Factors affecting prevalence of stunting and associated factor among children aged 6-59 months, in Kosti Locality, White Nile State, Sudan

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Abstract

Malnutrition was one of the most common causes of morbidity and mortality among under five children in throughout the World. The objective of this study to assess the factors affecting prevalence of stunting and associated factors among less than five years children in Kosti Locality, White Nile State, Sudan. A cross-sectional community based study was conducted from 15 December to 31 January 2021, multistage cluster sampling technique followed by simple random sampling was used to select 807 children from households/care takers. Data were collected by trained community health volunteers and four qualified dietician workers under regular supervision. Data were entered into EPI-INFO version 10 software packages and SPSS version 24.0 software. Structured questionnaire and anthropometric measurement were collected using the procedure stipulated by the WHO (2006), Associations and correlations of the variables were computed using the Chi-square, 95% CI and. Variables with P value less than 0.05 was considered

as statistically significant. Study findings the prevalence of stunted were 51.4% , which the child sex, Family size, complementary feeding and monthly income were significant associated.while prelacteal feeding , exclusive breast feeding , level of education and sources of drinking water we're affecting factors As conclusion the prevalence of stunting was high in our study area, the efforts focus on the factors affect and associated with prevalence of stunting, they were, parent education, occupational status, and receiving of complementary feeding, which the presence of infection in the past two weeks were predictors to more significant associated. But the frequency of diarrhea was an only variable was not associated with stunting.

Keywords: Malnutrition, associated factor, under five children, stunting.

1. Background

low height-for-age is referred to as stunting and occurs when the Z-score is below the median by more than -2SD (WHO, 2007). Stunting is seen as a failure to reach linear growth and is prevalent in children with long-term insufficient nutrient intake and frequent infections. If a child is stunted before the age of two, then irreversible effects of poor motor and cognitive development occur. The prevalence of stunting occurs amongst one-third of the world's children (UNICEF a; WHO, 2004). Stunting is considered as a severe public health problem in the community when its prevalence in children is greater than it is%40 (WHO, 2006). largely irreversible outcome of inadequate nutrition and repeated bouts of infection during the first 1000 days of the child's life, therefore stunting is a reduced growth rate in human development Children who suffer from growth retardation as a result of poor diets or recurrent infections tend to be at greater risk for illness and death. Stunting is the result of long-term nutritional deprivation or illness, or a combination of both and often results in delayed mental development, poor school performance and reduced intellectual capacity as report (WHO, 2010).

Globally 161 million children under five were stunted in 2013 (de Onis, 2016) , In 2015, Africa has the highest prevalence of stunting at 37.6% , followed by Asia

at 22.9% (de Onis ,2012) . According to the Ethiopian mini Demographic and Health Survey (EDHS) report 2014, stunting among children under five years of age is at 40%. In the Amhara National Regional State of Ethiopia stunting, wasting, and underweight is reported to be 40%, 10% and 33%, respectively (CSA, (2014). Also the prevalence rate of stunting (low height-for-age) in developing countries' preschool children was 33% in 2000. This rate masks regional disparities. The same authors estimated that the prevalence rates of stunting for Africa, Asia, and Latin America and the Caribbean were 35%, 34%, and 13%, respectively. Prevalence rates between 30 and 39% are considered high. No doubt that Africa is the poorest continent in the world then the high poverty in Africa has aggravated the problems of poor health among children and women. According to WHO. (2011). in Sudan, 2.2 million children less than five years of age are stunted – just over one in every three children. It is no wonder that Sudan is one of the 14 countries where 80 per cent of the world's stunted children live14. A stunted child faces a higher risk of dying from infectious disease (1.9 to 6.5 times more likely to die) and the child is likely to perform less well in school (equivalent to two to three years' loss of education). Stunting is associated with impaired brain development, meaning lasting, impaired mental functioning. This, in turn, leads to significantly reduced learning Adults stunted as children earn a lower income in life (on average, 22 per cent less), which further exacerbates deprivation. For a country as a whole, stunting may result in a loss to GDP of 2 to 3 per cent per year.

Stunting can be caused by various factors such as parental, socio-demographic, and economic status, as well as cultural practices and environmental and other health related variables (WHO, 2011).

For instance, poverty, low parental education, lack of sanitation, low food intake, poor feeding practices, inadequate breastfeeding, repeated infections, family

size and birth interval are regarded as factors determinants of stunting (Gelano, 2015). Another study reported that family socio-economic status was the most important factor associated with stunting (Ruwali, 2011). Similarly to other study conducted by Derso, (2017) are in agreement that stunting is influenced by child age, age of the mother, child sex, family size, paternal education, marital status of mother, and number of livestock of the family (Asfaw,2015). Moreover, availability and utilization of health services and the care provided to the child were found to be other determinants of stunting (WHO, 2015).

The Sudan was recognizes that the stunting as a major public health problem and. stunting is greatly dependent on the local cultural factors , Such as tradition and community livelihood, then investigating the prevalence and associated factors within this context is important to development interventions to mitigate theses problem to promote good health and has implemented programmes such as free health care for pregnant women and their children as a national health insurance scheme Depending on scientific survey undertaken in 2013. On 5th September (2014) the UNICEF, revealed that report indicates to "stunting" affects five percent of the under-five population in Sudan as a whole. And they stated that, there are several contributed factors of prevalence of stunting they should be identified to avoid the occurrence of malnourishes diseases, and promote child health. These factors may include several factor like larger family size, low income, but the maternal illiteracy, literacy of parent and low maternal education was main risk factors reported (Phengxay et al., 2007). Therefore, the aim of this study was to

Materials and Methods

Study design: across-sectional community based study was conducted on 807 mothers in household with children aged 6-59 months, at a period between 15 December to 31 January 2021, to determine the prevalence of stunting and identify

the associated factors among children aged less than five years in Kosti Locality, White Nile State, Sudan.

Study area: The study was conducted in Kosti locality, White Nile State which located nearly to 390 kilo meters from Khartoum which is the capital republic of Sudan .Kosti locality it is one of nine localities in White Nile state. It was divided in to four units administrative such as Kosti north unite consist of 44 area ,Ummahani unite consist of 35 village, Kosti west unite consist of 24 area and Kosti south unite consist of 17 area according of population data for Kosti locality in 2018 (Central bureau of statistic in WNS).

The total populations is 341311 HHs and 56214 of under five children (IMM, 2017).

Study population and sampling:

The study population included children aged 6–59 months. Children who were seriously ill during the study were excluded. Out of 85 areas and 35 villages. 24 areas and 10 villages were selected by lottery method. The total sample size (n = 807) was distributed to each selected unite by proportionate allocation based on the total number of households in each unite. Using systematic simple random sampling technique which select the first household randomly and proceeded to the second participant based on the formula used to calculate sample size (ni) of each selected unite, ni=(n x Ni) /N

Data Collection Procedures and tool:

Data were collected using a structured questionnaire to collect qualitative and quantitative. In addition to anthropometric measurement. Such as weighing was done using weighing scale (soliter), Weight measurement was reported to the nearest 0.1 kg.Weight was taken without shoes; Height was measured using a portable wooden. Accumbent length was measured to nearest 0.1cm in children less than 2

years or those who were unable to stand. The child was made to lie Morton to the long axis of the board and the crown of the head placed against the fixed board. Height of children more than 2 years was measured in a standing-up position to the nearest 0.1 cm using vertical board.

Data Management

The data was analyzed using the EPI-INFO version 10 software package and SPSS version 24.0 software .The descriptive analysis was used to describe the percentages and frequency of socio demographic characteristics and mean for independent and dependent variables , Both bivariate and multivariate logistic analysis was performed to determine the prevalence of stunting with association factors. Associations of the variables were computed using the Chi-square, 95% CI and.Variables with P value less than 0.05 was considered as statistically significant, whenever p-values were less than 0.05 at 95 % CI, was used for strength association between background variables and the target outcome variables.

Ethical Considerations: Ethically clearance was obtained from the University of Elgazira Faculty of Medicine, Primary Health Care Center to the general nutrition management of White Nile state and from general nutrition management to the nutrition management in Kosti locality. Informed consent obtained from each mother/care giver after explain the purpose of the study. Confidentiality was done by using code numbers rather than names.

Results

Demographic and socio-economic characteristics

In this study, the total children participate were (807) in aged 6-59 months and complete response was obtained (100%), the majority 682 (84.5%) of the mothers were married and 355 (44.0%) were within the age group of 20–29 years. With regard to parents educational status, 600(74.3%) of fathers were received Primary

education and 640 of the mothers (79.3%) also were Primary education. The respondents 504 (62.5%) had average of more than five family size while 303 (37.5%) of households have Less than five.and majority occupation of heads of the family were labour's was about 519 (64.3%). Although more than half 431 (53.4%) of households were poor income, while less than half of data 340 (42.1%), 36 (4.5%) were middle and high income respectively.

Table (1) Demographic and socioeconomic characteristics of head of the family in Kosti district, White Nile S State, Sudan.(N=807)

	Answer	**Frequency**	**Percent**
Social status	Married	682	84.5%
	Divorce	61	7.6%
	Other	64	7.9%
Age	15 - 19 Year	139	17.2
	20-29 Year	355	44.
	40 - 49 Year	31	3.8
Education level of father	No educated	98	74.3%
	Primary	513	74.3%
	Secondary	170	21.8%
	Higher education	36	3.6%
	Post graduate	2	0.2%
Education level of mother	No educated	116	14. 4%
	Primary	544	67. 4%
	Secondary	123	15.2%
	High educated(University)	24	3.0 %
Number of the family	More than five members	504	62.5%
	Less than five members	303	37.5%
Income level	Poor	431	53.4%
	Middle	340	42.1%
	High	36	4.5%
Occupation	Government employee	120	14.9%
	Merchant	168	20.8%
	labour's	519	64.3%

Among children participated in this study, generally the children varied in terms of sex and age in about 421 (52.2%) were females, while 381(47.2%) were males, (Table 3).Regarding the children 6-59 months of age 362 (44.9%), 242 (30.0%) , 149 (18.5%) and 54 (6.7%) children were found in the age groups of 12-23month, 6-11 months, 24-35 month and 36-59 month respectively. Out 511(63.3%) of children born with normal birth weight (>2.5 kg) and 296 (36. 8%) were born with low birth weight. Regarding breastfeeding 525 (62.1%) of children were still breast feeding at the time of data collection. So the studied children, 691 (85. 7%) of them started breastfeeding immediately after birth within one hour and 104 (12. 9%) after two hours , regarding receive of prelacteal feeding at the time of birth majority of children were receive water as prelacteal feeding and quarter of them were not receive. (Table 2)

Table (2) Characteristics of under-five Children (N=807):

	Answer	Frequency	Percent
age	Six month to less than one year	242	30.0
	one year to less than tow year	362	44.9
	tow year to less than three year	149	18.5
	three yea to less than five year	54	6.7
Sex	Male	381	47.2
	Female	426	52.8
infection during the last two week,	Yes	554	68.6
	No	253	31.4
diarrhea during the last two week,	Yes	589	73
	No	218	27
Weight at birth	normal birth weight	511	63.3
	low birth weight	296	36.7
Starting of breastfeeding after birth	One hour	691	85. 7
	After two hours	104	12.9
	More than three hours	12	1.5
Receive of prelacteal feeding at the time of birth	**Yes**	**643**	**79.7**
	No	**164**	**20.3**

The environmental health characteristics

The majority households 426(52.8%) were used public tap water for drinking. and about 140 (17.3%) were drinking directly from the river Almost 368 (45.6%) of households require Carriage to fetching water. and 253 (31.4%), of the households require spigot, whereas 97 (12.0%) are required to travel on foot to fetch water.With regard to the waste disposal, 390 (48.3%) of households had toilettes; and about 314 (38.9%) had hole in the ground are traditional pit latrines, and only 51 (6.3%) of households used open field defecation **(Table 3).**

Table (3) environmental health characteristics (N=807).

	Answer	Frequency	Percent
Sources of drinking water	Water tap	426	52.8
	Wells	37	4.6
	Tanks	118	14.6
	River directly	226	28.0
Method of fetching water	Spigot	253	31.4
	Barrel	89	11
	Carriage	368	45.6
	On food (galloon)	97	12
Waste disposal	Modern bathroom	52	6.5
	Toilets	390	48.3
	Pit	314	38.9
	Open field defecation.	51	6.3

Prevalence of stunting

In our study population the overall prevalence of stunting was 51.4%, which the prevalence of stunting was 238 (53.0%) among female and 211 (47.0%) among males. The highest prevalence of stunting was seen in children age one to less than two years with prevalence of 178 (49.2%) And the lowest prevalence of stunting was seen in children aged three to less than five year with prevalence of 11 (20.4%) Table (4).

Table (4) Prevalence of stunting by age of children (N=807).

The age	Stunting	Frequency	Per cent
Six month to less than one year	168	242	69.0%
One to less than two years	178	362	49.2%
Tow to less than three year	58	149	39.0 %
Three to less than five year	11	54	20.4%

Factor associated with stunting

Child age, family size, income level, child morbidity of infection and diarrhea, prelacteal feeding in addition to complementary feeding were analyzed and the output of the multivariate logistic regression showed that all of these factors were significantly associated with stunting. (Table 5).

Age of a child was directly associated with stunting. Which children age of one to less than two years was more likely to be stunted than children aged three to less than five year, thus Unger children had a stronger association with stunting and there are statistical more Significant $p<0.05 = 0.000$).

The number of family size had also shown a positive significant association with stunting $p<0.05 = 0.000$). In which children had a family more than five members were more likely to be stunted than children had family of less than five members. There were strong association with stunting and the time of receiving an

extra meal among children, which most incidence of stunting were seen in children receiving an extra meal at less than six month of age and there were Significantly associated with $p<0.05 = 0.000$).

With regard the income of household, which the frequency of children with stunting were seen in low income level, because there was a significant association between income level and prevalence of stunting $p<0.05 = 0.027$.

The morbidity of infection and diarrhoea in past two weeks to the study, which the incidence of infection and diarrhoea were observed in more than half of children participate, but children with infection were seen more likely to be stunting than those without infection. And there was significant associated with stunting $p<0.05 = 0.035$, while children with diarrhoea were not associated with prevalence of stunting $p<0.05 = 0.350$.

Table (5) Factors association with stunting among under five children (N=807).

Variables	Stunting		P.value <0.05	Association
	Yes	**No**		
child age				
Six month to less than one year	168	73	= 0.000	Significant
one to less than two years	178	184		
Tow to less than three year	58	91		
Three to less than five year	11	43		
Family size				
More than five members	393	111	= 0.000	Significant
less than five members	102	201		
Complementary feeding				
Less than six month	278	72		
On six month	105	129	= 0.000	Significant
More than six month	34	129		
Income level				
Low	236	195		
Moderate	160	180	= 0.027	Significant
High	20	16		
Morbidity				

infection	241	175	= 0.035	Significant
diarrhea	249	167	= 0.350	Nun Significant

Discussion

The study has investigated the prevalence of stunting and its associated factors among children aged 6–59 months in Kosti locality, Wight Nile state. The prevalence of stunting was 51.4%, of this 47.0% in males and 53.0% in females. This finding was similar to the regional figure, was 50.2% (WHO, 2014), But, it was much higher than other studies done in Ethiopia like Somali region, 22.9% (Masibo,2012), and other study in Dollo Ado district, 34.4% (El-Sayed,2001), and lower than studies done in India, 74.2% (Geberselassie,2016).

In the present study the prevalence of stunting were increases with increases children age, this finding was supported by other studies done in north of Ethiopia by (Herrador, 2014). Which show that, the prevalence of stunting seen in infant period and increase in less than five years, this might due to culture nutritional status of the mother or poor dietary practice, weaning and poor nutritional quality of complementary feeding, So the prevalence of stunting indices were higher in children who were started the complementary feeds before 6 months of life, this finding same to study conducted by Mamabolo et al. (2004) show that children be exclusively breastfed for the first six months followed by timely introduction of nutritious complementary foods at six months can decrease the incidence of malnutrition , and contrary to study conducted by Ntab et al. (2005) observed that increased risk of child under nutrition with prolonged breastfeeding this state of delaying complementary feeds beyond the recommended period in children perceived as weak or not growing well, On the other hand, this study identified that the family members of household with six or more members had a higher or more likely to be malnourishes compared to children from five or less family members.

This finding is supported by another study conducted in southeast Ethiopia which revealed that children whose mothers gave birth to more than four children were more likely to be stunted compared to children from mothers who gave birth to one child (Asfaw, 2015). This due to the fact that, families with more children cannot feed themselves well and face difficulty to provide the daily nutrition requirements, also corroborates with previous studies done in Sudan by (Nabag, 2013) , Pakistan by Jamro (2012), and in our finding inverse with study conduct by Kweneng (2012) in west district of Botswana , which revealed that, there was not relationship between the size of the household and the child malnutrition. With regard the level income of the family which the low-income group was a higher risk of being stunting than children of better income families. This found agreement with Study done in northern Sudan by USAID, (2007) revealed that poor family income has been found as a risk factor for prevalence of stunting, because the low incomes were decrease the amounts of food available for consumption. Among infections and diarrhea in present study, the limited access to safe drinking water in the study area was exposes these children to varied types of infections and diarrheal diseases which further increase the risk of malnutrition. The probability occurrence of stunting was higher for children who had infection in past two weeks of the study. This result is in agreement with previous studies conducted by Zeray, et.al. (2019) in Ethiopia and Burkina Faso (2017). They observed that prevalence of malnutrition was increase with children who had infection compare to those without infection .But there was no association between diarrheal disease and the prevalence of stunting; this finding was in line with other study conducted in Damot district, Ethiopia 2017 by (Abera, 2017) and Vadodara, India 2014 by (Popat, 2014).They revealed that the children who had diarrheal disease were more likely to be under weight and wasting but not be stunting.

Conclusion

Our study revealed that the prevalence of stunting was high in Kosti locality, Weight Nile State area which the efforts focus on the factors affect and associated with prevalence of stunting, they were children age, family size, level of family income, and receiving of complementary feeding and presence of infection in the past two weeks were predictors to more significant associated. Frequency of diarrhea was an only variable was not associated with stunting.

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