

Baseline Assessment for Addressing Acute Malnutrition by Public-health Staff in Cambodia

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ABSTRACT

The objective of this study was to formulate appropriate responses by the public-health sector to reduce acute malnutrition among children in Cambodia. A cross-sectional survey to identify wasting together with a simple wealth-ranking exercise was conducted. Thereafter, separate focus-group discussions were also conducted with mothers of malnourished and non-malnourished children, who belonged to the poorest strata, to identify coping mechanisms and to assess feeding and hygiene practices. There was no statistical correlation between wasting and socioeconomic status ($df=3$, $p=0.06$). Reported feeding practices were poor, including not giving of colostrum, too early introduction of weaning, low feeding frequency, and late introduction of nutritious foods. Healthcare-seeking behaviour appeared inadequate, and hand-washing with soap was not practised. Acute malnutrition was mainly related to these factors rather than to food insecurity. An education campaign in tandem with peer-counselling would be the most appropriate option.

Key words: Nutrition disorders; Child nutrition disorders; Wealth; Public-health sector; Food security; Health behaviour; Cross-sectional studies; Cambodia

INTRODUCTION

Adequate food supply and nutrition is one of the key areas to achieve health for all (1). Malnutrition is a main factor impeding human development as poor food intake leads to nutritional deficiencies that adversely affects growth and the immune system of infants and children (2,3) and is a determinant of poverty (4,5).

The most common response by health managers to acute malnutrition (wasting) appears to be the creation of supplementary feeding programmes (6,7). Therefore, identification of malnourished children and concurrent supplementation of food by public-health staff may be an appropriate response to tackle wasting. In Cambodia,

acute malnutrition is relatively common (8), but the public-health sector has only embarked on a process of reform since 1996. Often, persons with limited educational background man health facilities, especially in rural areas, and motivation is low due to minimal official financial remuneration. Care-seeking at public facilities is sub-optimal with only 0.3 annual contacts per capita (9), and the services are only consulted for a fifth of all illnesses and injuries (10).

Given these limitations of the public-health staff in rural Cambodia, any envisaged approach for supplementary feeding programmes should be simple and reliable to optimize its effectiveness and efficiency. To be efficient, integration into ongoing activities, such as outreach sessions, is a must as the costs of supervision, logistics, and training can be shared (11,12).

Conducting a thorough baseline assessment increases programme effectiveness (13). Poverty, and as such vulnerability to food insecurity, has been recommended as an indicator for malnutrition (5). Targeting poorest households for participation in supplementary feeding activities may also enhance effectiveness. Methods

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to classify households among socioeconomic groups and to identify the poorest include consumption expenditure of households, wealth-ranking using durable assets, and cash income of households (14).

Here, we report on a baseline assessment that was conducted to formulate appropriate responses by public-health staff in Cambodia to address acute malnutrition among children.

Background

Kirivong operational district (KOD), located in Takeo province in the southeast of Cambodia, comprises four administrative districts with 31 communes and 290 villages, and has a population of 201,817 (1998 census). Twenty health centres and an 80-bed referral hospital provide health services. The hospital is located in the south of the operational district, nine km from the Vietnamese border. The majority of the population are rice farmers, often at subsistence level, who additionally conduct fishing and gathering to supplement their diet. Two of the administrative districts—Koh Andeth and Borey Chalusar—are located in the Tonle Bassac Delta, have numerous canals, and are flooded during the rainy season. Consequently, they have different farming patterns compared to the more undulating districts of Kirivong and Traing that normally do not flood.

During July–October in 2000 and 2001, Takeo province experienced the worst floods in Cambodian history whereby a considerable proportion of farmers lost their wet-season rice. Due to two successive losses of the principal crop, a major impact on the nutritional status of children was anticipated.

MATERIALS AND METHODS

The study was conducted during January–February 2002, three months following the retreating of the flood waters, in eight villages of six communes from four administrative districts of KOD. Subjects for the study were rice farmers, all victims of floods during 2001. It was assumed that the floods would have created food insecurity among the poorest households and that they consequently had a high risk of having wasted children. It was also assumed that these households could be identified by a set of easily assessable assets whereby a wealth-ranking exercise was conducted. Focus-group discussions were then held with mothers of malnourished and non-malnourished children belonging to the poorest stratum to ascertain coping mechanisms for flood-related food insecurity.

Wealth-ranking

The study was developed in the absence of baseline data regarding the prevalence of wasting and associated risk factors among children at KOD, and there were uncertainties concerning the proportion of the study population who were affected by flooding. This hampered calculation of the required sample size to indicate statistical significances. Therefore, it was opted to randomly select two villages per administrative district to obtain a sample of children that would be representative of KOD. To select the villages, all Health Centre Chiefs were requested to name villages where residences had been flooded. The names of the villages were written on separate pieces of paper and placed in a box according to administrative district whereupon two villages were drawn from each box.

Selection criteria

Households were eligible for inclusion when: (a) rice-farming constituted the main source of income; (b) their rice-field had been flooded during 2001; and (c) having at least one child aged 60 months or less.

Wealth-ranking procedure

The ability of a Khmer farmer family to respond to crisis depends on its ability to command its accumulated resources. One study in Cambodia found that the most common response to crisis was to use savings and/or reduce food consumption (15). Other prevalent options were to raise loans or sell animals. Indicators for wealth-ranking included materials used for constructing the house; availability of electricity; consumer durables, such as television and radio; means of transport; availability of farm animals; access to a private toilet; and use of safe drinking-water (protected well: rain or bottled water). Materials used for constructing the house, availability of electricity, durables, and transportation were considered to indicate the household's ability to save money. Availability of farm animals was considered to indicate access to cash without resorting to borrowing as animals can be easily traded. Access to a private toilet and use of safe drinking-water were also considered because of their potential impact on public health and consequent reduction in out-of-pocket expenses for healthcare. Scores for wealth-ranking indicators were developed in consultation with three KOD senior staff members who had a thorough knowledge of the socioeconomic status of the population. They were requested to assign scores on a scale of 0 to 4 against each individual indicator while taking into account the ability to

positively influence a response to crisis (0=no benefit; 1=minor benefit; 2=somewhat important benefit; 3=moderately important benefit; 4=important benefit). A positive response was considered to result from access to cash money, be it from savings, selling assets or animals, or potential reductions in out-of-pocket healthcare expenses.

To align the assessed households along four socioeconomic strata, the sum of all individual scores was divided by the number of households. Each 25 percentile served as a cut-off whereby households were classified as: (a) very poor: score within first quartile of all households; (b) poor: score within second quartile; (c) average: score within third quartile; and (d) better-off: score within fourth quartile. [The questionnaire is available from the authors upon request.]

Approach

Four trained literate individuals used a piloted pre-coded structured questionnaire. One supervisor and two health centre staff members accompanied them to the selected villages. A map of the village was drawn, and each house was allocated a number. Interviewers would divide the villages roughly in two halves and part ways with one health centre staff member per couple of interviewers. At each selected village, every household was approached to identify their eligibility for inclusion. Consent of eligible household members was asked and, if obtained, the mother of children was subjected to interview. Children were screened using mid-upper arm circumference and, if found to be less than 12.5 cm, their weight-for-height was measured for confirmation of wasting ($\leq 80\%$ wt/ht).

Focus-group discussions

Following the wealth-ranking exercise, mothers were identified for participation in focus-group discussions, taking into account the nutritional status of their children and their socioeconomic situation. Eight focus-group discussions were held with 51 mothers classified as very poor: 3 discussions with 14 mothers of malnourished children and 5 with 37 mothers of non-malnourished children. An additional focus-group discussion was conducted at a village where no malnourished children were identified for further comparison (14 participants).

Questions concerned alterations to purchasing ability due to harvest loss, access to paid labour and credit, nutrition and diet, and health behaviour and hygiene. Information was also collected on average expenditure

per month on a number of key items, such as food-stuffs, healthcare, education, transport, and miscellaneous items, such as cigarettes. The aim was to identify the differences in nutrition-related practices and the presence or absence of coping mechanisms among households with or without wasted children of the poorest socioeconomic stratum.

Statistical analysis

All data were processed and analyzed using the statistical package Epi-Info 6.04b. Households were stratified according to presence or not of a malnourished child, residence by administrative district, and socioeconomic status. Proportions were compared using the chi-square test, and significance was determined at the 5% level ($p < 0.05$).

RESULTS

Targeting households with wasted children

Household characteristics

In total, 252 households were eligible for inclusion, and all consented to participate in the study. These households had 355 children aged 60 months or less. The households had, on average, one (range 1-4) child aged 60 months or less and six (range 3-14) members. Two (range 1-6) members per household were economically active. Ninety-eight percent had no toilet facility. Surface water was the main source of drinking-water for 45% of the households, followed by rainwater (31%) and water from unprotected and protected wells (both 12%). Nineteen percent had electricity, 22% a radio, and 19% a television. None of these variables were statistically different for households with or without wasted children.

Prevalence of wasting

Overall, 8% of children were wasted, ranging from none in Borey Chalusar district to 14% in Kirivong district (Table 1). The number of malnourished children per household was limited to one individual in every case. Thirteen (48% of total) wasted children had no siblings.

Classification of households according to wealth-ranking by administrative district

Table 2 provides an overview of household classification by district according to the wealth-ranking approach applied. Kirivong district had the highest proportion of

very poor (46%), followed by Koh Andeth district (31%). Both the districts had the lowest proportion of better-off households (15% and 14% respectively). Traing and Borey Chalusar, on the other hand, had more than one-third of households classified as better-off and less than 15% of households classified as very poor.

The very poor households had the highest prevalence of wasted children (18%, 12/66) and the better-off the lowest (5%, 3/62). This was 13% (8/64) for the

participants was 36 (range 18-42) years, and only 16% could read and write.

Income opportunities other than rice farming

While production of rice is an integral part of household income, all families had additional sources of income as even in 'normal' years they are still required to buy rice for several months. During the study period, rice was available in all villages and was being exported to neighbouring Viet Nam. Opportunities varied from

Table 1. Malnutrition per administrative district

| District | No. of households | No. of children aged ≤60 months | No. of wasted children | % of children wasted | % of households with wasted child |
|----------------|-------------------|---------------------------------|------------------------|----------------------|-----------------------------------|
| Koh Andeth | 72 | 116 | 7 | 6 | 10 |
| Kirivong | 65 | 87 | 12 | 14 | 18 |
| Traing | 72 | 98 | 8 | 8 | 11 |
| Borey Chalusar | 43 | 54 | 0 | 0 | 0 |
| Total | 252 | 355 | 27 | 8 | 11 |

Table 2. Stratification of households per administrative district according to wealth-ranking

| District | Very poor | | Poor | | Average | | Better-off | |
|----------------|-----------|----|------|----|---------|----|------------|----|
| | No. | % | No. | % | No. | % | No. | % |
| Koh Andeth | 22 | 31 | 27 | 38 | 13 | 18 | 10 | 14 |
| Kirivong | 30 | 46 | 11 | 17 | 14 | 22 | 10 | 15 |
| Traing | 10 | 14 | 13 | 18 | 22 | 31 | 27 | 38 |
| Borey Chalusar | 4 | 9 | 13 | 30 | 11 | 26 | 15 | 35 |

poor households and 7% (4/60) for the average. This correlation between wasting and socioeconomic status did not reach statistical significance ($df=3$, $p=0.06$).

Targeting wasted children by use of socioeconomic indicators

The proportion of households having no farm animals was significantly higher among those with a wasted child than those without: 27% (8/30) vs 9% (19/222) ($p=0.003$). Otherwise, none of the variables selected for wealth-ranking—alone or in combination—were statistically associated with wasting. Absence of farm animals had a positive predictive value of 30% and a negative predictive value of 90%, implying that this indicator would identify about a third of malnourished children only but that the probability of identifying wasted children among households with farm animals would be low.

Focus-group discussions

A general overview is given as no differences in feeding and hygiene practices, coping strategies, or health behaviour were reported by caretakers of malnourished or non-malnourished children. The median age of the

village to village, but cutting rice in fields of rich land-owners was the most mentioned alternative source of income. The work takes many hours to perform and—with travelling—can take women away from home for 10-12 hours a day. Others engage in petty trading, collect palm water, or make palm sugar, fish, fatten animals, and dig out ponds or irrigation canals. Daily wages for casual work varied from 2,500 Riels to 5,000 Riels per day (1 US\$=3,900 Riels).

Mothers worked for additional days to meet the extra costs of purchasing rice when the rice harvest was lost. They increased their labour—and therefore their income—to pay for purchasing greater amounts of rice rather than reducing expenditure on other items.

Borrowing money was an accepted 'coping strategy'—with families borrowing for various reasons, including celebrations, and more urgent needs, such as healthcare. Families in debt admitted selling assets, including live-stock, to pay back their loans, while others borrowed from one source to pay off their debts with another lender.

A limited number of credit opportunities were open—both through non-governmental organizations and private

businessmen. But the person has to have some collateral for borrowing money. This means that poorer families, without land or other assets, may not have access to credit through more formal channels. Consequently, they borrow from private individuals, often at high rates of interest.

Nutrition practices

Most mothers reported that they did not put their baby to the breast until the second or third day after delivery. Instead of giving colostrum they waited for the milk to appear. Mothers would give water, sugar water, or honey to the newborn—dripped from a spoon or finger—until the milk comes into the breast. The water was often not boiled, and the spoon or finger was not aseptic. Once breastfeeding was begun, all mothers continued to give water or sugar water to 'top up' their children, and no cases of exclusive breastfeeding were reported in any village studied.

Giving additional food—a porridge mix consisting of rice, salt, and sugar—was begun around 3-4 months of age. Mothers believed that their children were hungry and, therefore, needed more than breastmilk. However, since mothers had to work away from home, many infants were left in the care of siblings or grandmothers as early as three months of age. While porridge was added in most cases at 3-4 months, other foods were not introduced until much later, often well into the second year of life.

In most families, young children and adults ate only two meals a day. Rice and vegetables were the usual food eaten. Fish was taken less than once a day, although the frequency was increased during the rainy season. Crabs and shrimps were also picked up from rice fields during this season. Meat was rarely taken—mostly at celebrations, and eggs were not a common part of diet.

Health behaviour and hygiene practices

Caretakers reported that defecation took place in the area around the house due to lack of toilets: children and old people using areas close to the house, while others walked further away. During the focus-group sessions, several children suffered diarrhoeal episodes.

Most mothers reported that they would call in a private doctor or a nurse rather than take their children to the nearest health centre for treatment. The cost of transport to the health centre was the main reason cited, as most private practitioners will come to the house. Inter-

viewees valued injections administered by the health centres above oral medication.

Basic hygiene practices were inadequate. Hand-washing before preparing food was fairly universally practised but not after defecating. No soap was used. Some villages had wells. For other villages, the source of water was the pond of the local pagoda or another pond. In many cases, animals were observed to have access to the pond, and the interviewees reported limited understanding of the need to protect the water source or the links between dirty water and diarrhoea. Most caretakers said that they never boiled water for themselves or their children, including newborn infants.

DISCUSSION

Identifying the poorest in a relatively-homogenous poor rural population poses major challenges (16). Nevertheless, a recent study by Schellenberg *et al.* indicated that significant differences in care-seeking occurred among poorer and richer families in a rural Tanzanian population living in households with similar socioeconomic status (17). To assess the socioeconomic status of households, they applied wealth-ranking with weighted scores on income sources, education level of household head, and assets of households. In an accompanying commentary, Gwatkin pointed out that the use of wealth-ranking, instead of otherwise preferred information on income or consumption to measure socioeconomic status, is gaining wide acceptance among policy-makers as similar results can be obtained (18).

This is not to deny the importance of more salient factors that may enable households to effectively cope with crisis. For example, we did not assess factors, such as social networks and kinship relations of families, additional sources of income, negotiating power, and mutual assistance processes, all of which may affect the ability to deal with a crisis. Our findings, however, are consistent with those of others in Cambodia who applied different methods to assess the socioeconomic status of households but found acute malnutrition, irrespective of stratification (8,19).

This study was based on the assumption that production of rice equals food security. With 72% of selected households that lost two main harvests (data not shown), it was expected that the prevalence of wasting would be considerable. However, only 8% (range 0-14%) of children were acutely malnourished. Clusters

of malnourished children within family units did not occur which suggests that it is very unlikely that food insecurity is the only cause of malnutrition. If food insecurity was the main cause of wasting, all children within household would be malnourished. A study conducted by Save the Children has shown that rarely more than one child per household is malnourished, except in acute famine situations (Bruce J. Personal communication, 2002).

Factors most likely leading to wasting appeared to be feeding and hygiene practices, inappropriate home management of diarrhoea, healthcare-seeking behaviour. For example, the late onset of breastfeeding—sometimes as late as 3-4 days after delivery—deprives the infant of valuable antibodies present in colostrum, and this can have a negative impact on the child's ability to fight infections (20). Also, complementary foods were introduced at 3-4 months of age, while there is clear evidence that exclusive breastfeeding is best until the child is six months of age (21).

Complementary feeding included rice porridge with minimal nutritional value. In the majority of cases, fish and vegetables were not included until the child was more than one year old. The reported feeding frequency was twice daily only. Hand-washing with soap did not occur, only 2% had a toilet, more than 50% did not have access to safe drinking-water, and water was not boiled before consumption.

In this context, assuring an adequately-nourished population by interventions through the public-health sector limits the range of possible actions mainly to the provision of information, education, and communication on nutrition and hygiene practices and home management of diarrhoea. Table 3 provides an overview of topics for education that have to be addressed to reduce wasting in KOD. Supplementary feeding activities through the public-health sector in the observed situation would be an ineffective and inefficient strategy as

they are costly and potentially create dependency, consequently disempowering caretakers (22).

The importance of caring practices cannot be ignored, and there is, therefore, a need to work with chief caregivers to develop strategies on how best to feed the whole family and, at the same time, ensure that the youngest members get sufficient food of good quality. In our study setting, grandparents appeared to be key caregivers, and training and awareness-raising for them on the nutrient needs of young children would be an important part of any intervention.

However, provision of education alone—in the absence of other mechanisms—is unlikely to instigate behaviour change as demonstrated by Bolam *et al.* in Nepal (23). In Bangladesh, in addition to education by health workers, peer-counselling of mothers during the last month of pregnancy and the first months following delivery significantly improved breastfeeding and complementary feeding practices compared to controls (24).

Peer-counselling can be conducted by mothers who are selected for their ability to raise well-nourished children, even when they are poor (25). Such mothers are present within the population as indicated by our data, which show that 4 of 5 poor families did not have an acutely-malnourished child. Peer-counselling could be initiated by applying the Hearth Model whereby volunteer mothers of the community are trained to conduct feeding sessions aiming at providing malnourished children with one nutritious meal a day in addition to their normal diet during a two-week rehabilitation period (22). Foods that are used by low-income women without malnourished children of the same community are used for preparing daily meals (positive deviance approach), thereby ensuring that locally-available and affordable foods are used and enabling participants to find solutions within their available means. The challenge remains to integrate this approach in the routine delivery of health services.

Table 3. Topics for health education to address wasting at Kirivong operational district

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| Giving colostrum immediately following delivery Exclusive breastfeeding for six months Complementary feeding practices, including a more diversified diet and earlier introduction of fish and vegetables Increasing feeding frequency of young children, using meals and nutritious snacks Continuing breastfeeding for at least two years of life Hand-washing with soap before preparation of food and after defecation Boiling of all drinking-water Appropriate home management of childhood diarrhoea using oral rehydration salt Danger signs of diarrhoea warranting consultation from qualified health practitioner |
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