Table 5 Determinants of appropriate treatment-seeking behaviour

Variables	AOR	(95% CI)
Type of village		
NMV (ref.)		
MV	0.80	(0.51-1.24)
Number of children U5 at home		
> 1 (ref.)		
1	1.05	(0.48-2.30)
Children's age (months)		
≤ 27 (ref.)		
> 27	0.70	(0.44-1.09)
Children's sex		
Female (ref.)		
Male	1.26	(0.81-1.93)
Caregivers' age (years)		
≤ 30 (ref.)		
> 30	0.75	(0.47-1.19)
Marital status		
Other (ref.)		
Married	1.70	(0.53-5.45)
Level of education		
Illiterate (ref.)		
Primary school	0.99	(0.38-2.61)
Secondary school or higher	1.06	(0.37-3.05)
Occupation		
Other (ref)		
Farmer	0.87	(0.54-1.41)
Forest worker	0.80	(0.42-1.51)
Income (US$)		
≤ 60 (ref.)		
> 60	1.04	(0.65-1.66)
Nearest health service		
**Inappropriate health service (ref.)		
Public health service	5.86	(3.43-10.02)*
Private health service	1.69	(0.52-5.46)
Mode of transportation		
By vehicle (ref.)	1.84	(0.94-3.61)
On foot		
Proximity to nearest health service		
More than 30 min (ref.)		
Within 30 min	3.42	(0.82-14.16)
Treatment at home		
No (ref.)		
Yes	0.26	(0.15-0.45)*
Total cost (US$)		
> 1.1 (ref)		
≤ 1.1	0.52	(0.33-0.83)*
Knowledge level		
Low (ref.)		
High	1.90	(1.14-3.17)*
Preventive action		
Low (ref.)		
High	1.76	(1.13-2.76)*

Notes: MV: Mobile clinic villages; NMV: non-mobile clinic villages; Children U5: children under five; AOR: adjusted odds ratio; CI: Confidence interval; *p value <0.05; **Inappropriate health service includes drug stores, charlatans and traditional healers.

under five were at high risk because they had the least timely and least effective treatment for febrile illnesses among all age groups [5].

In this preliminary survey to determine baseline rates, the presence of mobile clinics (MV) was not associated with appropriate treatment-seeking behaviour for children under five. This may be explained by the limited activities conducted by the mobile team and volunteers for the residents of the target villages in the initial stages of intervention. The initial stage included malaria diagnosis for fever patients and treatment specifically for confirmed malaria cases visiting the clinic, wherein only the patients benefitted from their activities that were not extended to meet community needs. Further, circumstances between MV and NMV were not identical despite efforts to match both. That is, MV were selected because of their relatively inaccessible location (remote, bordering forests where malaria vectors breed, and at a great distance from RHCs). The caregivers were inadvertently more familiar with inappropriate health services, such as drug stores, than mobile clinics and village volunteers in rural areas. However, previous studies in Bago Region in Myanmar concluded that having volunteers specifically trained for implementing malaria control programmes can improve accessibility and administration of health care in villages without health staff, although overall they may remain low [18].

One of the behaviours that led to the delay in seeking treatment was treatment at home; almost 50% of the children with fever were treated at home before seeking treatment outside. Individuals are more likely to begin with self-medication at home to minimize both expenditure and the burden of reaching a facility in remote areas where transportation and health facilities are scarce [28-30]. A high proportion of fever cases were first treated at home with shop-bought drugs before visiting health facilities [31]. Caregivers who administered

medication at home were not likely to seek appropriate treatment [12], possibly because the child recovered after self-medication and/or other first-aid measures, such as tepid sponging.

Greater awareness about malaria and undertaking a broader range of preventive actions for malaria influence appropriate treatment-seeking behaviour. A study in Cambodia showed that early recognition of malaria symptoms is the first important step to treatment seeking [20]. In the present study, although caregivers were aware of malaria symptoms, about 50% were unaware that children under five and pregnant mothers are especially vulnerable to malaria. A previous study in Tikekyi township,Yangon region and four townships in Bago region, Myanmar demonstrated that the level of awareness about malaria was low compared to the average score used in the studies [16,32].

The most popular health service providers in this study were midwives, primarily because caregivers' trust them being qualified and experienced health providers [33,34]. Another reason is that midwives have served villagers for longer than the village malaria volunteers [18]. A survey conducted by Myanmar Artemisinin Resistance Containment (MARC) showed that the public sector, including RHCs and midwives, was cited as the most popular source for treatment of malaria [35]. Drug stores also played an important role in the present study, as one-quarter of the caregivers sought treatment from them. A similar situation was observed in sub-Saharan Africa [36]. Proximity to drug stores may have encouraged individuals to use them to save on transportation [37].

Findings from this study should be considered in the context of some limitations. First, caregivers were asked about the fever of their children under five during the previous two months, thus responses might reflect recall bias. Nevertheless, the items utilized in data collection were drawn from validated and reliable instruments that have been used in a variety of settings. Second, this study was unable to explore causal relationships because of a cross-sectional study design.

Despite these limitations, this study is valuable as it identified the determinants of caregivers' treatment-seeking behaviour for children under five presenting with fever in malaria-endemic, rural Myanmar. This study provides baseline findings for the initial stage of the implemented intervention.

Conclusions

Caregivers' treatment-seeking behaviour was poor for their children under five with fever, as only one-third demonstrated appropriate treatment-seeking behaviour. Further, baseline treatment-seeking behaviour for fever cases did not differ significantly between MV and NMV. Caregivers' knowledge of malaria, malaria prevention behaviour and proximity to public health services were important determinants of appropriate treatment-seeking behaviour. At the same time, treatment at home and total cost for treatment and transportation were negatively associated with appropriate treatment-seeking behaviour. The role of the midwife was important, as most caregivers first sought their assistance for their children's illnesses.

Greater awareness and health education for caregivers are necessary, particularly on early treatment-seeking and appropriate use of health care options for fever. These findings will be utilized to improve the quality of the intervention and will be compared with follow-up data collected at a later stage to evaluate its effectiveness at the community level.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MT conceived the study, collected data, carried out analysis, and wrote manuscript. JY oversaw data analysis and participated in writing manuscript. MK participated in the design of the study. MJ participated in study designing and overall coordination. All authors read and approved the final manuscript.

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CHAPTER

8

The Role of Nutrition Training for Health Workers in Addressing Poor Feeding Practices and Undernutrition Among HIV-Positive Children

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8.1 INTRODUCTION

The human immunodeficiency virus (HIV) epidemic has had a variable course over the past three decades. After years of rapid escalation of new cases of infections, the epidemic is now stable and even showing signs of decline in some parts of the world [1]. The rate of new infections is decreasing in some age groups; however, transmission rates are still escalating in children and adolescents [2]. Approximately 700 newborns and young children are infected every day; as a result, 3.3 million children are currently infected with HIV. These children are vulnerable to a number of adverse health outcomes, including undernutrition, short life expectancy, and ill health caused by unprecedented opportunistic infections.

HIV contributes to 3% of child mortality, and undernutrition is an underlying cause of more than one-third of total child deaths [3]. The mortality rate is high among children because of this dual burden of

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immune-debilitating conditions [4]. In addition, opportunistic infections increase the demand for energy and further drive HIV-positive children into undernutrition. A lack of adequate nutrition and energy may also jeopardize the efficacy of antiretroviral therapy (ART) [5]. Moreover, adherence to ART is low among children who are undernourished [5], making it difficult to achieve viral suppression [5,6].

Undernutrition may have short- and long-term effects on HIV-positive children. The short-term effects include impaired immunity, increased risk of opportunistic infections, morbidity, and mortality. The long-term effects include poor cognitive functioning, poor achievement of developmental milestones, and poor levels of education [7–10]. As a result, even when HIV-positive children survive with ART, if they are undernourished they may not be able to function like their HIV-negative counterparts who received adequate nutrition during childhood [2]. They may suffer from chronic diseases as they grow up, or they may die young [11]. Early nutritional deficits are also linked to noncommunicable diseases in adulthood such as diabetes, dyslipidemia, hypertensive heart disease, stroke, and hypercholesterolemia [12].

To address child undernutrition among HIV-positive children, it is imperative to focus on interventions that can target its causes. This calls for proper nutrition and feeding counseling by trained health workers who routinely care for such children. Through training, health workers can acquire the skills to integrate nutrition care into the existing care and treatment system.

The aim of this chapter is to describe nutrition training for health workers and to discuss how they can address undernutrition among HIV-positive children. First, we identify the nutritional needs of HIV-positive children with or without ART at various stages of the disease. Second, we explain the need to apply tailor-made nutrition interventions within the local context. Third, we explain the role of health worker nutrition training in addressing feeding practices and undernutrition. In addition, we use the example of one intervention in Tanga, Tanzania, and extrapolate from this to training interventions for health workers who care for HIV-positive children. Fourth, we identify the challenges that health workers should expect and highlight successful, sustainable models of nutrition training.

8.2 HIV-POSITIVE CHILDREN: NUTRITIONAL NEEDS AND THE NEED FOR TAILORED INTERVENTIONS

8.2.1 Nutritional Needs of HIV-Positive Children

HIV-positive children have special nutritional needs at various disease stages [13]. The World Health Organization (WHO) recommends increasing nutrition intake depending on children's clinical disease stage,

opportunistic infection, and nutritional status. HIV-positive children with no symptoms may have the same energy expenditure as other healthy children of the same age; however, their food consumption should be altered when the need arises because of the risk posed by the disease [13]. For example, newly infected HIV-positive children who are 6 months of age or older and have mild symptoms require 10% more energy than that needed to sustain an HIV-negative or otherwise healthy child of the same weight [13]. Additional energy and nutrients may be obtained through normal diets that are otherwise provided to the household if these are of adequate diversity, quality, and frequency.

HIV-positive children who have acute respiratory tract infections tend to lose energy [13]. Malignant conditions also require high energy. Moreover, energy is continually lost when a child has chronic diarrhea. To cope with infections and to replenish nutritional loss, HIV-positive children need an additional 20–30% of energy [13].

Children with advanced HIV experience severe undernutrition. To help with their recovery, such children need at least 50–100% more energy [13]. They can obtain such high levels of energy from ready-to-use therapeutic food until they have recovered their weight loss [13,14]. If not yet initiated, then ART should also be administered to them to prevent opportunistic infections [13].

Chronic infections at any stage of the disease cause loss of appetite, vomiting, and lethargy. Oral thrush and esophageal candidiasis also cause painful swallowing, leading to poor feeding and possibly undernutrition [13]. Appropriate medical interventions are important to treat such conditions. It is also important to provide children with small and appropriate meals that are easy to swallow.

8.2.2 Need for Tailor-Made Nutrition Interventions for HIV-Positive Children

When caregivers are well-informed about child nutrition, they can improve their feeding practices and ultimately the nutritional status of HIV-positive children. Nutrition knowledge can help to counter misconceptions, myths, and restrictive traditional beliefs about nutritious food and good feeding behaviors. Even in food-insecure regions, such knowledge can help caregivers to use the limited food available and preserve the rest for dry seasons. In food-rich regions, well-informed caregivers can use available food resources to bring about desired feeding practices. Improved nutrition knowledge can also help to improve food preparation hygiene, preventing diseases such as diarrhea [13] (Box 8.1).

Health workers need to provide nutrition counseling to improve the nutrition knowledge of the caregivers [13]. However, health workers often do not have the knowledge and skills to provide such important care in

BOX 8.1

POOR FEEDING PRACTICES DUE TO POOR NUTRITION KNOWLEDGE OF CAREGIVERS

Caregivers' nutrition knowledge affects the way they feed their children. Even where food is available, adequate knowledge is necessary to achieve the appropriate amount, type, and frequency of feeding. Lack of such knowledge may cause caregivers to follow community norms in feeding practices, which may be related to misconceptions.

In Tanga, Tanzania, a high proportion of caregivers of HIV-positive children did not know how to feed their children with the right amount, frequency, and types of foods. This was one of the most important determinants of undernutrition. One of them reported the following:

> *Even under normal circumstances, she knows that the normal feeding frequency is 2. Now, today she is HIV-positive, and she is supposed to get 5 meals a day...she does not know this and budget-wise, she finds that the 5 meals are too much...so she cooks 'bada porridge'...this is cassava-made porridge in the morning and the child will eat again in the afternoon (evening), and that is it... (A 43-year-old HIV-positive home-based care worker and a mother of 3 children, one of whom is HIV-positive)*

Nutrition counseling may help to resolve misunderstandings of caregivers if performed by trained health workers using common examples. If caregivers understand the need to properly feed their children, then they may find ways to improve existing practices using the available resources, even under financial hardship.

most settings [15] or to prevent HIV-positive children from suffering from acute or chronic undernutrition [16]. Recurrent undernutrition is common if local determinants are not considered and if it is managed using only traditional methods [17].

Lack of practical nutrition training in professional schools is a major cause of health workers' poor knowledge of undernutrition prevention [18]. Most medical and nursing schools worldwide lack adequate clinical nutrition training [19]. As a result, health workers graduate without gaining sufficient knowledge and skills to treat undernutrition. Although guidelines to manage undernutrition exist [20,21], they focus on its treatment as a disease and do not emphasize prevention of undernutrition or address its underlying causes. Patients therefore suffer repeated episodes of undernutrition on returning to the environment in which it developed. The guidelines have also failed to address child undernutrition in the context of HIV [20,21].

It is essential to provide in-service nutrition training that is tailored to local needs to improve the knowledge, skills, and competence of health workers [15]. Such needs include the awareness of local determinants of undernutrition. Nutrition training can help health workers to address local restrictive beliefs and myths against proper feeding practices, and to be aware of their own misconceptions. In addition, training can boost skills in providing care, including nutrition counseling [15].

Knowledgeable health workers can provide tailored nutrition counseling to caregivers of HIV-positive children. Caregivers can easily follow such advice if it focuses on solving the problem and uses existing resources (e.g., improving feeding practices using foods similar to those available to caregivers) [22]. They are more likely to change old behaviors if provided with options that are affordable and simple to prepare. In addition, if counseling is repeated frequently and made part of existing routine care, it can make more enduring effects. Nutrition training of health workers and subsequent counseling with monitoring are effective interventions to improve caregivers' knowledge of feeding practices [23].

8.3 NUTRITION TRAINING FOR HEALTH WORKERS PROVIDING CARE TO HIV-POSITIVE CHILDREN

8.3.1 Shortage of Health Workers: Turning a Crisis into an Opportunity

Countries with a high burden of HIV [1] also lack sufficient numbers of health workers [24]. Because a limited number of health workers must care for a large number of patients, tasks are obliged to shift to less qualified health workers or mid-level providers [25]. Such a shift can ameliorate both the health workforce crisis and child undernutrition. To achieve this, nutrition training must be designed to match workers' levels of understanding.

Nutrition training for health workers has been effective in improving knowledge and practices among physicians, nurses, and specialized health workers, such as nutritionists and dieticians [23,26–29]. It has also been effective in improving the knowledge and feeding practices of lay health workers who treat children [30–32]. However, mid-level providers have not yet been targeted for this type of training, and so there is little evidence of its effectiveness.

Evidence is also lacking regarding both efficacy and effectiveness of nutrition training for feeding practices and management of undernutrition in HIV-positive children. Although WHO has released guidelines for vulnerable groups [13], field testing has not been documented. The

guidelines need to be adapted to suit the local epidemiology, food availability, practices, and health worker cadres. They also need to be integrated into the country's nutrition policy for routine implementation.

8.3.2 Local Adaptation of Nutrition Training

Local and national adaptation is important for nutrition training [13], because the causes of undernutrition are multifaceted and vary from region to region among HIV-positive children. For example, undernutrition may result from food insecurity and hunger in drought regions, but from different causes in food-rich areas. Geographical variation may also account for epidemiological differences in opportunistic infections that play a role in undernutrition among HIV-positive children. For example, diarrhea may be more common in wet areas with poor hygienic conditions than in drier areas.

Knowledge of seasonal variations can help to predict the epidemiology of diseases that are responsible for child undernutrition. In regions where a great deal of fruit grows (such as Tanga, Tanzania), the incidence of diarrhea generally increases when the fruits (e.g., mango) are ripe. During wet seasons, flies multiply and become vectors for diarrheal diseases. During the harvesting season, food is more available at affordable prices, so acute forms of undernutrition are proportionally low.

8.3.3 Local Determinants of Undernutrition to Be Examined Prior to Nutrition Training

Household food security is an important determinant of undernutrition [5]. WHO defines it as access to sufficient, safe, and nutritious food to maintain a healthy and active life for all people at all times [33]. It comprises three important pillars [34]. These are food availability, food access, and food use. Household food insecurity is measured using the validated Household Food Insecurity Access Scale [34], although several other scales exist.

It is also important to measure local feeding practices [13], such as feeding frequency (Box 8.2). This is measured as the number of times a child was fed the previous day. WHO recommends a feeding frequency of at least 5 times per day [13]. Another feeding practice of interest is dietary diversity score, measured as the number of food types consumed the previous day. WHO recommends providing HIV-positive children with a variety of foods to improve absorption, provide adequate nutrients, and increase appetite [13]. The quality of the diet is measured by assessing types of nutrition in the previous day's diet and the quantity of food in grams, which allows calculation of the recommended daily allowance (Box 8.3).

BOX 8.2

POOR FEEDING PRACTICES AMONG HIV-POSITIVE CHILDREN IN TANGA, TANZANIA

In Tanga, Tanzania, HIV-positive children had poor feeding practices. More than 88% of such children were fed at a lower than recommended frequency, and this was associated with undernutrition [16]. In the focus group discussion, caregivers mentioned the likely causes of low feeding frequency. For dietary diversity, most caregivers did not know what foods to provide, and in what combination, to yield adequate nutritional diversity. This was related to poor knowledge, food insecurity, and poverty. For some caregivers, the health status of HIV-positive children improved when they were provided with a variety of foods that were within their reach [16].

BOX 8.3

IDENTIFYING LOCAL CAUSES OF POOR FEEDING PRACTICES IS IMPORTANT IN DESIGNING EFFECTIVE NUTRITION TRAINING

Each region has a different set of determinants of undernutrition for HIV-positive children. The commonest risk factors are food insecurity and poverty. In Tanga, Tanzania, food is available in abundance, but poor feeding practices are unprecedented and result from risk factors other than those commonly recognized. Households of HIV-positive children succumb to selective food insecurity, caregivers who are unemployed, people who are too weak to engage in farm work, orphanhood, and single parents who may not adequately provide children with necessary nutritional foods,

In Tanga, our children do not have jobs, so no income, not enough money for buying food. He can only afford to buy a small amount of cheap food, which is not enough to feed all 7 grandchildren. (A 70-year-old grandmother of 6 orphans)

I am a single mother, my baby's father died, I remarried again and the second husband divorced me, so I am alone. All expenses are on me. I do not have much help from anyone else. My income is 1.25 USD per day. This is for family food and medicines. It is not enough. So whatever I can, I will do, the food that I can afford is what we can eat. Just enough to pass the day, and I know she is not satisfied with food. Her nutrition status is poor. (A 40-year-old widow with 4 children, one of whom is HIV positive)

continued

BOX 8.3 (*cont'd*)

Knowing local determinants may further streamline counseling and tailor it to suit each individual. A blanket approach to all caregivers may not bring about changes in feeding practices even in a homogenous community. This is because of the diversity of determinants of poor feeding practices and other local factors. It is therefore important to investigate such factors and frequently monitor changes due to time, season, and disease stages.

Child undernutrition is also associated with a number of sociodemographic characteristics [13], such as the number and age of children, orphan status, and caregivers' education level, income, and occupation.

Restrictive feeding behaviors may also affect child undernutrition. These behaviors include taboos regarding feeding children and pregnant women specific nutritious foods such as eggs, liver, and vegetables, among others. It is important to determine the reasons for not eating a particular type of available food [16]. In addition, myths about poor feeding practices should be examined to improve the counseling of caregivers. It is possible to explore such factors in focus group discussions (Box 8.4).

8.4 CONDUCTING NUTRITION TRAINING

8.4.1 Necessary Preparations for Nutrition Training

Successful nutrition training of health workers (especially mid-level providers) requires adequate preparations. These include identifying the targeted health workers, deciding the training venue, preparing patients for practical sessions, assembling training materials, and evaluating nutrition knowledge before training.

8.4.1.1 Identifying the Targeted Health Workers

Nutrition training should target health workers who treat HIV-positive children. They should be trained for integrated nutrition care in the existing HIV care and treatment system [13]. Integrated care can provide better links between services and save time, particularly if there are limited health workers to complete tasks. In most developing countries, health workers are clinicians, registered nurses, adherence nurse counselors,

BOX 8.4

LOCAL RESTRICTIVE BEHAVIORS AND TRADITIONAL BELIEFS SHOULD BE STUDIED AND INCLUDED IN NUTRITION TRAINING

Some of the caregivers in Tanga perceived that eating vegetables downgrades one's social status. In their communities, households that consume meat are considered of high income, whereas those consuming vegetables are perceived as poor. This is because meat is more expensive compared with vegetables, which are diverse and widely available. Therefore, even poor households do not consume vegetables when they can afford meat.

I eat other foods but not green vegetables. Good food includes meat (red or white meat), beef, or chicken. Vegetables are not considered good food here. In our normal diet, we do not eat vegetables even when they are available. (A 25-year-old mother of 2 HIV-positive children)

People do not want to cultivate vegetables; it is not their tradition. Young women are not made to make such gardens...it is not a matter of lack of energy. Even HIV-positive people do not have such tradition. A woman is a person who does not work, only men do that in Tanga. (A 35-year-old businesswoman and a mother of one HIV-positive child)

Such restrictive behaviors are inherited from one generation to another, creating generations of poor feeding practices and micronutrient deficiency. The lack of necessary nutrients for HIV-positive children further damages their ability to fight opportunistic infections, driving them to more advanced stages of the disease and increased risk of morbidity, undernutrition, and mortality. Knowledge of such local restrictive behaviors can help to streamline feeding counseling if health workers also have adequate nutrition counseling skills.

nutritionists, and laboratory technicians. In human resource–constrained areas, mid-level providers commonly serve in these facilities.

8.4.1.2 Deciding on the Training Venue

Training may be more effective if it uses existing health facilities. If the training venue is close to the facilities, then the trainees can easily move to and from various practical sessions. Because nutrition training usually takes more than 1 working day, health workers from distant facilities will need to travel to participate. Therefore, choosing training venues close to health facilities saves both time and money.

8.4.1.3 Gaining Cooperation from Patients for Practical Sessions

The inclusion of patients typical of the local context in practical sessions can help health workers learn practical knowledge and skills. However, it is important to include patients with varied characteristics, too. For example, if wasting patients are selected in a region where wasting rate is high, then the training will be more meaningful. Additionally, the inclusion of positive deviant HIV-positive children can promote understanding of survival despite common difficult conditions. For example, if a child is not experiencing wasting, despite experiencing the same difficult conditions as other children, he or she might be considered a positive deviant.

8.4.1.4 Assembling Training Materials

The WHO guidelines for nutrition training follow the Integrated Approach to Nutritional Care of HIV-Infected Children (6 months–14 years). According to these guidelines [13], prospective trainees need pre-training materials about basic nutrition knowledge before undergoing training. It is useful for participants to prepare common cases and discuss how they manage them. In this way, trainers can establish the needs of health workers before nutrition training. Learning materials will also help participants refresh their understanding of the link between undernutrition and HIV infection. Health workers will therefore acquire some basic knowledge before the nutrition training. Because there are differences in basic knowledge among health workers, it is important to prepare training materials and methods based on their level of understanding.

8.4.1.5 Assessment of Nutrition Knowledge Before Training

Prior to nutrition training, health workers' baseline knowledge level should be assessed. After the training, a similar knowledge test will help determine how much participants have learned. Knowledge decay can be also evaluated at a later stage. The training materials based on WHO guidelines contain questions that can assess knowledge levels [13]; these include different aspects of nutrition knowledge, such as food preparation hygiene, counseling knowledge and skills, feeding practices, and opportunistic infections.

8.4.2 An Example of Nutrition Training in Tanga, Tanzania

Nutrition training was conducted among health workers caring for HIV-positive children at care and treatment centers in Tanga, Tanzania [35]. It targeted mid-level providers, or a majority of health workers in Tanzania, who serve populations in rural and semi-urban areas [25] (Figure 8.1).

FIGURE 8.1 Participants of the nutrition training in Tanga, Tanzania.

FIGURE 8.2 Participants of the nutrition training in a practical anthropometric session.

The Tanga nutrition training followed the steps recommended by WHO (Figure 8.2). These included formative research to examine the magnitude of undernutrition and poor feeding practices [16]. This research examined and addressed specific determinants of undernutrition (Figure 8.2). It used a mixed methods design consisting of cross-sectional quantitative and qualitative studies. The triangulated results identified the specific factors and feeding practices associated with undernutrition among HIV-positive children.

In total, 16 midlevel providers participated in the nutrition training [35]. The 2-day training occurred at an HIV care and treatment facility and included 18 theoretical and practical sessions. The training emphasized pertinent characteristics previously identified in the formative research. It also emphasized local food availability, norms, and myths of feeding in Tanga and in potential areas of improvement. Before the training, the trainees' baseline nutrition knowledge and skills were assessed using a standard questionnaire.

8.4.2.1 Contents of Nutrition Training

The integrated nutrition training consisted of 10 steps (Table 8.1) that aimed to teach the health workers how to assess, classify, and choose a nutrition care plan. They also aimed to teach health workers about how to implement the nutrition care plan, to manage special cases, and to consider other factors in the care of HIV-positive children [13]. A knowledge

TABLE 8.1 Ten steps of nutrition training in Tanga, Tanzania

ASSESSMENT AND PLANNING	
Step 1	• How to assess and classify child growth • How to take anthropometric measurements and assess nutritional status • How to plot growth curve and monitor growth • Clinical practice on wards in how to assess growth and nutritional status
Step 2	• How to assess child's nutritional needs • How to determine additional nutritional needs • Practical session on how to assess nutritional needs of HIV-positive children
Step 3	• How to classify nutritional needs in terms of a nutrition care plan based on individual characteristics, taught in step 2 • Each nutrition care plan explained, examples given of local foods to cater for each plan • How to move from one care plan to another
IMPLEMENTING CARE PLAN	
Step 4	• How to explore what the child eats and drinks • How to evaluate feeding practices: feeding frequency and dietary diversity • How to examine the child's ability to eat, and monitor associated problems
Step 5	• Who feeds the child and how the child receives food
Step 6	• How to examine the household's food security and socioeconomic status
Step 7	• Discuss local determinants of undernutrition and how to avoid them • Role-play and group discussion on local determinants of undernutrition • Discuss infection control, food preparation hygiene, and opportunistic infections
Step 8	• Make a decision to refer • Discuss conditions that warrant referral • How to prepare patients before referral, based on the local protocol
DEALING WITH SPECIAL NEEDS	
Step 9	• Discuss HIV-positive children with special needs • How to feed the child recovering from illness, who is vomiting, who has severe undernutrition, and who has mouth sores
Step 10	• Discuss HIV-positive children on ART • What to do if the child is not gaining weight on ART, if the child has nausea or vomiting while on ART, and side effects of ART

assessment was conducted before the training was completed, and a question-and-answer session was held to clarify any misconceptions, myths, and beliefs that restrict feeding practices.

8.5 CHALLENGES OF IMPLEMENTING NUTRITION TRAINING

8.5.1 Fragmented Efforts in HIV Programs

In Tanzania, vertical HIV programs are implemented by development partners other than the government. In Tanga, two nongovernmental organizations provide care and treatment in public health facilities. Each organization operates using its own protocol and hires its own health workers in care and treatment centers. The government also provides care for hospitalized patients or those who seek treatment for other conditions. Within this context, it is difficult to plan and implement nutrition training for all health workers who care for HIV-positive children. None of the organizations accept responsibility for developing the existing human resources. In addition, the government lacks funds to train all of its health workers, including those working for other implementing partners. This kind of fragmentation is common in many developing countries.

8.5.2 Health Worker Shortage

A limited number of health workers work in Tanzania, and they provide care and treatment for a large number of HIV-positive patients in routine clinics. For example, on a typical clinic day in Tanga, up to 80 children may visit a care and treatment facility in which only four or fewer mid-level providers work. If health workers have to spend more time on individualized nutrition care and detailed counseling, then they may not be able to complete other tasks. Therefore, even if they acquire a high level of nutrition knowledge from training, they will only be able to provide a general approach to nutrition care. Many sub-Saharan African countries suffer from a shortage of health workers and share these common problems.

8.5.3 Knowledge Decay—Retraining Needs and Costs

Trained health workers experience knowledge decay; therefore, training should not be a one-time investment. Health workers may gradually forget their knowledge unless nutrition training is provided frequently as continuing education. For this case, the training was privately funded for research purposes and may not be sustainable or able to be scaled up. Nutrition training should be institutionalized, and the overall running costs of HIV programs should be used to make it sustainable.

8.6 USE OF SUCCESSFUL MODELS TO IMPLEMENT NUTRITION TRAINING AND PROGRAMS

The effectiveness of nutrition training and subsequent counseling for health workers may be increased by following other successful models and programs. Such successful models include the ART-adherence model, active case finding by directly observed treatment programs (DOTS) in tuberculosis, and the positive deviance approach model.

8.6.1 ART-Adherence Model

Despite numerous challenges, the ART-adherence model in Tanzania has been successful even among children. The adherence counseling is integrated into routine care. In this model, health workers in care and treatment facilities receive frequent ART-adherence counseling training. This helps to sharpen their skills, knowledge, and methods of monitoring adherence. Patients are given simple tools to remember how to use ART on time, including a fixed timetable based on their most routine activities and peer reminder methods. Such local innovations during training are useful and practical. By repeating the training, health workers realize how important adherence counseling is for routine care.

Patients bring their remaining pills or a medicine diary and show their health workers how they use their ART. From this, health workers can know the level of adherence over the previous month and identify reasons for missing doses when pills remain. The health workers and patients are then responsible for moving toward adherence. Health facilities maintain high levels of ART adherence by continuing routine follow-up through pill counting whenever a patient visits there.

Nutrition care may adapt such an innovative and tailor-made ART-adherence model by frequently training health workers. In addition, nutrition care can be integrated into routine HIV care and treatment and can be made a mandatory intervention. In this model, health workers may provide feeding diaries to caregivers of HIV-positive children. It helps health workers and caregivers to plan together using individual feeding patterns, and it helps assist in monitoring progress. Peer reminders may be used in nutrition interventions through nutrition groups as in adherence interventions. In such groups, caregivers can encourage each other and remind themselves of the best feeding practices. A care and treatment center can also ask community health workers and home-based care to extend care and follow-up at home.

8.6.2 Active Case Finding and Supervision by DOTS

The DOTS program is one of the most successful interventions to combat tuberculosis. The DOTS strategy includes five elements: political

commitment to ensure adoption of policy and strategies and, to ensure financial sustainability, early and active case detection; standard and effective treatment and patient supervision; effective drugs and supplies; and monitoring and evaluation.

Nutrition interventions that adopt this model may yield better results. For example, the nutritional status of all children, including HIV-positive children, could be improved by strengthening nutrition governance through the adoption of updated nutrition guidelines [36], which recommend integrating nutrition care for HIV-positive children into national policies. Active identification of the early stages of undernutrition will help health workers identify such cases through constant monitoring to determine trends in growth. If health workers receive adequate training to sharpen their skills, then nutrition counseling for feeding practices will improve [22]. Monitoring and evaluation of health workers' nutrition knowledge and skills will help maintain the quality of health care and ensure that HIV-positive patients receive routine and standard care [23].

8.6.3 Positive Deviance Approach

Positive deviants are people who show extraordinarily positive results despite the normal trend in a population [37]. For example, in communities where undernutrition is common, children who have better nutritional status are considered positive deviants. Their caregivers might have taken a different approach toward feeding that may be considered abnormal in such a population. The use of such cases as examples of how nutritional status may improve, regardless of normal trends, can be helpful in changing patterns of undernutrition and poor feeding [38]. This approach has proved useful in Vietnam [37] and other regions with a high prevalence of child undernutrition [38].

A positive deviant approach may also be useful among HIV-positive children in areas where food is available but where caregivers have restrictive feeding practices, similar to those for HIV-negative children [38]. Collecting examples of how others feed their children well can help change the beliefs underlying poor feeding practices, and evidence of children with improved nutritional status can lead to sustainable results. In addition, the identification of centers that conducted successful counseling may help to stimulate other facilities into integrating such interventions, thereby helping to improve nutritional status through feeding practices.

8.7 CONCLUSION

The growing number of HIV-positive children will continue to exacerbate child undernutrition rates unless it is addressed. Both AIDS and

undernutrition are preventable if locally available resources are appropriately used. In some countries like Tanzania, food is available but not effectively used.

Nutrition training can benefit health workers of various cadres. Training of qualified health workers and community workers can benefit the general population. If the necessary resources are available, then they have the potential to improve feeding practices and undernutrition among HIV-positive children.

For nutrition training of health workers to be more effective, it is critical to identify specific and local risk factors for undernutrition and poor feeding practices. It is then important to institutionalize the training program to make it sustainable at a country level. In this way, HIV-positive children can live and enjoy their adulthood like other members of society without depending too much on donor agencies.

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