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Research Article

Improving Adherence to Antiretroviral Therapy in People Living with HIV/AIDS by the Community-Based Interactive Approach in Temanggung District, Indonesia

Sisilia Esti Purwaningsih, Titien Siwi Hartayu*

Faculty of Pharmacy, Sanata Dharma University, Yogyakarta, 55282, Indonesia

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***Corresponding author:**
Titien Siwi Hartayu

email:
titien_hartayu@yahoo.com

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ABSTRACT

Adherence to antiretroviral (ARV) therapy is critical for people living with HIV/AIDS (PLWHA) since it extends life expectancy despite not curing the infection. A study in Temanggung District aimed to enhance knowledge, attitudes, and practices of PLWHA using the Community-Based Interactive Approach (CBIA-ARV). This quasi-experimental study employed a time-series pretest-posttest design with control and intervention groups, selecting participants through purposive sampling based on specific inclusion and exclusion criteria. The inclusion criteria used were Smile Plus members (≥ 18 years), PLWHA ≥1 year, receiving ARV drug therapy, not pregnant, and not experiencing communication barriers. Exclusion criteria were participants who could not be present during CBIA-ARV activities and participants who were not present during posttest 2 and or posttest 3. Interventions were provided using the CBIA-ARV method. The intervention significantly improved knowledge, attitudes, and practices in the intervention group across all time points: pre-post 1, 2, and 3 (knowledge: p=0.001, attitudes: p=0.001, practices: p=0.001). In contrast, the control group showed minimal changes in knowledge and attitudes initially, with significant improvements appearing only in attitudes and practices later (p=0.001). Comparing both groups, significant differences emerged post-intervention in knowledge, attitudes, and practices at various stages (p<0.05). The study concluded that the CBIA-ARV approach effectively enhances PLWHA's knowledge and attitudes, proving to be a valuable method for improving treatment adherence in this population.

INTRODUCTION

Temanggung is located in the middle of Central Java Province with a stretch of north to south 34.375 km and east to west 43.437 km. Temanggung Regency is astronomically located between 110°23'-110°46'30" east longitude and 7°14'-7°32'35" south latitude with an area of 870.65 km^2 (87,065 Ha). Temanggung residents mostly make their living as tobacco farmers. Tobacco season only lasts for 2 months. The following ten months many Temanggung people are unemployed. At the time of the tobacco harvest, it has become a habit for Temanggung people to look for night entertainment, because tobacco farmers and tobacco traders will look for tobacco at night. Temanggung residents seek nightlife in the prostitution area of Bandungan Semarang because Bandungan is only a short distance from Temanggung. This past time is likely to make the Temanggung area prone to many incidents of HIV AIDS.

Based on the data from the HIV AIDS program report of Temanggung District in 2022, the number of HIV AIDS patients reached 729 people spread across 22 sub-districts. The highest rank is in two sub-districts, Parakan and Temanggung. The number of patients who have received Anti Retrovirus (ARV) treatment is 495 people (68%) and as many as 267 People Living With HIV AIDS (PLWHA) are still taking ARVs (56%). The ARV data in January 2023 according to the Disease Prevention and Control Service

Program (P2P) HIV AIDS Temanggung District, there are 280 people and PLWHA lost to follow up there are 61 people (21.4%) while most patients have been suffering from HIV for more than 1 year with a long duration of treatment.

HIV AIDS medicine must be appropriate based on therapeutic management guidelines according to individual preferences, prognosis, and comorbidities. The goal of ARV therapy is to reduce *viral load* to prevent the emergence of opportunistic infections that can cause death. Long-term treatment will have the potential for patients to be disobedient in using drugs which will ultimately have an impact on the failure of therapy (Kementrian Kesehatan RI, 2022).

According to the Preliminary study data that the researchers conducted, adherence behavior is strongly influenced by various concerns, first because the family has not been able to provide support or because PLWHA themselves have not openly shared their condition status to family or partners. Second, interventions carried out by health workers in the form of counseling, home care, providing information, or with certain tools can increase adherence to taking ARV drugs. Third, there is no involvement from peers or communities that can be directly met with friends to provide reinforcement (Kementrian Kesehatan RI, 2022)

The involvement of peers or communities in Temanggung District was initiated by PLHIV friends themselves. A peer support community was formed in 2008 named *Smile Plus*. This community was formed as a response to the concern of HIV-infected people with their peers and took part in HIV prevention advocacy in Temanggung District. *Smile Plus* is an organization of peer support groups of those infected and affected by HIV AIDS and other vulnerable targets, who are committed to improving the quality of life and struggling to dismiss the negative stigma attached to being able to be independent and prosperous. One of the assistance that has been carried out by the *Smile Plus* community is ARV monitoring. This is done so that PLWHA are always compliant in taking ARVs.

The Community-Based Interactive Approach (CBIA) is one of the health education methods conducted in the form of small groups of 6-8, by conducting intensive problem-based discussions (Suryawati, 2003). CBIA-ARV is an effective method to improve behavior as shown in the research of Hartayu, Ihzam, and Suryawati (2012).

The large number of patients with HIV AIDS and the characteristics of long-term treatment require special attention, especially related to improving adherence to using the drugs to improve the quality of life of these patients. Therefore, it is important to research improving adherence to ARVs among people with HIV AIDS in Temanggung District.

Adherence to the use of ARV drugs in PLWHA patients in Temanggung district is still low even though it is one of the factors determining the success of therapy. Many factors can influence drug adherence in PLWHA patients in Temanggung including knowledge, motivation, age, spousal and family support, and medical personnel intervention. Patient motivation in using ARVs is something that can be intervened. Interventions that can be done include providing education and knowledge to patients living with HIV. An intervention method that has been proven effective in increasing motivation quickly is the CBIA. The CBIA-ARV method is expected to increase adherence to the use of ARV drugs in PLWHA patients so that therapeutic success can be achieved optimally.

METHODS

This study used a quasi-experimental design with a time series pretest and post-test in one group with a control group design. The population was 200 Smile Plus members who used ARVs. The number of subjects was determined based on CBIA-ARV guidelines with the selection of subjects for the intervention group involving 40 people and the control group involving 40 people. The sampling technique used a non-random purposive sampling method with inclusion criteria: smile plus members aged ≥ 18 years, diagnosed with HIV for ≥ 1 year, PLWHA receiving ARV therapy, not pregnant, and not experiencing communication barriers. Exclusion criteria were PLWHA who were not present during CBIA-ARV activities and PLWHA who were not present during post-tests 2 and 3. There were two variables in this study, namely the independent variable and the dependent variable. The independent variable is CBIA-ARV education which contains all aspects related to ARV drugs. The dependent variable is the knowledge, attitudes, and practices of patients living with HIV in the use of ARV drugs.

This research instrument consists of CBIA-ARV guidelines, booklets, CBIA-ARV worksheets and questionnaires. The CBIA-ARV manual contains information on how to implement CBIA-ARV from the socialization of AOC (agent of change) to the implementation of CBIA-ARV. The booklet was prepared with a focus on information on how to use ARV drugs, the side

effects of drugs found, and what if PLWHA patients have experienced drug withdrawal. Before use, the booklet was tested for content validity using the expert judgment method and language comprehension test to five PLWHA who are members of Smile Plus. CBIA-ARV worksheet is a worksheet given to each CBIA-ARV group, and its function is to help participants better understand ARV material from the booklet that has been read. The ARV drug adherence questionnaire was prepared based on the material in the booklet. The questionnaire instrument for data collection in this study consisted of three types, knowledge questionnaire with Guttman type (true/false statements) attitude and practice questionnaire with Likert method. Before use, the questionnaire was tested first, namely the language comprehension test, validity test by three experts, and reliability assessment using Cronbach alpha with an alpha value of 0.625.

Data were collected three times, pretest and posttest 1 data were taken simultaneously with the implementation of CBIA-ARV, posttest 2 was taken after 4 weeks of CBIA-ARV, and posttest 3 was taken after 8 weeks. The three data were collected offline/face-to-face. The intervention group conducted CBIA-ARV for 3 hours. No lecture was conducted in the control group, but a CBIA-ARV booklet was given at the end of the CBIA-ARV activity. The control group was only given the pre-test and post-test online using the G form because PLWHA patients live far from the city and have a wide demographic distribution. The first meeting of each group began with a brief explanation of the purpose, objectives, and benefits of the study as well as the right of participants to withdraw at any time. Prospective participants were given the opportunity to ask questions if they were not clear enough and continued with the signing of informed consent forms.

In the intervention group, CBIA-ARV activities were carried out with facilitators by Agents of Change (AOC), namely the Temanggung branch of the Indonesian Pharmacists Association as many as 5 (five) people. Prior to the implementation of CBIA-ARV, the facilitators were given training. During CBIA-ARV, the facilitators were in charge of accompanying each group of participants. The role of the facilitator is very large in stimulating the dynamics of the discussion and fulfilling all information needs. CBIA-ARV activities were held at the Smile Plus Temanggung secretariat office. Participants who attended were divided into 5 groups of 8 people each. Furthermore, the facilitator began to distribute pretest questionnaires and the researcher began to explain how to fill out the questionnaire starting from informed consent, and self-identity to answering all aspects of knowledge, attitude, and practice questions. After ensuring that the participants understood and there were no more questions, the test was immediately conducted for 15 minutes. The pretest was conducted first to determine knowledge, attitudes, and practices before the CBIA-ARV intervention. After the pretest was completed and all questionnaires were collected so that all data completeness could be checked, then the facilitator asked participants to choose one person from the group members to become the group leader. The group leader is responsible for recording all questions that arise from the discussion and then conveying them during the large group discussion together with the resource person.

Data collection of the pretest and posttest 1 control group was included in a series of CBIA-ARV education activities. The first activity was to distribute pretest questionnaires that could be done within 15 minutes, then began to distribute the booklet "*Taat Obat ODHA Sehat*" to participants. Participants were given 10-15 minutes to read the booklet. The second activity was a small group discussion. The facilitator played a role in accompanying the discussion but was not allowed to answer questions given by participants. The facilitator only showed the location of information related to the questions contained in the booklet. The small group discussion lasted 45 minutes. The third activity was the large group activity. Each small group presented their findings and asked questions that had not been answered by the group leader. Each question will be answered by a resource person. The resource person in this activity is the Hospital Voluntary Counseling and Testing (VCT) officer. This question-and-answer session lasted for 40 minutes. After the discussion was completed, the researcher distributed the post-test questionnaire. Filling in the questionnaire was given 15 minutes. Posttest 2 data collection was conducted offline, with a data collection interval of 4 weeks after the implementation of CBIA-ARV. Participants were asked to come to the Smile Plus Secretariat office and fill in the questionnaire that had been provided. The time given to fill in the questionnaire was 15 minutes. The third data collection was conducted 8 weeks after the implementation of CBIA-ARV. In the second data collection, participants were asked to fill out the questionnaire and were given 15 minutes to complete the questionnaire.

Data processing was first done by assessing the results of the questionnaire. The first stage of processing questionnaires that have been filled in by participants is screening, coding, tabulation, and cleaning. Responses to each questionnaire item were scored differently according to the type of answer. Forced choice responses on knowledge questions as well as attitude and practice statements were coded differently. The descriptive analysis involved data collection and processing using the Microsoft Excel program. On the knowledge variable of the intervention group, pretest-postest1, pretest-postest2, and pretest-posttest 3 because the data was not normally distributed, it was analyzed using Wilcoxon. The results of pretest-postest1 on attitude variables were normally distributed data, so the analysis was carried out using the paired t method while pretest-postest2 and pretest-postest3 resulted in non-normally distributed data, so they used Wilcoxon. The results of the practice variable on pretest-postest1, pretest-postest2, and pretest-postest3 data were not normally distributed, so they used Wilcoxon. The results of the control group knowledge variables on pretest-posttest 1, pretest-postest2, and pretets-postest3 were not normally distributed, the analysis used Wilcoxon, the attitude variables on pretest-posttest 1, pretest-posttest 2 were normally distributed using paired t and pretest-postest3 were not normally distributed so they used Wilcoxon. The results of the pretest-posttest 1 practice variable were normally distributed using the paired t method, pretest-posttest 2, and pretest-posttest 3 using Wilcoxon because the data were not normally distributed. In the comparison test between the intervention and control groups, the knowledge variable pretest, posttest 1, 2 and 3 resulted in non-normally distributed data using Mann-Whitney, the attitude variable pretest, postest1 was normally distributed using unpaired t, while posttest 2 and 3 data were not normally distributed using Man Whitney. The pretest, posttest 1, posttest 2, and 3 practice variables were not normally distributed, so they used Mann-Whitney. This stage of analysis was conducted using an SPSS 23 program (IBM Corp., Chicago, USA), with a confidence variable of 95% (α = 5%). Ethical Clearance for the study was obtained from the Health Research Ethics Commission (KEPK) RST Magelang with number 581/EC/XII/2023.

RESULTS AND DISCUSSION

Based on the data of 80 participants, the participant's characteristics include age, level of education, and occupation. Based on age characteristics, the highest percentage is 31-50 years old which is a productive age that usually shows better knowledge abilities than participants aged 18-30 years. Based on the characteristics of education, it was found that high school graduates occupied the highest position with 65% in the intervention group and 45% in the control group. In terms of occupational characteristics, most of the participants were private employees with 37.5% in the intervention group and 32.5% in the control group summarized in Table 1.

Table 1. Participants' characteristics

Characteristics of Participants	Variable	Intervention Group N =40	Control Group N=40
1. Age (in Years)	18- 30	15 (37.5 %)	13 (32.5 %)
	31-50	25 (62.5 %)	25 (62.5 %)
	51-60	0	2 (5%)
2. Education	Elementary School	7 (17,5 %)	3 (7.5 %)
	Junior high school	7 (17.5 %)	14 (35 %)
	High school	26 (65 %)	18 (45 %)
	Undergraduate	0	5(12.5%)
3. Jobs	Students	2 (5 %)	0
	Private employees	15 (37.5 %)	13 (32.5%)
	Entrepreneur	10 (25 %)	10 (25 %)
	Government employees	0	3 (7.5 %)
	Housewives	13 (32.5 %)	12 (30 %)

The characteristics of the two groups look different on the education variable in the control group dominating more than 50% of participants with high school education while in the intervention group less than 50%, this is likely to cause differences in increasing the knowledge of these two groups. According to Notoatmodjo (2014), one of the factors that influence knowledge is education, high education will affect the participant's ability to capture the information provided so that the participant's knowledge will be higher.

This study aims to determine the variables of knowledge, attitudes and practices of the control group and intervention group before and after the provision of education with the CBIA-ARV method, and to see how the impact of providing education on the CBIA-ARV method on the adherence of PLWHA in Temanggung district.

Knowledge, attitude, and practice variables of the intervention group and control group

Knowledge Variables (good category) in the intervention group and control group.

After CBIA-ARV-ARV in the intervention group, there was an increase in the number of good categories, namely pretest 5 people increased in posttest 1 to 24 people and posttest 2 as many as 25 people and posttest 3 as many as 17 people. The good category increased due to the provision of education in the intervention group. Providing education in CBIA requires an active role from participants, with intense education it is expected that participants' knowledge will increase. According to Widayati (2019), providing intense education can change participants' knowledge. Providing education with CBIA-ARV requires an intensity of attention that involves the senses of the ears and eyes. Most knowledge is obtained through the senses of the ears and eyes (Notoatmodjo, 2014). According to Notoatmodjo (2014), knowledge is the result of someone's curiosity after the sensing process. Participants were given a booklet at the time of CBIA-ARV implementation, asked to study the *booklet,* and conduct discussions in groups, this is a sensing process so that knowledge increases. This increase in knowledge was also shown in a study conducted by Cahyani in 2015, where the CBIA-ARV method effectively increased the knowledge of students of SMK Depok Sleman about diabetes.

The increase in the number of good categories (posttest 1, 2, and 3) in the intervention group shows that the CBIA-ARV method can increase the knowledge of PLWHA patients which can also indirectly increase adherence to using ARVs. CBIA-ARV was able to increase the knowledge of participants as evidenced by the increase in the number of people in the good category in the intervention group. The CBIA-ARV method was also successful in influencing knowledge improvement previously, including in the research of Lestari *et al.* (2022).

The results of the study in the control group for the good category were a pretest 15 people, post-test 1: 16 people, post-test 2: 12 people, and post-test 3 as many as 10 people. There was an increase in the number of good categories by 1 person on posttest 1, this is probably because the researcher used the same question for pretest and posttest, so it raises the possibility that participants have memorized the question. This study also showed a decrease in the number of good categories in posts 2 and 3. According to Notoatmodjo (2007), increasing knowledge can occur of them by providing education. The control group was not given any education so the number of people in the good category decreased. Education provided can be individual or group education such as CBIA-ARV (Achmadi, 2013). Decreased attitudes and practices are the result of decreased knowledge (Wawan and Dewi, 2019). Knowledge variables in both groups are summarized in Table 2.

Attitude variables (good category) in the intervention group and control group.

The results of the study prove the number of people who fall into the good category in the intervention group, namely pretest 7 people, posts 1: 29 people, posttest 2: 29 people, and posttest 3: 21 people. An increase in the number of good categories occurred in Posttest 1 and Posttest 2, then there was a decrease in the good category in Posttest 3. Changes in attitude are getting better based on the results of posts 1 and 2 because participants have received education on the CBIA-ARV method so that it can improve participants' attitudes towards the use of ARV drugs. A decrease in the number of good categories occurred in week eight, this shows that the CBIA-ARV method must be carried out continuously so that the attitude of PLWHA patients can always be maintained, which in turn can increase drug adherence. Repetition of CBIA-ARV education after 8 weeks needs to be done to maintain the attitude of participants (Hartayu, 2012). The increase in the good category in the intervention group proves that there is an increase in the attitude of the intervention group.

An increase in attitude also occurred in research conducted by Cahyani, 2015 where CBIA also improved the attitude of vocational students in Sleman.

The results prove that the number of participants who fall into the good category in the control group based on pretest data is 19 people, posttest 1: 19, posttest 2: 6, and posttest 3: 0 people. The decrease in the number of good categories in posts 2 and 3 shows that the attitude variable in the control group is still low. The results of the number of good categories in posttest 1 in the control group showed the same results as the pretest because participants may have memorized the answers. After all, the researcher made the same statement questions in the pretest and posttest. At the end of the posttest 1 session, participants were given the booklet "*Taat Obat ODHA Sehat*" in pdf form, hoping that participants could read and understand the booklet independently, but seeing the results of the study participants did not seem to read the booklet so that there was still a decrease in the number of good categories in the control group in weeks four and eight. Overall, the decrease in the number of good categories of participants' attitude variables was the result of a decrease in participants' knowledge (Achmadi, 2013). However, it is not absolute that the decrease in attitude is only due to a decrease in knowledge because a decrease in attitude can also be influenced by environmental factors and experience (Anzwar, 2011). In the control group, no education was given at all, education is a stimulus that can shape participants' attitudes (Azwar, 2007). The attitude variables of the intervention and control groups are summarized in Table 2.

Practice variables (good category) in the intervention group and control group.

This study shows the practice variables of the intervention group which are included in the good category from pretest 5 people, posttest 1: 31, posttest 2: 28 people, and posttest 3: 31 people. A decrease in the number of good categories by 2 people in posttest 2 but again an increase in the number of good categories by 2 people in posttest 3 is summarized in Table 2. This increase occurred because the emergence of motivational factors is a driving factor for participants to take practice (Sarwono, 2008). There was a decrease in the number of good categories in week 4 by 2 people, possibly at the time of doing the posttest participants were experiencing flu so they were not in a fit condition. The physical condition and health of participants have an impact on a person's emotions which directly affect practice (Notoatmodjo, 2019).

From this study, it can be seen that the results of the good category practice variable in the pretest control group participants were 35 people, posttest 1: 18 people, posttest 2: 11 people, and posttest 3: 6 people. The number of good categories in the control group practice variable is greater than in the intervention group, possibly due to the factor of providing education before starting to use ARVs, PLWHA will meet with the Hospital's Voluntary Counselling and Testing (VCT) team to get in-depth information related to the disease, treatment and about adherence in using ARVs (Ministry of Health, 2022).

Table 2. The number of participants categorized as good in the knowledge, attitude, and practice variables before and after CBIA in the intervention group and control group

Variable	Intervention Group				Control Group			
	Before CBIA-ARV	After CBIA-ARV			Before CBIA-ARV	After CBIA-ARV		
	Pretest	Post 1	Post 2	Post3	Pretest	Post 1	Post 2	Post 3
	Good Category							
Knowledge	11	24	25	18	15	16	12	10
Attitude	7	29	29	21	19	19	6	0
Practices	5	31	28	31	8	35	11	6

In this study, participants experienced a decrease in the good category of practice variables seen in the results of posttests 1, 2, and 3. This happened because there was no knowledge of education so it had an impact on reducing participant practices (Aris, 2018). The realization of knowledge and attitudes is practice, a decrease in practice can occur due to a decrease in knowledge and attitudes of participants (Capalcanty, 2015). Decreased practice can occur due to decreased knowledge and attitudes (Notoatmodjo, 2014). The practice variables in the intervention and control groups are summarized in Table 2.

The results of this study showed that the variables of knowledge, attitudes, and practices that were categorized as good in the intervention group before the CBIA-ARV method education was conducted were still low. The variables of knowledge, attitudes, and practices that fall into the good category increased in number after the CBIA-ARV method education was carried out, indicated by an increase in the good category in Posttest 1, 2, and Posttest 3.

Comparing the statistics of pretest-posttest 1,2,3 variables of knowledge, attitude, and practice in the control group and intervention group.

Statistics of pretest-posttest 1,2,3 knowledge variables in the control group and intervention group.

The results of knowledge variables in the control group showed pretest-posttest 1 (Wilcoxon, p= 0.924), pretest-posttest 2 (Wilcoxon, p= 0.861), and pretest-posttest 3 (Wilcoxon, p= 0.561) proving that there was no significant change in knowledge between pretest and posttest. Significant changes in participants' knowledge variables occurred because the control group did not receive education on the CBIA-ARV method. Knowledge that is not based on strong understanding will be easily forgotten (Hartayu, 2012). The decrease in the number of good categories occurred because participants did not receive in-depth knowledge. After all, in-depth knowledge will raise awareness and motivation that can encourage participants to take practice (Sarwono, 2008). Although participants received a booklet after the implementation of CBIA-ARV, but still needed self-motivation to read (Sarwono, 2008).

Comparison of pretest and posttest results in the intervention group showed pretest-posttest 1 (Wilcoxon, p=0.001), pretest-posttest 2 (Wilcoxon, P=0.001), and pretest-posttest 3 (Wilcoxon, p=0.001) where the education method was done using CBIA-ARV there is a significant change in knowledge with a p value <0.05. This finding shows that the variable knowledge of the intervention group after a period of 4 and 8 weeks of CBIA-ARV implementation has changed significantly. The CBIA-ARV method results in more stable and long-lasting knowledge variables so that it can be the basis for changes in participants' attitudes and practices (Green, 2000). The increase in knowledge also occurred because participants received the booklet *Taat Obat ODHA Sehat*, in the booklet, participants get a lot of information related to how to use ARV drugs correctly and appropriately so that adherence to using ARVs can increase. The CBIA-ARV method prioritizes the independence and active role of participants in following the entire CBIA-ARV series (Hombing, 2015). The discussion emphasizes independence and participants can share their experiences while taking ARVs, the experience is indirectly able to increase participants' knowledge (Anzwar, 2011).

The results of this study further prove that the chosen CBIA-ARV method is effective in increasing the number of good categories of participants' knowledge variables summarized in Table 3. The knowledge variable lasted for a long time, as evidenced after 8 weeks still showed significant changes.

Statistics of pretest-posttest 1,2,3 attitude variables in the control group and intervention group.

The results of the attitude variables of the control group were pretest-posttest 1 (t-test, p=0.323), pretest-posttest 2 (t-test, p=0.001), and pretest-posttest 3 (Wilcoxon, p=0.001). Data from pretest-posttest 1 of the attitude variable resulted in a p-value >0.05, indicating that there was no significant change in attitude. Significant changes in attitude were proven to occur in the comparison of pretest-posttest 2 and pretest-postest 3. Attitude change did not occur (pretest-postest1) because participants did not get any information or education at all. Significant changes in attitude variables actually occurred (pretest-posttest 2 and 3) because there were factors that could improve participants' attitudes, such as information from the booklets distributed (Rinto, Sunarto, and Fidianingsih, 2008). This significant change can occur because participants have gained good knowledge through the booklet "Taat Obat ODHA Sehat" that was distributed. In the control group, there was

no intervention or education so the longer the attitude variables of the participants would decrease. Significant changes in participants' attitude variables also occurred after a period of 8 weeks from the pretest (*P*=001). This significant change occurred because participants did not have good knowledge so that the longer the attitude of the participants also decreased. Behavior-based on good knowledge and attitudes will last a long time, but if it is not based on good knowledge, it will not last long (Notoatmodjo,2014).

The statistical results of the attitude variables of the intervention group pretest-posttest 1 (T-test, *p*=0.001), pretest-posttest 2 (Wilcoxon, *p*=0.001) and pretest-posttest 3 (Wilcoxon, *p*=0.001). Significant changes in attitude variables occurred because participants attended the meeting with enthusiasm, and participants were very literate with the information provided by the resource person during the question-and-answer process. Participants also gained knowledge through the booklet, *Taat Obat ODHA Sehat*. Increasing attitudes and attitude formation can be influenced by three factors, namely social, individual personality characteristics and information factors received (Achmadi, 2013). This significant change can occur because participants receive good information through *booklets* and information from resource persons. An increase in attitude is also influenced by an increase in participant knowledge (Achmadi, 2013).

The results of the pretest-posttest statistics of the two intervention groups showed that there were significant changes after 4 weeks of CBIA-ARV implementation. According to Rinto, Sunarto, and Fidianingsih (2008), attitude change can occur because the information received is reliable. Information that can be trusted by participants is information provided through booklets and information from resource persons that participants think they trust. The resource person brought in was the VCT officer who had been serving the participants when taking ARVs at the hospital. According to Anzwar, 2011, attitudes can be influenced by multimedia, booklets are information media from competent sources. Significant changes in attitude variables after 8 weeks of CBIA-ARV implementation occurred because environmental factors according to Notoatmodjo (2014) can reduce knowledge, where knowledge will affect a person's attitude. After all, from the environment a person can learn something bad or good. Therefore, it is necessary to repeat CBIA-ARV education to maintain the attitude of participants (Hartayu, 2012). The statistical results of the attitude variables of the two groups are summarized in Table 3.

Statistics of practice variables in the control group and intervention group

Statistics of practice variables in control group pretest-posttest 1 (T-test, *p*=0.001), pretest-posttest 2 (Wilcoxon, *p*=0.001), and pretest-posttest 3 (Wilcoxon, *p*=0.001). This is likely due to the presence of uncontrolled confounding independent variables from the Hospital VCT team. At the beginning of ARV use, participants were educated first by the Hospital VTC officer. This education is necessary to ensure that participants will always comply with how to use ARVs that have been prescribed by the doctor (Ministry of Health, 2022). This assurance needs to be done because ARVs are the only drugs circulating in Indonesia to prevent resistance. The pretest-posttest 2 comparison showed that after a period of 4 weeks, there was no significant change. Although there was an uncontrollable confounding independent variable, it did not last long, so it did not have an impact on participants. A decrease in the practice variable is evident with a significant change in the practice variable after a period of 8 weeks. Changing people's behavior requires a long and lengthy process (Capalcanty, 2015). Participants do not have good knowledge so their attitudes and practices are also not good (Notoatmodjo, 2014).

The results of the comparison of the pretest-posttest 1 practice variable of the intervention group (Wilcoxon, *p*=0.001), pretest-posttest 2 (Wilcoxon, *p*=0.001), and pretest-posttest 3 (Wilcoxon, *p*=0.001). Significant changes can be influenced by participants' knowledge and attitudes that increase as well (Notoatmodjo, 2014). In his book, Notoatmodjo (2014) says that if the subject gets good enough knowledge this will cause the subject's attitude to be good enough too, so that the subject's practices which are the embodiment of attitudes will change as well. The comparison of pretest and posttest 2 which showed significant changes proved that the intervention group participants had the same practice variables after a period of 4 weeks of CBIA-ARV implementation. Improvements in participants' practice variables occurred due to motivation that arose because of the desire that encouraged participants to practice (Sarwono, 2008). Significant changes in practice variables in the intervention group were evident in the statistical comparison between pretest and posttest 3, where the P-value

obtained in the posttest comparison was <0.05. This value indicates a significant change which can be summarized in table 3. This is evident in the study (Hombing, 2015) where the CBIA-ARV method was able to significantly improve the practice variables of the intervention group. The complete statistical results are summarized in Table 3 below. The results of the study in the intervention group proved that the CBIA-ARV method had an impact on the knowledge and attitude variables of the intervention group. The results also proved that changes in knowledge, attitudes, and practices of the intervention group remained stable after a period of 4 weeks to 8 weeks after the CBIA-ARV method education.

Comparing the intervention group (IG) with the control group (CG): Pretest IG-pretest CG, Posttest1 IG-posttest1 CG, Posttest 2 IG-posttest2 CG, Posttest3 IG-posttest 3 CG.

Statistics of knowledge variables of the intervention group with the control group

In the comparison of pretest IG and pretest CG (Mann-Whitney, *p*= 0.232), posttest 1 IG-CG (Mann-Whitney, *p*=0.001), posttest 2 IG-CG (Mann-Whitney, *p*=0.001), and posttest 3 IG-CG (Mann-Whitney, *p*=0.001). Pretest comparison data showed no significant changes in knowledge variables while posttest 1, 2, and 3 showed significant changes. Significant changes in the comparison of posttest 1, 2, and 3 were due to differences in education (Wawan and Dewi, 2019). The knowledge variable in both groups before providing education with the CBIA-ARV method was still low. Significant changes in posttest 1, 2, and 3 data occurred because in the intervention group participants were given education with the CBIA-ARV method. In the CBIA-ARV method, participants are given time to be active in small and large group discussions. The comparison of posts 1, 2, and 3 proves that the knowledge of the intervention group is better than the control group. This knowledge lasted up to 4 weeks after CBIA-ARV which proved that the CBIA-ARV method had a significant impact on the knowledge of intervention group participants. The knowledge variable of the intervention group was proven to be better than that of the control group. This knowledge lasted up to 4 weeks after CBIA-ARV which proved that the CBIA-ARV method had a significant impact on the knowledge of intervention group participants. The variable knowledge of the intervention group was proven to be better than the control group because one of the factors that can affect knowledge is education (Wawan and Dewi, 2019). Educational factors in this study are in the form of providing interventions with the CBIA-ARV method conducted by researchers. Providing education on the CBIA-ARV method is effective in increasing the knowledge of patients with diabetes mellitus (Hartayu, MI, and Suryawati, 2012).

Table 3. The comparison of pre-post data either in the control group and in the intervention group (within-group test)

Comparison	Control group (*p*-value)			Intervention group (*p*-value)		
	Knowledge	Attitude	Practices	Knowledge	Attitude	Practices
Pre – Post 1	.924	.323	.001*	.001*	.001*	.001*
Pre – Post 2	.861	.001*	.001*	.001*	.001*	.001*
Pre – Post 3	.516	.001*	.001*	.014*	.001*	.001*

* *p*-value >0.05.

Table 4. Comparison of Intervention Group (IG) with Control Group (CG): Pretest IG-CG, Posttest 1 IG-CG, Posttest 3 IG-CG, Posttest 2 IG-CG

Comparison		The Intervention Group											
		Knowledge				Attitude				Practice			
		Pretest	Posttest 1	Posttest 2	Posttest 3	Pretest	Posttest 1	Posttest 2	Posttest 3	Pretest	Posttest 1	Posttest 2	Posttest 3
The Control Group	Pretest	.232				.973				.556			
	Posttest 1		.001*				.001*				.059		
	Posttest 2			.001*				.001*				.001*	
	Posttest 3				.023*				.001*				.001*

* *p*-value >0.05.

Attitude variable statistics between intervention-control groups

Comparison of attitude variables pretest (unpaired T, p=0.973), posttest 1 (unpaired T, p=0.001), posttest 2 (Mann-Whitney, p=0.001) and posttest 3 (Mann-Whitney, p=0.001). Pretest comparison data showed no significant changes in attitude variables while posttest 1, 2 and 3 showed significant changes. This result happened because the two groups received different treatments. Significant changes indicate that increasing knowledge will affect the respondent's good attitude because knowledge is a psychological impetus that can foster a person's attitude and behavior (Kholid, 2012). This significant change occurred because the intervention group participants had a good and enthusiastic response when attending CBIA-ARV. Intervention group participants have a positive evaluation so that they think that ARV adherence is beneficial to health (Wawan and Dewi, 2019). Significant changes after 4 weeks and 8 weeks proved that the attitude of the intervention group lasted longer. Someone who has a good attitude directly has good knowledge (Wawan and Dewi, 2019). Improved attitudes are also evident in research on antibiotics in adult men with the CBIA-ARV method in Umbulharjo District (Capalcanty, 2015).

Statistics of practice variables between intervention-control groups

Comparison of pretest (Mann-Whitney, p=0.556), posttest 1 (Mann-Whitney, p=0.059), posttest 2 (Mann-Whitney, p=0.001) and posttest 3 (Mann-Whitney, p=0.001). The results indicated there was no significant change in the practice variable at pretest and posttest 1 but the results of posttest 2 and 3 showed significant changes. There are several factors that may affect the results of posttest 1 because, at the beginning of using ARVs, patients with HIV are required to get education about drug adherence conducted by VCT officers (Ministry of Health, 2022). The results of posts 2 and 3 showed significant changes, indicating that the provision of education in the intervention group can not only affect the practice variable but also can maintain the practice variable of HIV patients for a longer time. Providing education on CBIA-ARV methods has been shown to change the knowledge and attitudes of participants which has an influence on increasing participant practices (Achmadi, 2013). Increased practice was demonstrated in antibiotic research with the CBIA-ARV method (Capalcanty, 2015).

The results of the study are summarized in Table 4 below, indicating that the variables of knowledge, attitudes, and practices in both groups before CBIA-ARV were the similar levels of these variables. The provision of education on the CBIA-ARV method was quite influential on the variables of knowledge, and attitude of the intervention group compared to the control group. Knowledge, attitudes, and practices of the intervention group also persisted until 8 weeks after the implementation of CBIA-ARV.

CONCLUSIONS

Based on the results of the study, the good category of knowledge variables (11 people), attitude (7 people) , and practice of the intervention group were categorized as good (5 people) and the control group of knowledge variables (15 people),attitudes (19 People) and practices (35 people) before the implementation of CBIA-ARV were low. After the implementation of CBIA-ARV there was an increase in the number of good categories of knowledge variables of the intervention group (post 1=24 people, post 2=25 people, post 3=18 people), attitudes (post 1=29 people, post 2=29 people, post 3=21 people) while the control group variable knowledge (post 1=16 people, post 2=12 people, post 3=10 people), attitudes (post 1=19 people, post 2=6 people, post 3=0 people) decreased. The CBIA-ARV method was able to improve knowledge and attitude variables in the intervention group with a p-value <0.05. Further research is needed to improve the adherence of PLWHA patients in using ARVs such as social factors, and family support. By investigating a wider range of variables, researchers can gain insights that can improve patient adherence to ARVs.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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