

The Nutritional status of preschool children in urban and rural areas of Benin City, Edo State

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Abstract: The nutritional status of preschool children in urban and rural areas of Benin City, Edo State was investigated. Preschool children aged between 3 and 5 years were selected from nursery schools in urban (n= 150) and rural (n= 150) areas. Nutritional status was assessed using anthropometric measurements of height, weight and arm circumference and was compared with NCHS standards. Dietary assessment was based on weighed inventory method and 24 hours recall obtained from their mothers. The nutrient intakes were compared with the RDA. Validated questionnaires were also used to collect data on their socioeconomic status obtained from the mothers. Data was analyzed using SPSS version 10. There were no significant differences between the males and females in both the rural and urban areas except for the rural males having a significant higher LBM than the females. Using weight-for-age 11.3% and 82% of urban and rural children were underweight. Also 1.33% and 33% were stunted, while 42% and 85% were wasted in the urban and rural schools respectively. The intakes of protein, iron, calcium and vitamin A were inadequate in both groups. Majority of mothers of the preschoolers in urban were educated (70%) and earned a monthly income above N7,000 (84.67%). The findings show that the nutritional status of preschool children in Benin especially in the rural areas was poor and this could be attributed to poverty and poor educational status of the mothers.

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I. Introduction

The nutritional status of an individual is the health of an individual as conditioned by the quality of nutrients consumed and the body's ability to utilize these nutrients to meet its metabolic needs. Thus, the nutritional status of preschool children of a population is generally accepted as an indicator of the nutritional status of the community (1). The preschool children are vulnerable from the nutrition point of view; the main reason being their easy susceptibility to malnutrition and infection (2, 3). Although growth at this period is not as rapid as during infancy period, children in this age group are usually very active and this calls for high nutrient needs; eating habits are also established at this state. Ene Obong (4) further pointed out that it is also during this period that under nutrition in the form of kwashiorkor, marasmus, anaemia and xerophthalmia are common. The assessment of preschool children is therefore of great use in the determination of protein energy malnutrition (PEM). WHO (5) reported that PEM is a very common condition among children less than 5 years of age in poor countries. UNICEF (6) estimated that approximately one out of three children younger than 5 years of age are chronically malnourished and are thus trapped early in life in a pattern of ill health and poor development. Malnutrition is thus associated with more than half of all deaths of children worldwide (7). Smith and Haddah (8) noted that in 1995, one hundred and sixty seven million children under the age of 5 years representing almost one third of children in developing countries were malnourished.

Malnutrition arises from a complex of nutritional, social and biological deprivation and is manifested in various forms such as stunting (short stature), underweight, muscle wasting, growth retardation, diminished subcutaneous fat, ill health and high mortality rate (9). Growth is increase in size and its progress is mainly structural and can be measured with some degree of reliability in terms of height, weight, age etc (10). There are wide variations in the rates at the height and weights of children are eventually attained. This is because many factors may contribute to these variations. These include quality and quantity of food, family income, family size and genetic constitution (11). The assessment of growth was identified as the most important measure for evaluating the health and nutritional status of preschool children through anthropometric measurements (10). This is because anthropometric indicators of growth not only provide information on health and nutritional status but is also an indirect measure of the quality of life of an entire population (12).

In this study a combination of anthropometry, dietary assessment and socioeconomic status were used to determine the nutritional status of preschool children since they have been known to give fairly accurate

results (13). This study is therefore aimed at assessing the growth and nutritional status of preschool children in rural and urban areas of Benin Edo State, Nigeria.

II. Materials and Methods

The study area was conducted in Benin the capital city of Edo State. Children between the ages of 3 and 5 years were randomly selected from four nursery schools; 2 from rural and 2 from urban areas. A total of 300 preschoolers (150 from each area) were used for the study. The children were further separated on the basis of sex, urban males (76) and females (74); rural males (82) and females (68). Permission to carry out the study was obtained at two levels; first from the school authorities and second from the mothers of the respondents since children aged 3-5 years were not able to fill questionnaires or recall dietary intake appropriately. The age of the subjects was obtained from the mothers from the child's record in school.

Anthropometric Measurements

The body weight of each child in light clothing and without shoes was taken using portable bathroom (HANSON model) to nearest 0.2kg (14). Standing height was measured using a constructed vertical wooden rod affixed with graduated fibre glass tape. Subjects stood bare footed and readings were taken to the nearest 0.1cm (15). Head circumference was measured using a non stretchable tape. The tape was placed firmly round the head and measurement was taken to the nearest 0.1cm. chest circumference was measured by placing the tape firmly round the chest at the nipple line. Measurements were taken to the nearest 0.1cm. chest/head circumference ratio was calculated by head circumference (14). Body fat was determined as follows:

$$\text{Body fat} = 0.491 \times \text{weight} - 6.918 \quad (16)$$

Lean body Mass was calculated as:

$$\text{LBM} = \text{Body weight} - \text{body fat}$$

Body Mass Index was calculated as:

$$\text{BMI} = \frac{\text{body weight (kg)}}{\text{Height (m)}^2}$$

The recorded height, weight and arm circumference were compared with reference standards (17). Nutritional status assessed using weight-for-age, height-for-age and weight-for-height (< -2 s.d. NCHS standards).

Food Intake Measurement

The food intake was measured using 24 hours dietary recall and weighed inventory method. The interviewers visited the schools during break/lunch time and recorded the type and quantity of food consumed by the children using a Salter weighing food scale. The 24 hours dietary recall was administered on the mothers for three consecutive days, since preschoolers were not able to recall appropriately. The interviewers used standardized pre-tested questionnaire to administer the 24 hours dietary recall. Mother who were the primary source of recall were asked to recall all foods consumed by the child during the last 24 hours. Food models, measuring spoons and cups were used for qualification of foods. The food and nutrient intake were calculated from consumption table compiled by Oguntola and Akinyele (18). The food and nutrient intake were compared with their respective suggestive dietary intake (19). The percent adequacy of the food and nutrient intake was also calculated.

Socio Economic Status

Information on the background characteristics such as socioeconomic status, family size, income, availability of basic requirements/nutrients were obtained from the pretested questionnaire administered to the mothers.

Statistical Analysis

The data collected from the questionnaire was analysed using SPSS version 10 (20) for all descriptive statistics such as frequencies, percentages, means and standard deviations. The t-test was used to differences between urban and rural preschool children and between males and female in the various parameters at 95% confidence level (21). Results were also compared with FNB and NRC (19) standards for weight, height and various nutrients.

III. Results

Anthropometry

The mean anthropometric indices of the rural and urban preschool children are presented in Table 1 and 2. There were no significant differences in the various measured and calculated parameters for the rural children except for LBM in which the rural male had significantly higher ($p < 0.05$) value than the females. All other parameters were not significant. The urban preschoolers (both sexes) were taller and heavier than the rural

preschoolers. Children from the urban schools generally had higher values in all the anthropometric parameters compared to rural children. The chest/head circumferences ration was also normal in both groups (> 1.0). The results as shown in Table 3 urban and rural respectively were underweight, while 1.33% and 33% of urban and rural were stunted for both sexes.

Dietary Intake

Table 4 shows the nutrient intake as percentage of the recommended dietary allowances for the rural and urban children. The energy intake of both the urban and rural children was below the recommended dietary allowances (77.93% and 71.87%) respectively. Also the mean protein intake was grossly inadequate for the rural children while that of the urban children was below the RDA by 74.12%. The vitamin A and Iron intake of the urban children was slightly below the RDA (89.1% and 91.5%), respectively, while the rural was below the RDA by 61.27% and 69%, respectively. Calcium intake was also just below the RDA in the urban children (94.9%) while the rural children were 54.6% below the RDA.

Socio Economic Status

In Table 5, the socioeconomic status of the mothers revealed that majority of mothers of the children in the urban schools were either civil servants or teachers (38%), 14% were self employed (hair dressers, tailors, etc.) 23% were traders, 14% were involved in specialized skills (lawyers, doctors, lecturers, bankers etc.) while 11% were pensioners. A larger proportion of mothers of the rural children were farmers (45.35%). Approximately 5 members and above were present in rural households (49.6%) while between 4 and 5 members were present in the urban households (48%). The family size of the urban apparently had few numbers of children in the household. About 84.67% of mothers of the urban preschoolers earn above N7,000 while about 50% of mothers of the rural children earned a monthly income of between N4,000 – N6,000

IV. Discussion

The assessment of nutritional status of preschool children is expected to reflect a number of variables that might influence early growth and development. This study therefore compared the nutritional status of preschool children in urban and rural areas of Benin City. The result indicates that generally, the preschoolers met 98.3% and 92.4% of their recommended height as well as 96.12% and 92.5% of the recommended weight in the urban and rural group, respectively. Also, the urban group was found to have higher anthropometric characteristics than the rural children. The urban males and females were equally taller, heavier and also had higher values for arm circumferences, BMI, body fat and LBM than their rural counterparts. Arm circumference which is a useful tool for fast assessment of nutritional status and also an easy way to detect childhood malnutrition in developing countries was adequate in both groups with only about 6% of the rural children having mild malnutrition using this index (arm circumference < 13.5 cm) the chest/head circumference ration was within normal range for both groups (> 1.0), though low values for head and chest circumference prevailed more amongst the rural children. Using NCHS standards (17), the prevalence of underweight was more evident in the rural children (85%). Similarly, stunting and wasting was also more prevalent in the rural children (33% and 85%), respectively.

Dietary intake assessment is considered as the most important determinant of nutritional status. Based on this the mean daily energy intake was significantly higher ($p < 0.05$) in the urban children (1402 kcal/d vs. 1293.83 kcal/d). The higher energy intake of the urban children is reflected in their having a higher body weight and body fat than their rural counterparts. The food composition pattern assessed using 24 hours dietary recall showed that rice was the staple food consumed by the preschoolers in both areas. Others were garri, fufu, yam and beans. Their main source of protein from beans which has a low biological value. Onimawo *et al* (9) reported that well over 80% of protein consumed by school aged children came from plant foods. Consumption of milk was also found to be more regular in the urban than rural children. Furthermore, the food intake assessment showed that in both groups, carbohydrate contributed a larger percent to the total energy intake. This further confirms reports by other Nigerian authors (7, 9) that roots, tubers and legumes are the most abundant and cheap staple foods available in Nigeria. The vitamin C intake of the rural children was normal while that of the urban children was slightly below RDA. This shows that the rural children consumed more fruits and vegetables which are good sources of vitamin C than the urban children. Again the higher calcium intake of the urban children could be due to their higher consumption of foods of animal origin. In terms of macro and micronutrient intake, the urban preschoolers were better off than their rural counterparts, though they were not within the prescribed limits (19). This is also reflected in the socioeconomic status of the mothers where 45.3% of mothers of the rural children were farmers whose monthly income (50%) ranged between N4,000 – N6,000. Whereas about 84.67% of mothers of the preschoolers in the urban earn a monthly income higher than N7,000 well over 75% mothers of the urban children are literate and have one form of education or the other. The economic status of the mothers of the urban children makes them have an advantage over the mothers of the

rural children. This is because the urban mothers can help generate more income for their family as well as have the necessary income to purchase some basic food needs of the children. Their educational background could also have contributed to their having better knowledge about the nutritional requirement of their children.

V. Conclusion and Recommendation

On the whole, the results indicated that the number of well nourished children was small and that the extent of malnutrition was more prevalent in the rural than the urban children. Poverty and under education of the mothers can be said to be the primary causes of under nutrition since the poor people in most societies do not have the basic requirements that is necessary for nutritional well being. Government is thus encouraged to also put in more effort in improving the nutritional status of preschool children by incorporating them into the existing school feeding program.

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