



Review Article

Prevalence of Energy Malnutrition in Children under Five Years and Service Delivery Responses in Nepal

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ABSTRACT

Protein Energy Malnutrition (PEM) is a very common problem in children under five years of age in Nepal. The purpose of this review is to summarise the situation of PEM in children under five in Nepal and the service delivery mechanisms carried out by Ministry of Health and Population (MOHP) through a review of published literature. A search of the Google Scholar and PubMed databases was conducted using the following keywords; Child health services; protein energy malnutrition; stunting; wasting; underweight; child, preschool; nutrition; nutrition policy; Nepal. Prevalence of PEM among children under five was identified and classified based on the indicators defined by United Nations Children's Fund (UNICEF). Forty nine percent of children under five years of age were stunted, 39% were underweight, and 13% were wasted. Stunting appeared to be more common in mountain and hilly areas while wasting and underweight were more common in the Terai areas. A comparative study of PEM among children under five years in the South-East Asia Region showed that Nepal had the second highest stunting rate. To control PEM, the MOHP has introduced various nutritional strategies, programmes, with PEM specific objectives. This review of the literature reports a modest decline in the level of stunting, a marked decline in the level of children underweight, but a slight increase in the level of wasting. Well designed programmes were not properly executed.

Key Words: Protein energy malnutrition; stunting; wasting; child health services; Nepal

INTRODUCTION

Protein energy malnutrition (PEM) is a range of pathological conditions arising from a deficiency of protein and energy, and is commonly associated with infections. [1] In children, PEM is defined by measurements that fall below minus two standard deviations of the normal weight for age (underweight), height for age (stunting) and weight for height

(wasting). [2,3] Wasting, stunting, and weight are often used as indicators of PEM. Two severe nutritional clinical conditions involving PEM are Marasmus and Kwashiorkor. [4,5]

PEM is a very common problem in children under five years of age in Nepal, [6] and is a significant contributor to morbidity and mortality—accounting for more than half of all child deaths. [7] In particular PEM is one of the leading manifestations of malnutrition,

[8] increasing vulnerability to frequent infections and ill-health in children. [8,9] PEM also leads to permanent impairment of physical and mental growth of those children who survive. [10]

In Nepal, there does not seem to have been any significant changes in prevalence of PEM since the early 90s. [11] Reports published by UNICEF Nepal, 2006 and Nepal Demographic and Health Survey (NDHS), 2001 showed that nearly 51 percent of under five children were stunted, 48 percent were underweight, and 10 per cent were wasted. [7,12] These reports also indicated that stunting is more common in mountain and hilly regions while wasting and underweight are more common in the Terai region of Nepal.⁷ To overcome PEM, the Nepal Ministry of Health and Population (MOHP), has formulated various strategies and programmes. [13]

In Nepal, the prevalence of wasting among children under five years is a severe problem. According to the World Health Organisation (WHO) expert committee, [14] “for wasting, prevalence cut off value 10-14% is taken as serious and 15% or more than 15% is considered critical.” The situation is also so serious that wasting increases dramatically in the first two years of life and the prevalence is highest among children age 9-11 months. [15] It is justified by the statement that PEM usually manifests early, in children between 6 months and 2 years of age and is associated with early weaning, delayed introduction of complementary foods, a low-protein diet and severe or frequent infections. [2,16-18] However, as Shoham & Duffield [19] reported, wasting is not such a serious problem because an adequate diet may correct the problem in a few weeks. Conversely, they stated that the correction of stunting may take much longer.

Prevalence rate of stunting in Nepal is soaring making the child health situation critical. In children under five, as highlighted by Pradhan [20] PEM, and in particular

stunting, has increased vulnerability to disease and increased risk of mortality. Moreover, studies have shown that stunted children frequently experience social disadvantages, which, in themselves, may detrimentally affect their development. [21,22]

The prevalence of underweight in children under five, still poses greater risk of death, since the prevalence cut-off value for underweight (30% or higher) is very high. [14] Moreover, one study showed that severely underweight children were found to be two to eight times more likely to die within the following year as compared to children of normal weight for their age. [23]

There is considerable variation in results of the studies. One neglected but important factor that influences the problem is the role of service delivery mechanisms.

Definitions of the indicators

UNICEF has defined three anthropometric indicators of PEM as follows. [24,25] These anthropometric indicators have been used in this review as they are designed for identification and classification of children suffering from protein energy malnutrition. [26]

Underweight: Percentage of children 0–59 months old who are below minus two standard deviations from median weight for age of WHO Child Growth Standards. These growth standards were generated through data collected in the WHO Multicenter Growth Reference Study which sampled 8,440 children in six countries (Brazil, Ghana, India, Norway, Oman, and the United States). [27] The WHO Child Growth Standards describe normal growth under optimal environmental conditions and is used to assess children everywhere, regardless of ethnicity, socio-economic status, and type of feeding.

Wasting - Moderate & severe: Percentage of children 0–59 months old who are below minus two standard deviations from median weight for height of the WHO Child Growth Standards.

Stunting - Moderate & severe: Percentage of children 0–59 months old who are below minus two standard deviations from median height for age of the WHO Child Growth Standards.

Aims:

- To conduct a review of the published literature in order to summarise the situation of Protein Energy Malnutrition in children under five in Nepal and to describe the service delivery mechanisms carried out by the MOHP.

Objectives

- To estimate the prevalence of PEM in children under five years of Nepal
- To compare and contrast the picture of PEM in children under five of Nepal

with that of other countries of South East Asia Region

- To analyze the nutritional strategies, programmes and activities launched by MOHP to address PEM

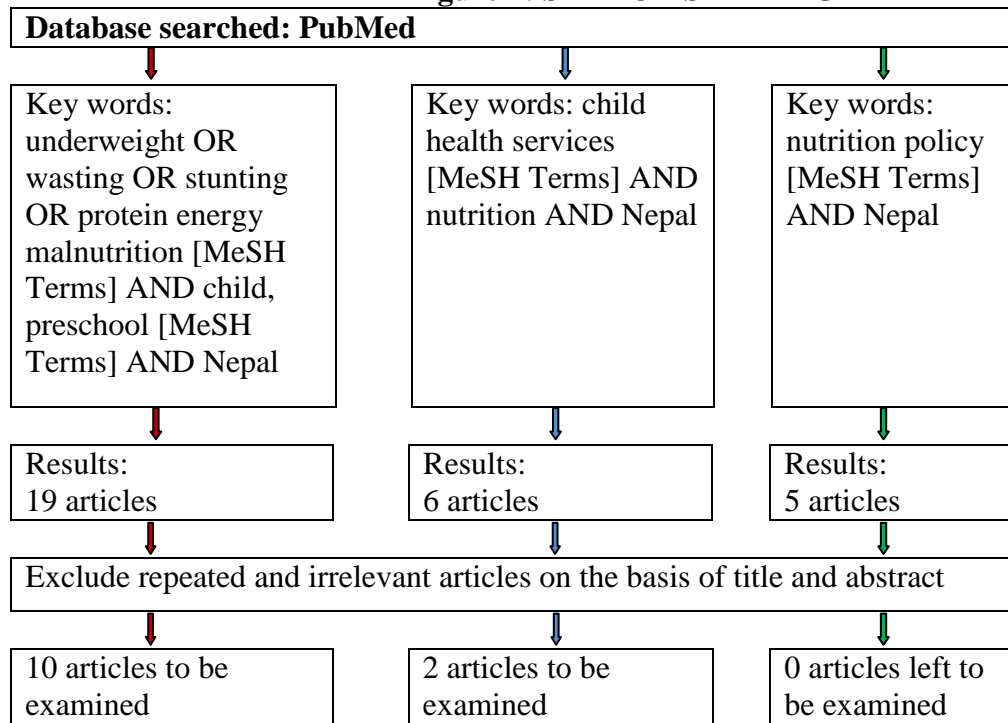
METHODS

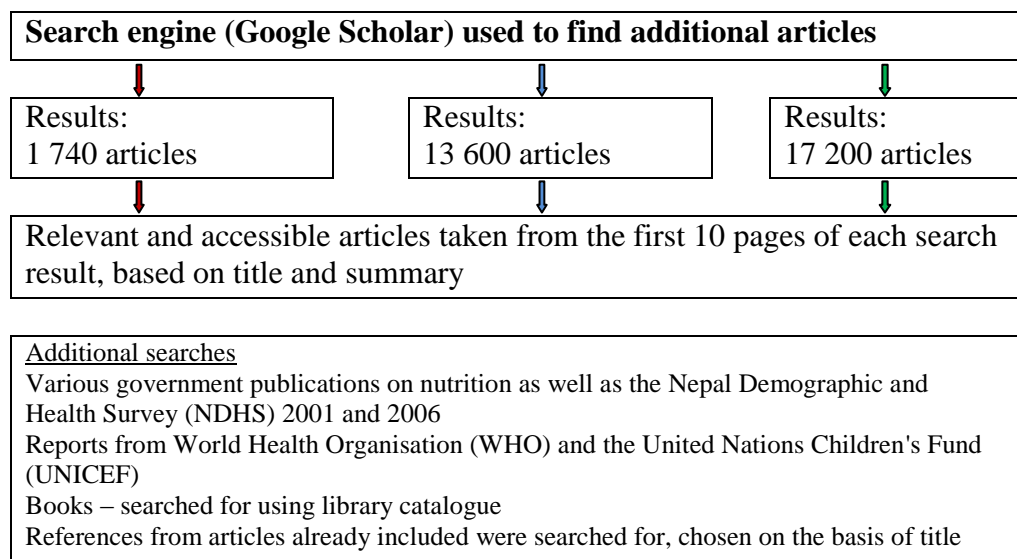
Technical Information

For this review, a literature search was performed using the search strategy outlined in figure 1. Literature was searched using PubMed, and Google Scholar. Search terms were limited to publication date to October 05, 2010.

Restrictions were put on location, age group and language of publication. Papers that addressed PEM in women, refugees, other age groups except under five years and malnutrition other than PEM, and articles published in languages other than English and Nepali were excluded.

Figure 1: SEARCH STRATEGY





RESULTS

NDHS 2006 [15] reports that 49 percent of children in Nepal under five are stunted, 13 percent are wasted, and 39 percent are underweight. It also reports that the distribution of the problem is not uniform. Rural populations are the most affected with stunting, wasting, and underweight (see table 1) and that while stunting is a major problem in the mountainous areas, wasting is more significant in the Terai (see table 2). The study also shows that the Western areas are most affected by stunting (see table 3).

Table 1 Prevalence of stunting, wasting, and underweight (in percent) among children under five years in urban and rural areas of Nepal in 2006

PEM (Indicators)	National (Total)	Urban	Rural
Stunted*	49	36	51
Wasted*	13	8	13
Underweight*	39	23	41

* below -2SD, % of children under 5 years based on WHO Child Growth standards
 Source: 2006 NDHS Fact Sheet

Table 2 Prevalence of stunting, wasting, and underweight (in percent) among children under five years in ecological zone of Nepal in 2006

PEM (indicators)	Ecological zones		
	Mountain	Hill	Terai
Stunted*	62	50	46
Wasted*	9	8	17
Underweight*	42	33	42

* below -2SD, % of children under 5 years based on WHO Child Growth standards
 Source: 2006 NDHS Fact Sheet

Table 3 Prevalence of stunting, wasting, and underweight (in percent) among children under five years in development region of Nepal in 2006

PEM (indicators)	Development Regions				
	Eastern	Central	Western (W)	Mid-W	Far-W
Stunted	40	50	50	58	53
Wasted	10	14	11	12	17
Underweight	33	38	39	43	44

* below -2SD, % of children under 5 years based on WHO Child Growth standards
 Source: 2006 NDHS Fact Sheet

A more recent report, World Health Statistics 2010 [28] indicates that 49.3 percent of under five years children of Nepal are stunted and 38.8 percent are underweight. This report does not present the data of wasting. But the report of Nepal Health Development Partnership 2009 [29] shows reduction in the percentage of underweight (from 39% to 34%) among the same age group.

Comparisons between South-East Asia Region (SEAR) and the Nepal

WHO 2009 Nutrition profile of member countries of SEAR [30] shows that Nepal ranks second highest in the prevalence of stunting and second lowest in wasting among under fives. The data also show Nepal has lower prevalence of underweight i.e., (38.6) [31] than Bangladesh (48%), [32] India (42.5%), [33] and Timor Leste (48.6%) [34] and higher compared to the rest countries within this region.

Service delivery mechanism carried out by Ministry of Health and Population (MOHP) National Nutritional Policies and Strategies

MOHP has introduced various nutritional strategies. It developed national nutritional strategies in 1978, introduced a comprehensive nutrition programme in 1979, national nutrition strategy for Nepal in 1986, and Nepal National Plan of Action in 1998. [15] A National Nutrition Policy and Strategy (NNPS) was formed in 2004 under the Child Health Division of Department of Health Services of MOHP. Specific strategies are proposed to control PEM. [13,35,36] These strategies focus particularly on exclusive breast feeding, timely introduction of complementary foods, growth monitoring services, ANC checkups, de-worming during pregnancy, infant and young children feeding practices, workshops/seminars for medical professionals, Behaviour Change Communication (BCC) for changing the dietary practices, nutrition rehabilitation

home, maternal and nutrition practices, and breastfeeding week.

The National Strategy for Infant and Young Child Feeding (IYCF), was also developed in the year 2004 [37] based on the global strategy of WHO and UNICEF.

Nepal Health Sector strategy 2004 and Nepal Health Sector Programme-Implementation Plan (NHSP-IP) [38,39] have also recognized the nutritional problems of children and have adopted a particular implementation strategy regarding nutrition.

A National School Health and Nutrition Strategy jointly approved by MOHP and Ministry of Education (MOE) to develop physical, mental, emotional, and educational status of the government-run school children has also been formulated. As a result, a National School Health and Nutrition programme has been piloted in two districts namely Sindhupalchowk and Syangja from June 2008 and will be completed in May 2012. [35]

National Nutritional Programmes

The MOHP has also designed and implemented other nutrition programmes to control PEM [13,40] such as growth monitoring and nutrition counselling at Primary Health Care Centre (PHCC), Health Posts (HPs), Sub-Health Posts (SHPs) and Outreach Clinics (ORCs). Also, the practice of exclusive breastfeeding is promoted through mass media together with the concept of complementary feeding after the child reaches six months.

To address the problem of PEM, MOHP have also developed interventional programme such as Community Based-Integrated Management of Childhood Illness (CB-IMCI) as proposed by the Second Long Term Health Plan (SLTHP). [35,36]

Recently, Integrated Regional Information Networks (IRIN), Nepal [41] reported that Nepal has planned a multi-sectoral nutrition programme endorsed by several ministries.

Nutritional services

The nutritional services provided by the government of Nepal differ at different levels of health service. At the central level, the Ministry of Local Development (MOLD) coordinates child development programmes with other relevant ministries and International Non Governmental Organizations (INGOs). At the intermediate level, Directorates of health services and District Public Health Office/ District Health Office (DPHO/DHO) provide counselling and mobilize women group, train health professionals, community level service providers and volunteers, implement and strengthen nutritional programmes, integrate community-based programmes with other health programmes, and implement growth monitoring.

At the local level, the Municipalities and Village Development Committees (VDCs) implement and monitor Early Childhood Development (ECD) programmes—in particular; they monitor the nutritional status of children below three years of age. For example, Ministry of Health has child nutrition and health programme run in its health posts all over the country.^[42] Besides the government programmes and activities on PEM, NDHS 2006^[15] shows that United Nations Mission in Nepal (UNMIN), World Food Program (WFP), Save the Children Alliance, United States Agency for International Development (USAID), and UNICEF-Nepal have performed a vital roles in introducing and supporting nutritional programmes in Nepal. INGOs, especially Save the Children Alliance and Plan Nepal have sponsored health and nutrition services, which support the holistic development of children.^[42]

Other actions

The Nutrition Section of the MOHP has launched a nutrition promotion week in different districts to enhance knowledge on

timely initiation of proper feeding practices.^[15] It has also recommended nutritional intervention (nutritional supplementation, enrichment, nutrition education and rehabilitation) as a priority element of essential health care services.^[13] Moreover, it has placed nutrition among the main health programme areas for inter-sectoral cooperation.^[11] MOHP through Maternal and Child Health (MCH) programme^[42] is also monitoring the nutritional status of children below three years in some of its project district.

MOHP has formulated PEM specific objectives for reducing its prevalence in children under five years to half of the 2000 level by the year 2017 through a multi-sectoral approach.^[35] For example various activities were carried out in the fiscal year 2008/09 by MOHP to prevent PEM such as regular growth monitoring at health centres, capacity building and orientation on growth monitoring to health workers, Infant and Young Child Feeding (IYCF) promotion and establishment of nutrition rehabilitation centres in all Regional & Zonal Hospitals among others.^[35]

With all these nutritional programmes and services MOHP hopes to reduce the prevalence of underweight to 27 %, stunting to 28%, and wasting to 5% in under five years children by the end of 2015 (MDGs).^[43] In addition, MOHP has aimed to reduce PEM in children under five to half of the 2000 level by the year 2017.

DISCUSSION

The results of this qualitative analysis suggest that, in a five year period (2001-2006), reduction in the prevalence of stunting from 51% to 49% is a modest decline compared to reduction in the prevalence of underweight from 48% to 39%; a marked decline in the same period.

WHO, Global Database on Child Growth and Malnutrition (Nepal) [44] showed a fall in the percentage of stunting by 7.8% (from 57.1 % in 2001 to 49.3% in 2006) and a reduction in the percentage of underweight by 4.2% (from 43% in 2001 to 38.8% in 2006). These changes in the percent of stunting and underweight also show similar trends i.e., a modest decline in the level of stunting, a marked decline in the level of children underweight. This contradicts with NDHS, 2006 statement which stated that there has been a marked decline in the level of stunting, a modest decline in the level of children underweight over the last five years.

Rural areas have higher prevalence (above national averages) for all three nutritional indicators, since Nepal is mainly rural with only 14% of people living in urban areas.

The Terai region (in southern Nepal) has lower prevalence of stunting. This may be because the Terai has a surplus of food, the food supply is varied, and of good quality together with a minimal or no short-term (seasonal) food gap. In contrast, in the mountain and hilly areas, people often grow homogenous crops which are often in short supply.

The far-western region has the highest prevalence of underweight whilst the eastern region has the lowest prevalence. This may be because the far-western region has the lowest socio-economic status, has the highest percentage of women with no education, has more number of babies with birth weight less than 2.5 kg, and has the highest percentage of women with BMI < 18.5 km/m², all of which contribute to the increase in the number of underweight cases among under five years children.

Comparative study of prevalence of stunting, wasting, and underweight in countries of SEAR of WHO also provides a similar results for Nepal as provided by NDHS 2006. In contrast, Revised draft of

Global Framework for Action of WFP & UNICEF [45] stated that the PEM situation is worsening in Nepal. Alike, Nepal is ranked 19 among 24 countries with the largest burden of stunting by UNICEF. [25]

MOHP has formulated different strategies and programmes to overcome PEM. National Nutrition Policy and Strategy provides a comprehensive documentation on nutrition policy and strategy. [36] The National Strategy for IYCF includes training/orientation of health workers and school teachers on IYCF counselling, new growth monitoring, and PEM to update knowledge on PEM including IYCF. [37]

Similarly, MOHP launched a comprehensive nutrition programme. [15] The MCH programme of MOHP has launched the nutrition package in collaboration with the nutrition section of ECD services. However, a review of the ECD services shows that the directions of most of its programmes are skewed towards psycho-social development and education and cognitive development with no or very little inputs on health and nutrition. [42]

The concept of a multi-sectoral nutrition programme for Nepal that is supported by the ministries for women, local development, agriculture, and education is not novel in the history of Nepal nutrition programme. The National Health Education, Information and Communication Centre (NHEICC) Nepal [46] has already mentioned in its 2003 report that nutrition education will be the contents of HEIC messages. This suggests a lack of proper coordination between the ministries.

Michaelsen et al [47] reported that underweight, stunting, and wasting each contribute to child mortality and disease burden, and calls for both a short term and long term approach to deal with PEM as the National Nutrition Policy and Strategy has clearly mentioned.

Gurung ^[48] mentioned “the Government of Nepal does not have any strong and effective programmes to tackle PEM.” The Government has written programmes or plans to address PEM listed in its report, and they have the capacity to be strong and effective because they are based on the WHO global strategy. However they are not properly executed.

MOHP should be very clear that nutritional programmes do not only address PEM. In this condition, PEM may not be fully addressed and this review suggests that this should be made clear by the MOHP. In addition, the MOHP may not be able to attract an adequate number of concentrations of interested people and organizations. Before 1980, developing countries were focused on PEM but then the focus shifted due to the perceived glamour of micronutrients. ^[49] If this situation should occur in Nepal, this would exacerbate the current situation even further.

These nutritional programmes and services have helped to certain extent to reduce the percent of stunting, wasting, and underweight and thus improved the nutritional status of children under five years of age over the past five year. As a result, Nepal is close to achieving the Millennium Development Goals (MDGs) target of reducing the percent of underweight children to 29 % by 2015.

In Nepal, future research is urgently required to determine the effectiveness of multi-sectoral nutrition programmes. In addition, research is needed to answer whether or not federal funds for PEM are being used according to the funder’s guidelines.

Limitations

This review did not explore Marasmus and Kwashiorkor conditions because the review of literature was not designed to explain these conditions but to highlight the extent and distribution of PEM based on three indicators viz. stunting, wasting, and

underweight. Likewise, children under five years of age are only taken into consideration. Moreover, the review is based on restricted search, only using documents available to the author on web.

CONCLUSION

There is some but insufficient progress in the condition of protein energy malnutrition in children under five years of age in Nepal. It may be that the strategies, programmes, and activities for PEM although well presented in the report but not properly executed or poorly implemented. The results of this review suggest that there is a modest decline in the level of stunting, a marked decline in the level of children underweight, but a slight increase in the level of wasting from the year 2001 to 2006 when the national demographic health survey was conducted. The results indicate that reducing the prevalence of underweight to 27 %, stunting to 28%, and wasting to 5% in under five years children by the end of 2015 (MDGs) continues to be a challenge. Moreover, MOHP goal to reduce PEM in under five years of children to half of the 2000 level through a multi-sectoral approach by the year 2017 is very difficult. This article is assumed to be helpful to policy makers, nutritional expert, and everyone interested in knowing the situation of PEM among under five years children in Nepal.

Recommendations arising from the results of this review

- The government of Nepal should give first priority to the nutrition interventions to reduce the PEM.
- The actions of the Ministry of health and population should become more visible.
- Strategic planning should be performed before start of the nutritional programmes.

- Holistic concepts to address underweight, stunting, and wasting should be launched separately from programmes that address the nutritional problem as a whole.

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