

# Exploration of Adolescent Knowledge Experiences and Efforts to Identify Interventions on the Use of Digital Technology Information Media to Increase Knowledge related to HIV/AIDS Prevention

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## ABSTRACT

**Background:** HIV/AIDS has become a pandemic that worries the world community, especially teenagers because of their lack of understanding in tackling the prevention and spread of HIV/AIDS. One of the things that can be done is to identify interventions in the utilization of digital technology information media. **Purpose:** This study focuses on exploring the experiences of adolescents in efforts and in identifying interventions using digital technology information media to increase knowledge related to HIV/AIDS prevention. **Methods:** Qualitative research using interpretive descriptive approach and literature review on teenage students of SMA Negeri 4 (SMA A) and SMK Negeri 6 (SMA B) in Pangkep Regency, Class II and Class III. Sampling using purposive sampling type of criteria sampling. The number of participants is 20 people and 5 participants who fall into the source triangulation category. Semi-structured interview guidelines with in-depth interviews, FGDs and observations using field notes. **Results:** There are 4 main themes that are obtained, namely: 1) Lack of youth knowledge about HIV/AIDS; 2) Perception of adolescents' response control towards HIV/AIDS sufferers (ODHA); 3) Work Program in efforts to prevent HIV/AIDS; 4) The needs of adolescents, teachers, health center staff, and the health office regarding plans for developing interventions to increase youth knowledge in efforts to prevent HIV/AIDS. **Conclusion:** Respondents have inadequate knowledge about HIV/AIDS, show negative attitudes towards PLHIV and are also involved in risky practices that can affect HIV transmission. This shows that the provision of accurate and comprehensive information related to HIV/AIDS is a component of prevention and control interventions that must be increased so that intervention strategies are needed to alleviate suffering and possibly reduce the negative consequences that may occur. **Keywords:** HIV/AIDS, Youth, Knowledge, Intervention Strategy, Model Development.

## INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) is a group of disease symptoms that arise due to decreased immunity caused by HIV infection. HIV and AIDS disease has become a pandemic that worries the world community because besides that vaccines and drugs have not yet been found to prevent these diseases. HIV/AIDS has a relatively long asymptomatic (without symptoms) phase in the course of the disease. This causes the development pattern to resemble an iceberg phenomenon<sup>1</sup>.

In Indonesia, based on the report from the Data and Information Center of the Ministry of Health of the Republic of Indonesia, it is known that HIV/AIDS cases tend to increase every year, in 2019 it was found that the number of cases was 50,282 (HIV) and 7,036 (AIDS) with the majority of sufferers being in the productive age group ( $\geq 15-49$  years). This means that efforts to treat HIV/AIDS both globally and in Indonesia in reducing mortality can be said to be successful, but in terms of efforts to prevent an increase in the disease, it still requires attention so that the epidemic of AIDS and sexually transmitted infections can end in 2030 according to the SDGs target in the health sector<sup>2</sup>.

The physical impact of HIV/AIDS disease can interfere with the development of the nervous system, respiratory system, kidney system and the risk of nephropathy, haematological problems, and an increased risk of metabolic disorders<sup>3</sup>. HIV/AIDS disease does not only have a physical impact on sufferers, but also has other impacts such as social, economic and psychological impacts<sup>45</sup>.

Based on a report from the South Sulawesi Provincial Health Office, the number of people living with HIV/AIDS from 2005 to 2022 has reached approximately 26,000 cases (South Sulawesi Health Office 2021). Pangkajene and Islands (Pangkep) is one of the regencies in South Sulawesi Province which are recorded as having cases of HIV/AIDS. According to data from the Pangkep District Health Office, the survey results showed that in 2019 there were 65 new HIV sufferers, then in 2021 it increased to 154 cases and 18 people with AIDS. Most of these cases were experienced by the age group of 15-49 years<sup>6</sup>. One of the reasons for the increase in HIV/AIDS cases is due to unsafe and high-risk sexual behavior.

According to the Centers for Disease Control and Prevention (CDC) young people (15-24 years) are the largest group with cases of sexually transmitted diseases (STDs), including HIV/AIDS<sup>7</sup>.

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Sexual behavior is one of the most common causes of PMS cases in adolescents<sup>8</sup>. Research shows that adolescents tend to engage in high-risk sexual behavior, such as having unprotected sex, changing sex partners and accessing sexual health services less than adults<sup>7</sup>.

Based on research results that adolescents who have risky behavior towards free sex have less knowledge about HIV/AIDS and its prevention by 59%<sup>9</sup>. Other research related to health literacy on reproductive health issues and their prevention including HIV/AIDS shows that the level of health literacy in adolescents is still in the low category and indicators such as the ability to access, understand and apply health information on reproductive health problems are mostly (50%) in the low category. and problematic<sup>10</sup>. According to one of the social factors related to adolescent sexual experiences is the factor of education or health literacy about sex. The above shows that it is necessary to explore the experience of adolescents in efforts and in identifying interventions using digital technology information media to increase knowledge related to HIV/AIDS prevention<sup>11</sup>.

## MATERIALS DAN METODE

Qualitative research with interpretive descriptive approach and literature review. An interpretive descriptive approach was chosen with the main objective to explore the perceptions of female students, teachers/principals, the health office and puskesmas staff regarding the problem of HIV/AIDS. The results of this study are to determine a health education intervention model that fits the needs and conditions in schools to increase prevention of HIV/AIDS in adolescents. Data collection for this research was carried out using FGDs with students and in-depth interviews with school principals/teachers, the health office, and puskesmas staff. Data collection was carried out from May to June 2023, in SMA) at SMAN 4 Pangkep and SMKN 6 Pangkep. The location selection was based on the consideration that HIV/AIDS cases are increasing every year. Sampling was taken using purposive sampling technique with the type of criteria sampling with a total of 20 people consisting of 10 students from SMA Negeri 4 Pangkep (SMA A) and 10 students from SMK Negeri 6 Pangkep (SMA B) and triangulation of sources as many as 5 people (2 teachers/principals, 2 puskesmas officers, and 1 health service). The research instrument used a semi-structured interview guide which was developed by the researcher himself and used tools in the form of a recording device and video. FGDs were conducted after obtaining informed consent from the student group for 1 hour (60 minutes) duration, while in-depth interviews were conducted with health center staff and the health office for 40-60 minutes. To guarantee ethical considerations for this study, research ethics approval is required from the Research Ethics Committee of the Faculty of Public Health UNHAS, Number: 3808/UN4.14.1/TP.01.02/2023. In addition, this research ethics applies principles originating from the Health Research and Development Ethical Guidelines and Standards issued by the Commission (National Health Research Ethics (KNEPK), namely the principle of respecting human dignity, the principle of doing good (beneficence) and not harming (non-maleficence) and the principle of justice (justice).The participants can withdraw from this research at any time if they feel uncomfortable and there are no consequences.

## RESULTS

This study involved teenage students with the number of participants according to the saturation of the data obtained from the results of the analysis of the participants' answers. The table of participant characteristics is as follows:

Based on table 1 and table 2, it was found that the group of students interviewed were on average aged 16 and 17 years in class X and XI. The average age of the teachers is 36 years, with supporting teachers in the Physical Education, Health and Recreation Department and also as school principals. The characteristics of the puskesmas staff include

**Table 1. Characteristics of student FGD participants (n=20 people).**

Student participants	Sex	Age (Years)	Class and School
PS 1	Female	17	Student class 11, SMAN A
PS 2	Female	17	Student class 11, SMAN A
PS 3	Female	16	Student class 10, SMAN A
PS 4	Female	17	Student class 11, SMAN A
PS 5	Female	16	Student class 10, SMAN A
PS 6	Male	16	Student class 10, SMAN A
PS 7	Male	16	Student class 10, SMAN A
PS 8	Male	17	Student class 11, SMAN A
PS 9	Male	17	Student class 11, SMAN A
PS 10	Male	17	Student class 10, SMAN A
PS 11	Female	16	Student class 10, SMKN B
PS 12	Female	16	Student class 10, SMKN B
PS 13	Female	16	Student class 10, SMKN B
PS 14	Female	17	Student class 11, SMKN B
PS 15	Female	17	Student class 11, SMKN B
PS 16	Male	16	Student class 10, SMKN B
PS 17	Male	16	Student class 10, SMKN B
PS 18	Male	17	Student class 11, SMKN B
PS 19	Male	17	Student class 11, SMKN B
PS 20	Male	17	Student class 11, SMKN B

**Table 2. Characteristics of Source Triangulation Participants (Teachers/ Principals, Health Office, Health Center staff) (n=5 people).**

Participant	Sex	Age (year)	Information
<b>School (teacher / head master)</b>			
PG 1	Male	38	Education S1, Kepala Sekolah di SMAN A
PG 2	Male	35	Education S1, Guru Pengampu bidang studi Penjaskesrek di SMAN B
<b>Health dept</b>			
PD 1	Male	41	Education S2
<b>Health centre staff</b>			
PP 1	Male	36	Education S1, Health centre staff during 5 year in health centre A
PP 2	Female	34	Education S1 + Profesi Ners, health centre head during 6 year health centre B

both of them being a puskesmas nurse who is in charge of maternal and child and adolescent health in the Puskesmas area, the average age is 35 years, working for more than 5 years.

The research theme was formulated based on an analysis of the participants' answers to the interview questions and field notes during the data collection process. There were 4 themes that described the experiences of adolescents related to HIV/AIDS. The resulting themes are as follows:

a) Theme 1: Lack of youth knowledge about HIV/AIDS

Based on table 3 above, most students view HIV/AIDS as a term that is often heard. However, they do not know things related to HIV/AIDS, such as the definition of HIV/AIDS, its causes, ways of transmission and prevention.

PS4, PS8, PS9, PS10, PS11, PS12, PS17, PS19, PS20 : "I don't know... just right, hehe."

PS6: "HIV stands for human immunodeficiency virus or a disease that absorbs human immunity caused by a virus

Few students know about the causes of HIV/AIDS, such as HIV is the same disease as hepatitis.

**Table 3. Theme Analysis Process 1.**

Them	Category	Coding
Lack of knowledge of adolescents about HIV/AIDS	Most of the students did not know about HIV/AIDS	Don't know about HIV/AIDS Can be transmitted through the air / touch Transmission of HIV / AIDS is the same as Hepatitis This is due to the lack of education from parents and the community about HIV/AIDS Caused by all the illegal drugs Lack of interest in finding out about HIV/AIDS
	Limited understanding of teachers about HIV/AIDS	Only know limited to sexually transmitted diseases Learning is limited to reproductive organs Don't know too much detail

PS15 : "...having sex with the opposite sex...a disease that can be transmitted through the air/touch"

PS18 : "uh... that's sis. Transmission of HIV/AIDS is the same as Hepatitis I think, because it's transmitted through touch, right ..."

P20 : "I don't know sis..."

The teacher also said that HIV/AIDS is a sexually transmitted disease caused by having sexual intercourse with more than one partner.

PG1 : "HIV is a sexually transmitted disease that attacks the immune system as a result of having sexual intercourse with many partners, using drugs, needles and other things"

Teachers see that HIV/AIDS is a term they often hear but rarely want to know more about and the problem of this disease is only taught to students, only limited to learning related to the reproductive system in general.

PG1: "If it's only as far as learning that I know... because it relates to the reproductive system, as in it is discussed related to diseases that can attack reproduction in general, whether contagious or not... not explained in detail, uh..."

PG2 : "... because we here the school can be said to be a marine school so for learning it is rarely taught related to issues like that (HIV/AIDS Disease)..."

a) Theme 2: Perception of Adolescent Response Control towards HIV/AIDS Sufferers (ODHA)

Based on Table 4 above, it can be seen that adolescents' perceptions of control over HIV/AIDS sufferers are divided into 2 categories, namely: negative and positive adolescent responses.

The students said that their actions towards HIV/AIDS sufferers were to avoid sufferers/take distance, and there was fear such as being afraid of shaking hands.

PS7, PS10, PS11, PS12, PS13, PS15, PS16 : "...keep your distance."

PS18 : "not close to them..."

PS6: "... you must be scared sis, you'll get infected too..."

PS18: "reduce interaction with them, such as not shaking hands and others"

Apart from the negative responses from students, there were also positive actions taken by students towards HIV/AIDS sufferers, such as providing support, respecting sufferers, behaving or acting the same as people in general, and others. Here are some quotes from some students:

PS9: "support or provide support to keep up the spirit even though it has been said that a cure for the disease has not been found, but we as

friends or neighbors must support people who have...the disease so that they can recover quickly"

a) Theme 3: Work Program in the Prevention of HIV/AIDS

Based on the results of the data analysis in table 5 above, it was found that there were several teacher/principal statements supporting the above categories and themes, in which the teachers said that any efforts they had made to prevent HIV/AIDS was by collaborating with puskesmas, conducting outreach by distributing banners. The principals of other schools also mentioned that they sometimes held meetings with students about the dangers of HIV/AIDS, this can be seen from the respondent's quotations below:

PG1: "... actually we have collaborated with the local health center, um.. we have put up some kind of banners.... in crowded places e related to the prevention of infectious diseases..."

PG2: "If there is no such program specifically, we will only provide efforts in the form of meetings with students about the dangers of HIV and AIDS"

The results of interviews with health center staff stated that there were several programs that they had carried out such as health screening, but these were still limited, as the screening program had not yet reached school children/adolescents and only prioritized pregnant women and the elderly.

PP1: "Incidentally at the puskesmas there is a program called e.. screening. But there are no school children, the targets are only waria, pregnant women and TB patients. and in the future maybe we can make a health program that has something to do with HIV specifically for teenagers, especially erm.. school children so we can prevent the disease from occurring."

PP2: "Future program efforts in handling HIV/AIDS, namely efforts to increase knowledge of adolescents, pregnant women, the elderly, and waria in handling HIV AIDS and the need for screening in handling HIV/AIDS in these circles in the form of a kind of counseling, and how much better using an application that can make new breakthroughs change their knowledge and behavior about how to prevent HIV/AIDS."

Respondents from the Health Office also said that their efforts to prevent HIV/AIDS include providing education related to HIV/AIDS and forming a Milineal Posyandu program in the form of counseling, using health videos and audio visuals.

PD1: "The program's future efforts in handling HIV and AIDS in the scope of Pangkajene and Islands districts, so there is a need for a new media that can attract the attention of both youth, society in general and pregnant women. When we provide education to them, they are very enthusiastic and happy and understand what we provide about the prevention of HIV / AIDS itself. So far, we have been running the Milineal Posyandu Program in the Pangkep area, the aim of this

**Table 4. Theme Analysis Process 2.**

Them	Category	Coding
Perception of adolescent response control towards HIV/AIDS sufferers	Negative response of teens	Avoid sufferers Take distance Afraid to shake hands Reducing social interaction Feeling scared Provide support
	positive response of teens	Continue to behave the same as other people in general Respect sufferers Respect or accept each other and do not isolate sufferers

**Table 5. Theme Analysis Process 3.**

Theme	Category	Coding
Work program for schools, health center staff, and the health office in an effort to prevent HIV/AIDS	School efforts to prevent HIV/AIDS	Outreach to students Collaboration with health centers Banner installation screening Health education
	Center staff program	Dissemination of information through social media Health application Media use
	Socialization from the health department	Providing education Milineal Posyandu Program (counseling, use of video, and audio-visual)

Posyandu is to provide education on various kinds of infectious diseases, especially HIV/AIDS, which we provide education in the form of counselling, video and audio visual..."

a) Theme 4: Needs of adolescents, teachers, health center staff, and the health office regarding the Intervention development plan to increase youth knowledge in efforts to prevent HIV/AIDS

The results of the analysis from the FGDs and in-depth interviews obtained some coding related to interventions suggested by students, teachers/school principals, as well as input from health center staff and the health office. From the qualitative results described above, an intervention plan was found to increase youth knowledge in efforts to prevent HIV/AIDS in schools. More details can be seen in the image below:

Based on the theme related to the needs of adolescents, teachers, health center staff, and the health office related to plans for developing interventions to increase youth knowledge in efforts to prevent HIV/AIDS (need assessment) several inputs were obtained regarding plans for developing interventions to increase knowledge of adolescents in efforts to prevent HIV/AIDS by using Virtual Reality-based technology in schools in the form of HIV/AIDS education by empowering teachers and collaborating with health center staff and the health office. Education is carried out in groups.

PS1: "...it's good that there is regular counseling at school, especially information related to sex education"

PS5: "I completely agree that there is counseling especially if the parents are also involved so that they can also know and control their children"

PS6: "It's also good if learning is like that anyway sis (HIV/AIDS education) we go to the field, it's a kind of field practice like that e.."

PS13: "Good counseling is held at any time, like maybe class 10 this week/month, then the next class will be next week just to be structured so you don't get confused if you learn a lot hehehe..."

PG1: "There must be collaboration with health workers, so counseling can be held regarding HIV or other diseases on a regular basis because

if we think about it, the teachers who teach are minimal, so we have little understanding"

PG2: "Indeed there needs to be regular counseling from local health workers regarding HIV/AIDS so that we have children to know what HIV is and how to prevent it."

Recommendations for the design of information delivered during education related to HIV/AIDS include information about adolescent sex education, the reproductive system and the prevention and treatment of HIV/AIDS.

PS1: "...regular counseling...especially information related to sex education"

PS3: "informed about HIV/AIDS"

PS19: "...perhaps it would be good in terms of reproductive health as well, especially in detail about the diseases that can attack that system"

PG1: "a detailed explanation regarding what HIV/AIDS is, what causes it, e how it is transmitted and what should students do if they are exposed to HIV and others"

PG2: "If it's possible, teachers can also teach education related to HIV so that we can know and understand, so it can be conveyed directly to students regarding the dangers of HIV/AIDS"

Suggestions for effective material providers include inviting doctors or specialist doctors and working with health workers. Information channels related to HIV/AIDS education can be provided via video, face to face or in book form and even with advanced technology such as Virtual Reality.

PS6: "Offline sis, directly it's good to use LCD using power point"

PS7: "using books, it's also good via the internet ee social media"

PS9: "Using video, it's even better if you're so sophisticated, sis, what's currently viral, ehh, what's more, the name, e... what looks like glasses when you see it directly looks like real (Virtual reality)"

PS10: "videos using VR are good, because I see that many schools learn to use it"

PS15: "ask for a party from the health center, maybe there are doctors, nurses, or experts on HIV"

PG1: "...if you can, bring in an expert"

PD1: "...So far we have been running the Milineal Posyandu Program... the aim of this Posyandu is that we provide education on various first-line infectious diseases as well as HIV/AIDS, which we provide education in the form of counselling, videos and audio visuals. So for the use of applications in the form of android applications, websites and virtual reality, we have not implemented them in Pangkep areas.

The results of the complete data analysis summary above can be seen in table 6 below:

The results of this qualitative research are the basis for designing interventions for quantitative research, including education about HIV/AIDS for students and teachers and also requires parental involvement because adolescents are still under parental responsibility. The media used in health education can be in the form of videos/books/leaflets/Virtual Reality made by researchers based on the results of a qualitative research need assessment. The reproductive health education intervention in this study was related to the provision of information regarding the need for assessment in qualitative research. Reproductive health education interventions in this study related

to HIV/AIDS (causes, modes of transmission, prevention), youth sex education, and reproductive health on a regular basis. Doctors/specialists, nurses/health workers can provide material using media in the form of powerpoints, books, and advanced technology such as videos based on Virtual Reality (VR).

## DISCUSSION

### Lack of youth knowledge about HIV/AIDS

The results in this qualitative study found a lack of understanding, perceptions of adolescent behavior control towards sufferers, work programs and needs of schools, health center staff, and the health office, regarding plans to develop interventions to increase youth knowledge in efforts to prevent HIV/AIDS. Adolescence is a different age group (10-19 years) with complex needs including elements of biological growth and social role transitions during puberty and transitional phases in life before reaching adulthood<sup>12</sup>. During this stage, adolescents are at their hormonal peak, excited to give the best of themselves and establish themselves to build an identity in society so they don't hold back from engaging in high-risk behavior<sup>13</sup>. In addition, adolescents have a need for sexual health, and many ways to meet these sexual needs<sup>14</sup>, and one of the problems that are often faced by adolescents is a lack of understanding of premarital sex, which can cause a problem such as unwanted pregnancy and exposed to sexual transmitted diseases<sup>15</sup> and lack of knowledge about HIV/AIDS<sup>16,17</sup>

This study also found that adolescents had less knowledge about HIV/AIDS, even though some of the respondents had been exposed to information related to HIV/AIDS. This is in line with research conducted<sup>18</sup>, that most of the knowledge about HIV transmission and prevention in adolescents is still in the poor category even though adolescents have heard and received information about HIV/AIDS.

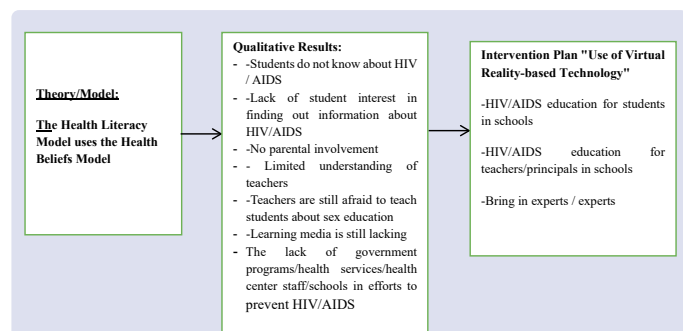
Lack of access to adolescent information such as counseling from educational or health institutions, access to information through the mass media and the internet affects adolescents' understanding of the importance of self-protection against HIV/AIDS and affects adolescent attitudes due to association. While adolescents' knowledge of HIV is noteworthy, there is also a small proportion of students who hold misinformation about HIV that does not exist<sup>19</sup>. This was also explained<sup>20</sup> that the lack of knowledge about HIV/AIDS among Indonesian women indicates that the provision of accurate and comprehensive HIV/AIDS information is an integral part of prevention and control interventions and must be increased. Armed with more knowledge, it is hoped that women will be more likely to determine their own and their partner's HIV status and take appropriate precautions.

A good understanding of this disease will help youth in their efforts to prevent HIV/AIDS<sup>21</sup>. Adolescents' knowledge of HIV/AIDS is an important predisposing factor and although an increase in knowledge does not necessarily lead to changes in behavior, it has a positive relationship<sup>14</sup>. One of the places or sources for youth to get information related to HIV/AIDS is at school. School-based HIV/AIDS education is a common and proven intervention strategy to inform young people about HIV/AIDS. However, the teacher's lack of skills in conveying sensitive information to students can hinder the program from achieving its goals<sup>22</sup>.

This study also explained that the lack of information related to HIV/AIDS was not only experienced by students but also by teachers. According to Sarma and Oliveras (2013) solving this problem requires training teachers on the new curriculum on HIV/AIDS, which has a positive impact on developing individual skills, building their confidence and conducting training.

**Table 6. Theme Analysis Process 4.**

Tema	Category	Coding
Kebutuhan remaja, guru, petugas puskesmas, dan dinas kesehatan terkait rencana pengembangan Intervensi untuk peningkatan pengetahuan remaja dalam upaya pencegahan HIV/AIDS	Material	HIV/AIDS (causes, modes of transmission, and prevention)
		Teen sex education
		Reproduction health
	Method	Penyuluhan dari petugas kesehatan
		Praktik lapangan
		Secara berkelompok (Kelas)
		Melibatkan orang tua/ wali
	Media	Video and audiovisual in person (face to face)
		Android use
		Internet (websites)
Source person	virtual reality	
	Using LCD (Powerpoint)	
	Using books	
	Health Officer (doctor/nurse/ midwife)	
		Collaboration with health centers



**Figure 1.** Development of Interventions Using Virtual Reality-Based Technology to Increase Adolescents' Knowledge in HIV/AIDS Prevention Efforts.

## Perception of control over adolescent responses to HIV/AIDS sufferers (PLWHA)

In this study, data was obtained that there were 2 categories of perceptions of control over adolescent responses to HIV/AIDS sufferers (PLWHA), namely negative and positive responses. Regarding the negative responses of adolescents in research such as avoiding or taking distance, fear of physical contact (shaking hands), reducing social interaction and feeling afraid, this is also explained by research<sup>23</sup> that adolescents generally have low awareness of HIV/AIDS, show negative attitudes towards PLWHA, and are also involved in risky behavior that can affect HIV transmission, such as the attitude of not eating from the same bowl as someone with HIV, not buying goods because they think people living with HIV can transmit HIV, think that transmission can occur through handshakes, sharing clothes and through bites mosquitoes, witchcraft, and others.

Another impact is that PLWHA will be ostracized and avoided. So that one form of behavior control can be done by limiting association or avoiding promiscuity<sup>24</sup>. This is also in line with that there are still many Indonesian people who misunderstand HIV transmission and the stigma attached to PLWHA because of a lack of knowledge or understanding of HIV/AIDS itself<sup>25</sup>.

Most young people in schools have negative attitudes towards people living with HIV/AIDS<sup>26</sup> and thus discrimination against HIV/AIDS in the form of exclusion, rejection and avoidance occurs worldwide<sup>27</sup>. A low level of HIV knowledge is associated with high misunderstandings about HIV transmission<sup>28</sup>. Misconceptions about HIV can also be influenced by area of residence, education level, employment status<sup>29</sup>, health literacy<sup>30</sup> and wealth index<sup>28</sup>. Lack of knowledge about HIV/AIDS often creates fear of disease and rejection of people living with HIV/AIDS (ODHA)<sup>31,32</sup>

Lack of knowledge about HIV has also been identified as a stigmatizing factor for people living with HIV<sup>33</sup>. This discriminatory attitude towards PLHIV is most likely related to ignorance of the mechanism of HIV transmission<sup>31</sup>. People living with HIV often experience stigmatization, experiencing avoidance behavior (eg refusing to share food, holding hands or sitting close together), gossiping and swearing, and social rejection (eg exclusion, loss of respect and position)<sup>34</sup>.

Several studies report that stigma against PLHIV often occurs within the family, including parents, siblings, and in-laws<sup>35</sup>. They may even be discriminated against by health workers<sup>36</sup>. Lack of knowledge about HIV, fear of HIV infection, personal values, religious beliefs, socio-cultural values and norms<sup>37,36</sup>, educational background and marital status have been reported to be associated with stigma and discrimination<sup>27</sup>. Families encourage infected people to remain silent about their condition to avoid social exclusion<sup>27,38</sup>, fear of interacting with infected people and avoid personal or physical contact with infected people<sup>39</sup>.

In this study, apart from negative responses to PLHIV there were also positive responses from adolescents such as providing support (enthusiasm), treating the same as people in general, respecting sufferers, mutual respect or acceptance of sufferers, and not isolating PLWHA. This was also explained that the attitude of respondents towards PLWHA was quite encouraging because a small number had a good attitude, were willing to care for HIV relatives or were willing to continue friendship with HIV-positive friends, allowed students to continue their education and teachers taught at school<sup>29</sup>.

This research is also in line that their attitudes and responses to PLWHA reflect a desire to integrate PLHIV into various areas of social and professional life. So, the community needs education about HIV/AIDS, such as how to transmit it properly, the impact and how

to prevent HIV/AIDS. For the community, it is important to gain an understanding of HIV/AIDS such as the exact process of transmission, the consequences it causes, and the preventive measures that must be followed. This is intended so that people can accept the presence of people with HIV/AIDS around them and eliminate negative attitudes and discriminatory treatment<sup>39</sup>

## Work Program in the Prevention of HIV/AIDS in Adolescents

According to the Decree of the Minister of Manpower and Transmigration of the Republic of Indonesia that the prevention and control of HIV/AIDS refers to actions taken to prevent the spread of HIV and overcome the negative impacts of HIV/AIDS. In this study, data was obtained that there were programs as a form of government (health service) efforts in preventing HIV/AIDS in adolescents such as the counseling-based millennial posyandu program and providing education related to HIV/AIDS. In addition, the efforts of puskesmas officers to prevent HIV/AIDS include screening, health counseling, using health applications, and disseminating information through social media. Meanwhile, programs or efforts from the school itself are in the form of outreach to students, collaborating with the puskesmas and installing health banners<sup>39</sup>.

Research Strengthened the findings of this study, explaining that there was an education or health promotion program implemented in the community<sup>40</sup>. In addition, through comprehensive universal care, HIV transmission can be prevented while promoting the health of people living with HIV/AIDS<sup>40,41</sup>. Community nursing work includes health promotion and care, such as disease screening, aged care and mental health education, facilitation and counselling, to members of the community other than those living with HIV who have different health needs<sup>42</sup>.

The results of this study also found that there were government programs (health services) aimed at preventing HIV/AIDS through the use of social media, such as educational videos related to HIV/AIDS. Apart from that, education is also the right step and has proven to be more efficient in increasing the level of knowledge and understanding of youth about HIV/AIDS. The delivery of education to teenage students is currently getting simpler with the development of fast and modern technology in disseminating educational information about HIV/AIDS knowledge, especially among students<sup>43</sup>.

There are also several other programs implemented in various countries in an effort to prevent HIV/AIDS, such as reaching the HIV community with the support of PEPFAR (President's Emergency Plan for AIDS Relief) which appears to have reduced sexual behavior, increased knowledge about HIV, and increased use of services. HIV testing among high-risk populations in Vietnam. These programs can play a key role in reducing the spread of HIV, improving the cascade of care, and creating an AIDS-free generation<sup>44</sup>.

These PEPFAR programs have recruited, trained, and deployed a cadre of peer educators (individuals currently involved in injecting drug use or sex work, or in the past) and health educators (usually college graduates trained in health education). These outreach workers are trained to provide HIV prevention information, skills, and supplies (such as condoms), as well as links to HIV testing, treatment, and other services, based on globally recommended best practices for HIV prevention<sup>45,46,44,47</sup>.

An innovation must also be realized to provide treatment and prevention services at a lower cost by revising policies to enable more affordable procurement of antiretroviral drugs, to provide quality services at lower prices<sup>48</sup> and to support an essential health environment at lower costs. Ultimately, resources should be invested in

the most cost-effective HIV programs that target the populations and locations where they will have the strongest health impact<sup>49</sup>.

### The needs of adolescents, teachers, health center staff, and the health service related to plans for developing interventions to increase knowledge in efforts to prevent HIV/AIDS

The results of the study found that the need for an intervention development plan to increase knowledge in efforts to prevent HIV/AIDS was urgently needed both in the form of material related to HIV/AIDS, the need for implementation methods (counseling, field practice, class/group, involving parents/guardians), media use (video, face to face, use of android, website/internet, LCD/powerpoint, and books) as well as the need for resource persons from health workers (doctors/nurses/midwives) as well as collaborating with other experts at the puskesmas<sup>49</sup>.

This research is reinforced by other findings which explain that nurses and health officials both at home and abroad need to complement or develop an innovation in HIV education and health promotion programs in the future<sup>41</sup>, one of which can help identify social resources that should be targeted in the development of interventions to improve health promotion and human quality of life<sup>50</sup>.

This research also found data that apart from material needs related to HIV/AIDS, material related to adolescent sex education and reproductive health was also needed. Education about sexuality and reproductive health provided in schools tends to only consider the biological aspects of adolescent sexual and reproductive health and tends to depict adolescent sexuality as something that is considered taboo and dangerous which is regulated by moral and religious norms<sup>51</sup>. Findings from a study also stated that cultural norms and gender differences are very important in conversations between mothers and children about sexual health<sup>51</sup>.

According there are several obstacles in providing education about sex to adolescents. Cultural factors/abstinence hinder parents or teachers from conveying teaching about early sex to adolescents. Teaching reproductive and sexual health is a sensitive topic that needs support when it is given to adolescents and society in general. So far, the teaching of sexuality and reproductive health in schools has not been comprehensive and has not been in line with the reality of sexual behavior and the sexual risks faced by adolescents. This is the impact of the limited knowledge of adolescents about reproductive health<sup>52</sup>.

In a world transformed by advances in digital technology, we have the opportunity to creatively embrace this diverse and evolving suite of tools to identify new ways to increase access to HIV testing in different populations at a global level. Such technologies provide wide-scale use that can address the barriers and challenges faced by those most at risk of infection while providing a potentially inexpensive and scalable tool to prevent the global spread of HIV. One technology-based intervention strategy that supports HIV testing is the use of Virtual Reality<sup>53</sup>.

The use of media with virtual reality-based technology is also one of the lists of needs for several responses in this study. Virtual Reality (VR) is a technology for virtually interacting with a simulated environment using a computer. Developments in graphic device technology provide much-needed solutions to produce better visual output. By using three-dimensional (3D) animation of an environment that is presented to get a visual experience, an environment that is imitated from real life or an environment that is only in imagination, so that it makes the user feel like he is really involved in it<sup>54</sup>.

Virtual Reality (VR) is most often used when talking about video and online games using virtual reality glasses. However, thanks to improvements in AR and VR technology that are connected to social

media, digital professionals predict that VR will change the way we communicate, including the way we communicate about health<sup>55</sup> especially focusing on HIV<sup>34</sup>. According to UNAIDS (2018) that HIV can be prevented and treated but too few young people know their status, and hope that VR will be able to help dispel fear and show simple steps people can take to find out their HIV status.

The use of VR in HIV prevention and care can be done with video games or digital games<sup>56</sup>, companion apps (Alexa and Siri) and developing virtual characters for the Tough Talks project. This finding was also reinforced by the study of Liran et al (2019) that patient education using VR was effective in increasing ART adherence and showed that participants' experiences resulted in reduced viral load and increased CD4+. Participants stated the experience was comfortable, educational, and that it would help improve adherence<sup>56</sup>.

VR is more immersive and thus has a greater positive emotional impact, which can increase engagement and learning. VR is rapidly becoming more accessible, affordable, and immersive, and more research is needed to better explore the opportunities of using this increasingly mature technology to improve people's lives.

## CONCLUSION

There are still teenagers who have less knowledge or understanding regarding HIV/AIDS and there is also a negative stigma of teenagers towards PLWHA. The results of this study also determine a health education intervention model that fits the needs and conditions in schools to increase prevention of HIV/AIDS in adolescents, namely the development of interventions with digital technology based on Virtual Reality (VR) to be carried out at a later stage.

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