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Contribution of Fish Consumption to Reduction of Malnutrition among the Under-Five Children in Salima, Malawi

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Abstract

A study was conducted in Kazembe and Cinderella areas in Salima district, central Malawi. 80 under-five children and their wards were experimental units for the study. Food frequency based questionnaire and Mid Upper Arm Circumference (MUAC) measurements were used to collect data. Data was analyzed using SPSS (version 16). Descriptive statistics was performed where means, frequencies and percentages were derived and presented in graphs and various charts.

Results show that about 90% of the infants in fishing community had normal nutrition status, 10% of the infants were moderately malnourished and no case of severe malnutrition was reported. In a non-fishing community 75% of the children were normal, 17.5% had moderate malnutrition and infants with severe malnutrition were 7.5% of the sample. In the fishing community, prevalence rate of Marasmus was at 7%, Kwashiorkor (9%), Night blindness (6%), Goitre (1%), Rickets (2%). In non-fishing community the prevalence rate for Marasmus was at 15%, Kwashiorkor (19%), Night blindness (8%), Goitre (2%) and rickets. Therefore, the study recommends conceited efforts on advocacy of fish consumption among pregnant and lactating mothers as well as under five children to improve their nutritional and health status.

Keywords: Kwashiorkor; Fish consumption; Protein; Infants

Introduction

Fish is significant in the life of mankind, being an important natural source of protein and providing certain other useful products as well as economic sustenance to many nations [1].

Fish contain a total of about 18% to 20% protein as well as all the eight essential amino acids including those that contain sulphur such as lysine, methionine and cysteine. Amino acids play a greater role in growth and development of the human body, maintenance and repairing of worn out tissues and for production of enzymes and hormones required for many body processes [2]. The human body cannot naturally synthesize essential amino acids and must be supplemented exogenously and the diet is the best way of supplying the amino acids. Therefore, the consumption of fish must be encouraged since it contains an excellent essential amino acid profile.

Fish also contain the polyunsaturated fatty acids (PUFAS) namely EPA(eicosapentaenoic acid), DHA(decasahexanoic acid) and omega 3 and omega 6 fatty acids which are essential for proper growth of children and are not associated with the occurrence of cardiovascular diseases such as coronary heart disease. The presence of the PUFAS in the diet of pregnant women has been associated with proper development among unborn babies as well as reduced risk of premature delivery and low birth weight The fats also contribute to energy supply and assist in proper absorption of fat soluble vitamins namely A, D, E and K [2,3]

In addition, fish is a rich source of vitamins, particularly vitamin A and D as well as thiamine, riboflavin and niacin (vitamin B1, B2 and B3). Vitamin A from fish is more readily available to the human body than from plant foods. Furthermore, vitamin A is required for normal vision and for bone growth. On the other hand, vitamin D present in the liver and oil of fish is crucial for bone growth since it is essential for the absorption and metabolism of calcium. If eaten fresh, fish also contain low amount vitamins C which are important for proper healing of wounds, normal health body tissues and in the absorption of iron in the human body [4].

The minerals present in fish include iron, calcium, zinc, iodine (from marine fish) phosphorous, selenium and fluorine. These minerals are easily absorbed by the human body. Iron is important in the synthesis of heamoglobin in red blood cells which is important for the transportation of oxygen to all parts of the body. Iron deficiency is associated with anemia, impaired brain function and in infants is associated with poor learning ability and poor behavior [1].

Iodine present in sea food is important for hormones that regulate body metabolism and in children it is required for growth and normal mental development. A deficiency in iodine

may read to goiter (enlarged thyroid gland) and mental retardation in children.

Globally, nearly 870 million people are undernourished [5]. In Africa, malnutrition affects over 200 million children below five years of age, thus they fail to reach their potential cognitive development [6]. Malawi is endowed with a variety of natural resources which include an extensive network of water systems covering more than 21% of its territory and the larger part of that water system is Lake Malawi (28750 km^2), Lake Malombe (303 km^2) and Lake Chirwa (683 km^2) [7]. These lakes together with numerous rivers are a source of fish which is the most consumed animal protein in Malawi. In spite of this, little progress has been made to use to promote easy access to fish as an intervention to fighting malnutrition among the under-five children. Under-five malnutrition in Malawi is a serious problem as evidenced by a 2005 National Demographic survey which reported 30% of the under-five children as being underweight, 40% stunted and 7% wasted [8].

In Malawi, nearly half of all deaths of under-five children are attributed to malnutrition [9]. This is ascribed to a prolonged consumption of poor diet by most households in rural communities [10]. However, supplementing the diet with protein and micronutrient from fish has the potential of reducing the prevalence rate of malnutrition among the under-five children [11]. Elsewhere, numerous researchers have reported on the nutritional benefits of fish as compared to other major protein sources such as meat and beans. Conversely, limited initiatives have been made in understanding the potential role of fish to childhood nutrition in Malawi. Therefore, studies whose main thrust is to document the levels of availability, access and consumption levels of fish and fish products among women and infants are worthwhile in Malawi.

The main objective of the present study was to analyze the role that fish play in reduction of malnutrition particularly among the under five children. This was achieved by comparing the health status of children in fishing and non-fishing communities of Salima district, central Malawi.

Materials and Methods

Research design

The study was conducted in Cinderella and Kazembe areas in Salima district, central Malawi. Majority of people in Cindellella are artisanal fishermen who exclusively rely on capture fisheries for their livelihood. On the other hand, Kazembe area comprises of active farmers who usually cultivate maize for consumption and commercial purposes.

Using simple random sampling method, 40 fishing households and 40 non-fishing households from Cindellella and Kazembe respectively were selected for the study. Common anthropometric indices (Mid Upper Arm Circumference MUAC) as described by Maleta et al. was used to assess the nutritional status of under-five aged children in the actively fishing and non-fishing areas. Using a questionnaire, qualitative data on fish and other major protein foodstuffs consumption levels was obtained. Quantitative data on level of nutritional status of children was obtained through use of a MUAC measuring tape. Measurements on the left arm of various sampled under-five children were taken at the middle point between the elbow and the shoulder, while the arm was relaxed. The readings were then recorded to the nearest 0.1 cm. In addition, data on to prevalence of protein-energy malnutrition and micro nutrient deficiencies from health centers present in the selected study areas [12].

Statistical analysis

MUAC tape readings were interpreted in accordance to the standard reference recommended by World Health Organization [13]. MUAC less than 11 cm indicates severe acute malnutrition, between 11 and 12.5 cm as moderate malnutrition and greater than 12.5 indicates normal nutrition status. Statistical Package for Social Scientist (SPSS) version 16 was used to analyze the data in form of descriptive statistics and expressed the output frequencies in form of percentages, graphs and charts.

Results

Consumption of fish and other protein rich food stuffs

Results (**Figure 1**) of the consumption of protein-rich foodstuffs showed that greater than 50% of the households in a fishing community had a higher frequency rate of consumption with a weekly mean consumption score of 5.1 as compared to non-fishing community with greater than 50% of its households having weekly mean consumption score of 2.3. The frequency of consumption of beans, red meat and poultry meat were generally low with mean consumption scores of between 1 and 3 in both areas respectively.

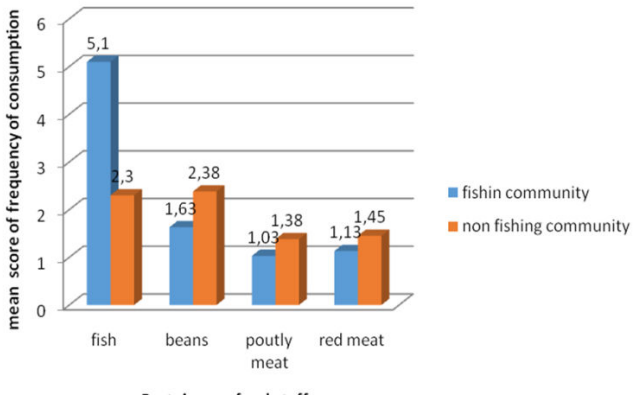

Figure 1: Consumption rate of fish and other protein-food stuffs.

Determination of the nutrition status of under-five children

Nutrition assessment of under- five children in non-fishing community using MUAC showed that 7.5%, 17.5% (**Table 1)** had

severe and moderate malnutrition respectively whilst 75% (**Table 1**) had normal nutrition status. On the other hand, the fishing community had no case of severe malnutrition and 10% (**Table 1**) of the children had moderate malnutrition whilst 90% (**Table 1**) of the children had a normal nutrition status.

Table 1: Nutritional status of under- five children.

Site	Severe (%)	Moderate (%)	Normal (%)
Fishing	0	10	90
Non Fishing	7.5	17.5	75

Prevalence of protein energy malnutrition and dietary deficiencies

Secondary data obtained from Katawa and Senga Bay Baptist clinic showed that the fishing community had a lower prevalence rate of both protein energy malnutrition and dietary deficiencies. In the fishing community, prevalence rate (**Figure 2**) of Marasmus was at 7%, kwashiorkor (9%), Night blindness (6%), Goitre (1%), Rickets (2%). In non-fishing community the prevalence rate for Marasmus was at 15%, Kwashiorkor (19), Night blindness (8%), Goitre (2%) and rickets at 6%.

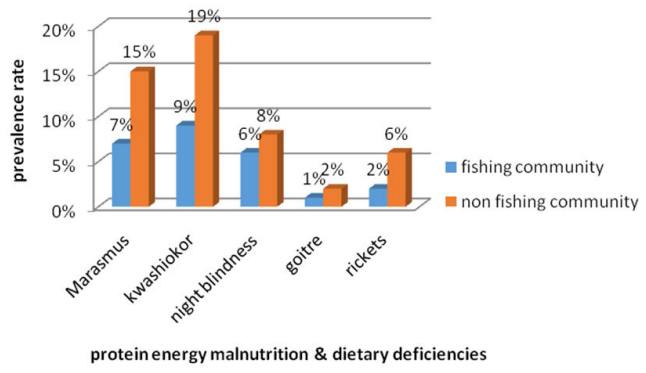

Figure 2: Prevalence rates of protein energy malnutrition and dietary deficiencies

Discussion

Consumption of fish and other proteinacious foods-stuffs

The results **(Figure 2)** shows that the majority of households in a fishing community had the highest (5.1) weekly fish consumption mean score as compared to a non-fishing community (weekly fish consumption mean score of 2.3). This is attributed to the fact that individuals in a fishing community have easy access to fish and pay little or nothing for it. Accessibility of fish by non-fishing community is difficult since it is located far from the Lake which is the main source of fish for Salima district. In addition, the area does not have any water source nearby like rivers and dams which can also offer easy accessibility of the fish. On top of that,fish farming in the area is also not practiced. The phenomenon of high fish consumption rate by fishing community and low consumption rate by non-fishing community was also documented by Gomma and Ranna [14].

According to the results of the present study (**Figure 2**), frequency of consumption of red meat, poultry and beans were generally low in both study areas as signified by frequency mean scores of one and two respectively. This is ascribed to the tendency of raising animal (goats, chickens, pigs) as a source of income and not as food by most individuals in rural communities. In Malawi, localized studies in all the regions have also revealed low consumption of food of animal origin.

The low frequency of consumption of beans in both areas is due to the fact that more individuals in these areas are much more involved in cereal production (maize, rice) unlike leguminous production. This makes beans an expensive commodity as its availability in these areas depends on suppliers who most of the times aim at profit maximization.

Nutritional status of under-five children

Comparison of the nutritional status of under -five children between fishing community and non-fishing community in accordance to MUAC definition as indicated in the results (**Table 1**) shows that that the majority of children in fishing community had a normal nutrition status (90%) with moderate malnutrition at 10% and no severe case of under-nutrition. On the other hand, 75% (**Table 1**) of the under-five children in non-fishing community had a normal nutritional status with moderate malnutrition at 17.5% and severe malnutrition at 7.5%. These findings are in tandem with findings of a similar study conducted in Lake Victoria by Nyapendi et al. [15]. The study aimed at assessing the social economic variables leading to malnutrition along the beach and hinterland sites by using weight height Z score indices. At beach site, underweight and wasting was at 16.6% and 5% respectively whilst at hinterland underweight was at 28.6% and wasting at 9.4%. In another related study, Ferdous et al. compared the nutrition status of children of five to ten years old between residing in urban and rural areas in regard to differences in fish consumption. Higher Body Mass index (17.53) was recorded among urban children who had a higher frequency of fish consumption than their counterparts in rural areas (14.07) who had a low fish consumption frequency [16].

According to WHO, an increase in fish consumption is a good practice because fish provides protein, essential fatty acids and micro nutrients which help in growth and development of the child? In the present study, the improved nutritional status of children in fishing community is therefore likely ascribed to the increased fish intake by majority of the households.

Prevalence rate of protein energy malnutrition and micro nutrients deficiencies

Protein energy malnutrition applies to a group of related disorders that include Marasmus, kwashiorkor and intermediate states of Marasmic kwashiorkor [17]. Marasmus results from inadequate intake of proteins and calories and it is termed the sickness of weaning. Kwashiorkor is a life threatening and

debilitating form of malnutrition caused by lack of protein in the diet. On the other hand, micro nutrient deficiency is as a result of lack of essential vitamins and minerals required in small amount by the body for proper growth and development. Common diseases attributable to micro nutrient deficiencies include Night blindness, Goiter and Rickets [17].

Results of the present study (**Figure 2**), shows a variation in prevalence rate of protein energy malnutrition and micro nutrient deficiencies between a fishing and non-fishing community. The fishing community registered a low prevalence rate (7%, 9%) of protein energy malnutrition while the non-fishing community had a high prevalence rate (15%, 19%). However; minor differences were noted in terms of the prevalence rate of micro nutrient deficiencies between a fishing and non-fishing community. The difference in prevalence rate of protein energy malnutrition between the two communities could probably be attributed to differences in accessibility of fish protein with the fishing community having a relative advantage. According to FAO, individuals in households with fishing as a main source of food have less challenge in meeting the daily nutrient requirement [18]. The insignificant difference in prevalence rate of micro nutrient deficiencies is likely ascribed to success of vitamin A supplementation and iodine fortification programs initiated by nongovernmental organization, the World Vision International in conjunction with the Ministry of Health as an intervention for combating micro nutrient deficiencies in Malawi [19].

Conclusion

Results of the current study affirms the potential capability of fish consumption towards alleviation of malnutrition among the under five children. This is in accordance to the observed differences in nutritional status of under-five children between those that had high frequency of fish consumption and the ones with lower consumption frequency. Majority of the under-five children in households with high frequency of fish consumption had a normal nutritional status as well as a low prevalence rate of protein energy malnutrition and micro nutrient deficiencies as compared to their counterparts in non-fishing community.

Recommendations

There is need for multisectoral conceited efforts by relevant stake holders to encourage both artisanal fishing and non-fishing communities to venture into robust fish farming through financial and infrastructure support to ultimately enhance fish production in an attempt to reduce under-five malnutrition. The importance of fish protein in the growth and development of children should constantly be emphasized in both fishing and non-fishing communities to encourage consumption of fish among pregnant and lactating mothers as well as under-five children thereby increasing chances of high birth weight and improved nutrition status respectively.

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