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Research Article

Diversifying Staple Foods to Address Protein-Energy Malnutrition Among Children Aged 2-5 Years in Gushiegu District

Adiza Sadik, Afisha Abu-Ja-Jah and Alijata B. Sulemana

Tamale Technical University, Northern Region, Ghana

Abstract

Background and Objective: Good nutrition is the foundation of a child's growth and survival. Adequate growth is an essential indicator of nutritional status and health in children aged 2-5 years. Diversification of dietary staples is associated with household or individual food availability and the consumption of different food nutrients. The aim of the study was to evaluate the effect of dietary diversity to address protein-energy malnutrition among children aged 2-5 years in Gushiegu District. **Materials and Methods:** A cross-sectional descriptive study was conducted. A total of 80 caregivers and 80 children from Gushiegu District were randomly selected. Data was collected using a pre-tested semi-structured food frequency questionnaire. The nutritional status of the children was assessed using anthropometric indices. **Results:** Based on the results, in the study setting, the stunting prevalence was 11.2%, underweight was 6.5% and thinness was 3.7%. **Conclusion:** Mothers fed children with a variety of foodstuff but to improve child feeding practices they should be educated by healthcare staff in the community.

Key words: Children health, malnutrition, protein, staple foods, stunting

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Corresponding Author: Adiza Sadik, Tamale Technical University, Northern Region, Ghana

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Adequate nutrition is essential for human development. Undernutrition, stunted and wasted (children having less than the normal body weight for their ages, being too short for their ages and/or too thin respectively) are the public health problems in Ghana¹. This nutritional condition is often associated with geographical areas and socio-economic factors such as poverty and education¹. Under-nutrition remains the public health challenge in most developing countries, which has a dire consequence on the children in the first five years of life². For instance, nearly half of all deaths in children under five are attributable to undernutrition³. In WHO nutritional report, about 155 million children under-five are stunted. Similarly, about 52 million of them still experience wasting². Micronutrient deficiencies cause an estimated 1.1 million of the 3.1 million child deaths that occur each year due to undernutrition². Vitamin A and zinc deficiencies adversely affect child health and survival by weakening the immune system. Lack of zinc impairs growth and can lead to stunting in children. Iodine and iron deficits prevent children from reaching their physical and intellectual potential³.

The assumption is that under-nutrition, more especially among children under five, is attributed by an intertwined of diverse social factors such as low parental knowledge on childcare on best feasible feeding habits, inadequacy understanding of suitable feed mix for children, inconsistent timing of exclusive breastfeeding in addition to a low interface of women to health care facilities after delivery to engage on under-nutrition for improved maternal and child nutritional statuses³.

Low intakes of other essential micronutrients, such as calcium, vitamin D and B are also linked to protein-energy malnutrition. In the study setting, few empirical studies were conducted on how dietary diversity could address protein-energy under-nutrition among children. The specific objective of this study was to assess the nutritional practices of children aged 2-5 years, to determine the factors that influence their nutritional status and to determine the proportion of stunting, wasting and underweight in children aged 2-5 years in Gushiegu district.

Globally, a wider variety of food is crucial to prevent the deleterious impacts of hidden hunger among children under the age of five. Therefore, the argument is that the variety of staple food is associated with better child nutritional outcomes in spite of socio-economic factors in the geographical areas⁴. It can be stated that, diversification of staple food ensures a healthy diet that contains a balanced and adequate combination of essential macronutrients

(carbohydrates, fats and protein vitamins and minerals) and other food-based substances such as dietary fiber for children. Many kinds of cereal, legumes, fruits, vegetables and animal-source foods provide adequate nutrition for most people⁵.

Effective ways to promote dietary diversity involve food-based strategies, such as home gardening and educating mothers and caregivers on better infant and young child feeding practices, food preparation and storage/preservation methods to prevent nutrient loss⁶. The incidence of protein-energy malnutrition in children has been the subject of extensive research for several decades. Studies show that protein-energy malnutrition affects children's growth and development, especially 0-5 years⁷. A well-nourished child has regular access to the adequate food supply⁸, such a child will have weight and height measurements that can compare very well with the standard normal distribution of height (H) and weight (W) of healthy children of the same age and sex⁸.

Inadequate breastfeeding and lack of nutritional knowledge, ignorance of weaning and weaning foods, inverted or cracked nipples causing difficulty in breastfeeding are dietary factor contributing to protein-energy malnutrition and under-nutrition⁹. Child-eating behaviours are problematic and include inborn food preferences and appetitive traits, neophobia and emotional responses to food⁵. The main causes of malnutrition among children in Sub-Saharan countries are feeding practices, lack of knowledge on dietary diversification on the part of mothers and caregivers¹⁰. Furthermore, breast milk alone does not meet all the nutritional needs of a growing child and therefore the consumption of a variety of foods is essential¹⁰. A recommendation of World Health Organization indicates that Minimum Dietary Diversity (MDD) is the consumption of not less than four of the seven food groups in order to maintain proper growth and development¹⁰. The increased nutrient density of dietary diversity is an indicator of nutrient adequacy.

Nutritional status is optimal when the body gets enough nutrients and uses it efficiently; allowing for physical growth, brain development and general improvement in health. Malnutrition occurs when optimal growth is affected by deficiency in one or more essential nutrients. Furthermore, over or undernutrition occurs when the body receives excess nutrients in harmful amounts¹¹.

Stunting occurs mainly in early childhood (mostly by two years of age) and through a cumulative process. Stunted children at school-age are likely to have been exposed to poor nutrition since early childhood and the degree of stunting tends to increase throughout the school-age years¹². The prevalence of stunting and thinness were 50.3 and 19.4%

respectively in Volta region¹³. In a similar study, conducted at the Hohoe municipality, in the Volta Region, Agbozo *et al.*¹⁴ found the lower values for underweight (15.6%), stunting (9.8%) and thinness (4.3%).

Factors that affect nutritional status differ among municipalities, districts and communities and over time. Identifying these factors in a particular locality is essential in solving dietary problems. These factors could range from individual-related factors such as age and gender to family-related factors such as parents' occupation and household size and community-related factors such as the area of residence and access to clean drinking water¹⁵. However, in a study conducted by Erismann *et al.*¹⁶ in Burkina Faso, it is found that caregiver occupation was not associated with undernutrition.

MATERIALS AND METHODS

Study site: Gushiegu District is the study area. It is one of the Administrative Districts of the Northern Region of Ghana. The population of Gushiegu District was 111,259 in 2010 with 395 communities. Males constitute 48.7 percent and females represent 51.3 per cent. Over three-quarters of the population (76.0%) of Gushiegu District was residing in rural localities. The proportion of children (0-9 years) is very high, which reduces as age advances, with a small number of elderly persons (60 years plus).

The total age dependency ratio is 79.1; the total dependency ratio for rural is higher (95.3) than urban (74.7), the Total Fertility Rate is 3.7. The General Fertility Rate is 108.8 births per 1000 women aged 15-49 years, which is the highest rate among the regions. The Crude Birth Rate (CBR) is 25.8 per 1000 population. The crude death rate is 6.7 per 1000.

The death rate for males is about 45 deaths per 1000 population while for the females, the highest death rate is about 25 deaths per 1000 people (aged 70 and above)¹⁷.

Study design: This was a cross-sectional descriptive study, using children aged 2-5 years from selected communities within the study setting in November 2020. Socio-demographic information was collected from mothers and caregivers through a semi-structured questionnaire which included feeding practices. A spring salter weighing scale (25 kg-100 g) and stadiometer was used for anthropometric measurement.

Study population and sample size: The study population included children aged 2-5 years who resided in Gushiegu district with their corresponding mothers/caregivers. The

minimum age of enrollment for the study was two years with the maximum being five years as on the day of data collection. Their parents consented to and the child assented to participate in the study. The sample of 80 respondents was selected for the study.

Sampling method: A stratified sampling method was used to select study communities within the Gushiegu district. Systematic random sampling methods was used to select the study participants. The list of all neighborhoods in the District was obtained from the District Assembly. The communities were then grouped into four. One community from the list was randomly selected without replacement by ballot, for inclusion into the study.

The study used a total of four communities. The total number of study participants was distributed among selected communities.

Data collection tool: A pre-tested semi-structured questionnaire was used to select respondents. Weight and height were measured for each respondent using a spring (salter) weighing scale and a stadiometer.

Statistical analysis: The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25.0 for windows (SPSS, Inc., IBM, Chicago, Illinois, USA). Descriptive statistics (frequency and percentages) were used to present the results.

RESULTS

Dietary practices of children aged 2-5 years: Table 1 shows the dietary practices of children aged 2-5 years. Results

Table 1: Dietary practices of children aged 2-5 years

Variables	Frequency	Percentage
Frequency of eating		
Once	20	25.0
Twice	30	37.5
Three times	20	25.0
Four times and above	10	12.5
Frequency of taking snacks		
Once	32	40.0
Twice	22	27.5
Three times	16	20.0
Four times and above	10	12.5
The child eats sweets every day		
None	24	30.0
Once	22	27.5
Twice	23	28.7
Three times and above	11	13.8

Table 2: Factors affecting the nutritional status of children in this community

Variables	Agree	Neutral	Disagree
Mother's exposure to IYCF information on the mass media	61 (76.3%)	19 (23.7%)	0 (0.0%)
Mother's participated in food cooking demonstration	20 (25.0%)	20 (25.0%)	40 (50.0%)
Husband involvement in IYCF	16 (20.0%)	5 (6.3%)	59 (73.7%)
Maternal knowledge on IYCF	59 (73.8%)	10 (12.5%)	11 (13.7%)
Occupational status of the mother	61 (76.3%)	19 (23.7%)	0 (0.0%)
Residential status of the mother	33 (41.3%)	21 (26.3%)	26 (32.5%)

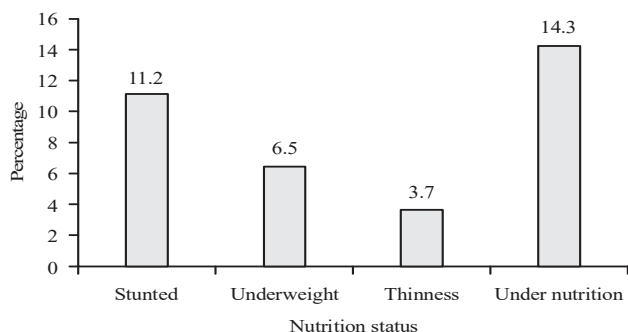


Fig. 1: Proportion of stunting, wasting and underweight among children

showed that most of the children (37.5%) took meal two times in a day. The study further established that few of the children (12.5%) took snacks four times and above.

Factors that influence the nutritional status of children aged 2-5 years:

Table 2 shows the factors affecting the nutritional status of the children in the study area. Results showed that, half of the respondents [40 (50%)] disagreed with the statement that mothers' participation in food cooking was a factor affecting the nutritional status of children whilst 59 (73.7%) disagreed with the statement that, parents's involvement in infant and young child feeding (IYCF) practices affect the nutritional status of children. A total of 33 (41.3%) respondents agreed that the mother's residential status affected a child's nutritional quality. Only 11 (13.7%) respondents disagreed with the statement that, maternal knowledge on IYCF was a factor affecting a child's nutritional status.

Figure 1 shows that the overall prevalence of under-nutrition among children was 14.3%. The prevalence of stunting was 11.2% and underweight was 6.5%.

DISCUSSION

The aim of the study was to evaluate the effect of dietary diversity to address protein-energy malnutrition among

children aged 2-5 years in Gushiegu District. The study identified varied factors that were affecting children's nutritional status at the time of the survey. In the present study, majority of the respondents agree with the statement that occupational status of the mother affect the nutritional status of the children. This finding is different from those of Erismann *et al.*¹⁶, who reported that caregiver occupation was not associated with undernutrition of children in Burkina Faso. Results of the present study showed that mothers' residential status was a factor affecting children's nutritional status. This result agrees with a previous study carried out by Gupta *et al.*¹⁵ who reported that children's residential status affected their nutritional status.

Results of the present study showed that most of the children were underweight. Similar results have been reported by Agbozo *et al.*¹⁴ who stated that in the Hohoe municipality children were found to be underweight.

CONCLUSION

The researcher concluded that dietary knowledge and feeding practices of mother influence children nutritional status. Mothers should use local staple foods to ensure adequate nutrition and to promote optimal growth of children in the study setting.

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