

'Let Food Be Your Medicine': a model for HIV nutrition services

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Abstract

Introduction: The positive impact of optimal nutrition on human immunodeficiency virus (HIV) outcomes is well established however there are few examples of HIV being used as a complimentary treatment in outpatient care. The aim of this study is to evaluate the effectiveness of an HIV nutrition project in educating healthcare providers, stimulating the development of provincial nutrition services and building nutritional capacity of people living with HIV (PLHIV).

Material and methods: Healthcare providers (HCP) attending a nutrition study trip and demonstration camp were evaluated for their satisfaction and knowledge of HIV nutrition. These interventions were then replicated on a provincial level with the development of hospital nutrition services and camps that in turn were evaluated for attendance, satisfaction and attendee HIV nutrition knowledge.

Results: Training of 13 HCP resulted in the instigation of six provincial nutrition camps, one HCP conference, and the establishment of nutrition services and classes attended by over 3111 PLHIV and family members. Satisfaction scores reported by participants in the camps varied from 89% to 98% with HIV nutrition knowledge improving in all instances.

Conclusions: This project study demonstrates that HCP and PLHIV are very receptive to the inclusion of nutrition education as part of outpatient HIV care, and that educational interventions can effectively snowball to reach a large number of PLHIV and their families, and improve HIV nutrition knowledge.

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Key words: HIV nutrition, healthy eating, diet, symptom management, food safety.

Introduction

The wasting associated with human immunodeficiency virus (HIV) is a significant clinical problem and one of the most common manifestations of advanced HIV disease [1-6]. The criteria for diagnosis of HIV-associated wast-

ing syndrome include profound weight loss greater than 10%, plus either chronic diarrhoea or chronic weakness and fever, for more than a month [1, 7]. Wasting has been associated with increased mortality, accelerated disease progression, loss of lean body mass and deterioration in strength

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and functional status [1, 2, 4, 5]. Despite suggestions that highly active antiretroviral therapy (HAART) would reduce the occurrence of HIV associated weight loss and wasting, they remain common complications and weight loss remains an independent predictor of mortality [3, 6, 8]. The malnutrition associated with HIV-related weight loss is considered multifactorial with contributors including decreased intake of nutrients, nutrient malabsorption and metabolic alterations [9].

Highly active antiretroviral therapy has transformed HIV into a chronic disease for many patients and over time these treatments have been associated with a number of metabolic and morphologic disorders including dyslipidaemia and insulin resistance, as well as sub-cutaneous adipose tissue loss and abdominal obesity [10, 11]. The pathogenesis of these abnormalities is likely multifactorial, resulting from the virus itself, adverse effects of HAART and patient factors including genetic predisposition, nutrition and the environment [10, 12-15]. The side effects associated with each class of antiretroviral drugs varies but include lactic acidosis, gastrointestinal intolerance, lipodystrophy, hyperlipidaemia and other lipid and glucose abnormalities [13, 14, 16]. People living with HIV (PLHIV) report gastrointestinal symptoms including diarrhoea, nausea, vomiting, abdominal pain, dyspepsia, heartburn, constipation, and flatulence [13, 17, 18].

The importance of nutrition in the management of HIV and AIDS is now well established. Achieving and maintaining optimal nutrition is purported to improve the immune function, reduce the incidence of HIV-related complications including metabolic disorders, attenuate disease progression, and improve survival of PLHIV [19-26]. Nutrition counselling and support are recommended to enable PLHIV to achieve an adequate nutrient and energy intake for as long as possible, enhance their quality of their lives, improve and minimise symptoms [4, 23, 27]. This can be achieved through nutritional assessment and screening, interventions such as nutrition education and lifestyle counselling, and by providing psychosocial support [15, 23, 24]. Nutritional supplements and ready-to-use therapeutic foods are also reported to be beneficial in improving the nutritional status of PLHIV [15, 28, 29]. In Thailand, it has been reported that interventions will be better received if the cultural context, psychosocial and sensory factors are considered [28].

There are limited examples of services utilising diet as a complementary HIV treatment modality in outpatient care. In Africa, the USAID Food and Nutrition Technical Assistance Project (FANTA) has supported HIV and nutrition policies and guidelines, the integration of food and nutrition into HIV services, and food-by-prescription (FBP) programming [30, 31]. In Thailand, the Thai Red Cross AIDS Research Centre (TRCARC) established the first full-time nutrition clinic solely for HIV patients. There are only a few other such clinics worldwide. The TRCARC, as part of the Thai-Australian Collaboration in HIV Nutrition (TACHIN) project, implemented the 'Let Food Be Your Medicine' project between June 2008 and February 2010. This programme sought to improve the health of PLHIV

through better nutrition, by strengthening the nutritional knowledge and capacity of hospital healthcare workers and PLHIV, and assisting healthcare providers (HCP) to initiate learning activities in their own hospitals. The following study reports on the outcomes of the project in building nutrition knowledge of PLHIV and capacity of HIV health workers to offer nutritional support.

Material and methods

Four hospitals were selected to participate in the project: Queen Savang Vadhana Memorial Hospital, Chonburi Province; Sanpatong Hospital, Chiangmai Province; Surat Thani Hospital, Surat Thani Province and Khon Kaen Hospital; Khon Kaen Province. Inclusion criteria for selection of PLHIV and children living with HIV (CLHIV) were 1) attendance at an HIV clinic outside of the TRCARC catchment area of Bangkok; 2) hospital management interest in establishing nutrition clinics; and 3) the HIV service must include multiple care teams. Staff and PLHIV from the selected hospitals participated in activities to build their HIV nutrition capacity including a study field trip to the TRCARC nutrition clinic and a demonstration nutrition camp. These activities were monitored and evaluated throughout program implementation including an end-of-project assessment for sustainability.

Selected HCP, mostly nurses and nutritionists, and PLHIV volunteers undertook a study field trip to the TRCARC nutrition clinic where they participated in training workshops. Course content included nutrition and its role in HIV; gastrointestinal complications and nutrition disorders associated with HIV including nutrition therapy for metabolic syndrome; meal planning and food safety; symptom management through food and lifestyle modification; nutritional screening; and complementary nutritional therapies.

Camps were held for PLHIV to reinforce and share nutrition knowledge, with a demonstration camp initially hosted by TRCARC followed by eight camps at the provincial hospitals. All participants were evaluated regarding their knowledge of HIV nutrition prior to and following the camps. The anonymous questionnaires asked 10 multiple choice questions about basic nutrition, diet modification for symptom management, food safety, antiretroviral-food interactions, and dietary supplements including herbs. Examples of questions included "Which food group is our body's best source of energy?" (answer options: a) starch-based foods such as rice or taro; b) meat and poultry; c) vegetables; d) milk) and "Which of these foods is a good choice when you have diarrhea" (answer options: a) curry; b) rice with soup; c) cake; d) lemon juice). Questions were scored with one point for each correct answer. In addition, course staff also assessed participants' knowledge in a nutrition game station quiz and practical application during a cooking class and menu creation. A participant was assessed as having an "improvement in knowledge" if they demonstrated a better understanding of dietary modification for symptom management.

Table 1. Nutrition education events and attendance

Hospitals	Number of study field trip participants	Number of camps/ meetings	Camp participants				Nutrition classes/services	
			CLHIV + Family members	Adult PLHIV	PLHIV volunteers	HCP	Number of classes/ services	Number of attendees
Surat Thani	3	2	24 + 9	0	0	8	96	960
			26 + 26	0	0	9		
Sanpatong	3	2	26	54	10	0	96	488
			29	21	10	7		
Queen Savang Vadhana	4	2	0	59	2	33	48	963
			29 + 21	0	7	3		
Khon Kaen	3	1	0	0	18	96	12	700
Total	13	7	190	134	47	156	348	3,111

CLHIV – children living with HIV, PLHIV – people living with HIV, HCP – healthcare providers

The camps training and hands-on exercises in five food stations: 1) hand washing and food hygiene; 2) food shopping and labeling; 3) antiretroviral therapy (ART) adherence and management of side effects through nutrition; 4) 'let food be medicine' or the management of GI complications and nutrition disorders, such as weight gain, anorexia, dyslipidemia, nausea and vomiting, through food modification, and 5) selection of healthy, fresh foods. Children living with HIV, aged 5 to 14 years, were included in camps and provided with additional activities such as drawing and essay competitions on healthy eating, and graphical exercises explaining HIV and nutrition. Children's knowledge of basic nutrition was assessed by evaluators using a simple checklist, essay content, drawing activities and performance at nutrition game stations. There was some variation in camp content and in a few instances, the hand washing and shopping elements of the camp were not included.

The Thai Red Cross AIDS Research Centre also provided technical assistance, funding, screening and educational resources for the provincial hospitals to establish nutrition clinics and classes for PLHIV. These services were provided weekly over a period of 48 weeks. A network was created among different hospitals to sustain their working with continued supportive supervision provided by TRCARC and the TACHIN team.

The programmes were monitored throughout implementation and evaluated at their conclusion. Preset criteria for project success included attendance during the study field trip with at least 80% participation in nutrition classes, and implementation of PLHIV camps and nutrition services at provincial hospitals. Project assessment included pre- and post-tests, satisfaction questionnaires, and evaluation of the pre-set criteria for success. Satisfaction was evaluated by asking questions regarding the usefulness of each topic, the value of the content, whether the knowledge could be utilised and whether the presentations were a suitable length, with responses captured using a five-level Likert scale (*strongly disagree, disagree, neither agree nor disagree,*

strongly agree). Staff assessed participant expectations prior to the camp and then evaluated these again post-camp to determine whether they had been met. An *After Action Review* was also completed to capture lessons learned from the events, analysing *what* happened, *why* it happened, and *how* it can be done better in the future. Post-training monitoring and evaluation of selected hospitals was conducted at six- and 12-month intervals.

Results

Thirteen participants (five nurses, five dietitians, and three volunteers from the four hospitals) attended a one-week study field trip with all attendees participating at least 80% of the time. The feedback from the workshop was very positive with participants indicating they were either 'satisfied' or 'very satisfied' with the information gained during the study trip. Feedback indicated the desire for more information on food labeling and selection of cooking oil.

Three of the hospitals, Queen Savang Vadhana Hospital, Sanpatong Hospital and Surat Thani Hospital, conducted two nutrition camps each with a total of 527 attendees. The six camps varied in length from one to five days, with the average being three days. Four of the camps were targeted at CLHIV (> 7 years of age) and their families while the other three were for PLHIV. The Khon Kaen Hospital found that non-disclosure of HIV status was a barrier to camp organisation. Instead, the hospital hosted a one-day nutrition conference for 58 healthcare workers, including nurses, nutritionists and peer educators, from 20 district hospitals in the Khon Kaen Province.

A total of 167 camp participants (24 at Surat Thani Hospital, 83 at Sanpatong Hospital, 60 at Queen Savang Vadhana Hospital) were assessed with pre- and post-questionnaires and other tools. Pre-testing of HIV nutrition knowledge revealed an average result of 68% and a marked difference across the hospitals with results varying from 53% at Queen Savang Vadhana Hospital to 95% at Surat Thani Hospital.

Table 2. Results from analysis of the camp participant satisfaction forms

Hospitals	HIV nutrition knowledge Pre-test (%)	HIV nutrition knowledge Post-test (%)	Satisfaction score (%)	Increased confidence in sharing and applying HIV nutrition knowledge (%)
Surat Thani	95	97	90	95
	–	–	98	97
Sanpatong	55	79	94	99
	81	93	97	93
Queen Savang Vadhana	60	80	89	95
	53	93	93	97
Khon Kaen	61	72	90	–
Overall	68	86	93	96

Knowledge on HIV nutrition improved in all instances following the educational programme with an average score increase of 18%. The greatest benefit was seen in the areas of health eating, symptom management and food safety. However, improvements in knowledge varied greatly, from 2% to 40% at different sites, with lower scores being associated with younger age and lower educational status. The results also showed a positive correlation between an increase in knowledge scores in pre- and post-tests ($p = 0.036$) and a greater number of different activities conducted at each camp.

Satisfaction scores reported by participants in the camps, were high with an average of 93% and a range from 89% to 98% with second camps scoring higher in all instances, presumably as a result of improved preparation. Almost all participants, 96%, reported increased confidence in sharing and applying HIV nutrition knowledge. Feedback from camp participants indicates a high level of interest in HIV-related nutrition and requests were made for more information on a number of topics including selection of cooking oils, the five food groups, diet/menu planning, and the management of GI symptoms and nutrition disorders including vomiting, diarrhoea, diabetes, hypertension and obesity. Nutrition game stations proved particularly popular with attendees, as did sessions addressing symptom management and dietary supplements and herbs.

Discussion

These results demonstrate the Thailand 'Let Food Be Your Medicine' programme to be a capacity-building model easily replicated at a provincial level. Since the project's implementation all hospitals have continued to collect nutrition data on a routine basis and conduct monthly nutrition classes at ARV clinics. In addition, a standard operating procedure for HIV nutrition services has been developed and published as a result of this initiative. The initial four pilot hospitals have also expanded the uptake of HIV nutrition-related activities to other hospitals in their respective provinces. The project shows a snowball effect, where an action, in this instance

the study field trip and demonstration camp, stimulates similar activities across a broad geographical region, resulting in the development of increasingly large numbers of the target population.

The programme resulted in increased levels of HIV nutrition knowledge and was well received by participants. The interactive sessions and nutrition game stations were preferred as channels of communication and there were requests to reduce the number of formal lectures. Other suggestions included greater continuity between camps and the development of nutrition clubs. There were requests for further information on a number of practical issues including food selection, menu planning and the management of symptoms and nutrition disorders, with recommendations that these issues could be addressed through posters and videos at the HIV clinics. In addition, it was suggested that the negative impacts of unhealthy and processed foods should be similarly promoted and attention drawn to potentially harmful effects of unknown herbal preparations. As a result of discrepancies in knowledge improvement between sites, the researchers recommend that in future children participating in the camps should be a minimum of 7 years of age and greater care should be taken to provide information, resources and questionnaires appropriate to the educational level of the participant.

There was a considerable discussion regarding the time demands that HIV treatment, camps and classes placed on participants. Two- or three-day camps were reported as preferable as they did not remove participants from their day-to-day activities, particularly employment, for an extended period of time. People living with HIV taking highly active retroviral therapy particularly seemed to struggle with time management in day-to-day life and it was proposed that classes should highlight the value of investing time in health care and stress relief to improve one's quality of life. It must be stressed that the benefits from this investment are not immediate but take time.

This study did not include systematic evaluation of physical or psychosocial health, or nutrition behaviour, however research by other authors, including in Thailand, has reported

improvements in lipid profiles, symptom management and quality of life, following nutrition counselling and support initiatives [23, 26, 27]. Other “Food by Prescription” (FBP) initiatives have been based in Africa, treating PLHIV suffering from moderate to severe acute malnutrition. In these programmes, participants were supplied lipid-based therapeutic food and this was associated with significant improvements in BMI. In the Thailand programme, only one hospital, Queen Savang Vadhana Hospital, reported on the BMI of participants attending nutrition classes. The majority of those attending were in a normal weight range (55%) while 26% were overweight and 19% underweight. Food supplements were not provided to participants at any of the hospitals.

This study represents pragmatic research in a health care setting and as such has a number of limitations. Not all hospitals were able to implement the program in a consistent manner: the inability of the Khon Kaen Hospital to host camps, due to non-disclosure of HIV status by PLHIV, being a prime example. This does however present an opportunity to address non-disclosure with PLHIV since the benefits of disclosure and consequent family support are well documented [32-34]. It should be noted, however, that the nutrition conference for HCP hosted by the Khon Kaen Hospital would appear to be a successful alternative to camps since it has resulted in the provision of nutrition services to some 700 PLHIV. This indicates that there may be some flexibility in the implementation of a nutrition program and that activities may be tailored to the local context without negative results.

Conclusions

The 'Let Food Be Your Medicine' project demonstrates that HCP and PLHIV are very receptive to the inclusion of nutrition education as part of outpatient treatment for HIV. The initial capacity-building interventions, of a study trip and demonstration camp, snowballed into the development of provincial nutrition services, classes and camps, reaching a large number of clients and their families. This effective model of nutrition capacity building may be easily replicated in other areas or countries. Further research is needed to determine the impact of nutrition interventions on health outcomes.

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Conflict of interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. Erlandson KM, Li X, Abraham AG, et al. Long-term impact of HIV wasting on physical function. *AIDS Lond Engl* 2016; 30: 445-454.
2. Grinspoon S, Mulligan K; Department of Health and Human Services Working Group on the Prevention and Treatment of Wasting and Weight Loss. Weight loss and wasting in patients infected with human immunodeficiency virus. *Clin Infect Dis* 2003; 36 (Suppl 2): S69-78.
3. Wanke CA, Silva M, Knox TA, et al. Weight loss and wasting remain common complications in individuals infected with human immunodeficiency virus in the era of highly active antiretroviral therapy. *Clin Infect Dis* 2000; 31: 803-805.
4. Kotler DP. Wasting syndrome: nutritional support in HIV infection. *AIDS Res Hum Retroviruses* 1994; 10: 931-934.
5. Balog DL, Epstein ME, Amodio-Groton MI. HIV wasting syndrome: treatment update. *Ann Pharmacother* 1998; 32: 446-458.
6. Tang AM, Forrester J, Spiegelman D, et al. Weight loss and survival in HIV-positive patients in the era of highly active antiretroviral therapy. *J Acquir Immune Defic Syndr* 2002; 31: 230-236.
7. National Center for Infectious Diseases Division of HIV/AIDS. 1993 revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. *Center for Disease Control*, 1993.
8. Mangili A, Murman DH, Zampini AM, et al. Nutrition and HIV infection: review of weight loss and wasting in the era of highly active antiretroviral therapy from the nutrition for healthy living cohort. *Clin Infect Dis* 2006; 42: 836-842.
9. Gasparis AP, Tassiopoulos AK. Nutritional support in the patient with HIV infection. *Nutrition* 2001; 17: 981-982.
10. Anuurad E, Semrad A, Berglund L. Human immunodeficiency virus and highly active antiretroviral therapy-associated metabolic disorders and risk factors for cardiovascular disease. *Metab Syndr Relat Disord* 2009; 7: 401-409.
11. Barbaro G. Metabolic and cardiovascular complications of highly active antiretroviral therapy for HIV infection. *Curr HIV Res* 2006; 4: 79-85.
12. Brown TT, Glesby MJ. Management of the metabolic effects of HIV and HIV drugs. *Nat Rev Endocrinol* 2011; 8: 11-21.
13. Reust CE. Common adverse effects of antiretroviral therapy for HIV disease. *Am Fam Physician* 2011; 83: 1443-1451.
14. Jones R, Sawleshwarkar S, Michailidis C, et al. Impact of antiretroviral choice on hypercholesterolaemia events: the role of the nucleoside reverse transcriptase inhibitor backbone. *HIV Med* 2005; 6: 396-402.
15. Suttajit M. Advances in nutrition support for quality of life in HIV+/AIDS. *Asia Pac J Clin Nutr* 2007; 16 Suppl 1: 318-322.
16. Manfredi R, Chiodo F. Disorders of lipid metabolism in patients with HIV disease treated with antiretroviral agents: frequency, relationship with administered drugs, and role of hypolipidaemic therapy with bezafibrate. *J Infect* 2001; 42: 181-188.
17. Santos AS, Silveira EA, Falco MO, et al. Effectiveness of nutritional treatment and synbiotic use on gastrointestinal symptoms reduction in HIV-infected patients: Randomized clinical trial. *Clin Nutr* 2016; doi: 10.1016/j.clnu.2016.06.005.
18. Ouattara E, Danel C, Moh R, et al. Early upper digestive tract side effects of zidovudine with tenofovir plus emtricitabine in West African adults with high CD4 counts. *J Int AIDS Soc* 2013; 16: 18059.
19. de Pee S, Semba RD. Role of nutrition in HIV infection: review of evidence for more effective programming in resource-limited settings. *Food Nutr Bull* 2010; 31: S313-344.

20. Hsu J, Pencharz P, Macallan D, et al. *Macronutrients and HIV/AIDS: A Review of Current Evidence*. WHO, Geneva 2005.
21. Reid C, Courtney M. A randomized clinical trial to evaluate the effect of diet on quality of life and mood of people living with HIV and lipodystrophy. *J Assoc Nurses AIDS Care JANAC* 2007; 18: 3-11.
22. Thapa R, Amatya A, Pahari DP, et al. Nutritional status and its association with quality of life among people living with HIV attending public anti-retroviral therapy sites of Kathmandu Valley, Nepal. *AIDS Res Ther* 2015; 12: 14.
23. Sherlekar S, Udipi SA. Role of nutrition in the management of HIV infection/AIDS. *J Indian Med Assoc* 2002; 100: 385-390.
24. Guidelines for nutrition support in AIDS. Task Force on Nutrition Support in AIDS. *Gastroenterol Nurs Off J Soc Gastroenterol Nurses Assoc* 1989; 12: 28-36.
25. Somarriba G, Neri D, Schaefer N, et al. The effect of aging, nutrition, and exercise during HIV infection. *HIVAIDS Auckl NZ* 2010; 2: 191-201.
26. Chotivichien S, Arab L, Prasithsirikul W, et al. Effect of nutritional counseling on low-density lipoprotein cholesterol among Thai HIV-infected adults receiving antiretroviral therapy. *AIDS Care* 2016; 28: 257-265.
27. Thuita FM, Mirie W. Nutrition in the management of acquired immunodeficiency syndrome. *East Afr Med J* 1999; 76: 507-509.
28. Rodas-Moya S, Pengnonyang S, Kodish S, et al. Psychosocial factors influencing preferences for food and nutritional supplements among people living with HIV in Bangkok, Thailand. *Appetite* 2017; 108: 498-505.
29. Tesfaye M, Kaestel P, Olsen MF, et al. The effect of nutritional supplementation on quality of life in people living with HIV: a randomised controlled trial. *Trop Med Int Health TM IH* 2016; 21: 735-742.
30. Food and Nutrition Technical Assistance II Project. Review of Kenya's Food by Prescription Program. FANTA-2, FHI360; Washington, 2009.
31. Sadler K, Bontrager E, Rogers B, et al. Food by Prescription: Measuring the Impact and Cost-Effectiveness of Prescribed Food on Recovery from Malnutrition and HIV Disease Progression Among HIV+ Adult Clients in Ethiopia. Feinstein International Center, Boston 2012.
32. Bravo P, Edwards A, Rollnick S, et al. Tough decisions faced by people living with HIV: a literature review of psychosocial problems. *AIDS Rev* 2010; 12: 76-88.
33. Hodgson I, Plummer ML, Konopka SN, et al. A systematic review of individual and contextual factors affecting ART initiation, adherence, and retention for HIV-infected pregnant and postpartum women. *PLoS One* 2014; 9: e111421.
34. Rochat TJ, Bland R, Coovadia H, et al. Towards a family-centered approach to HIV treatment and care for HIV-exposed children, their mothers and their families in poorly resourced settings. *Future Virol* 2011; 6: 687-696.