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STATE OF MALNUTRITION AMONGST ADOLESCENTS IN A PERI URBAN AREA

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Abstract

The study seeks to investigate the existence and prevalence of malnutrition among adolescents in a peri urban area of Chiwundura in Zimbabwe). The primary data collection was done through conducting anthropometric measurements, series of interviews with adolescents and administering questionnaires. It was concluded that malnutrition is prevalent among the adolescents. Above 40% of the adolescents were undernourished. Most of the adolescents ate a high carbohydrate diet and low protein. There is need for malnutrition interventions which provide a balanced diet to the adolescents. It was recommended that nutrition gardens and poultry projects need to be set up to help in reducing undernutrition. Growth monitoring practices also need to be appropriately implemented.

Keywords: adolescents, balanced diet, malnutrition, undernutrition, overnutrition.

1. Introduction

During adolescence there is rapid enlargement of organs and tissues which needs to be supported by nutrients. Undernutrition in adolescents may lead to slowed growth rates, have lasting consequences on an adolescent's cognitive development. Macronutrient deficiencies may have negative impact on bone mineralisation (Levy *et al.*, 1985). Overnutrition puts an adolescent at risk of coronary heart diseases as they grow up (Baker *et al.*, 2007). According to Sharma (2005), adolescence is a crucial period in a woman's life. Health and nutritional status during this phase is critical for the physical maturity, which in turn influences the health of the offspring. It is seen that the rate of low birth weight prematurity and neonatal and infant mortality is high among children born to malnourished adolescent girls. Adequacy of dietary intake in terms of calorie and protein are important in order to improve the chances of child survival and safe motherhood.

Malnutrition is poor nutritional status due to dietary intake either above or below the optimal value (Nnakwe, 2009). Malnutrition occurs when the diet contains an incorrect amount of one or more nutrients (Barker, 2002). According to Doswett *et al* (2005), it is a state of nutrition in which there is a deficiency or excess (or imbalance) of energy, protein, and other nutrients, it can be both over and under nutrition and has adverse physiological and clinical effects. It is a serious public-health problem that has been linked to a substantial increase in the risk of mortality and morbidity. Many factors can cause malnutrition, most of which relate to poor diet or severe and repeated infections, particularly in underprivileged populations. Inadequate diet and disease, in turn, are closely linked to the general standard of living, the environmental conditions, and when the population is not able to meet its basic needs such as food, housing and health (Barasi, 1997). According to Johns (2003), the fundamental problem underlying malnutrition and undernutrition in many developing countries is the lack of resources and knowledge to grow food.

According to Barasi (2003), nutritional state may decline during an infection and compromise the body's ability to combat it and recover. Malnutrition commonly affects all groups in a community. Nutritional status of an individual is often the result of many interrelated factors. Malnutrition can be measured using anthropometry, biochemical indicators (e.g. a decrease in serum albumin level) and clinical signs of malnutrition (hair and skin changes) and dietary evaluation. This study focuses on determining the state of malnutrition amongst adolescents in Chiwundura, a peri urban area in Zimbabwe. This area is prone to drought due to low annual rainfalls. The area under study has low food production and is likely to result in under nutrition amongst adolescents. Interventions in Zimbabwe to curb malnutrition are targeting children and mothers leaving out adolescents, whereas the adolescents may be vulnerable. However, studies on malnutrition amongst adolescents have been reported in other countries (Garcia, 2005; Hyderabad, 2004; Kapil, 2002; Deshmukh *et al.*, 2006).

2. Method

2.1 Sample and Sampling Technique

Forty adolescent girls in the age group 10-18 years from different schools in Chiwundura were involved in the study. Simple random sampling was used to select individuals in the study. According to Creswell (2007), simple random sampling adds credibility to sample when potential purposeful sample is too large. On the other end Neuman (2006), pointed out that random samples are most likely to yield a sample that truly represents the population. The adolescents at different education levels such as upper primary and secondary school level were randomly selected from four high schools with the help of their teachers. Ten adolescents were selected from each school by randomly picking out names

of adolescents from the school registers. The forty adolescents had their Body Mass Index (BMI) and Mid Upper Arm Circumference (MUAC) measured. A sample of thirty from the forty adolescents was involved in the 24 hour recall and twenty nine adolescents answered the food frequency questionnaires.

3. Results and Discussion

3.1 BMI

Fig. 1 shows the BMI for the adolescents in Chiwundura. Of the total, 2.5% of the adolescents had a BMI of below 17 indicating that they were severely thin, 20% had a BMI between 17 and 18.4 indicating that they were mildly thin, 60% had a BMI between 18.5 and 24.9 indicating that they were normal, 15% had a BMI in the range 25.0-29.9 indicating that they were overweight and 2.5% of the adolescents had a BMI above 30 indicating obesity. The percentage of adolescents who had a BMI less than 18.5 which indicated that there were undernourished was 22.5%, the prevalence of under nutrition in Chiwundura was lower that the study carried out by Barlow and Lew (2005), which indicated that 45% of the adolescents in Singapore had a BMI between 15-17.9, Barlow carried out another study in Malaysia which indicated that 27% of the adolescents had a BMI between 15-17.9 indicating under nutrition ,these results are almost similar to the results obtained in Chiwundura, the percentage of malnutrition between the study in Malaysia and the one in Chiwundura differed by 5%. It has been reported that 3% of the adolescents in Singapore had a BMI above 25, the study carried out in Chiwundura indicated a higher percentage of adolescents with a BMI above 25 (17.5%) compared to the 3% in Singapore, 4% of the adolescents in Malaysia in a study carried out by Barlow and Lew (2005). Comparing the results from Chiwundura, Malaysia and Singapore, Chiwundura had 22.5% adolescents who were undernourished (BMI <18.5), Singapore had 45% adolescents who were undernourished BMI <17.9, Malaysia had 27% of the adolescents who were undernourished BMI <17.9.

The results from Chiwundura were almost in agreement with a study done by Garcia (2005) in Columbia which indicated that 27% of adolescents between 10 and 17 years of the lowest wealth quintile were found to be in a state of chronic malnutrition, which represents a risk three times higher than that for children of the same age in the wealthiest quintile. The study attempted to estimate the socioeconomic disparities in malnutrition both in urban and rural regions, and to evaluate the factors (at the individual, household and contextual levels) that explain these disparities.

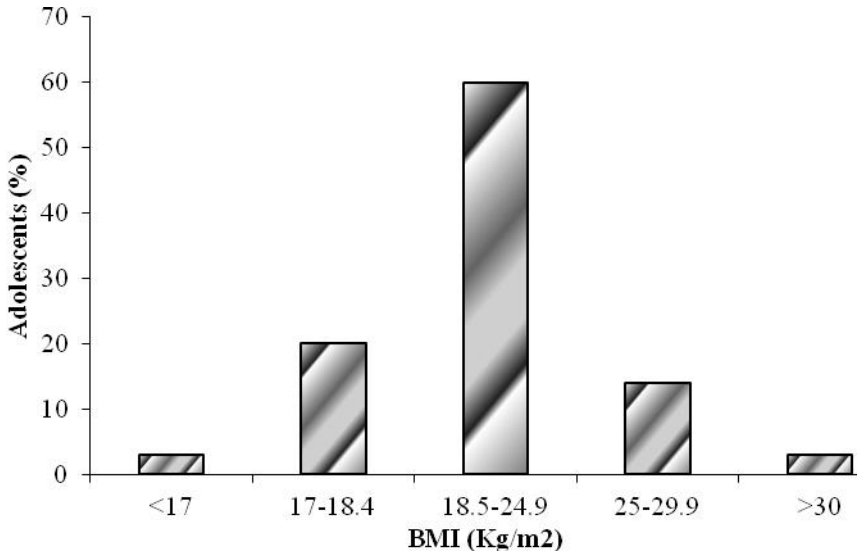

Fig 1: Body mass index of adolescents from Chiwundura.

Fig. 2 shows MUAC measurements for the adolescents in Chiwundura. One (2.5%) adolescent had a MUAC below 18.5 cm hence classified as severely malnourished, Fifteen (38%) adolescents had a MUAC between 18.5 and 22.5 cm hence classified as moderately malnourished and twenty four (60%) adolescents had a MUAC above 22.5 cm hence classified as normal (Voorhoeve, 1990).

Slight differences were observed between prevalence of acute malnutrition measured by weight for height versus MUAC in Chiwundura. The study in Chiwundura indicated that 40% of the adolescents were malnourished using weight for height, whilst 40.5% were malnourished using MUAC. In contrast with this, three surveys carried out by Action la Faim in the Philippines found a big discrepancy between the two. In contrast to the study in Chiwundura, Johnson *et al* (1984) reported in a Philippines reported that mid upper arm circumference resulted in lower prevalence of malnutrition as compared to weight for height. Even though standards and cut offs used then, differ from those that are used today, five surveys carried out in the southern Philippines island of Mindano between January 2009 and December 2010 have found similar results in all the five surveys. The study carried out in Chiwundura indicated a slightly higher prevalence of malnutrition with the use of MUAC in relation to weight for height (BMI-for-age).

In Ethiopia prevalence of acute malnutrition in pastoralist populations as measured by weight for height was found to be much higher than MUAC (20% versus 7%). A study in agrarian populations in Ethiopia indicated that, both

indicators led to similar estimates this is in agreement with the study in Chiwundura. The study carried out by Myatt (2007), that included data from 560 surveys from 31 countries showed that while a similar prevalence of acute malnutrition according to MUAC and weight for height was found for the whole data set, there were differences in the MUAC and weight for height relationship between and even within countries, in some populations the prevalence of acute malnutrition was the same according to both indicators being similar to the study in Chiwundura. In other countries MUAC led to a higher prevalence than weight for height or vice versa. Compared to the results from the Philippine surveys prevalence of acute malnutrition according to MUAC was found to be lower in parts of Ethiopia, Kenya, Sudan, Chad, the Indian subcontinent and the Hispanic populations (Myatt, 2007).

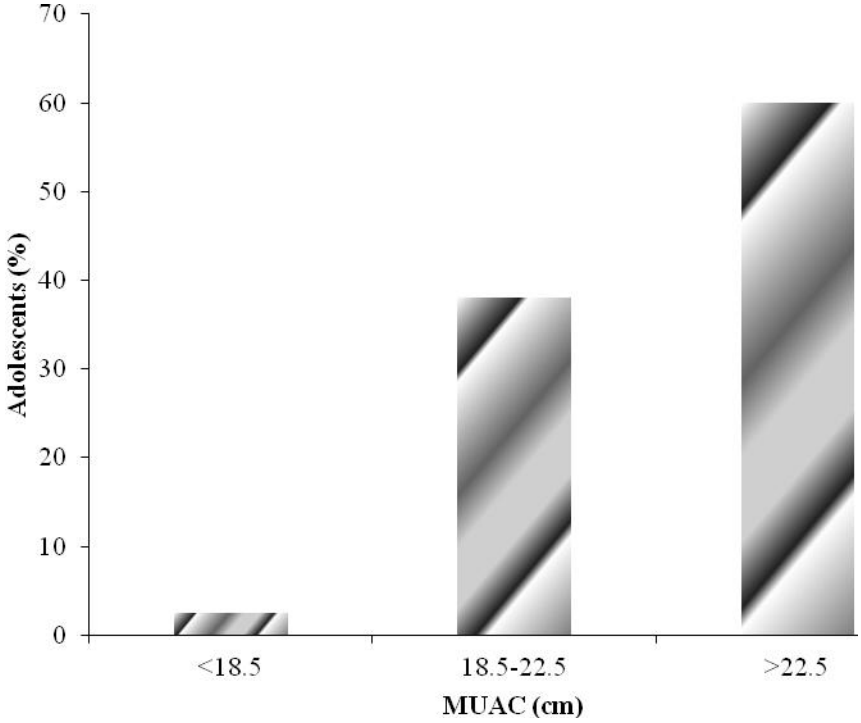

Fig. 2: Mid upper arm circumference of adolescents.

3.2 Types of Foods Consumed

Table 1 shows the frequency of different foods eaten per week. The foods commonly consumed by the adolescents in Chiwundura are cabbages, sadza, dried beans, peanuts and guavas. Dark green vegetables, fish, milk and chicken are moderately consumed. Adolescents in Chiwundura from the results of the food frequency questionnaires consume a diet that is high in carbohydrates. Proteins and vitamins are moderately consumed. The low protein consumption was similar to a study carried out by Hedges (2005) which indicated that 40% of age group 10-12 years, 15% of age group 13-15 years are deficient in protein while a total of 15% are deficient in protein. Vitamin C deficiency was also prevalent in the schools (80% in age 11-12 and 63% overall).

Table 1: Foods taken and frequency of consumption per week

Frequency	Number of adolescents taking certain foods								
	Dry beans	Peanuts	Guavas	Maize mealie meal	Milk	beef	Fish & Chicken	Green vegetables	Fruits
2-3 times a week	24	18	32	6	12	8	4	9	7
Once per day	6	12	5	30	5	3	1	6	3
Seldom	9	8	2	3	20	25	25	22	20
Never	1	2	1	1	4	4	5	3	10

3.3 Twenty Four Hour Recall

Three day 24 hour recall results are illustrated in Table 2. In a 24 hour dietary recall, the respondent is asked to remember and report all the foods and beverages consumed in the preceding 24 hours. All the adolescents consumed less than the recommended calories within a day, though they consumed the carbohydrates. The calories were below the recommended calories to be consumed by an adolescent of their age group with reference to Barasi (2003). Results of the Chi-square test show that there is a significant difference between calories consumed by the adolescents and the recommended calories.

Table 2: Nutrients consumed by the adolescents in Chiwundura during a 3 day 24 h recall

Student Number	Age	Mean calories	Recommended calories*	Mean carbohydrates (%)	Mean protein (%)	Mean fat (%)
7	10-12	1260	1740	65	18	8
8	13-14	1381	1845	66	17	11
9	15-16	1091	2220	65	16	11
6	17-18	1133	2220	59	13	30

**Munoz et al., 1997*

4. Conclusions

There is relatively high prevalence of malnutrition amongst the adolescents in Chiwundura, basing on the anthropometric measurements carried out and the dietary evaluations. Compared to trends of malnutrition in Zimbabwe children, it can be concluded that malnutrition amongst adolescents in Chiwundura is relatively higher. There is need to include adolescents in malnutrition interventions. Drought preparedness projects such as multi storey gardens, nutrition gardens and poultry projects need to be set up since they help in reducing undernutrition. Overnutrition in adolescents can be reduced by consuming less carbohydrates (chocolates, sweets, chips) and fatty foods. Adolescents should be encouraged to eat a balanced diet. Growth monitoring practice should be appropriately implemented. The main purpose of growth monitoring is to assess growth adequacy and identify faltering at early stages before the adolescent reaches the stage of under nutrition or obesity.

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