



The Sustainable Action against HIV and AIDS in Communities (SAHACOM): Impacts on health and quality of life of people living with HIV in Cambodia

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ABSTRACT

This study evaluated the impacts of the Sustainable Action against HIV and AIDS in Communities (SAHACOM) Project on health and quality of life of people living with HIV (PLHIV). Outcome indicators from baseline documentation (2010) were compared to those obtained at midterm (2012) and end line (2014). Results showed that HIV prevalence among pregnant women aged 15–24 attending antenatal care decreased from 0.5% at baseline to 0.3% at midterm and end line. Proportion of PLHIV who were on antiretroviral therapy (ART) 12 months after the initiation of the treatment increased from 85% at baseline and midterm to 89.5% at end line. Proportion of PLHIV in need for ART and currently on the treatment increased from 90.0% at baseline to 92.5% at midterm and to 96.0% at end line. Regarding their health status, proportion of PLHIV reporting their overall health as good increased from 52.0% at baseline to 78.3% and 80.2% at midterm and end line, respectively. Similarly, proportion of respondents reporting their overall quality of life as good increased sharply from 35.0% at baseline to 73.3% and 72.0% at midterm and end line, respectively. In conclusion, the SAHACOM is effective in improving health and quality of life of PLHIV in Cambodia.

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INTRODUCTION

Globally, 35.3 million people were estimated to be living with HIV in 2012, and the number of people receiving antiretroviral therapy (ART) has tripled over the past five years¹. Life expectancy of people living with HIV (PLHIV) has been improved due to ART^{2,3}. Approximately, ART averted 6.6 million AIDS-related deaths worldwide from 1995 to 2012, and the number of annual AIDS-related deaths fell by 30% between 2005 and 2012¹. While this progress deserves a great deal of appreciation, there is growing recognition of the importance of addressing psychological and social problems in the daily life of PLHIV and their family^{4,5}.

Cambodia has recently been internationally lauded for its successes in slowing HIV epidemic. The National Center for HIV/AIDS, Dermatology, and STDs (NCHADS) estimated that HIV prevalence in general population aged 15 to 49 had fallen from a peak of over 2.0% a decade earlier to 0.6% in 2013^{6,7}. Outstanding national leadership and commitment have been recognized through a Millennium Development Goal (MDG) award in 2010, as Cambodia had reached its universal access target for ART⁸. However, the high coverage of the access to care and treatment for in-need PLHIV must be maintained, and stigma and discrimination PLHIV face in communities and at healthcare facilities must be reduced.



Starting in October 2009, KHANA has implemented the Sustainable Action against HIV and AIDS in Communities (SAHACOM) Project. The SAHACOM utilizes a community-based approach to empower and create ownership in communities. Through this model, community support volunteers and peer educators are utilized to provide support, services, and implement activities of the project. It aims to reduce the impacts of HIV and AIDS by improving health and quality of life of the most vulnerable populations. The project focuses on Integrated Care and Prevention (ICP), Focused Prevention (FP), and integration of sexual reproductive health/family planning (SRH/FP), maternal and child health (MCH), livelihoods, and social protection. The logical framework for the SAHACOM is shown in the **Figure (see next page)**.

Through the SAHACOM Project, KHANA has provided financial and technical supports to implementing partners (IPs) and communities for providing outreach education using behavior change communication (BCC), promoting condom and lube use, accelerating case detection through new HIV testing and counseling approaches, increasing accessibility of the beneficiaries to receive early pre-antiretroviral therapy and antiretroviral therapy (pre-ART/ART) services, and maximizing retention in care and treatment. The IPs also had been provided technical supports on capacity strengthening as well as policy and strategy work.

In early 2010, the SAHACOM baseline documentation was conducted using desk reviews, field visits, and consultative meetings with various program staff. The SAHACOM mid-term survey

was conducted in 2012 with 916 PLHIV, and the end-line survey was conducted in 2014 with 1,004 PLHIV. A number of core indicators and practical recommendations were documented. This impact evaluation was conducted to review the intervention activities and measure changes in terms of efficiency and effectiveness of the program and the extent to which objectives of the project have been achieved by comparing outcome indicators across the life span of the project using data from surveys at the three waves: baseline, mid-term, and end line.

The overall purpose of this end-of-project assessment was to evaluate the effectiveness of the SAHACOM in improving health and quality of life of PLHIV by examining the extent to which the intended objectives of the project set at the baseline have been achieved. The specific objectives of this study were:

- (1) to assess changes of key outcome indicators in terms of ICP, FP, SRH/FP, MCH, livelihoods, and social protection among PLHIV;
- (2) to identify problems and constraints that have been encountered by both KHANA and its IPs related to HIV prevention, care, treatment, and support over the course of the project implementation; and
- (3) to document lessons learned and challenges and to make recommendations for the improvement of the project activities.

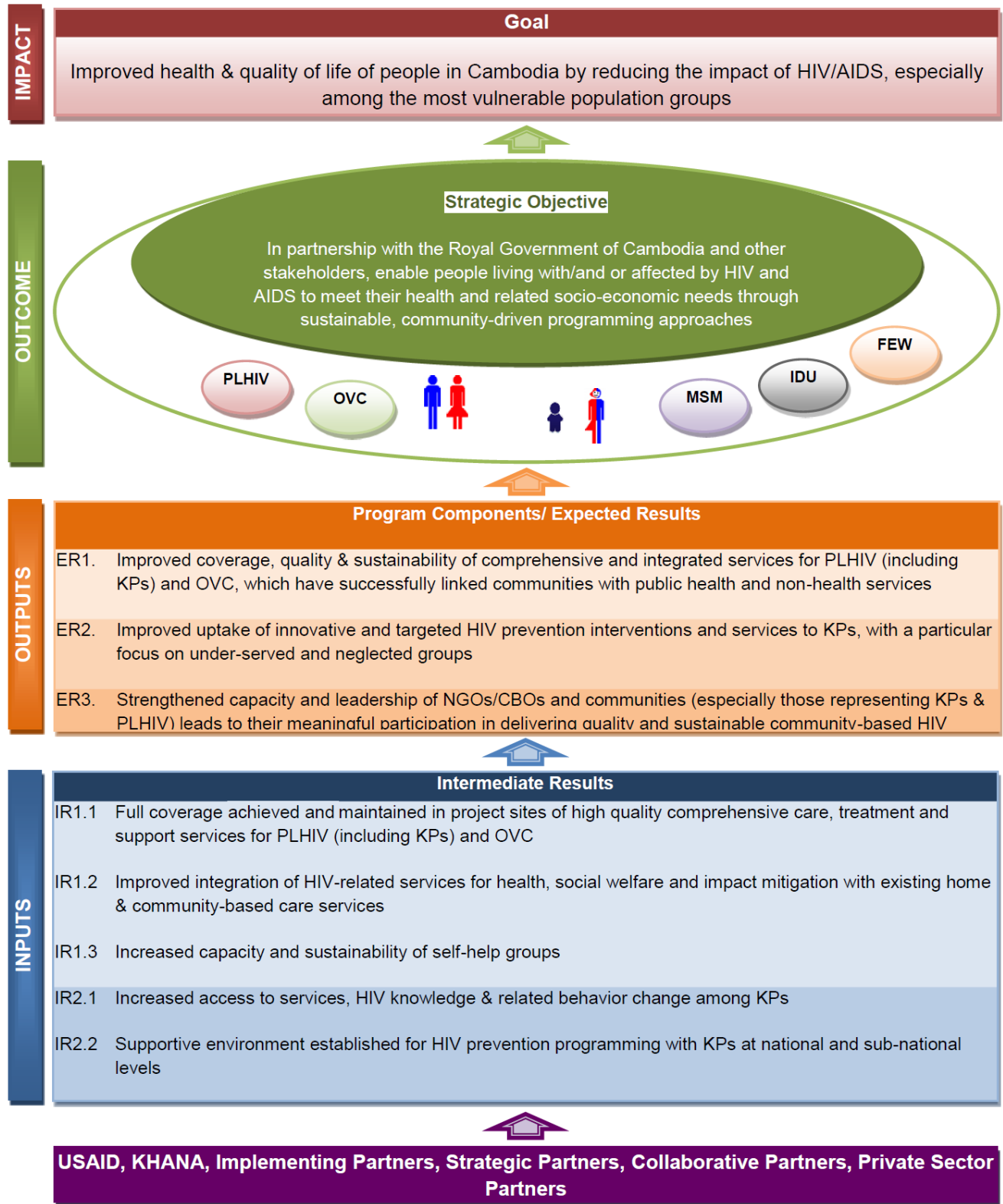


Figure Logical framework for the SAHACOM



MATERIALS AND METHODS

Study sites and sampling

This study was conducted in Phnom Penh, the Capital city, and five provinces including Battambang, Pailin, Pursat, Siem Reap, and Takeo. The z test for a two sample comparison of proportions was employed to detect a change of 10-15% of key indicators such as general health status and self-rated quality of life. The power of 80% with 95% confidence interval (CI) was set for the calculation. Design effect of 2 was used to compensate the cluster effect. The selection of these indicators was based on the SAHACOM baseline documentation report⁹. As a result, the total minimum PLHIV sample size required for the study was approximately 900 samples. Adjusted for incomplete response or missing data of 10%, the final sample size was approximately 1,000.

Coordination and administration of the survey were facilitated by KHANA's partners at provincial level to ensure the quality of the data. A two-stage cluster sampling method was utilized to select the study samples. The sample size were proportionally allocated to the size of PLHIV in each province and only six out of nine city and provinces where the ICP has been implemented were selected to represent the overall SAHACOM project area. Other provinces were excluded due to the fact that the target population size for the interventions was too small at the time when the baseline documentation and mid-term survey was conducted. Furthermore, the total number of the population in the selected six city and provinces represented more than 70% of the total coverage of the ICP and 100% of the total coverage of the FP.

Number of health centers in each selected province to be included in the study was decided based upon the number of PLHIV registered in each health center. In order to be included in the study, a health center must cover at least 20 PLHIV. In addition, other factors were assessed when deciding whether to include a health center in the study such as convenience for data collection and duration of the project implementation in the health center coverage. We then used the probability proportional-to-size sampling to select the required number of PLHIV from each province.

Data collection training and procedures

Before the data collection, all interviewers and field supervisors were trained for two days on data collection methods and one day for tool pretesting and reflection. The main objective of the training was to ensure that all interviewers and field supervisors understood the procedures and follow the standardized guideline in the same manner and guarantee the quality of the data. The training covered necessary skills including interview techniques, confidentiality, and practices of the questionnaire administration. We also reviewed the study protocol during the training sessions in order for the team members to be thoroughly familiar with it. Quality control skills such as rechecking and reviewing the questionnaires after administration as well as resolving issues that might arise during the fieldwork were included in the training. Regular review sessions with interviewers were conducted during the survey period to review progress and communicate any problems or issues occurring during the data collection.

Questionnaire development

The questionnaire was developed using standardized tools adapted from previous studies to measure key outcome indicators related to the project objectives. The questionnaire was initially developed in English and then translated into Khmer, the national language of Cambodia. Another translator back-translated it into English to ensure that the "content and spirit" of every original item were maintained. Clear instructions and explanations were addressed to avoid any confusion during the interviews.

Prior to the main data collection, a pilot study was conducted before constructing the final questionnaire to ensure that the wording and contents were culturally suitable, acceptable, and clearly understandable for the study participants. The pilot study was conducted with 10 randomly selected samples to assess the contents, format, length, language, and appropriateness of the questionnaire. Necessary modifications were made based upon feedbacks from the pilot study and comments from researchers and practitioners working on HIV in Cambodia.



Variables and measurements

The questionnaire collected information on socio-economic characteristics, physical and mental health status, ART, community support, and perceived satisfaction with health care and support services. Socio-economic characteristics, community support, and satisfaction with health care and support services were measured using existing items adapted from previous studies in the same population^{9,10,11,12} and the most recent Cambodia Demographic and Health Survey¹³.

Socio-economic characteristics included age, gender, marital status, years of formal education completed, main occupation, average monthly household income, number of days that their family did not have enough food to eat, whether their family had borrowed money or rice from other families in the past month, and types of support that they thought the most important for them or their family. We also asked about whether they had received any support from KHANA and its IPs and types of support they received in the past 12 months.

We assessed self-rated health status using the following question, "In general, how would you rate your overall health?" with five response options including very good, good, neither good nor poor, poor, and very poor. Similarly, we assessed self-rated quality of life using the following question, "In general, how would you rate your overall quality of life?" with five response options including very good, good, neither good nor poor, poor, and very poor.

Several questions were used to collection information regarding health status and care and treatment. These included questions on HIV status and disclosure, ART, ART adherence, access to ART, referrals for pre-ART/ART services, receipt of different types of care and support such as reproductive health, family planning, tuberculosis, and condom. Regarding community support, the participants were questioned about their main concerns in daily living with HIV and sources and types of external support they had received in the past 12 months. They were also asked whether they thought their family situation would be more difficult if there was no support in the near future.

Ethical considerations

The study protocol was approved by the National Ethics Committee for Health Research, Ministry of Health, Cambodia. Participation in this study was voluntary. Participants could refuse or discontinue their participation at any time for any reason without consequences. An informed consent was obtained from each participant after a detailed description of all study objectives and procedures was provided. Confidentiality of the information was ensured by removing all personal identifiers from the survey questionnaire.

Data entry and analyses

Data were coded and entered into a computerized database using Epi Data version 3 (Odense, Denmark). Double data entry was performed to minimize entry errors. Descriptive statistical tests were used to compute means and standard deviations (SD) for numerical variables and frequencies for nominal and ordinal variables. Chi-square test or Fisher's Exact test for categorical variables and paired Student's *t*-test for continuous variables were used to compare outcomes at midterm to those at end line to detect changes in key outcome indicators. Two-sided *p*-values of less than 0.05 were regarded as statistically significant. SPSS version 20.0 (IBM Corporation, New York, USA) was used for all data analyses.

RESULTS

Socio-economic characteristics of PLHIV at midterm and end line

In total, 916 PLHIV were included in the midterm and 1,004 PLHIV in the end-line survey. As shown in **Table 1**, socioeconomic situation among PLHIV at midterm and end line were very similar. Mean age of the respondents was 41.4 years (SD= 8.4) at midterm and 42.8 years (SD= 8.9) at end line with a proportion of females of 66.5% and 67.3%, respectively. Mean year of education completed was 4.4 years (SD= 3.3) at midterm and 4.3 years (SD= 3.3) at end line. Approximately two-thirds of the respondents at both lines were married. The distribution of main sources of family income in the past year, main bread winner of the family, monthly average household income, and number of days in the past month on which family had no enough food were also similar.



Table 1 Socioeconomic characteristics of PLHIV in the SAHACOM Project at midterm ($n=916$) and end line ($n=1,004$)

Variables	Midterm	Endline
Mean age (in years, \pm SD)	41.4 \pm 8.4	42.8 \pm 8.9
Female gender	608 (66.5)	675 (67.2)
Mean years of education completed (\pm SD)	4.4 \pm 3.3	4.3 \pm 3.3
Marital status		
Never married	14 (1.6)	20 (2.0)
Married	569 (62.2)	630 (62.8)
Divorced/separated/widowed or widower	331 (36.2)	353 (35.2)
Mean number of household members (\pm SD)	4.5 \pm 2.6	3.0 \pm 2.2
Main sources of family income in the last year		
Farming	316 (34.5)	392 (39.0)
Self-employed business	554 (60.5)	538 (53.6)
Selling labor	373 (40.7)	378 (37.7)
Monthly salary	185 (20.2)	220 (21.9)
Help from NGOs or individuals	79 (8.6)	21 (2.1)
Main bread winner in the family		
Myself	455 (49.9)	512 (51.0)
Spouse	337 (37.0)	323 (32.2)
Children	79 (8.7)	68 (6.8)
Relatives	40 (4.4)	39 (3.9)
Mean monthly household income (USD, \pm SD)	116 \pm 222	116 \pm 227
Number of days in the past month on which family had no enough food (\pm SD)	4.2 \pm 5.8	4.5 \pm 6.0

Abbreviations: NGO, non-governmental organization; PLHIV, people living with HIV; SAHACOM, Sustainable Action against HIV and AIDS in communities; SD, standard deviation.

Comparisons of general key indicators

Table 2 (next page) shows comparisons of general indicators at baseline, midterm, and end line. HIV prevalence among pregnant women aged 15 to 24 attending antenatal care decreased from 0.5% at baseline to 0.3% at midterm and end line. Regarding retention to ART, the percentage of PLHIV on ART 12 months after the initiation of the treatment remained unchanged from baseline to midterm at 85.0% but increased to 89.5% at end line.

The proportion of PLHIV who were in need for ART and currently on the treatment increased steadily

from 90.0% at baseline to 92.5% at midterm and to 96.0% at end line. Regarding their health status, the proportion of PLHIV reporting their overall health as good increased from 52.0% at baseline to 78.3% and 80.2% at midterm and end line, respectively. Similarly, the proportion of respondents reporting their overall quality of life as good increased sharply from 35.0% at baseline to 73.3% and 72.0% at midterm and end line, respectively. For health care service satisfaction, the proportion of PLHIV who reported being satisfied with community-based care services also increased from 83.0% at baseline to 96.0% at midterm, but dropped slightly to 91.5% at end line.



Table 2 Comparisons of general indicators among PLHIV in the SAHACOM Project at baseline (2010), midterm (2012), and end line (2014)

Indicators	Baseline%	Midterm%	End line%
HIV prevalence among pregnant women aged 15-24	0.5	0.3	0.3
PLHIV who were on ART 12 months after initiation	85	85	89.5
PLHIV in need for ART and currently on the ART	90	92.5	96
PLHIV reporting their overall health as good	52	78.3	80.2
PLHIV reporting their overall quality of life as good	35	73.3	72
PLHIV being satisfied with community-based care	83	96	91.5

Abbreviations: ART, antiretroviral therapy; PLHIV, people living with HIV; SAHACOM, Sustainable Action against HIV and AIDS in communities.

The comparisons of types of support received in the past 12 months among PLHIV at midterm and end line are shown in **Table 3**. At end line, 95.2% of respondents received support from KHANA or its IPs in the past 12 months. The biggest type of support received by the respondents at end line was support to travel to a health facility (96.2%),

increased significantly from 93.5% at midterm (OR= 1.7, 95% CI= 1.2-2.2). Among respondents at end line, the perceived most currently important needs for their family were financial support for starting up family business (75.5%), followed by food (70.3%), and healthcare and treatment (50.7%).

Table 3 Comparisons of types of support received and types of support perceived to be the most important among PLHIV in the SAHACOM Project at midterm (n=916) and end line (n=1,004)

Indicators	Midterm (n,%)	End line (n,%)	OR (95% CI)
Types of support received in the past 12 months			
Support to travel to a health facility	856 (93.5)	966 (96.2)	1.7 (1.2-2.2)
Welfare support (food, other basic needs)	793 (86.6)	220 (21.9)	17.3 (13.8-21.6)
Skill trainings and VSL establishment	125 (13.6)	110 (11.0)	1.3 (0.9-1.7)
Support for income generating activities	102 (11.1)	143 (14.2)	1.3 (1.1-1.7)
Trainings on farming and husbandry	94 (10.3)	185 (18.4)	2.0 (1.5-2.6)
Support perceived to be the most important			
Food	684 (74.7)	706 (70.3)	1.2 (1.1-1.5)
Money for starting up family business	615 (67.1)	758 (75.5)	1.3 (1.2-1.9)
Medical care	276 (30.1)	508 (50.6)	2.4 (1.9-2.9)
Vocational trainings	79 (8.6)	187 (18.6)	2.4 (1.3-2.5)
Child education	153 (16.7)	301 (30.0)	2.1 (1.7-2.7)

Abbreviations: CI, confidence interval; OR, odds ratio; PLHIV, people living with HIV; SAHACOM, Sustainable Action against HIV and AIDS in communities; VSL, village saving loan.



Welfare support, such as food and other basic needs, decreased significantly from 86.6% at midterm to 21.9% at end line (OR= 17.3, 95% CI= 13.8-21.6). The percentage of people who received skill trainings and VSL establishment also decreased slightly from 13.6% at midterm to 11.0% at end line (OR= 1.3, 95% CI= 1.0-1.7). However, financial support for income generating activities increased from 11.1% at midterm to 14.2% at end line (OR= 1.3, 95% CI= 1.1-1.7). Similarly, support for trainings on farming and husbandry increased significantly from 10.3% at midterm to 18.4% at end line (OR= 2.0, 95% CI= 1.5-2.6).

Although a large proportion of PLHIV still perceived that food was important for their family life, the percentage decreased significantly from 74.7% at midterm to 70.3% at end line (OR= 1.2, 95% CI= 1.1-1.5). The proportion of PLHIV who responded that their family needed money for starting up family business increased significantly from 67.1% at midterm to 75.5% at end line (OR= 1.3, 95% CI= 1.2-1.9). Importantly, perceived needs for medical care increased significantly from 30.1% at midterm to 50.6% at end line (OR= 2.4, 95% CI= 1.9-2.9). Perceived needs also increased significantly from midterm (8.6%) to end line (18.6%) for vocational trainings (OR= 2.4, 95% CI= 1.3-2.5) as well as for child education support (from 16.7% to 30.0%, OR= 2.1, 95% CI= 1.7-2.7).

HIV status disclosure, community support, and satisfaction

Among respondents at end line, mean duration of living with HIV was 8.5 years (SD= 4.7 years). The majority (87.4%) of the participants who were living with a spouse or a regular partner reported that their spouse or partner knew their HIV status, and 73.1% reported that their spouse or partner was also HIV positive. It is worth-noting that 5.2% of the respondents did not know the HIV status of their spouse or partner. Almost all of the respondents (98.3%) reported that their family knew their HIV status. The main reason for having not disclosed HIV status to spouse, partner, or family included fear of stigma (25.0%), fear of rejection (25.0%), or they did not think it was important (16.7%).

Table 4 shows comparisons of concerns, social support, and levels of satisfaction with community-based care and support services among PLHIV at midterm and end line. For referrals to pre-ART/ART services, PLHIV at end line were significantly less likely to be referred by home-based care team members (24.9% vs. 76.8%; OR= 9.7, 95% CI= 7.8-12.0) but more likely to be referred by staff working at public health facilities (13.8% vs. 6.6%; OR= 2.4, 95% CI= 1.7-3.3) and self-help group (16.4% vs. 6.4%; OR= 3.0, 95% CI= 2.2-4.2) compared to those at midterm.

Table 4 Comparisons of referrals and perceived needs for community-based care and supports among PLHIV in the SAHACOM Project at midterm (n=916) and end line (n= 1,004)

Indicators	Midterm (n%)	End line (n%)	OR (95% CI)
Referred by home-based care team for pre-ART/ART	703 (76.8)	250 (24.9)	9.7 (7.8-12.0)
Referred by staff working at public health facility	66 (6.6)	139 (13.8)	2.4 (1.7-3.3)
Referred by self-help group for pre-ART/ART	59 (6.4)	165 (16.4)	3.0 (2.2-4.2)
Need for psychological support	309 (33.7)	233 (23.2)	1.7 (1.4-2.1)
Need for support for income generation	385 (42.0)	687 (68.4)	3.0 (2.5-3.6)
Need for support for child education	255 (27.8)	396 (39.4)	1.7 (1.4-2.0)
Need for vocational trainings	79 (8.6)	225 (22.4)	3.1 (2.3-4.0)

Abbreviations: ART, antiretroviral therapy; CI, confidence interval; OI, opportunistic infection; OR, odds ratio; PLHIV, people living with HIV; SAHACOM, Sustainable Action against HIV and AIDS in communities.



Regarding perceived needs, there was a significant change from midterm (33.7%) to end line (23.2%) for psychological support need (OR= 1.7, 95% CI= 1.4-2.1). PLHIV at end line were also significantly more likely to report that their family needed support for income generation activities compared to PLHIV at midterm (68.4% vs. 42.0%; OR= 3.0, 95% CI= 2.5-3.6). Perceived need for child education support also increased significantly from 27.8% at midterm to 39.4% at end line (OR= 1.7, 95% CI= 1.4-2.0). Vocational trainings also grew significantly in demand from 8.6% at midterm to 22.4% at end line (OR= 3.1, 95% CI= 2.3-4.0).

DISCUSSION

This end-of-project evaluation was conducted to measure the effectiveness of the SAHACOM Project by comparing key indicators at end line to those from baseline documentation and midterm survey among PLHIV. Several positive changes have been observed including the reduction of HIV prevalence among young pregnant women attending antenatal care, improvement of retention to ART, increase of the proportion of PLHIV on ART, improvement of overall health conditions and quality of life, and better satisfaction with community-based care and support services. These findings underscore the potential roles of community-based programs in integration of HIV with other services such as reproductive health which have been highlighted in a previous study in Cambodia¹⁴.

Studies in other developing countries also have shown the effectiveness of community-based interventions in improving health and quality of life of PLHIV. The Positive Partnership Project implemented by the Population and Community Development Association in Thailand has been proved to be successful in reducing fear of HIV infection and social judgement stigma among PLHIV¹⁵. In Kenya, community health workers were also found to play critical roles in increasing HIV knowledge and ART uptake among a cohort of PLHIV who knew their HIV status but were not accessing HIV treatment or care services¹⁶. In China, a 'cash on service delivery' model performed by community-based organizations was effective in providing follow-up care and treatment for PLHIV¹⁷.

Several other studies have also provided strong evidences on the effectiveness of community-based programs in improving care and support services for PLHIV including positive prevention by reducing risky sexual behaviors among sero-discordant couples^{18,19,20} and improvement of socio-economic conditions by increasing savings and independency as well as improving social relation and social environment²¹. However, in their recent systematic review, Kennedy et al. concluded that the evidence that income generation interventions influence HIV-related behaviors and outcomes among PLHIV is inconclusive²².

Welfare support, such as food and other basic needs, had decreased significantly from midterm to end line. The large drop of welfare support was due to the discontinuation of food support from the World Food Program (WFP) in December 2012. However, perceived needs on food support decreased since midterm despite the withdrawal. One possible explanation is that KHANA used funding provided by the United States Agency for International Development (USAID) to support households that were assessed to be the most vulnerable, although food support was still reduced. An additional explanation could be a result of the increase in PLHIV who had received trainings on farming and husbandry in the past 12 months allowing this population to be more sustainable in providing their own food.

Still food continued to be a high concern due to the fact that this group reported averaging 4.5 days of not having enough food, and 62.9% had to borrow rice or money from other families in the past month. Taking these facts into consideration, it seems that food support from the WFP had impacted many households who relied on the support. The livelihood program of KHANA is going to be utilized to help these households in the future, but some households still need bridging support until they can be self-reliant.

A principal note is the changes in support services that are seen as most important for family life today among PLHIV. Rank of the perceived need for food and money for starting up family business remained rather consistent, but there was a significant increase shown in the importance of medical care and support for child education from



midterm to end line. As a result of the information received from the SAHACOM and improved communication and collaboration between the community, health centers, and the local authorities, there had been an increase in understanding the importance of healthcare services for everyone in the community. This may also help explain the increase in value of medical care. In addition, as a result of education and awareness campaigns, stigma and discrimination had decreased significantly. Both of these points demonstrate that, because of services provided, PLHIV and their families are more able to think about what is necessary to obtain a better future rather than trying to get by day to day or worrying about the stresses of being discriminated from their community.

There had been a continuous increase in PLHIV who were currently on ART from the baseline to midterm and end line. This finding demonstrates that more PLHIV had access to ART and can additionally help explain the increase in value for medical care. There were also positive results in terms of adherence to ART. Reasons for the increase in adherence for treatment could be due to the fact that ART was distributed for three-month supply instead of one-month or bimonthly supply, which was more convenient for the patients. Additionally, there was a substantial increase in support for traveling to a health facility. It should be considered that this support for transportation may serve more as a reminder for PLHIV to get ART rather than patients are not able to pay for transportation due to the fact that a high majority of respondents said that they would have funds for transportation to receive ART if they did not have any external support. Furthermore, increase in adherence might be explained by the improvement of community-based and facility-based services in educating patients and KHANA's continuous efforts in a tracking system to decrease loss to follow-up.

The proportion of PLHIV who self-rated their overall health as good had increased significantly since baseline, which may explain the success of the programs in ART provision that make people feel better. PLHIV also reported a drastic increase in their quality of life from baseline to end line. This result may also reflect the effectiveness of several forms of support that KHANA and its IPs have

provided and had great positive impacts on the thousands of PLHIV and their families. Support had ranged from help with costs for travelling to health clinics, starting VSL, skill trainings, health education, and self-help groups to name a few. Support for referral fees to health facilities increased significantly from midterm to end line. There had been a shift from people receiving support on how to start a VSL to receiving support to start income generating activities and training for farming and husbandry. This could be due to the fact that people who were interested in VSL were already enrolled and later were interested in investing in an income generating activity like farming.

Sero-discordant couples are an important aspect to look at since more than one-third of HIV infections in Cambodia are transmitted between married people^{7,23}. In the SAHACOM end line survey, 26.9% of PLHIV reported that their spouse or partner were HIV negative. This is a high percentage of couples that are HIV sero-discordant. KHANA is working with NCHADS on the national Treatment as Prevention strategy to prevent more couples from becoming sero-concordant. Increasing the frequency of HIV test among negative partners will help with early detection of infection^{7,24}. Since there is still a gap in communicating HIV status with partners, introducing more of this type of open discussion in self-help groups or couple groups could help decrease stigma and/or fear between sero-discordant couples. Of the self-help groups already in place, there was a high satisfaction with them as seen in the end-line data.

Several limitations of this study should be noted. First, a baseline survey was not conducted, and comparisons of key indicators were made using data from desk-review documentation. This condition made the measurements of changes of the key indicators from baseline to end line difficult. In the interpretation of findings from this study, several confounding factors such as changes in socioeconomic situations and the uncontrolled effects of other intervention programs should be considered. However, Table 1 shows that socioeconomic conditions of the respondents at midterm and end line were not significantly different. Second, as with any self-reported measures, there are inherent biases and potential



for both underreporting and over-reporting in the variables. Third, findings from this study might be limited by unknown reliability and validity of the questionnaire, which were adapted from previous studies. However, the questionnaire was reviewed by experts in this area and pretested before the final versions were developed. The final limitation concerns possible recall bias as participants were asked to recall events that had taken place over the past several months.

CONCLUSIONS

This end-of-project evaluation shows the positive impacts of the SAHACOM in improving health and quality of life of PLHIV in Cambodia. However, several issues remained to be addressed for sustaining the outcomes of the project. Although perceived concern for food has decreased since the midterm, it continues to be an issue. In order to further the decline, it is important to maintain the livelihood and VSL program and invest in support for PLHIV and their families. A needs assessment is necessary to evaluate which households need the most support. In addition, future work should strive to increase PLHIV who are being trained in farming and husbandry to give households the opportunity to become self-reliant in the future rather than depending on external support.

To continue the trend of increase in adherence to treatment, ART should continue to be distributed in

a three-month supply rather than a one-month or bi-monthly supply. In addition, future studies should collect further information to identify what the reason was for missing or stopping ART to better address PLHIV's needs in the future. This will be helpful to understand if transportation support serves as a financial assistance to receive ART or more as a type of reminder so that individuals do not forget to pick up or take their medication. It would be helpful to determine whether reminders such as text messages would work to increase adherence in treatment for this population for future programs. Lastly, findings from this study highlight the importance of outreach workers' work and a community-based approach to target PLHIV in resource-poor settings.

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