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Effect of an Empowerment Intervention on Antiretroviral Drug Adherence in Thai Youth

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Abstract

A pilot study was conducted to determine effects of an empowerment intervention on antiretroviral therapy (ART) adherence among Thai youth living with HIV/AIDS. It compared two groups of 23 young persons (15–24 years) who receive ART from AIDS clinics at 2 community hospitals. One hospital's patients served as the experimental group, and the other as a control group. The experimental groups attended five sessions that empowered them to take control of their own health. The control group received standard of care. The data were analyzed using descriptive statistics and Chi-square statistics. Before the empowerment, no one from the experimental group or the control group had ART adherence 95%. After the intervention, the 82.6% of the experimental group had 95% adherence compared to the control group, which had 21.7% adherence ($p < .0001$). The empowerment intervention resulted in a significant increase in ART adherence among Thai youth.

Keywords

youth living with HIV/AIDS; empowerment; antiretroviral drug adherence; HIV/AIDS

INTRODUCTION

Thailand has the highest prevalence of HIV infection (1.2%) of any country in Asia. This is a decline from over 2.0% that was found in the early 1990's.¹ The annual incidence of HIV infection has fallen from 140,000 in 1993 to 20,000 per year in 2006. It has remained at that level since then.² The decline is the result of a very aggressive prevention program conducted by the Thai government. A contributing factor to the decline in incidence is the

widespread use of antiretroviral therapy (ART) which has resulted in an estimated 76% of persons with a CD4 t lymphocyte count of < 350 cells receiving ART.³ The widespread availability of ART included children and, as a result, there are many perinatally infected adolescents and young persons who are making the transition from being a dependent child to becoming an adult who has to take responsibility for his or her own health.^{4,5} Also, there are young people who become behaviorally infected in their teen years and must start ART. For HIV infected youth, this involves managing their ART regimens. Studies have shown that adherence to ART is high in Thai children^{6,7} but it wanes in Thai adolescents and young people with only about two-thirds of them adhering at a high enough level to suppress their virus and to avoid developing drug resistance.^{8,9} The Thai findings are consistent with the levels of adherence in youth from many countries as has been reported in review articles.^{10,11}

Failure to suppress one's virus has both personal and public health implications. It has been shown since the earliest days of ART that individuals who suppress their virus have much lower rates of death and opportunistic diseases.¹² Patients on therapy have been shown to be less likely to transmit HIV with those who have suppressed their virus to undetectable levels being 95% less like to transmit HIV to their sexual partners.¹³ There are also economic implications when infected persons do not control their virus. Thailand is now spending 1,363 Baht (approximately 45 US\$) for the first line medications to treat a patient for a year. However, if a patient is non-adherent and drug resistance occurs and second line drugs must be used, the costs increase remarkably. Doctors without Borders reported that Thailand was importing generic Lopinavir/ritonavir, the cheapest second line drug protease inhibitor, at a cost of \$793 per person per year. Adding two new second line reverse transcriptase inhibitors would add approximately \$100 per person per year.¹⁴ So, identifying ways to improve adherence in youth as they transition to becoming responsible for their medication taking is crucial. However, the strategy for doing this is not clear. A review of interventions showed several approaches to intervening so as to improve adherence in individuals who were between 13 and 24 years of age.¹⁵ These included dose simplification,¹⁶ directly Observed Therapy,¹⁷⁻¹⁹ phone reminders,²⁰ and educational/counseling sessions.^{21,22}

Two studies examined the impact of motivational interviewing (MI) following the Healthy Choices model on HIV viral loads and substance use. One study found that those who had received MI had lower viral loads than the control group after six months but this was not sustained at nine months.²³ The other study examined whether alcohol and marijuana use could be affected by the MI in a Healthy choices study. It found that alcohol use was reduced at 15 months in MI group as compared to the control group. There was no difference in marijuana use between the two groups.²⁴ These intervention studies were done in the United States and may not be applicable in youth from other cultures.

While these studies give insight for ways to intervene with youth, there are limitations to their use in Thailand. The dosage of Art that is used in Thailand is one pill, twice per day. This is the simplest regimen that is available anywhere in the world. The use of directly observed therapy is not practical in the Thai context. Private phone coverage is not as widespread in rural Thailand as in the United States and makes phone contacts in a manner that assures confidentiality more difficult. The educational/counseling approach has more

potential for use in Thailand and in other middle income countries. The Rogers et al. paper describes an intervention that was designed for HIV infected adolescents who had not yet started taking ART.²¹ The successful outcome of this study suggests an educational approach in this age population can be effective but it is not clear if it applicable to those who have been on therapy for an extended period of time. Another intervention consisted of six educational sessions that were conducted over a 12 week period. The sessions included both caregivers and youth although there were parts of the sessions when the two groups were separated. The participants had self-reported increases in adherence and a few had increases in CD4 counts but none had as much as a one log decrease in viral load at the six month follow up. Unfortunately, the content of the educational sessions was so poorly described that it is not replicable.²² In addition, these intervention studies were done in the United States and may not be applicable for youth from other cultures.

There have been some studies investigating adherence in Thai youth. The Thailand Healthy Choices trial employed the multiple session approach. It examined whether condom use, sexual risk behavior, alcohol use, and antiretroviral adherence could be impacted by a four session intervention based on motivational interviewing. It showed some short run impacts on reported behaviors but the improvements were not sustained at the six month follow up. There were no improvements in adherence as measured by self report or viral load.²⁵

Rongkavilit et al. interviewed HIV positive young persons from Bangkok and suggested the interventions with Thai youth be based on “the need to adhere to medications for short- and long-term well-being of self, family, and society in a context of Buddhist values”.²⁶ This suggested that using a U.S. approach of multiple sessions embedded in the Thai culture might have an impact on adherence to ART. This approach was included in study described in this paper. The designers of the study also recognized that adherence is not just a matter of education on the importance of adherence or providing reminders to patients. Patients need to believe that they can be successful at adhering to their ART. Therefore it was considered necessary to have the intervention attempt to empower patients to believe that they would be successful in adhering to their antiretroviral medication regimens.

While the concept of patient empowerment has been widely used in other areas of patient care, it has been rarely employed in studies of adherence to ART. One study showed that patients who felt empowered did not have better treatment outcomes as measured by viral loads and CD4 counts.²⁷ However, another study came to the conclusion that young people need support for managing treatments, social impacts of their disease and adherence.²⁸ Both of these studies were conducted in North America. No studies were found that had used the concept of empowerment as the basis for an adherence intervention. Therefore a study was conducted to compare ART adherence of HIV infected youth who participated in an empowerment intervention and to compare that group to ART adherence of a group that did not have that experience.

METHODS

This pilot study was designed to determine the effects of an empowerment intervention on antiretroviral drug adherence among both perinatally and behaviorally infected youth living

with HIV/AIDS in Roi Et Province in Northeastern Thailand between April – July 2011. HIV infected youth between the ages of 15 and 24 years of age who had less than 95% adherence were randomly selected from the HIV clinics at two different hospitals. These youth were known to be less than 95% adherent by pharmacy records. In the event that a patient did not want to participate another patient was selected as a replacement. The group from one hospital (n = 23) received an intervention that was based on empowerment principles while the group from the other hospital (n = 23) served as the control group and received the standard of care. All participants in both groups were receiving the standard prescription of three drugs in one pill which was to be taken twice a day.

Because an empowerment program for HIV medication adherence had never been conducted for Thai youth, it was not clear how many sessions there should be and at what intervals they should be conducted. The literature was helpful in developing a theoretical basis for the intervention. Aujoulat et al. reviewed 55 health related empowerment studies and summarized their findings by saying that: “(i) the educational objectives of an empowerment-based approach are not disease-specific, but concern the reinforcement or development of general psychosocial skills instead; (ii) empowering methods of education are necessarily patient-centered and based on experiential learning; and (iii) the provider–patient relationship needs to be continuous and self-involving on both sides”.²⁷ Our project incorporated these concepts into the conduct of the study.

However, the literature was not helpful in determining the actual content or duration of empowerment interventions. For as Aujoulat et al. concluded from their review “As only a few authors in our selection of research articles provide for a full description of their empowerment-based educational interventions, the methods and strategies used are poorly described”.²⁹ Because this was a pilot program and because there was no guidance from the literature, the conduct of the sessions was based on the nurse researchers’ previous clinical and research experience of working with young HIV infected Thais. It was decided that the program for the experimental group’s program should consist of eight sessions of 2 to 3.5 hours per session that would occur over an 18 week period. Our study was based on the empowerment construct that was advanced by Gibson.³⁰ This construct has been widely used in assisting patients and their caregivers in dealing with chronic disease as evidenced by the fact Google scholar says that her work has been referenced 196 times. She saw the empowerment process as consisting of four parts. These were 1) discovering reality, 2) critical reflection, 3) taking charge, and 4) holding on. Therefore, a session was devoted to each of those concepts. To ensure that the researcher who conducted the empowerment sessions truly understood the empowerment process, she attended a 30- hour training course on empowerment. In this training, she learned both theory and practice with an expert who has taught empowerment training sessions and has conducted several research projects using empowerment concept. The expert had ongoing supervision of the researcher who conducted the programs throughout the course of the study.

Two groups of participants (11–12 participants per group) received empowerment training using the same process on the same day (one group in the morning and another group in the afternoon) by the same trained nurse researcher. The first session was used to provide a verbal description of the study and to obtain informed consent from the participants. It was

conducted at both the experimental and the control clinics. The second session was also conducted at both clinics and was used to collect demographic data. A pill count was conducted by a pharmacist at this visit. This provided the baseline data upon which future adherence data could be determined. Sessions one and two are described in Appendix A. Sessions three through seven were the empowerment sessions and are described in detail in Table 1. Sessions one through five were held over five consecutive weeks. The sixth session was the last empowerment training session and was held four weeks after the fifth session. Because the theoretical basis for this session was “holding on,” it was considered necessary to have period of time elapse before conducting this session. The seventh session was held to obtain feedback from the participants and to remind the participants about the commitments that had with regard to adherence. It was held one week after the “holding on” session.

The eighth session was conducted eight weeks later and was used to conduct the final pill counts that were used to assess adherence to the drug regimens. It is described in appendix A. Participants from both groups attended this session at their respective clinics. The pharmacist knew how many pills that they had in their possession at the beginning of the study and how many pills had been picked up at the pharmacy during the study. Knowing how many pills were in the patients’ possession at the beginning of the study, having a record of pharmacy refills, and knowing the number of pills in the patients’ possession at the end of the study allowed the pharmacist to calculate the number of doses consumed during the study period. This was divided by the number of days in the study period to determine the adherence rate. Pill counts are a commonly used method of assessing HIV medication adherence which has been linked to biologic outcomes.³¹

Study subjects from both groups completed two data collection forms. The first was a personal data questionnaire: age, gender, marital status, level of education, type of family, number of family members, type of accommodation, cohabitants, family income, person/organization who provides the patient financial support, distance from home to hospital, whether the person was perinatally or behaviorally infected, duration since the discovery of HIV, duration of the antiretroviral drugs treatment and reasons for not taking antiretroviral drugs as prescribed. The second form collected data on antiretroviral drug adherence using a pill count conducted by pharmacists. This is the method recommended by the Bureau of AIDS, Tuberculosis and Sexually Transmitted Infections in Thailand.³⁰ Patients in both groups were reminded to bring in their pill bottles at their pharmacy visits. The pharmacists were not informed of the nature of the study and were merely asked to conduct pill counts. Both the experimental and control groups had the pill counts done at the beginning and the end of the eight week study period. The groups were compared by determining the percent of each group who attained 95% or greater adherence of prescribed medication. This level of adherence has been shown to result in suppressed virus and in reduced morbidity and mortality.^{33–36}

This research was conducted after having been approved by the Committee of Research Ethics, Faculty of Nursing, Chiang Mai University. The researcher informed the subjects about their rights to not participate and to withdraw at any time. All adult subjects were required to sign an agreement of participation in the research. If the subjects were under 18,

they were required to obtain signed parental permission. No incentives were provided for the participants other than token refreshments at the end of the sessions.

Data were analyzed using descriptive statistics, and by using the Chi-square test or Fisher's Exact test to examine differences between the experimental and the control groups for the categorical information collected on personal data questionnaire and on achieving 95% or greater of prescribed medication. Chi-square test was used when the cell sizes were expected to be large. If expected cell sizes were <5 , the Fisher's Exact test was used. Comparison of achieving 95% or greater of prescribed medication between the pre- and the post-intervention in the experimental group was undertaken with McNemar's test. The percentages of ART adherence of the experimental and control groups were investigated for the normality of the distribution using Shapiro-Wilks test. We found that all data sets deviated from the normal distribution, the medians and interquartile ranges (IQRs) and the Wilcoxon signed ranks test or Mann-Whitney U test were used to compare the differences among two samples within group and between groups, respectively. The level of significance was set at $p < 0.05$.

RESULTS

All 23 members of the experimental group attended all eight sessions of the intervention. All members of the control group attended all three of their sessions. There were no statistically significant differences between experimental and control groups in the information that was collected from the personal data questionnaire when comparing by age, gender, marital status, level of education, type of family, number of family members, type of accommodation, cohabitants, family income, source of financial support, distance from home to hospital, mode of transmission, time since the discovery of HIV, whether they were perinatally infected, duration of the antiretroviral treatment and reasons for not taking antiretroviral drugs as prescribed (Table 2). Both the experimental and control groups had relatively high levels of adherence (~88%) before the intervention. However this was sufficiently below the 95% level that these individuals were at risk for virologic failure and the development of drug resistance (Table 3).

Before the empowerment intervention, no one in the experimental group or the control group had ART adherence that was 95% or greater of prescribed doses. After the intervention, 19 (82.6%) of the participants in the empowerment group had ART adherence greater than 95%. Only 5 persons (21.7%) from the control group had greater than 95% adherence. After the intervention the proportion of subjects who had ART adherence 95% in the experimental group was significantly higher than in the control group ($\chi^2 = 14.723$; $df=1$; $p < .001$), and higher than the pre- intervention (McNemar $\chi^2 = 18.070$; $df=1$; $p < .001$). These results were confirmed when the data were analyzed by the Wilcoxon signed ranks test and Mann-Whitney U test (Tables 3 and 4).

DISCUSSION

This pilot study showed the potential of empowerment interventions to improve adherence to ART. It is particularly important that this was accomplished in a group of young persons,

an age group that is notorious for poor adherence. The designers of the study recognized that adherence is not just a matter of education on the importance of adherence or providing reminders to patients. Patients need to be equipped with the psychological wherewithal to believe that they can be successful at adhering to their ART. The intervention was based on the experimental group's learning to acknowledge their own power and ability to control their medication taking and to develop the confidence that they are able to take care of their own health. This is consistent with previous work that has been done with both chronically ill children and with HIV patients.^{23–24}

The strength of this pilot study is that the results indicate the potential for using empowerment training for improving adherence to antiretroviral agents and to other medication regimens – e.g. anti-diabetic and anti-hypertensive drugs. It is important to note that the adherence measure was not determined by the empowerment researchers but by pharmacists who were blinded to the purpose of the study. It is also important to note that, in spite of this being eight session program that was spread over 18 weeks, there was no participants lost to follow up. Lastly, the power of this pilot study was quite high.³⁷ The effect size or the standardized mean difference between the two groups after the intervention in this study was 1.4 $([97.40-89.80]/5.28 = 1.4)$. It means that the percentage of ART adherence of the average participant in the experimental group is 1.4 standard deviations above the average participant in the control group, and hence exceeds the percentage of ART adherence of 92% of the control group. It reflects that the probability that a participant from the experimental group will be higher than a participant from the control group was 0.84 because both groups were randomly chosen.

The obvious limitations of the study are the small sample size and the application of the method in one age group in one province of Thailand. Another potential explanation of the outcome is that some of its apparent impact may have been due to a “Hawthorne effect”. Perhaps the improvements in adherence occurred because the participants felt like they were special because they were in a study and changed their adherence behavior as a result. Another potential explainer of the changes in adherence is that the youth became aware that someone was monitoring their adherence. There is some support for either of these possible explanations in that 21.7% of the control group became adherent at the 95% level. In addition, the study had a relatively short time frame so that HIV viral loads were not done. While one session sought verbal feedback from the participants, the study did not have a formal process to collect quantitative data on the participants' satisfaction with the sessions. However, the fact that 100% of the experimental group participants attended all eight sessions is certainly an important qualitative measure of satisfaction with the program.

Clearly the study needs to be replicated with larger sample sizes and in different contexts and cultures. The follow up period was short. So, there is the need to examine the sustainability of this kind of an intervention. It also needs to be acknowledged that this was a labor intensive intervention and could be considered very expensive to implement in multiple locations. However, there is a very large difference in cost between maintaining a patient on a first line ART regimen and having to use second line combination in Thailand. Therefore, labor intensive interventions that prevent the need to switch to more expensive drug regimens may be very attractive. So, future studies should include cost/benefit analyses

that examine whether this intervention would save sufficient drug costs to justify the labor intensive nature of an empowerment intervention.

Finally it must be recognized that, while these patients were randomly selected, they had to volunteer to be a participant in for the study and they had to be willing to attend eight sessions. While this may have introduced a bias into the results, it is reflective of a real world setting. In order to implement an empowerment program, it will require individuals to volunteer to attend multiple training sessions. And, it needs to be recognized that, in the real world, no adherence intervention will work on all HIV infected persons. Therefore finding one that could work in some individuals, particularly in youth, is a potentially important contribution to the problem of improving ART adherence.

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Appendix A. Descriptions of Sessions One, Two and Eight

Session 1 (1st week of data collection period)

Meetings were conducted at both hospitals to select the samples of youths with poor adherence. The researchers informed the attendees about the research process of this study. Potential subjects were informed that participation in this study was voluntary. Individuals who were willing to participate and who were over 17 years of age signed a consent form. Those below 18 years had to sign a consent form and provide a signed consent form from their parents or guardians.

Session 2 (2nd week of data collection period)

The study subjects from both groups completed two data collection forms. The first was a personal data questionnaire: age, gender, marital status, level of education, type of family, number of family members, type of accommodation, cohabitants, family income, person/organization who provides the patient financial support, distance from home to hospital, mode of transmission, duration since the discovery of HIV, duration of the antiretroviral drugs treatment and reasons for not taking antiretroviral drugs as prescribed. The second form collected data on antiretroviral drug adherence using a pill count conducted by pharmacists who were blinded to the nature of the study.

Session 8 (18th week of data collection period)

This session aimed to the final evaluation (counting pill by blinded pharmacists). This was 8 weeks after the seventh session.

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TABLE 1

The five session of empowerment process

Session and Topic	Activities
First empowerment session: (Week 3) Discovering reality. This session was for developing trust, building relationships, developing respect for others and providing knowledge. Total time used: 3 hours and 30 minutes.	<ol style="list-style-type: none"> 1 The researchers and youth introduced themselves. The researchers summarized the research project and responded to any questions. 2 Trust and relationship building was conducted using a game. 3 Youth living with HIV/AIDS selected their buddy who will serve a partner and facilitator for exercises throughout the project. 4 Each youth told their buddy about when he or she first knew of his or her HIV infection, the problems of being HIV infected and the reality of taking ART. 5 The youth wrote an essay on their life with HIV infection. These were placed in their personal memory folders. The youth were asked to bring the folder to each session. The researchers received permission to copy all folders and to review them. They were placed in a locked cabinet between sessions. 6 The researchers provided information about ART and emphasized the importance of ART adherence to youth living with HIV/AIDS. 7 The attendees described their practices of taking ART and what caused them to adhere and not to adhere.
Between sessions	The researchers reviewed the youth's writings from the first session and looked for common themes. The researchers reviewed the memory folders. If information was missing, the participants were asked to furnish it before the next session.
Second empowerment session (Week 4): Critical reflection. The youth evaluated themselves critically for ART non-adherence. Respect for other's attitudes and behaviors was used. Total time used: 2 hours and 30 minutes.	<ol style="list-style-type: none"> 1 Youth summarized the activities and the results from the activities for the first session. 2 Youth living with HIV/AIDS were invited to tell their knowledge about HIV infection, the problems of being HIV infected and the difficulties associated with taking ART. These were listed on a flip chart. Mind mapping was used in this step. The topics on mind mapping were drafted by the researchers in accordance with the common themes from the first session. 3 A volunteer from the group told his story about his ART taking practices to the group. The group discussed his practices. In addition, the also compared these practices to their own practices and recorded their thoughts in their personal memory folders. 4 The participants suggested the methods/strategies for achieving ART adherence.
Between sessions	The researchers reviewed the memory folders. If information was missing, the participants were asked to furnish it before the next session.
Third empowerment session: (Week 5): Taking charge. After youth living with HIV/AIDS were aware of their strengths and were confident in their knowledge on ART adherence, they could take charge of the situation according to their perspectives and judgments to those of others. Total time used: 2 hours and 30 minutes.	<ol style="list-style-type: none"> 1 Youth summarized the activities and the results from the activities for the second session. They were then divided into two groups. 2 Participants in each group wrote down the advantages of ART adherence and the impacts of ART non-adherence. These were placed on a flip chart for all to see. 3 A representative from each group presented their results. Examples of the successful methods were presented and included such examples as getting a reminder by a close friend, using a poster reminder, and writing down one's medication taking a book. 4 Each participant selected appropriate methods/strategies for achieving his or her ART adherence. 5 Personal short term goals (for 4 weeks) and lifelong goals of ART adherence were set. 6 The participants were told could that they could access information, guidance and counseling as needed during next four weeks from the researchers at any time 24 hour a day. In addition, the researchers would follow-up them once a week using telephone call.
Between Sessions	The researchers reviewed the memory folders. If information was missing, the participants were asked to furnish it before the next session.
Fourth empowerment session: (Week 8) Holding on. As a result of the youths' awareness of their strengths, competencies and capabilities, they were able to	<ol style="list-style-type: none"> 1 The researchers summarized the 4 weeks practices of all participants. 2 Gave a token award to the person with best adherence suggestions for ART adherence practices in the third phase.

Session and Topic	Activities
maintain their own sense of power even during changing circumstances. Total time used: 2 hours	<ol style="list-style-type: none"> 3 All youth living with HIV/AIDS were encouraged to share their experience about the success and failure on ART adherence. 4 The researchers reflected the success and failure on ART adherence, the pros of ART adherence and the cons and ART non-adherence. Giving guidance for anyone who did not adhere with ART. However, he/she selected the strategies by himself/herself. 5 The researchers conducted the commitment activities which included playing soft music throughout these activities: A) Participants wrote down their personal commitment to adherence. This included both the correct practices that they would follow and the incorrect practices they would eliminate. B) The lights were turned off leaving only candlelight. C) Everyone closed his or her eyes while each participant told their commitments to the group.
Between sessions	The researchers reviewed the memory folders. If information was missing, the participants were asked to furnish it before the next session.
Fifth session: (Week 9) This session aimed to wrap up, evaluate, and end up the empowerment process. It was conducted 1 week after the fourth session. Total time used: 2 hours.	<ol style="list-style-type: none"> 1 The researchers and youth living with HIV/AIDS collaborated to summarize and evaluate the effects of empowerment on ART adherence. 2 Youth living with HIV/AIDS explained about the impression and the benefit of this project. 3 All youth living with HIV/AIDS restated their commitments to adhere. 4 The researchers thanked the participants for participating in the project. 5 The researcher made an appointment for the final evaluation (Pill count by the pharmacists) in 8 weeks.

TABLE 2

Comparison of the experimental and control groups with regard to data collected from the personal data questionnaire.

Personal data	Experimental group (n=23)		Control group (n=23)		χ^2	p-value
	Number	Percent	Number	Percent		
Age (years)						
15–17	13	56.5	11	47.8	.087	.768
18–24	10	43.5	12	52.2		
$\bar{X}$ (SD)	18.22 (3.37)		19.35 (3.76)			
Range	15–24		15–24			
Gender						
Male	10	43.5	10	43.5	.000	1.000
Female	13	56.5	13	56.5		
Marital status						
Single	20	87.0	20	87.0	2.564	.353*
Married	1	4.3	3	13.0		
Divorced/Separated	2	8.7	0	0		
Level of education						
Primary school	7	30.4	3	13.1	3.200	.246*
Secondary school	13	56.5	13	56.5		
High school/vocational education	3	13.1	7	30.4		
Type of family						
Single family	4	17.4	9	39.1	1.716	.189*
Extended family	19	82.6	14	60.9		
Number of family members (persons)						
1–5	15	65.2	17	73.9	.103	.749
6–10	8	34.8	6	26.1		
Type of accommodation						
Own house	23	100.0	22	95.7	.000	1.000*
Dormitory	0	0	1	4.3		
Cohabitants						

Personal data	Experimental group (n=23)		Control group (n=23)		χ^2	p-value
	Number	Percent	Number	Percent		
Parents and relatives	22	95.7	19	82.6	1.299	.220*
Lover/Partner	1	4.3	3	13.1		
Friends	0	0	1	4.3		
Family income (Baht/month)						
< 1,000	4	17.4	2	8.7	1.881	.724*
1,000–3,000	2	8.7	4	17.4		
3,001–5,000	8	34.8	10	43.5		
> 5,000	9	39.1	7	30.4		
Person/Organization who gives financial support						
Parents and relatives	20	87.0	17	73.9	3.069	.243*
Lover/Partner	2	8.7	6	26.1		
Government organization/foundation	1	4.3	0	0		
Distance from home to hospital (kilometer)						
< 10	10	43.5	9	39.1	.000	1.000
10	13	56.5	14	60.9		
Mode of transmission						
Mother to child	16	69.6	14	60.9	.383	.536
Sexual transmission	7	30.4	9	39.1		
Duration since the discovery of HIV infection (years)						
< 3	1	4.3	5	21.7	3.296	.210*
3–6	10	43.5	10	43.5		
> 6	12	52.2	8	34.8		
Duration of the antiretroviral drugs treatment (months)						
< 6	1	4.3	1	4.3	.678	1.000*
6–12	1	4.3	2	8.7		
> 12	21	91.4	20	87.0		
Reasons for not taking antiretroviral drugs as suggested						
Forgot	21	91.4	18	78.4	4.377	.498*
Did not want to be noticeable and suspicious	1	4.3	2	8.7		

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Personal data	Experimental group (n=23)		Control group (n=23)		χ^2	p-value
	Number	Percent	Number	Percent		
Ran out of drugs and did not go to see the doctor	0	0	1	4.3		
Changed life style	0	0	1	4.3		
Too many times to take drugs	1	4.3	0	0		
Did not get the instructions	0	0	1	4.3		

* Fisher's Exact test

TABLE 3
Comparison the percentages of antiretroviral therapy (ART) adherence before and after empowerment intervention

Study group/period	Percentage of ART adherence					Wilcoxon signed ranks test	
	Min–Max	Mean	SD	Median	IQR*	Z	p-value
Experimental group (n=23)							
Before intervention	78.30–93.30	87.99	4.14	90.00	3.00	4.206	< .001
After intervention	91.70–100.00	97.40	2.72	98.30	3.00		
Control group (n=23)							
Before intervention	78.30–93.30	88.03	4.56	90.00	8.40	1.778	0.075
After intervention	77.00–97.00	89.80	5.28	90.00	8.30		

* IQR = interquartile range

Comparison the percentages of antiretroviral therapy (ART) adherence between experimental and control groups

TABLE 4

Study group/period	Percentage of ART adherence					Mann-Whitney U test	
	Min–Max	Mean	SD	Median	IQR*	Z	p-value
Before intervention							
Experimental group (n=23)	78.30–93.30	87.99	4.14	90.00	3.00	.526	0.599
Control group (n=23)	78.30–93.30	88.03	4.56	90.00	8.40		
After intervention							
Experimental group (n=23)	91.70–100.00	97.40	2.72	98.30	3.00	4.908	<.001
Control group (n=23)	77.00–97.00	89.80	5.28	90.00	8.30		

* IQR = interquartile range