

High Burden of Protein–Energy Malnutrition in Nigeria: Beyond the Health Care Setting

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Abstract

There is still a high burden of protein–energy malnutrition in Nigeria. The severe forms of the disease are usually associated with high level of mortality even in the tertiary health facilities. To review the cost-effective health promotional strategies at community levels that could aid prevention, early detection, and prompt treatment of protein–energy malnutrition. The strategy used for locating articles used for this review was to search databases like Google, Google scholar, relevant electronic journals from the universities' libraries, including PubMed and Scirus, Medline, Cochrane library and WHO's Hinari. We believe that strategies beyond the health care setting have potential of significantly reducing the morbidity and mortality associated with protein–energy malnutrition in Nigeria.

Keywords: Community, High burden, Nigeria, Protein–energy malnutrition, Strategies

Introduction

Protein–energy malnutrition (PEM) is still a major public health issue in developing countries.^[1] It is associated with as much as 50–60% of under-five mortality in poor countries^[2,3] and a myriad of morbidities. There are various anthropometric variables for classifying PEM.^[3] Acute malnutrition, for instance, is measured by weight for height or bilateral edema, while chronic malnutrition is measured by height for age.^[4] The WHO recently defined Severe Acute Malnutrition by a very low weight for height (below $-3z$ scores of the median WHO growth standards), visible severe wasting, or the presence of nutritional edema.^[5] Wasting (marasmus) and various forms of kwashiorkor are, therefore, forms of Severe Acute Malnutrition. One of the oldest classifications of PEM (Wellcome Working Group) used weight for age and the presence or absence of edema to arrive at a spectrum, with marasmus and kwashiorkor at either end of the spectrum.^[3] Besides macronutrient deficiency, deficiencies in iron, iodine, vitamin A, and zinc are the main manifestations of

malnutrition in developing countries, and indirect factors such as high rate of unemployment, poverty, illiteracy, and overcrowding contribute to the development of PEM.^[1] In addition, natural disasters are increasingly contributing to food shortage in Africa as the continent is not immune to the effects of climate change. According to a report published by the World Food Programme in mid-2011, an estimated 9 million people in the horn of Africa alone need humanitarian assistance as severe drought combines with conflicts to push the poorest and weakest, especially children, to the edge of survival.^[6] Food and nutrition education, in the presence of widespread food shortages, ends up in teaching people to eat what they cannot afford or do not have and, thus, has only limited potential.^[7] Beyond the health care settings, there is urgent need, therefore, to address the various persisting social determinants of PEM in Nigeria, such as poverty, illiteracy, unemployment, corruption, inequalities, and inequities. According to Odion (2009) cited in Anger, 70% of the over 140 million Nigerians currently live below the poverty line of 1 dollar per day.^[8] The first goal of the millennium development goal (MDG) is eradication of extreme poverty and hunger, but recent Africa Development Bank report revealed that the number of Africans that will be living below the poverty line is instead projected to increase by 2015.^[9] In this review, we advocate a paradigm shift in addressing PEM that focuses more on addressing determinants of health as well as preventive and health promotional strategies at community levels.

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Review Methods

The strategy used for locating articles used for this review was to search databases like Google, Google scholar, relevant electronic journals from the universities' libraries, including PubMed and Scirus, Medline, Cochrane library and WHO's Hinari. The search was for articles published only in English using search terms like "malnutrition," "protein-energy malnutrition," "PEM," "under-five," "community," "hospital," "strategies," "macronutrient," "micronutrient," "high burden," "morbidity," "mortality," "Nigeria," "Africa," "sub-Sahara." References of articles reviewed were also checked for relevant and related studies which were also reviewed where possible. The search was open to all articles irrespective of their year of publication. Retrieved articles were checked for their relevance to the study in terms of their focusing on malnutrition among under-five children.

PEM and Determinants of Health

It has been argued that inadequate management of severe PEM is the cause of an unacceptable high case-fatality rate in Nigeria today, and insufficient skilled manpower and poorly equipped health facilities to deal with life-threatening emergencies can be blamed for this.^[10] Unarguably, infections too, including HIV, also contribute to the development of severe malnutrition, but traditional risk factors such as poor nutrition, parental disadvantage and illness, poverty, and social inequity remain the important contributors to the prevalence of severe malnutrition.^[11] While it is important to strengthen the management of admitted cases of PEM seen in Nigeria, especially during the acute phase, we posit that it will be more cost effective and beneficial if strategies that could help prevent PEM are put in place. This becomes critical as various studies have consistently demonstrated that PEM is primarily a socioeconomic problem that results in a medical problem. In a case-control study conducted in Dhaka, Bangladesh, which involved children aged 6–24 months, Nahar *et al.* compared 507 children with weight-for-age z-score (WAZ) ≤ 3 matched for age, sex, and place of residence with 500 children whose WAZ was ≥ 2.5 .^[12] They documented that severely underweight children were more likely to have undernourished poorly educated teenage mothers, history of shorter duration of predominant breastfeeding, discontinued breastfeeding, higher birth-order; and fathers who were poorly educated and unskilled day-laborers.^[12] Victora *et al.*^[13] in Brazil also noted that social variables like family income and father's educational level as well as environmental variables, particularly the type of housing, degree of crowding, and type of sewage disposal, were also strongly associated with malnutrition in children. In Ghana, van de Poel *et al.* used data from the Ghana 2003 Demographic and Health Survey to demonstrate that malnutrition is related to poverty and maternal education.^[14] These findings clearly demonstrate how addressing the non-health-related MDGs such as eradication of extreme poverty/hunger (MDG 1), achieving universal

primary education (MDG 2), promoting gender equality and empowering women (MDG 3), as well as ensuring environmental sustainability (MDG 7) could help prevent malnutrition. In less than five years' time, world leaders will meet to assess the progress that has been made in meeting the Millennium Summit commitment, but a number of targets will not be met in Africa, not because there is no progress but because the rate of progress is slower than required.^[15] African leaders need to double their efforts in meeting the MDGs as a means of addressing determinants of health, and thereby preventing PEM among children.

Micronutrient Supplementation as a Key Strategy

A number of strategies have been documented to help reduce the incidence and severity of PEM. In a randomized controlled double-blind trial of 300 children in Maseru, Lesotho, where 150 children with PEM received zinc supplement and another 150 did not receive the same, Makonnen *et al.* documented that supplementation with 10 mg of elemental zinc significantly improved the outcome and reduced the mortality among children with PEM.^[16] Mortality was significantly reduced to 4.7% in the zinc supplemented group compared with 16.7% in the control group during hospitalization. They also noted that in the zinc supplemented group as much as 58% of the children were above the 80th percentile of expected weight for age 3 months after discharge, compared with only 27.6% in the control group.^[16] Additionally, dietary zinc supplementation resulted in a significant reduction in diarrheal disease, respiratory morbidity, and episodes of clinical anemia, skin infections, and fever as well as vomiting in children with PEM.^[16] A study conducted in India documented that vitamin E supplementation given as α -tocopherol daily for 6 weeks significantly improved the neurological signs such as vibration, joint position sense, dysdiadokinesia, ataxia, tandem walking, and hyporeflexia among children with moderate PEM.^[17] Naturally occurring substances such as honey have been found to be useful in the management of PEM. In a recent study involving 30 children with PEM and 20 matching controls conducted in Egypt, the patients were randomly assigned to either one of two groups.^[8] Both groups entered conventional nutritional rehabilitation program for 2 weeks, with the first group receiving honey in addition while the second received placebo.^[18] This study showed that the addition of honey to the nutritional rehabilitation program of PEM patients offered a more rapid recovery to their phagocytic function in addition to its beneficial effect on the growth parameters.^[18] In Nigeria, there are many opportunities that can be used to leverage micronutrient supplementation among the under-fives. Currently, vitamin A is supplemented during the routine immunization and National Immunization Days (NID). Companies producing various household food items such as sugar, salt, and vegetable oils can and should be mandated to fortify them with these trace elements and vitamins. Honey is found in various parts of the country and can be produced

in commercial quantities. Families should be encouraged to use honey in place of refined sugar. A little political will is all that is required to achieve these and protect our children from these micronutrient deficiencies.

Household Food Security

The incidence of PEM can be reduced by improving on storage and preservation of various food items during the harvest season. The Government of Nigeria needs to figure out how best to ensure household food security all year round. This can be achieved in partnership with private sectors and non-governmental organizations through a number of collaborative strategies. There are so many unemployed Nigerian youths that such collaborative efforts can help start small-scale farming such as fishery, poultry, piggery, etc. The Government of Nigeria must also look beyond the oil reserve in the Niger Delta and consider investing hugely in mechanized agriculture as a means of feeding its fast growing population. Industries that can process and preserve foods need to be established to avoid unnecessary wastages that usually characterize the plentiful harvest season. This will also help create employment for the teaming unemployed youths. A lot of countries are moving into all year farming using simple but efficient technologies like irrigation. The Government of Nigeria can key into this and it will also help in the economic empowerment for families. There are now genetically modified seedlings that can improve yield in some countries and Nigeria needs to explore this as a strategy to reduce hunger and PEM, especially among its vulnerable population. More importantly, low-income households should be identified and linked to income generating activities which are more sustainable. This should be the priority of the numerous poverty alleviation programs and the micro-financing banks in the country. It is ironic that Nigeria is the sixth largest exporter of oil and at the same time hosts the third largest number of poor people after China and India. Sadly, most of the oil wealth had ended up in the hands of the few political elites and their cronies, while the majority of the poor starve to death on a daily basis. In fact, Nigeria is among the 20 countries in the world with the widest gap between the rich and the poor.^[19]

Safety Nets

PEM is usually found among the children of low socioeconomic families. These families are barely surviving with low purchasing power. The government must think of creating safety nets for the less privileged in our society. Such safety nets may be in the form of additional free food rations and other essential commodities for such families. Even in the developed nations of the world, safety nets is still being created in different ways for their vulnerable populations. Beyond therapeutic foods, supplementary feeding, which is the provision of food rations (either local staples or specialized foods) to vulnerable or malnourished persons to supplement the local diet and provide balanced and/or adequate daily energy

intake, should be encouraged.^[20] A good example of such specialized food is the high-energy Ready-to-Use Therapeutic Foods (RUFT) which can be consumed at home. RUFT is a food product high in energy and micronutrients in which all powdered ingredients are suspended in fat and do not require any preparation or the addition of water before ingestion; it can be stored for long periods, does not require refrigeration, and can be individually packaged and used effectively in areas where hygiene conditions are not optimal.^[20] Nigeria should be able to produce RUFT or any other high-nutrient dense spread for the malnourished and other vulnerable children.

Community Level Strategies

The community-based organizations also have a role to play in contributing to household food security. They can support communal farming and help set up "Food Banks" where good spirited individuals in our communities can donate food items to support the less privileged. After all, an African adage says "I am because we were." We should be our brothers' keepers. At the community level, mentor mothers, traditional, religious, and women leaders could serve as veritable resources in achieving this. The mainstay in the management of PEM even in hospital setting is diet therapy. There are packaged high-energy therapeutic foods like F75 and F100 being distributed by non-governmental organizations such as UNICEF for the management of children admitted for severe PEM. Similar preparations are made at the various hospital settings in Nigeria and go by names such as high-energy mixture (HERMIX), Kwash pap in Nigeria. We do not need to wait for our children to develop severe PEM before giving them food. Mothers can be taught how to prepare such mixtures at home for their children using mentor mothers. Burundi, with the assistance of an international non-governmental organization, presents a model of how mentor mothers can be used to reduce PEM in a community using what they called Maman Lumieres (Light Mothers). Maman Lumieres are the key community implementers for a positive-deviance hearth (PD-Hearth) nutrition initiative using an approach that identifies affordable, culturally acceptable, effective, and sustainable practices that are already being used by individuals within a community to prevent malnutrition; by seeing these behaviors, families are empowered to adopt better practices even with limited resources and access to services.^[21] Maman Lumieres (mothers with healthy and nourished children) are trained to provide treatment for moderately malnourished children at home. This helps them reach out to their communities and alleviates the long distances and difficult terrain encountered when traveling to a health facility – a trip that can take a day of walking.^[21] This approach can be replicated in Nigeria, especially for hard-to-reach communities in the country. Community resources can also be used to encourage breast feeding culture in Nigeria. The recommendation is that babies should be exclusively breast fed (EBF) for the first 6 months, and thereafter, breast feeding needs to be continued into the second year of life along with appropriate complementary diets. Sadly, according to a

UNICEF report, between 2005 and 2009, only 13% of babies less than 6 months were exclusively breast fed and 32% were still breast feeding at age 20–23 months in Nigeria.^[22] In fact, a recent study put the average exclusive breast feeding rate in Nigeria for infants at their fifth month of age at 7.1%.^[23] The study also noted that the odds of EBF were higher in rich households than in poor households.^[23] This is very disturbing considering that PEM is commoner among the low socioeconomic households. There is an urgent need to mobilize the available resources to step up our exclusive breast feeding rate and encourage breast feeding into the second year of child's life with timely and appropriate complementary feeding.

Conclusions

In view of the persisting high number of children with PEM in Nigeria and associated high mortality rate with the severe forms of PEM even in hospital settings, community-based strategies that can help preventive PEM need to be encouraged and strengthened.

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