value=.497, P value=.332, P value=.710) respectively, we found that size at birth significantly associated to underweight (p value=0.03) with confidence interval (1.081- 8.401).

• **Table (1): Socio-demographic data of participants, in Fteeh ALagaleen, Khartoum, 2017.**

Percentages	Socio-demographic
<b>Gender</b>	
40.9	Male
59.1	Female
<b>Marital status</b>	
100	Married
0	Unmarried
<b>Mother education level</b>	
4.5	Illiterate
3.6	Khalwa
18.2	Primary
23.6	Secondary
50	University
<b>Mother occupation</b>	
80	Housewife
1.8	Worker
18.2	Employee
<b>Father education level</b>	
4.5	Illiterate
3.6	Khalwa
17.3	Primary
31.8	Secondary
41.8	University
<b>Father occupation</b>	
1.8	Unemployed
8.2	Worker
3.6	Trade works
35.5	Employee
50.9	Free work
<b>Family size</b>	
20	Three
80	More than three
100	Total

• **Table (2): Shows Weight for Height, in Fteeh ALagaleen, Khartoum, 2017.**

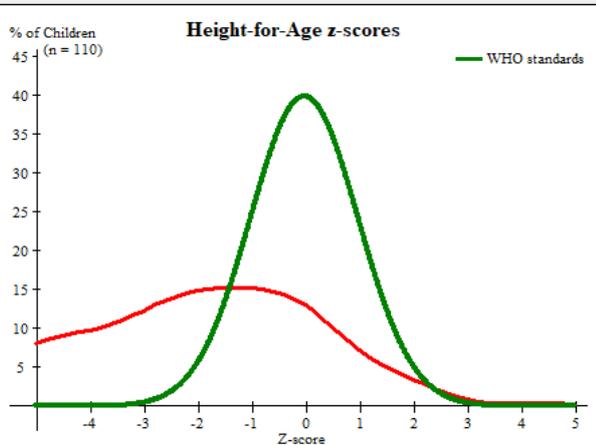
Weight for height	Percentage(%)
Wasted	23.6
Normal	76.4
Total	100



**Figure (1): Weight for height using Z score represents that 23.7% of children were wasting with< -2 SD, in Fteeh ALagaleen, Khartoum, 2017.**

- **Table (3): Shows Height for Age, in Fteeh ALagaleen, Khartoum, 2017.**

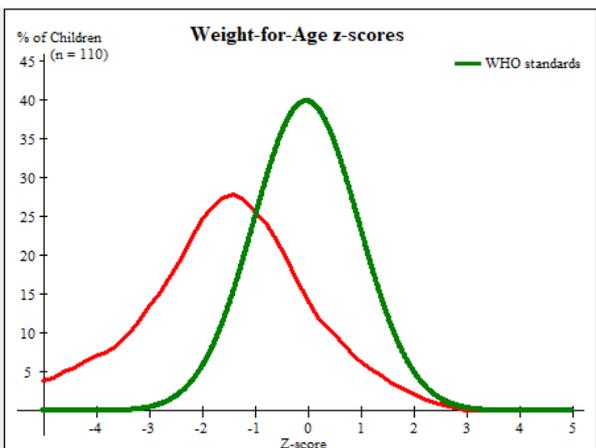
Height for age	Percentage(%)
Stunted	44.5
Normal	55.5
Total	100



**Figure (2): Height for age using Z score represents that 44.5 % of children were stunting, with < -2 SD, in Fteeh ALagaleen, Khartoum, 2017.**

- **Table(4): Shows Weight for Age, in Fteeh ALagaleen, Khartoum, 2017.**

Weight for age	Percentage(%)
Under weight	40.9
Normal	59.1
Total	100



**Figure (3): Weight for Age Using Z Score Represents That 40.9% of Children Were Underweight with < -2 SD, in Fteeh ALagaleen, Khartoum, 2017.**

**DISCUSSION**

The current study showed that prevalence of stunting, wasting and underweight among children (6-59) was found to be (40.9%),(23.7%) and (44.5%) respectively, this study has tried to come up with factors that significantly associated to malnutrition.

Malnutrition occurs during periods of vulnerability such as pregnancy, poor nutrition during intrauterine life may

affect size of baby at birth and also may lead to profound developmental consequences, in this study size at birth is taken as determinant factor of underweight and we found significant association between size at birth and underweight.

The results of the PO modl in Bangladesh among under five years children showed that both father’s and mother’s education had significant positive effects on child malnutrition. Children with secondary or higher educated father (or mother) were around 20–25% less likely to stay in the worst nutrition condition, compared to the children with illiterate fathers (or mothers). This finding coincides with several previous studies<sup>[5,6]</sup>, while in this study we found that there is no significant association between maternal and paternal education with malnutrition this is agreement with study conducted among children in Kampala which found that formal education exerted no influence on the nutritional status of children.<sup>[7]</sup>

According to Uganda Demographic and Health Survey of 2011, four in ten Ugandan children under-five years of age (33%) are stunted (short for their age), six percent are wasted (thin for their height), and 14 percent are underweight (low weight for age).<sup>[8]</sup> However in this study the findings are slightly higher level of stunting was found to be(44.5%), level of wasting (23,7%), level of underweight (40.9%).

Socioeconomic factors has strong association with malnutrition, in Demographic Republic of Congo studies shows that in richer households, often children are well fed and cared for and provided with a safe and stimulating environment, through which they are more likely to survive, to have fewer diseases and illnesses, and to fully develop thinking, language, emotional and social skills.<sup>[9]</sup> Findings are largely consistent with findings of others studies on malnutrition by socioeconomic status (SES) in SSA<sup>[10]</sup>, in this study monthly income is taken as determinant factor of malnutrition we found that it has no significant association to malnutrition.

One of the strongest predictors of malnutrition in Urban slums in India was mother’s working status. Children of nonworking mothers have better nutritional status than children of working mothers, possibly due to more time for caring of children.<sup>[11,12]</sup> Hence the busy time schedule of working mothers adversely affects the nutritional status of children. In this study we found that there is no significant association between mothers occupation and malnutrition.

Diarrhea was one of the associated risk factors of malnutrition in study done in Machakel woreda in North West Ethiopia, it found diarrhea increases the risk of malnutrition nearest to three times more likely than those who had not diarrhea. The finding of this study was similar with the study conducted in West Gojjam,

Oromia and North Gondar which indicated that the risk of diarrhea associated with malnutrition.<sup>[17,19,20]</sup> it is easy to imagine that when the number of episodes increases highly affects the nutritional status of children.<sup>[17,18,20]</sup> In this study in Feteah Alagaleen area in khartoum diarrheal episodes in the past two weeks is taken as determinant factor of wasting it is found that has no significant association with wasting.

A study in Ethiopia found that children from larger households were more vulnerable to malnutrition.<sup>[14]</sup> This could be because food for each household was limited and children were easily affected.<sup>[15]</sup> Although, other studies.<sup>[13,16]</sup> have confirmed that household size has no influence on the nutritional status of children, this is agreement with this study which shows that there is no significant association between household size and malnutrition.

### CONCLUSIONS

The study concluded the prevalence of malnutrition among children (6-59) months in Feteah Alagaleen was relatively high and also the study found significant association between size at birth and under weight. The Study recommend that proper antenatal care and also take care about feeding of pregnant women, WHO and UNICIF also recommend that there is need for exclusive breast feeding during first six months of life and thereafter semisolid complementary foods are introduced up to at least two years or more. There is need for a comprehensive study on the impact of low birth weight on underweight of children and on developing malnutrition later in life.

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