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INTERVENTION TO IMPROVE ANTIRETROVIRAL ADHERENCE AND QUALITY OF LIFE ON HIV/AIDS : A SYSTEMATIC REVIEW

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ABSTRACT

Introduction: : HIV/AIDS first appeared in Indonesia in 1987 which until now continues to spread in 386 regencies / cities in Indonesia. The high rate of HIV/AIDS in Indonesia requires patients to improve the compliance and continuity of treatment with the help of doctors or health workers, escorts and supported by the availability of drugs. This study aims to find out the effective mobile intervention to improve the compliance of ARV and QOL treatment of patients with HIV/AIDS

Method: The method used in systematic review uses protocols and rules that are suitable by using flow diagram. Feasibility of the study was assessed using picot framework with population of HIV/AIDS patients undergoing ARV therapy, the intervention used is mobile intervention which includes mobile reminder and mobile education

Results: The results include journal results from the search database Science Direct, Scopus, Proquest, and PubMed using 12 journals. The intervention consists of mobile intervention such as education and counseling. These interventions have been shown to improve treatment adherence, quality of life, and/or both.

Conclusion: There needs to be contributions from various parties to be able to improve the adherence of treatment and Qol, not only from patients and health workers but also families. mobile intervention is quite effective given to HIV patients in carrying out treatment adherence therapy as well as improving QOL in patients.

Keywords: *education; HIV/AIDS; mobile; online; telehealth*

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INTRODUCTION

Human Immunodeficiency Virus (HIV) infection is one of the serious public health problems that can cause widespread problems that include physical,social, and emotional problems (Flynn *et al.*, 2020). HIV is the cause of an epidemic in public health that has impacted millions of people around the world. Whereas medical advances have lowered the DEATH RATE of AIDS by 42% since 2004 (Patel *et al.*, 2017). A patient with HIV/AIDS should carry out routine treatment therapies such as antiretroviral. long treatment often brings up non-compliance in performing the treatment. routines performed for treatment can be a trigger for poor Qol in HIV patients. Decreased immunity, malaise, fatigue, nausea, loss of BB, and takikadia (Finkelstein *et al.*, 2015). Forgetfulness was identified as a major barrier in ARV compliance (Hardy *et al.*, 2011).

HIV/AIDS first existed in Indonesia in 1987 which until now continues to spread in 386 cities in Indonesia. A total 150,296 cases of HIV infection and 55,799 cases of AIDS have been reported. In 2014 there were 22,869 new cases of HIV and 1876 new

cases of AIDS. HIV/AIDS cases in Indonesia have spread to all provinces, with the highest number of HIV and AIDS cases, one of which is in East Java which ranks 2nd out of 33 provinces in Indonesia with HIV cases totaling 19,249 cases, while AIDS cases in East Java amounted to 8976 cases (Ditjen PP & PL. Kemenkes RI, 2014). Triyono and Misutarno (2013) said that the case of HIV / AIDS in Dr. Soetomo Hospital, Surabaya, East Java recorded in the data of new outpatient visits HIV / AIDS reached 805 patients (decreased by 2.9 % from 2011), while the data on outpatient visits poly Infectious Diseases Intermediet Care Unit (UPIPI) in 2012 reached 14,433 patients (an increase of 27.5% from 2011) and the hospitalization reached 679 patients (decreased 12.5% from 2011).

The therapy available to HIV/AIDS patients is ARV, this therapy cannot cure HIV/AIDS, but it can maximize the suppression of HIV replication. ARV aims to improve the quality of life of ODHA by suppressing viral replication and increasing the number of CD4 in the patient's body. ARV is expected to make the viral load in the patient's plasma lower than the quantification/- undetected limit. In addition to the decrease in viral load, ARV is expected to increase the number of CD4 to prevent opportunistic infections in patients. The most common reason for ARV failure is low adherence to Anti Retroviral Therapy (ARV). the average rate of adherence to treatment for chronic conditions such as HIV is only about 50% (Da Costa *et al.*, 2012). More than 740,000 ODHA live in China, they face a high level of stigma, and the prevalence of depression in this group is high resulting in a poor quality of life (Levi-Minzi and Surratt, 2014) As the most populous country in the world, China has 1.3 billion mobile phone users, with a penetration rate of 95% (S. O'Dea, no date)
Compliance is one of the indicators of success of ARV treatment. Compliance and continuity of treatment focuses more on the role and awareness of patients (not just following the doctor's orders), with diban tu doctor or health officer, companion and drug availability (Ditjen PP & PL. Kemenkes RI, 2014). Four factors have been reported as predictors of adherence to antiretroviral treatment problems: regimen characteristics, patient factors, doctor-patient relationships and system care Each of these factors plays an important role; However, research shows that one of the most common forms of noncompliance is forgetting to take medication (Flynn *et al.*, 2020). Non-compliance with ARV poses several potentially serious health problems, including a higher viral load of HIV, faster progression into AIDS, and an increased risk of resistance to HIV treatment (Moore *et al.*, 2015). In order for antiretroviral therapy to be effective, patients must properly adhere to the currently prescribed therapies Hiv prevalence worldwide is very worrying for people living with HIV/AIDS (Da Costa *et al.*, 2012). Some studies have tested devices or mobile intervention as tools for reminders such as pagers, alarms and phones (Hardy *et al.*, 2011). Electronic reminder devices, including mobile phones, are increasingly popular as helpers for patients who take medication as often as possible Lack of compliance (Hardy *et al.*, 2011). The purpose of this study is to assess the effectiveness of mobile intervention to adhere to antiretroviral treatment compliance and quality of life.

METHOD

Search Method and Identification

The literature search method used in this *systematic review* was selected from four indexed electronic databases such as *Scopus, Science Direct, Proquest,*and *Pubmed.* Key Words used using the term Medical Subject *Heading* (MeSH). Keywords and subject titles are used in searching for articles with *keywords* "*intervention*" OR "*Reminder*" OR"*education*" AND"*mobile" OR "online"* AND "*Adherence*" AND"*ARV*" AND "*QoL*" AND "HIV" AND "AIDS" in English. Search articles using *boolean operators (AND, OR NOT or AND* NOT). Article search results are written with flow charts. The feasibility of the study was assessed using the PICOT framework with *Population:* HIV/AIDS patients with antiretroviral therapy, *Intervention: Comparison:* patients who did not get the mobile intervention *reminder Outcome:* a study discussing Interventions to improve ARV treatment compliance and Quality of Life for HIV/AIDS patients and *Time:* Year *of* article used 2016-2021. Searches through the above keywords resulted in 16 articles from *Scopus,* 90 articles from *Science Direct,* 64 articles from *Proquest,* and 12 articles from *Pubmed,* with a total of 182 articles from all articles after being re-studied according to the topic then obtained 11 articles in English.

Intervention	*Mobile*	*Adherence*	*Antiretroviral*	*Quality of life*	*Hiv*
	Mobile application	*Medication adherence*	*Antiretroviral Therapy,*	*Life quality*	*Hiv*
	OR				
	Cell phone				
	OR				
	Telemedicine				

Table 1. Search Method and Identification

PICOS *framework*

PICOS	*Inclusion Criteria*	*Exclusion Criteria*
Population	Study focusing on HIV patients receiving antiretroviral therapy	Study that does not review hiv patients or HIV patients who do not use antiretroviral therapy
Intervention	*Mobile intervention* in HIV/AIDS patients	Study that does not discuss *mobile intervention* in PLWH
Comparators	The comparison intervention group used was the study group that did not get *Mobile intervention*	No exclusion criteria
Outcomes	Study describing improved adherence to antiretroviral therapy and/or improvement of quality of life	Does not address the impact of interventions on drug compliance and/or quality of life improvement.
Study Design	*Randomized control trial*	*Pre experimental*
Publication Years	*Post-2011*	*Pre 2011*
Language	*English*	*Language other than English*

Table 2. PICOS framework

DIAGRAM FLOW

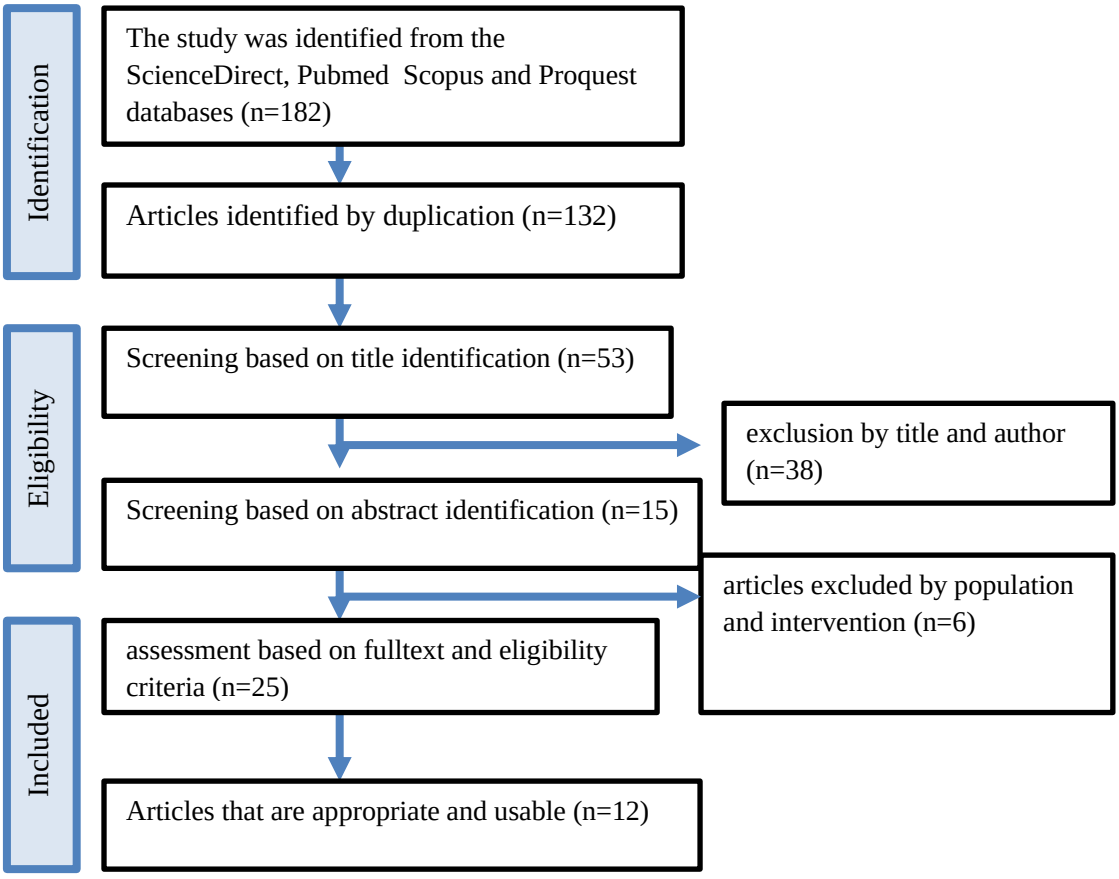

Figure 1. Diagram Flow Intervention To Improve Antiretroviral Adherence and Quality Of Life On HIV/AIDS Patient: A Systematic Review

RESULT

Population

The total participants of this review were 2,786 respondents. The highest number of populations was 700 to conduct random comparative effectiveness tests, and the lowest was 21 people. Participants aged 15-69 years, limited by several criteria such as age, ARV treatment history, telephone use history, and experience related to medical actions. Some studies make participants' willingness to respond to text messages and mobile phone ownership as inclusion criteria. All research was conducted on people with HIV.

Characteristic of Studies

The results include journal results from Scopus, Science Direct, Pubmed, and Proquest database searches using the keywords *intervention, adherence, antiretroviral, quality of life,* HIV. The journal was a randomized control trial research design. Journals are taken based on the 20116-2020 publication year.

Characteristic of Intervention

The interventions taken in this study are *mobile-intervention based interventions.* Before intervention, participants will be given inform consent and conduct self-assessment of antiretroviral compliance and quality of life assessment. Most of the interventions provided are reminders of antiretroviral drug use, education, and counseling either through internet-based-intervention or face-to-face (as a follow up of education based internet). Intervention is given to patients who have a mobile phone and can operate it, some trials are conducted by the way the patient is distributed 1 mobile phone in order to equate the facilities to the mobile phone used. interventions are carried out varies from 2 weeks to 36 weeks. reminder system is on average done 30 minutes before the schedule of taking the drug. some interventions are done with *chat* applications such as WeChat and SMS or application development such as WelTel, HIVAS, and WiseApp. reminders are sent with content in the form of types of drugs and doses, some interventions begin by asking the news such as "how are you?". interventions are done in two directions, if there are problems in the patient's condition then two-way communication will continue to be done. , self-management, stress management. Some education is sent through leaflets or images with the application used. the importance of physical activity and exercise, the importance of attention to maintenance treatment; health benefits of adherence to PSY and ARV drugs, strategies for addressing BD, HIV symptoms, adverse treatment effects, and practical treatment, and compliance strategies. The interventions in the study are described in the following table:

№	Title	Types of interventions
1.	(Da Costa *et al.*, 2012)	A mobile SMS-based intervention : SMS Reminder (Microeletronic monitor, Self report on drug compliance, Number of drugs)
2.	(Guo, Xu, Qiao, Y. Alicia Hong, *et al.*, 2018)	mHealth : weekly reminder (SMS&WeChat) and education (self management, stress management, life style, information about HIV)
3.	(Moore *et al.*, 2015)	daily personal texting reminder, mood assessment, psychoeducation
4.	(Hardy *et al.*, 2011)	text reminder 30 minutes before schedule, self report, health status, education (HIV information)
5.	(Kyomuhangi *et al.*, 2018)	WelTel (*text-messaging service)*
6.	(Abdulrahman *et al.*, 2017)	SMS and telephone call reminders, phone calls for clinic appointment reminders
7.	(Maccarthy *et al.*, 2020)	*Reminders and information from* a smARV pill box
8.	(Gross *et al.*, 2019)	Two way textmessages. reminder messages and respond
9.	(Guo, Hong, *et al.*, 2018)	WeChat-Based
10.	(Flynn *et al.*, 2020)	WiseApp: Real-time medication monitoring linking an electronic pill bottle and fitness tracker to the app
11.	(Fan *et al.*, 2020)	Reminder and Individual online communication (education, ARVicle) : Adherence, Basics about HIV and ARV, Comorbidities, Daily life, Disclosure, Drug resistance, Transmission prevention, Interpretation of test results
12.	(Luenen *et al.*, 2018)	Internet-based intervention: activation (patient supported to perform fun activities), psychoeducation, and task identification (negative mind change)

Clinical Outcome

Interventions given to HIV/AIDS patients may improve the patient's adherence to antiretroviral treatment. Compliance in the treatment of patients includes compliance with the schedule of drug consumption, dose compliance, and compliance in the fulfillment of drug willingness. Another clinical impact found in patients who are given interventions is improving the patient's quality of life. The elements that are often felt in Qol enhancement are in the psychosocial, interpersonal, and emotional elements. interventions provided in the form of education and support (psychosocial) make patients can reduce depression and stress felt. counseling can improve the quality of life of patients even with the stigma of HIV that is stillfelt.

Risk of Bias

Based on the bias risk assessment, there are 11 articles that are assessed the risk of bias with *JBI Critical Appraisal Checklist For Randomized Controlled Trials* in which there are 7 articles with the results of the assessment are:score 100% (n= 7 Articles). theseven citations after being assessed with *JBI* meets 13 assessments then it is worth reviewing. Score of 92% where there is 1 of 13 points Critical *Appraisal Checklist For RCT* is not appropriate.

DISCUSSION

The number of patients with HIV (PLWH) worldwide is alarming (Da Costa *et al.*, 2012) In a pandemic condition that has not been resolved to date, HIV is one of the major public health problems facing the world (Da Costa *et al.*, 2012). HIV treatments such as Antiretroviral are considered life-saving patients. (Hardy *et al.*, 2011). However, the average rate of adherence to treatment for chronic conditions such as HIV is still lacking, reaching only about 50% (Da Costa *et al.*, 2012). Antiretroviral conducted with adherence to treatment, will be effective in suppressing HIV incidence, promoting increased life expectancy and quality of life (Da Costa *et al.*, 2012). A mobile phone is an everyday usable device that is a powerful electronic reminder system. Popularity of mobile phones at Home (Hardy *et al.*, 2011). Most of the world's population owns mobile phones so that mhealth interventions through social media become more effective (Guo, Xu, Qiao, Y. Alicia Hong, *et al.*, 2018). The experience with mobile phones and other technologies shows that most of the subjects today are mobile phone users. Mobile phone is a convenient and inconspicuous reminder device that allows keeping patient privacy according to the level of patient preferences (Hardy *et al.*, 2011)

*M*obile-intervention is proven to be a tool to support compliance in antiretroviral therapy for 28 weeks (Da Costa *et al.*, 2012). Mobile-intervention for PLWH has been tested with a strict design. The development of one of mhealth (wechat + sms text messages) is an intervention used to improve ARV compliance and plwh quality of life (Guo, Xu, Qiao, Y Alicia Hong, *et al.*, 2018). Program mobile intervention sends a s SMS to ODHA, and results in improved adherence to antiretroviral therapy. Mobile intervention is simple, text messages are sent once a week and improve ARV compliance and are associated with suppression of viral load in HIV-infected populations (Lima *et al.*, 2016). Mobile intervention shows that daily SMS significantly improve self-reported adherence to ARV in hiv-infected young populations (Ssewamala *et al.*, 2019). Text message interventions are a representative approach to reducing the burden on patients to improve the- timeliness of drug-taking behavior especially among hard-to-treat populations (Moore *et al.*, 2015). Mobile intervention is one of the intervention options that gain traction and become an option for new interventions. It considered difficult to apply to patients in need of psychoeducation (such as bipolar) for increased adherence to taking the drug as well as in the patient population with a high risk of non-compliance with the drug. However, this intervention proved effective even though it was applied to difficult population patients (bipolar) if applied strictly (Moore *et al.*, 2015). In addition to sending reminder messages, mobile phone reception in health care, is also done in the application so that it is well received and practical in an effort to improve compliance with ARV (Hardy *et al.*, 2011).

Adherence to combination ARV is essential for successful suppression of the HIV virus (Moore *et al.*, 2015). In addition, M-intervention improves ARV drug compliance in the time and dosage aspects of drug administration for sustainability drug adherence (Hardy *et al.*, 2011). In addition to adherence to treatment, mobile interventions containing real-time monitoring of medication linking an electronic pill bottle and fitness tracker to the app, helping people living with HIV (ODHA) manage their own treatment compliance and improving their overall quality of life (Flynn *et al.*, 2020)

Mobile phone facilities such as SMS and WeChat were developed by giving a message as a reminder to take medication, given 30 minutes before the patient's schedule to take medication. In addition to reminders, education is either online or directly

provided to improve the patient's knowledge of drug use and have an impact on the patient's compliance with taking the drug. Education provided includes the use of antiretroviral drugs, dosages, ways, as well as the importance of the same schedule in taking the drug. Education in implementing a healthy lifestyle is also provided to support the success of patient treatment. Educational messages contain brief articles or Health information that will help patients improve their health status. In addition to reminder and education, regular counseling conducted by health workers becomes an alternative effective intervention for treatment compliance. Counseling related to medical constraints is important known to health workers to menantukan follow-up interventions to be given (Wahyuni *et al.*, 2020).

Sustainability results of m-intervention use in HIV/AIDS subjects. Assessed based on the response rate to text messages, this is an indication that the patient continues to use the app after the trial is completed (Hardy *et al.*, 2011). SMS can be a supportive therapy in antiretroviral compliance, improvement of clinical conditions and patient's quality of life. SMS is an educational alternative that can be done with a wider reach and cheaper costs. Mobile intervention is effectively used within 2 to 36 weeks (Maccarthy *et al.*, 2020)(Hardy *et al.*, 2011). Most studies mention the effective time used is 24 weeks (Abdulrahman *et al.*, 2017).

Mobile intervention services can be adapted to the patient's condition. Facilities offered include reminder, education, conseling, and self report. The applications used are very diverse such as wechat, text SMS messages, whatsapp, Zoom, and *other chat services.* In quality of life counseling, there needs to be a psychologist who can handle the mental condition of the patient. Mobile intervention should be given to the patient according to the needs. The application of mobile intervension will be maximized if the device is provided by health workers or health care falitas. Different types of mobile phones will reduce the intensity of reminders sent due to constraints such as lack of battery power, mobile phones do not support the installation of the desired application, as well as data packages or pulses are exhausted.there needs to be an initial data assessment of problems and interventions expected by patients. App usage is tailored to the apps used in the surrounding environment. M-health can be done by various applications with modifications according to the needs of each patient.

CONCLUSION

Mobile intervention is an intervention that can be used as an alternative to improve the compliance of HIV patients to antiretroviral treatment. Counseling can be used as a means for patients to share their experiences and difficulties in undergoing therapy. In addition to treatment compliance, mobile intervention is also beneficial for improving quality of life and lowering depression in HIV patients.

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