

Stunting and Associated Factors among School Children in Ombada Province, Sudan

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Abstract: A cross-sectional school based study was conducted to measure the prevalence of stunting and determine the associated factors. A total of 256 children were selected by systematic random sampling and assessed using a questionnaire and anthropometric measurements. The indicators were based on anthropometric indices i.e. height-for-age z-scores (HAZ). The prevalence of stunting among primary school children in Ombada province, Sudan was 13.7%, about 82.9% of them were mild and 17.1% were severe stunting. The study revealed that 14.7% of females were suffering from stunting compared to 12.6% in males (Odds Ratio OR = 1.1983 95% CI = 0.5860 - 2.4506), the prevalence among those who were consuming High protein foods rarely was 13.3% and 14.8% in children who were frequently eating high protein foods with no statistical association (Odds Ratio = 0.8889 and 95% CI = 0.3918 – 2.0168) as well as high carbohydrate foods (Odds Ratio = 0.0935 and 95% CI = 0.0410 – 0.2131), the percentage was 14.1% in children who their mothers education was low and 10.3% in case of high educated mothers (Odds Ratio = 1.4222 and 95% CI = 0.4066 – 4.9750) as shown in table three. As a conclusion, the problem of stunting status among school children was relatively high however most cases were mild stunted children.

Keywords: *stunting, malnutrition, children, prevalence, Sudan*

I. INTRODUCTION

Protein energy malnutrition (PEM) develops in children whose consumption of protein and energy is insufficient to satisfy the body's nutritional needs [1]. This nutritional status is more frequent in developing countries where fifth of under five children is underweight [2], it leads to considerable number of morbidity and mortality among preschool children, it can be defined as a state of nutrition where the weight for age, height for age and weight for height indices are below -2 Z-score of the NCHS reference [3]. Malnutrition is classified in different patterns such as underweight, stunting, wasting, marasmus and kwashiorkor [4]. Stunting is defined as insufficient height for age [5]. Stunting, or short height for age, is important public health indicator and it is used in assessing nutritional status, designing programs, and assessing impact [6]. The prevalence of stunting in children is high in many countries with low-income, in a study conducted in rural South African children about one in five children was stunted [7]. In the Bangang rural community, Cameroon, the prevalence of stunting of children was 41.26% [8]. Inadequate intake of nutrients is main cause of malnutrition [9].

II. MATERIALS AND METHODS

The study was Setting-based study which was carried out in Ombada province, Sudan. Ombada province is located in Khartoum capital of the Sudan, particularly in western Omdurman. It is a poor socioeconomic area, mostly populated by internally displaced persons who came due to drought and famines that occurred in western Sudan, in addition to some people from other different regions of Sudan. By time they became settled population. Nowadays the area is enjoying different services such as schools, hospitals, water supply and communication. However it is still suffering from poverty and low quality of life. The total number of primary school children was 717 pupils.

A bout 256 of children was involved in the study according to statistical equation. The systematic random sample was used in boy and girl primary schools after listing the target population frame to select the study group from both males and females.

Relevant data were collected using a questionnaire in addition to anthropometric measurements. The indicators were based on anthropometric indices i.e. height-for-age z-scores (HAZ). Collected data were analyzed using SPSS software package.

III. RESULTS

Table one illustrates that the prevalence of of stunting among primary school children in Ombada province, Sudan was 13.7% while table two shows that the percentages of mild and severe stunting were 82.9% and 17.1% of total stunted children respectively. The study revealed that 14.7% of females were suffering from stunting while the percentage among males was 12.6% (Odds Ratio OR = 1.1983 95% CI = 0.5860 - 2.4506), the prevalence among those who were consuming High protein foods rarely was 13.3% and 14.8% in children

who were frequently eating high protein foods with no statistical association (Odds Ratio = 0.8889 and 95% CI = 0.3918 – 2.0168) as well as high carbohydrate foods (Odds Ratio = 0.0935 and 95% CI = 0.0410 – 0.2131), the percentage was 14.1% in children whose mothers' education was low and 10.3% in case of high educated mothers (Odds Ratio = 1.4222 and 95% CI = 0.4066 – 4.9750) as shown in table three.

Table (1): The prevalence of stunting among primary school children in Ombada province, Sudan

Stunting	No	%
Stunted	35	13.7%
Not stunted	221	86.3%
Total	256	100%

Table (2): Classification of stunted children according to the level of stunting among children in Ombada province, Sudan.

Stunting	No	%
Mild Stunted	29	82.9%
Severe stunted	6	17.1%
Total	35	100%

Table (3): Associated factors of stunting among primary children in Ombada province, Sudan

		Stunted No (%)	Not stunted No (%)	Odds (OR)	95% CI
Gender	Females	19 (14.7)	110 (85.3)	1.1983	0.5860 - 2.4506
	Males	16 (12.6)	111 (87.4)		
High Protein foods	rarely	26 (13.3)	169 (86.7)	0.8889	0.3918 - 2.0168
	frequently	9 (14.8)	52 (85.2)		
High carbohydrates foods	rarely	9 (4.9)	174 (95.1)	0.0935	0.0410 - 0.2131
	frequently	26 (35.6)	47 (64.4)		
Mother education	Low education	32 (14.1)	195 (85.1)	1.4222	0.4066 - 4.9750
	High education	3 (10.3)	26 (89.7)		

IV. DISCUSSION

Stunting reflects chronic under nutrition during the most critical periods of growth and development in early life. The condition is found in developing countries in high rates. Several studies were carried out to study such chronic malnutrition. Our present study is one of these studies in order to increase knowledge about stunting and associated factors. The prevalence in this study was 13.7%, about 82.9% of them were mild and 17.1% were severe stunting. Severe nutrition usually needs nutritional intervention to improve the status while mild stunting may become moderate or severe unless attention was taken. This prevalence is similar to various indices measured throughout different developing countries.

Thakur and R.K. Gautam [10] found the prevalence of stunting was 6.3% in their study which was carried out among school-going boys. In a study conducted in rural Bangladesh about two-fifths of the children were stunted, of which 26.3% were moderately stunted and 15.1% were severely [11]. The prevalence of chronic malnutrition (stunting) in male was 6.2 and 17.43% for severe and moderate stunting and in females was 3.03 and 12.85% for severe and moderate stunting, respectively [12]. We did not find statistical association between stunting and current food intake, this might be attributed to the fact that the condition is chronic and usually takes time to be improved. Children are most affected by awareness and education of mothers which enable them to decide properly about their children's nutritional care.

V. CONCLUSION

The problem of stunting status among school children was relatively high; however, most cases were mild stunted children.

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References

- [1]. V S Srikanth, S Mangala, G Subrahmanyam. Improvement of Protein Energy Malnutrition by Nutritional Intervention with Moringa Oleifera among Anganwadi Children in Rural Area in Bangalore, India. *International Journal of Scientific Study*. 2014; 2(1): 32 – 35.
- [2]. Ram Milan Prasot, Sudhir Kumar Verma, Saurabh Kashyap, Mukesh Kr. Kanaujiya. An epidemiological study of Protein Energy Malnutrition (PEM) among 1-6 years children in rural Lucknow, Uttar Pradesh, India. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2014; 3(II): 10 – 14.

- [3]. Abolfazl Mahyar, Parviz Ayazi, Mazdak Fallahi, Taiyebah Haji Seiid Javadi, Baharan Farkhondehmehr, Amir Javadi, Zahra Kalantari. Prevalence of Underweight, Stunting and Wasting Among Children in Qazvin, Iran. *Iranian Journal of Pediatric Society*. 2010; 2(1): 37 – 43.
- [4]. Gizelle Kruger, Anita E. Pienaar, Dané Coetzee, Salomé H. Kruger, Prevalence of stunting, wasting and underweight in Grade 1-learners: The NW-CHILD Study. *Health SA Gesondheid*. 2014; 19(1): 7 pages.
- [5]. Pius C Manyike, Josephat M Chinawa, Agozie Ubesie, Herbert A Obu, Odotola Odetunde and Awoere T Chinawa. Prevalence of malnutrition among pre-school children in, South-east Nigeria. *Italian Journal of Pediatrics* 2014; 40:75
- [6]. Reynaldo Martorell* and Melissa F. Young. Patterns of Stunting and Wasting: Potential Explanatory Factors. *American Society for Nutrition. Adv. Nutr.* 2014; 3: 227–233.
- [7]. Elizabeth W Kimani-Murage, Kathleen Kahn, John M Pettifor, Stephen M Tollman, David B Dunger, Xavier F Gómez-Olivé, Shane A Norris. The prevalence of stunting, overweight and obesity, and metabolic disease risk in rural South African children. *BMC Public Health*. 2010; 10:158.
- [8]. Nicolas Policarpe Nolla, Marie Modestine Kana Sop, Marlyne Josephine Mananga, Tetanye Ekoe, Inocent Gouado. Assessment of nutritional status of preschool children in the Bangang rural community, Cameroon. *International Journal of Biotechnology and Food Science*. 2014; 2(2), 44-52.
- [9]. Abdelsafi A Gabbad, Alawia Adam, Mohammed A Elawad. Epidemiological Aspects of Malnutrition in Children Less Than Five Years Admitted to Gaafar Ibn Oaf Paediatric Hospital, Khartoum, Sudan. *Asian Journal of Natural & Applied Sciences*. 2014; 3(1): 67 – 71
- [10]. R. Thakur and R.K. Gautam. Prevalence of undernutrition among School going boys (5-18 years) of a Central Indian city (Sagar). *Human Biology Review*. 2014; 3 (4): 364-383.
- [11]. Mostafa Kamal SM. Socio-economic Determinants of Severe and Moderate Stunting among Under-Five Children of Rural Bangladesh. *Mal J Nutr*. 2011; 17(1):105 -118.
- [12]. Taha H. Musa, Elrasheed A. Ali1, Hassan H. Musa and Arshad Khan. Anthropometric parameters of malnutrition in children 5-15 years old in Khartoum State, Sudan. *Journal of Public Health and Epidemiology*. 2013; 5(8), pp. 313-318