



Literature Review: Use of Smartphones in Education for HIV/AIDS Patients

Fatimatuzahro^{*1)}; Bagoes Widjanarko¹; Zahroh Shaluhiah¹

¹⁾ Faculty of Public Health, Diponegoro University

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ABSTRACT

HIV/AIDS is an infectious disease and a cause of death in Indonesia. This disease requires medication adherence. Education plays an important role in the success of treatment adherence of HIV/AIDS patients. This study aims to analyze the use of smartphones in education on HIV/AIDS. The research design is a literature review using a systematic review by collecting research articles on the use of smartphones in education for HIV/AIDS patients. There are 10 research articles, with a period of 2017–2022. The results of the analysis of the articles show that the use of smartphone-based applications plays an important role in increasing the compliance of HIV/AIDS patients undergoing ARV treatment.

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^{*}) corresponding author

Fatimatuzahro

Department of Public Health, Faculty of
Public Health, Diponegoro University

Email: fatipromkes@gmail.com
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ABSTRAK

HIV/AIDS merupakan penyakit yang menular dan menjadi penyebab kematian di Indonesia. Penyakit ini membutuhkan kepatuhan dalam pengobatan. Edukasi memegang peran penting dalam keberhasilan kepatuhan pengobatan pasien HIV/AIDS. Penelitian ini bertujuan untuk menganalisis penggunaan smartphone dalam edukasi pada HIV/AIDS. Desain penelitian adalah literature review menggunakan systematic review dengan mengumpulkan artikel-artikel penelitian mengenai penggunaan smartphone dalam edukasi pada pasien HIV/AIDS. Artikel penelitian sebanyak 10 artikel dengan rentang waktu 2017–2022. Hasil analisis terhadap artikel-artikel diketahui bahwa penggunaan aplikasi berbasis smartphone berperan penting dalam meningkatkan kepatuhan pasien HIV/AIDS menjalani pengobatan ARV. Pasien HIV/AIDS yang menggunakan aplikasi berbasis smartphone menunjukkan peningkatan kepatuhan pengobatan ARV.

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INTRODUCTION

Development is a process and stage that every society or nation must undergo. Development must be seen as a multidimensional process that includes not only economic development, but also major changes in social, behavioral, and institutional structures (Anastasi & Pakhomova, 2020). Health development is part of national development that aims to increase awareness, willingness, and ability of the community to live a healthy life. Health development is also the task of the entire Indonesian nation, both the

government, the private sector, and the community (Darma et al., 2020).

A health problem that is quite large and threatens Indonesia and many countries around the world are HIV/AIDS. Currently, no country is free from HIV/AIDS and this health problem has caused a multidimensional crisis simultaneously, both development, health, economic and humanitarian crises (Setyo & Tambaip, 2020). Human Immunodeficiency Virus (HIV) is a virus that attacks or infects white blood cells which cause a decrease in the human immune system. Acquired Immune Deficiency

Syndrome (AIDS) is a collection of symptoms of the disease that arise due to decreased immunity caused by infection with HIV. Patients with HIV/AIDS will experience decreased immunity so that they are very susceptible to various infectious diseases (opportunistic infections) which can be fatal (Ministry of Health RI, 2014).

The new paradigm that becomes the global goal of UNAIDS is Zero AIDS-related death. This can be achieved if the patient comes to the HIV service and receives therapy Antiretroviral (ARVs) (Ghosn et al., 2018). One of the Millennium Development Goals (MDGs), namely the sixth goal is to fight HIV/AIDS, malaria, and other infectious diseases. This indicator aims to reduce HIV infection by half, including taking ARV treatment (Darma, PUrwadi, Wijayanti, 2020).

People with HIV/AIDS must undergo antiretroviral (ARV) therapy (Yim et al., 2020). ARVs are used to block or inhibit the process of viral reproduction (Benbow et al., 2021). Help maintain a minimal amount of virus in the body and slow down the minimum amount of virus in the body and slow down the damage to the immune system so that people infected with HIV can feel more comfortable or can live a normal life (Setyo & Tambaip, 2020).

Compliance behavior in treatment is one way to keep people living with HIV/AIDS (PLWHA) alive longer (Anne et al., 2020). Discipline in taking this drug can help maintain the consistency of the effectiveness of ARVs in the patient's body so that resistance does not occur and slows the development of the virus in the body. ARVs cannot kill the HIV in the body, but they can suppress the proliferation of the virus (Darma et al., 2020).

HIV/AIDS cases are moving at an alarming rate in the world. 37.7 million people are living with HIV/AIDS in Indonesia worldwide by 2020 with 1.5 million new HIV sufferers. 28.2 million people with HIV/AIDS until June 30, 2021, who have received ARV therapy (HIV Government, 2021). The number of HIV/AIDS sufferers in Indonesia in 2019 was 50,282 cases, while Central Java Province was ranked fourth with 5,630 cases (Ministry of Health RI, 2020).

The Indonesian Ministry of Health released a report on May 25, 2021, that the number of PLWHA found (419,551) and reported reached 77% of the estimated number of living PLWHA (543,100). PLWHA who routinely receive ARV treatment is 26% (142,906) of the estimated PLWHA (543,100) with loss to follow-up/LFU after starting ARV treatment (65,779) of 26% of PLWHA who have started ARV

treatment (262,693) (Ministry of Health RI, 2021). Based on these data, it can be seen that the adherence of PLWHA in Indonesia to ARV treatment is only 26%, or 142,906 people, while the remaining 74% of PLWHA who do not comply are at risk of transmitting HIV/AIDS to others.

The most important strategy to improve adherence to treatment for PLWHA is education. PLWHA needs detailed information about medication and knowledge of the consequences of non-adherence (Black & Hawks, 2022). In the 5.0 era, society cannot be separated from the internet and social networks. Health information through smartphones can be used to improve knowledge, attitudes, motivation, efficacy, and compliance. The use of Android smartphones in providing health education consists of several methods, namely text messages, games, and applications (Ministry of Social Affairs, 2020). Today's society prioritizes the use of smartphones over the use of television as a means of obtaining information or advertising. The purpose of this literature review is to analyze therapeutic communication in improving treatment adherence of HIV/AIDS patients.

METHOD

This research design is a literature review. The selected articles are research articles on smartphone use in education. The respondents are HIV/AIDS patients. Articles were selected based on inclusion criteria: articles on the use of smartphones in education for HIV/AIDS patients, articles in Indonesian and English, articles in pdf form that can be downloaded, and publication year 2017-2022. The results measured were the use of smartphones in education for HIV/AIDS patients.

Literature review using a systematic review by collecting articles that match the theme, namely the use of smartphones in education for HIV/AIDS patients. The research uses the Hawker instrument for critical analysis. Researchers identify research journals with keywords, namely "smartphone", "education", and "compliance" with HIV/AIDS treatment" on the science of the website direct, Scopus, Springer Link and Pro Quest. The following are the results of the identification and data extraction of research journals carried out:

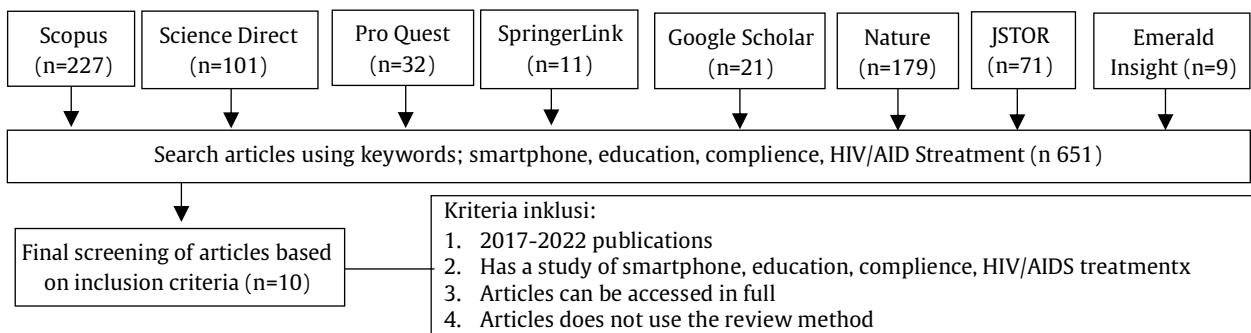


Chart 3.1
Process of Data Identification or Data Extraction

The next process is data extraction by grouping data according to variable and then data synthesis, by analyzing the use of smartphones in education in HIV/AIDS patients.

RESULTS

Based on several research articles, it can be grouped the use of smartphones in education for HIV/AIDS patients.

HIV/AIDS patients need comprehensive and detailed information about HIV/AIDS to be willing to take ARV

treatment properly. The research article extract result presented below,

Table 1.
Research Article Extract Results

No	Researcher, Title	Researched Variables	Research methods	Research result
1	Thu Minh Bui et al (2021) <i>Smartphone Use and Willingness to Pay for HIV Treatment-Assisted Smartphone Applications among HIV-Positive Patients in Urban Clinics of Vietnam</i>	The independent variable is Smartphone and willingness to pay (WTP) The dependent variable is the application of care for HIV/AIDS patients in Vietnam	Quantitative method Cross sectional study	The high level of willingness to pay reveals the feasibility of implementing smartphone-based applications for HIV treatment. The features of the app need to be developed with more attention to privacy features to attract single people living with HIV/AIDS and additional measures to initiate people with a long duration of ART to use the app
2	Larissa Jennings Mayo Wilson et al (2022) <i>Mobile phone access, willingness, and usage for HIV-related services among young adults living in informal urban settlements in Kenya: A cross-sectional analysis</i>	Independent variables: socio demographic including: gender, age, education level, length of stay in urban areas, marital status, ethnicity, religion, length of stay in the environment, length of time not working Dependent variable: prevalence of mobile phone use for HIV	Observational survey	The mean age of the participants was 19 years (± 1.3). 56% were male. Cell phone coverage, including text messaging and mobile internet, high (>80%), but only 15% of young adults have ever used mobile telephone to access HIV services. High willingness (65%), especially among those with private phone access (77%) compared to lower willingness (18%) among those who share a phone. Higher education and work young adults are also more willing to use the telephone for HIV services. Ethnic minorities, married and women participants living in large house holds were less likely to have access to or use mobile phones, limiting their potential participation in HIV-related m Health interventions
3	Anthony De Fulio et al (2021) <i>Smartphone-based incentives for promoting adherence to anti retrovirals therapy: A randomized controlled trial</i> (De Fulio et al., 2021)	Independent variable: compliance intervention based on smartphone Dependent variable: ARV therapy adherence	Randomized controlled pilot study	HIV sufferers with drug use disorders send selfie videos of taking drugs. Video senders get incentives sent via debit card reload. The intervention respondents sent 75% of the videos, and 81% of the videos met the validity criteria, showing a high level of usability. Respondents also rated the intervention as very acceptable. Obedience measured as the percentage of participants achieving the 95% compliance threshold, and also as an overall percentage day on which participants adhered to antiretroviral therapy.
4	Bernad Appiah et al (2021) <i>Perceptions of a mobile phone-based approach to promoting medication adherence: A cross-sectional application of the technology acceptance model</i>	Independent variables: perceptions of mobile phones related to the approach to promoting ARV treatment adherence Dependent variable: Treatment adherence	<i>Explanatory research</i> with a cross sectional approach	Consistent with the technology acceptance model, the intention to use caller tone as a means to improve medication adherence was higher among those who viewed the app positively in terms of ease of use and usability. Among those who are already users of caller tones, availability as a free download is also associated with more positive intentions
5	Jamie P. Morano et al (2019) <i>Attitudes, Beliefs, and Willingness Toward the Use of m Health Tools for Medication Adherence in the Florida m Health</i>	Independent variables: socio-demographic, attitude, belief and will Dependent variable: use of the m Health intervention for HIV care	Cross sectional study based on longitudinal data m Health study	Daily interest in receiving medication adherence reminders via the app (80.4% of users. This commercially available biprogrammatic m Health platform demonstrates feasibility and efficacy for upgrading ART and medication adherence in public health clinics and successful inclusion of older

No	Researcher, Title	Researched Variables	Research methods	Research result
	Adherence Project for People Living With HIV (FL-m APP): Pilot Questionnaire Study			age groups
6	Tyke Hanisch (2021) <i>Improving Medication Adherence Using Mobile Device Reminders Among HIV+ Adults</i>	Independent variable: reminder service via smartphone Dependent variable: HIV treatment adherence	Quantitative study with quasi-experimental design	Mobile text messages reminders could be an efficient mechanism for increasing ART treatment for HIV-positive adolescents aged 18 to 30 years
7	Robert Gross (2019) <i>Two-way mobile phone intervention compared with standard-of-care adherence support after second-line anti retroviral therapy failure: a multinational, randomized controlled trial</i>	Independent variable: mobile phone intervention Dependent variable: HIV treatment adherence	<i>Multinational randomized controlled trial</i>	Bidirectional MPI did not significantly increase 48th week suppression, but slightly affected virology failure. People who fail second-line ART may not benefit from telephone-based triggers or increased adherence support (or both). A more effective strategy is needed
8	Shuyu Han (2021) <i>Effects of a symptom management intervention based on group sessions combined with a mobile health application for persons living with HIV in China: A randomized controlled trial</i>	Independent variable: symptom management intervention combined with mobile health Dependent variable: impact of symptom management	<i>A parallel randomized controlled trial</i>	Knowledge of symptom management and certainty of self-management of symptoms is increase. Symptom management interventions with mobile health can increase knowledge of symptom management of PLWHA and symptom certainty self management
9	Suzette Glasner et al (2022) <i>Promising outcomes from a cognitive behavioral therapy text-messaging intervention targeting drug use, antiretroviral therapy adherence, and HIV risk behaviors among adults living with HIV and substance use disorders</i>	Independent variable: cognitive behavioral therapy message intervention Dependent variable: drug users, HIV treatment adherence	<i>Quasi experimental</i>	TXT-CBT in improving ART adherence and reduced drug use and HIV risk behaviors among people with HIV infection and comorbidities Opioid and stimulant use disorders
10	Deborah Hasin, et al (2020) <i>Health Call: Smartphone Enhancement of Brief Interventions to Improve Medication Adherence Among Patients in HIV care</i>	Independent variable: smartphone health call intervention Dependent variable: reducing alcohol dependence and increasing HIV/AIDS treatment adherence	Randomize method	<i>Health Call</i> paired with CG resulted in better ART adherence than CG alone

The use of mobile health applications can increase knowledge about HIV/AIDS among its users. Han (2021) in a study stated that symptom management and the certainty of symptom management themselves increased. Symptom management interventions with mobile health can increase knowledge of symptom management of PLWHA and certainty of self-management symptoms.

Compliance with HIV/AIDS treatment can prevent the transmission and spread of the HIV/AIDS virus to other people. Hasin, et al (2020) in their research developed a Health Call on a smartphone that could be used by HIV/AIDS patients. The Health Call application is intended to help HIV/AIDS patients reduce alcohol dependence and increase adherence to HIV/AIDS medication.

Study Bui et al (2021) in Vietnam on the use of smartphones and read in an essay for care assistance using a smartphone application for HIV/AIDS positive patients. The results showed the level of willingness of HIV/AIDS patients to a pay wall. This reveals the feasibility of implementing smartphone-based applications in the treatment of HIV/AIDS. Hanisch (2021) mentions that Message mobile text reminders could be an efficient mechanism for improving ART treatment for HIV-positive adolescents aged 18 to 30 years.

Morano et al (2019) stated that daily interest in receiving medication adherence reminders via the app (80.4% of users). This commercially available programmatic m Health platform demonstrated its feasibility and efficacy in improving ARV medication adherence. Glasner et al (2022)

stated that increasing text messaging intervention improves ART adherence and reduces drug use and HIV risk behaviors among people with HIV infection.

The research of Hasin, et al (2020) found that HIV/AIDS patients who utilize health Call application facilities on smartphones have better ARV treatment adherence than the group of patients who received motivational interviewing and Clinician's Guides. De Fulio et al (2021) the study stated that compliance is measured by the percentage of participants which achieved the 95% adherence threshold, and also as the percentage of all days on which participants adhered to antiretroviral therapy.

Gross (2019) in a study on two-way mobile phone intervention stated that two-way mobile phone intervention did not significantly increase suppression at week 48, but slightly affected the virology of failure.

DISCUSSION

Compliance is the extent to which a person's behavior in terms of taking medication or making other lifestyle changes is following medical or health advice (Swarjana, 2022). Obedience to ARV treatment in HIV/AIDS patients is an act of implementing the recommendations of the health service supervisor in this case a doctor or other health worker. Treatment adherence is not only in short period of time but also a predetermined period (Aharonovich et al., 2017).

Adherence to ARV treatment in HIV/AIDS patients is influenced by four factors, namely beliefs, attitudes and personality, understanding of instructions, social and family isolation, and quality of instructions (Sari, 2021). Understanding of the instructions is based on information obtained by HIV/AIDS patients about HIV/AIDS and its treatment. The provision of this information can be done through education (Mehraeen et al., 2020).

Education is part of communication, information, and education (KIE) in health education that is provided more systematically (Mulana, 2019). Health education is identified with health education because both are oriented to the expected behavior change, namely healthy behavior so that they can recognize health problems for themselves, their families, and groups in improving their health (Effendy, 2017). The media plays an important role in conveying health information in the process of health education for HIV/AIDS patients (Lima et al., 2016). One of the media relevant to the conditions of society in the digital era is the smartphone (Han et al., 2018). The use of smartphone-based applications plays an important role in conveying information and changing the behavior of HIV/AIDS patients in undergoing ARV treatment (Davies et al., 2020).

Based on research journals, it is known that the use of smartphone media and applications developed in several countries can help HIV/AIDS patients in obtaining information about HIV/AIDS and its treatment (Sued et al., 2016). Some of the applications used are paid and some are free (Cho et al., 2019). The use of HIV/AIDS service applications increases knowledge and adherence to ARV treatment in HIV/AIDS patients (Yuan et al., 2021).

Health information through smartphones can be used to improve knowledge, attitudes, motivation, efficacy, and compliance (Cho et al., 2019). The use of Android smartphones in providing health education consists of several methods, namely text messages, games, and applications (Mulana, 2019). Smartphones play a major role

in one's life activities because of their up-to-date nature in obtaining information (Fauzan et al., 2022).

CONCLUSIONS AND SUGGESTIONS

Based on the results of the literature review discussion, it can be concluded that the use of smartphone-based applications plays an important role in increasing the compliance of HIV/AIDS patients undergoing ARV treatment. HIV/AIDS patients who use smartphone-based applications show an increase in ARV treatment adherence.

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