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Validity and reliability of the Indonesian Version of HIV-KQ-18 in assessing public knowledge about HIV/AIDS in the special region of Yogyakarta

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ABSTRACT

An assessment of public knowledge about HIV/AIDS is necessary for the development of educational strategies and materials. A valid and reliable instrument is needed to obtain comparable assessment of public knowledge about HIV/AIDS from time to time. This research study aims to determine the validity and reliability of the Indonesian version of HIV-KQ-18 in assessing public knowledge about HIV/AIDS in the Special Region of Yogyakarta. This research study used a cross-sectional design with the inclusion criteria being people living in Yogyakarta who were at least 18 years old and the exclusion criteria being respondents who did not fill out the instrument completely and did not fill out duplicate forms from the same respondent. The instrument was analyzed using product-moment correlation and known-group validity, while its reliability was tested using Kuder-Richardson Formula 20 (KR20). The total number of respondents as the subjects in this research study was 305. The results of the validity test of the HIV-KQ-18 obtained an r_{xy} value from 0.177-.564, greater than r -table (0.112), and the HIV-KQ-18 instrument exhibited high reliability with a KR20 value of 0.763. The test of known-groups validity showed that there were significant differences in all groups tested, except for the group based on age. The HIV-KQ-18 is a valid and reliable instrument and it can be used to assess public knowledge about HIV/AIDS in the Special Region of Yogyakarta.

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1. Introduction

The number of people living with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) (UNAIDS) estimated that 38 million people are living with HIV around the world (UNAIDS, 2020). The total number of HIV cases in Indonesia until March 2021 was reported to have reached 427,201 with a total of 131,417 AIDS cases (Kemenkes, 2021). The discovery of new HIV cases in the Yogyakarta Region from January-December 2020 revealed as many as 591 HIV cases with a total of 71 AIDS cases (Kemenkes, 2020).

Assessment of public knowledge about HIV/AIDS is necessary for the development of educational strategies and materials in order to improve the quality of life of people living with HIV/AIDS (PLWHA) and to prevent an increase in the transmission of HIV/AIDS. Public knowledge about HIV/AIDS will affect public attitudes and behavior (Nurwati & Rusyidi, 2018). The non-adherence of PLWHA to antiretroviral (ARV) therapy is also very dependent on their level of knowledge (Pradnyani et al., 2019).

The instrument used to assess knowledge about HIV/AIDS must be valid and reliable because the validity of the data will be largely determined by the quality or validity of the instrument. An instrument is said to be valid if it can be used to assess the constructs to be assessed. A reliable instrument is one that is used on the same object of measurement constantly and still produces the same result. If a research expects valid and reliable results, the research instrument used must be assuredly valid and reliable (Rachmawati et al., 2014). If the validity and reliability of the instrument is poor, the data obtained may be invalid and may lead to wrong conclusions.

HIV-KQ-18 item is a viable and trustworthy, as evidenced by good internal consistency with Cronbach's alpha value = 0.75–0.89. HIV-KQ-18 suitability for use with populations with low levels of educational attainment (Carey & Schroder, 2002). The validity and reliability of a measuring instrument is not a fixed value because the value can vary depending on the research population, type, and purpose (Maria et al., 2017). Therefore, before an instrument can be used in Indonesia, it needs to be tested for validity and reliability. HIV-KQ-18 in Indonesia already exists and has previously been used by other researchers in Indonesia assess knowledge level among 120 HIV-positive females in Lampung, the level of knowledge of 63 nurses who provide care to patients with HIV/AIDS in Yogyakarta, and the level of knowledge 396 nurses who provide care to patients with HIV/AIDS in Jakarta (Aryanto et al., 2018; Irmayati et al., 2019; Waluyo et al., 2015). This study aims to determine the level of validity and reliability of HIV-KQ-18 in Indonesian when it is used in the Special Region of Yogyakarta.

2. Materials and Methods

The research study design was cross-sectional study design and sampling was done using convenience sampling. The inclusion criteria were the general public domiciled in Yogyakarta who were at least 18 years old and the exclusion criteria were respondents who did not complete the instrument and duplicate forms from the same respondent. The minimum required sample size is 200 (in the fair and adequate category, with no more than 40 instrument items) (Reise et al., 2000). HIV-KQ-18 has been translated into Indonesian. The original version of HIV-KQ-18 has been translated into Indonesian. The instrument consists of 18 statement items that have 3 answer options: 'true', 'false', and 'don't know'. Respondents score 1 for each correct answer and 0 for 'don't know' answer and wrong answer. The range of scores for knowledge based on HIV-KQ-18 is from 0 to 18 (Carey & Schroder, 2002). Higher scores indicate greater knowledge (Waluyo et al., 2015). Respondents are said to have good knowledge if they get a score of $\geq 75\%$ of the correct answers (Irmayati et al., 2019).

2.1. Research Process

The study began by contacting the developer of the HIV-KQ-18, Professor Michael P. Carey and he has given permission and expressed support for the validation testing of the same instrument for the Indonesian general population (Arifin et al., 2022). Therefore, this study was a part of larger study by (Arifin et al., 2022), although this study's focus was solely on D.I Yogyakarta (Yogyakarta Province). The fact that the two studies' data collecting was undertaken concurrently should be noted (but the respondents and the databases were also different). Notably, 10 respondents from the population of D.I. Yogyakarta participated in the instrument adaptation stages.

The respondents' educational backgrounds ranged from junior high school graduates (3 respondents) to high school graduates (2 respondents), bachelor-level graduates (4 respondents), and masters-level graduates (1 respondent). Furthermore, one respondent worked as a barber; another was a homemaker; one was an online motorbike taxi driver; and two were business owners (traders). The final five respondents were young people we met at a cafe in Yogyakarta.

This preliminary testing was conducted to ensure that the question items that would be distributed could be understood well by the respondents. Questionnaires were distributed to the respondents and the respondents were asked whether they could understand each question item, whether they could interpret the question items into their own words, and whether there were any dictions that needed to be changed but without changing the original meaning. Data was collected online by distributing Google Forms links containing informed consent and instruments via social media, namely, WhatsApp and Facebook, direct messages and paid promotions on Instagram, and direct distribution of Google Forms links to respondents. Respondents might contact the researcher if they had further questions before deciding whether or not to participate as research respondents. Only respondents who stated that they were willing to participate in the research were able to access the instrument and see the contents of the instrument. However, respondents were allowed to withdraw from the research at any time even after they had seen the contents of the instrument.

2.2. Data Analysis

Descriptive statistical analysis was conducted to describe the characteristics of the respondents, such as sex, age, educational attainment, employment status, and monthly expenses. The instrument validity test was conducted on item validity and known-group validity. The validity of the instrument items was analyzed using product-moment correlation and known-group validity was analyzed using the independent t-test or the Mann Whitney test. Meanwhile, reliability was tested with internal consistency using Kuder-Richardson Formula 20 (KR-20).

The test of known-groups validity in this research aimed to determine whether of the HIV-KQ-18 in Indonesian can be used to distinguish the level of knowledge about HIV/AIDS among the public from the 18-28 year age group and the 29-76 year age group, male group and female group, and group with high school or "less than high school" education attainment and group with post-high school education attainment. Based on previous research, hypotheses were formulated. The level of knowledge about HIV/AIDS in the group with post-high school education attainment is higher than that in the group with high school or "less than high school" education attainment (Yaya et al., 2016). The level of knowledge about HIV/AIDS in the female group is higher than that in the male group, while there is no significant difference in the level of knowledge between the various age groups (Nubed & Akoachere, 2016; Sofni et al., 2015).

3. Results and Discussion

3.1. Characteristics of Survey Respondents

The HIV-KQ-18 is a shorter of the previously developed 45- item HIV-K-Q and a translated version of the HIV-KQ-18 is available, but tests for validity and reliability have not been performed (Carey & Schroder, 2002). A total of 305 respondents participated in this research study and the characteristics of the respondents can be seen in Table I. The data shows that the respondents who participated in this study were averagely 28.07 years old with an age range of 18 to 76 years. The majority of respondents are women (63.3%), have post-high school education attainment (69.2%), are employed (53.4%) and single (63.9%), and spend less than IDR 3 million per month (80.3%).

According to the 2020 population census, the Special Region of Yogyakarta is dominated by the millennial generation (with an age range of 24 to 39 years) and generation Z (with an age range of 8 to 23 years), so it is reasonable if the average age of the respondents in this research study is around 28.07 years. The results of the census also reported that population distribution by sex in the Special Region of Yogyakarta is 50.45% women and 49.55% men (Badan Pusat Statistik Provinsi Daerah Istimewa Yogyakarta, 2020). The number of female respondents who participated in this study was also more than the number of male respondents. Based on a research, it is known that the most dominant social media users are women (Lubis, 2014).

The number of respondents with more than high school diploma was greater than respondents with a high school or less than high school diploma. Every year, the number of students in the Special Region of Yogyakarta continues to increase, which may be because of the increasing number of universities in each region and also increasing public awareness of the importance of education.

According to the results of the 2020 report, the average years of schooling of the population aged 15 years and over in the Special Region of Yogyakarta is 9.95 years, of which 3.90% of the population does not attend school, 9.69% does not complete elementary school, 15.60% completed elementary school, 18.73% graduated from junior high school, 36.37% graduated from high school, and 15.70% graduated from college (Badan Pusat Statistik, 2020). Most of the residents of the Special Region of Yogyakarta who are employed are full-time workers (63.68%), while the percentage of part-time workers is 28.29% and the percentage of unemployed residents is 8.04 percent. Therefore, only a few people with high school or less than high school education attainment participated, possibly because they were full-time workers and many refused to take the time to participate in this research study.

Table 1. Respondent Characteristic Data (n=305)

Variable	Number (N)	%
Age (in Years)		
Mean (SD)	28.07 (9.31)	
Age Range	18-76	
Sex		
Male	112	36.7
Female	193	63.3
Educational Attainment		
High school or "less than high school" education	94	30.8
Post-high school education	211	69.2
Employment Status		
Employed	163	53.4
Unemployed	142	46.6
Marital Status		
Married	102	33.4
Single	195	63.9
Preferring not to answer	8	2.6
Monthly Expenses		
Less than IDR 3 million	245	80.3
More than IDR 3 million	60	19.7

3.2. The Results of the Test on the Validity of HIV-KQ-18

The research instrument can be declared valid if each statement item on the instrument is able to reveal something that will be measured by the instrument. To assess whether the statement item in a measuring instrument is valid, product-moment correlation can be used by correlating the score of each statement item with the total score. There are two ways to determine whether an item is valid or not. First, an item on the instrument is valid if r_{xy} is greater than r_{table} . The value of r_{table} can be obtained from the value of degree of freedom ($df = n - 2$ ($n =$ sample size)). Second, an item is said to be valid if the correlation value is greater than or equal to 0.3 ($r \geq 0,3$) (Andreas, 2018).

The number of respondents in this research study was 305 and therefore, the value of df (303) with a significance of 5% was obtained and the value of r_{table} was = 0.112. Based on the results of the validity test on 18 items of the HIV-KQ-18, the r_{xy} value was obtained from 0.177-0.564 and it can be seen in Table II that all items were declared valid because r_{xy} was greater than r_{table} (0.112). This research study is in line with a research study conducted in Kelantan, Malaysia, which reported that the Malay version of HIV-KQ-18 is valid and can be used to assess knowledge about HIV/AIDS (Saddki et al., 2016).

This research study examined the known-groups validity of the HIV-KQ-18 in Indonesian. As expected, based on the known-groups validity test result of the HIV-KQ-18 in Indonesian, it was found that the groups based on sex and level of education exhibited significant differences ($p < 0.05$), while the groups based on age statistically did not exhibit a significant difference ($p > 0.05$). The results of the test on known-groups validity are presented in Table III.

These results are in line with the results of a study on the of HIV-KQ-18 in its first form, which discovered that knowledge about HIV/AIDS among those with more than a high school diploma was higher than those with a high school and less than a high school diploma. Respondents with higher educational attainment had significantly higher knowledge about HIV/AIDS than respondents with lower educational attainment (Carey & Schroder, 2002). Someone who has a higher educational attainment will have broader knowledge than someone with a lower educational attainment (Yuliantini, 2012). This result supports the a priori hypothesis and known-groups validity based on differences in the educational attainment of the respondents.

Test of known-groups validity of the HIV-KQ-18 that compared group differences based on sex and age has just been conducted in this research study, but another research study has obtained a result that female adolescents have a higher level of knowledge about HIV/AIDS than male adolescents. Based on Indonesia Demographic and Health Survey in 2017, female adolescents tend to hear more information about HIV/AIDS than male adolescents, so their knowledge about HIV/AIDS is higher than that of males (BKKBN et al., 2018; Nurwati & Rusyidi, 2018). Another study conducted in Jember also revealed that the pre-test and post-test scores on knowledge about HIV/AIDS in the female adolescent group were averagely higher than the scores in the male adolescent group (Rahmawati et al., 2020). This result supports the a priori hypothesis and known-groups validity based on the sex differences of the respondents.

The result of known-groups validity test based on age differences is in line with the result of another study, which, based on multivariate test that has been conducted, showed that there was no significant difference in knowledge about HIV/AIDS between respondents of various age groups [$F(6.222) = 2.091, p > 0.05 (0.055); Wilk = 0.896$] (Nubed & Akoachere, 2016). Knowledge based on age differences that is not statistically different can be influenced by educational attainment of each respondent because in this research study, there were more respondents who have post-high school education attainment than those who have high school or less than high school education attainment. Educational attainment is one of the factors that can greatly influence a person's knowledge about HIV/AIDS (Sulkarnaen & Ronoatmodjo, 2017). This statement is supported by another study, which statistically discovered a significant relationship between education and the level of knowledge about HIV/AIDS (Oktarina et al., 2009). This result also supports the a priori hypothesis and known-group validity based on age differences.

3.3. The Results of Reliability Test on the HIV-KQ-18

Reliability test is used to test the extent to which an instrument is able to produce accuracy and consistency for repeated measurement results. KR-20 was employed to test reliability because it is suitable for dealing with dichotomous data (Yusup, 2018). Dichotomous data consists of two scores, namely 0 or 1, where only the correct answer from the respondent will get a score of 1 and the wrong answer will get a score of 0. KR-20 was preferred in this study over KR-21 because the results of the HIV-KQ-18 are dichotomous and the difficulty level of the statement items also varies.

Based on the results of the internal consistency (reliability) of the HIV-KQ-18, the KR-20 reliability coefficient value was 0.76. An instrument is considered reliable if the KR-20 figure is greater than 0.70 (Fraenkel et al., 2012). The result of the reliability test on the instrument in its use among the population in the Special Region of Yogyakarta was declared acceptable because the value was greater than 0.70 and therefore, HIV-KQ-18 in Indonesian declared to have high consistency and reliability. The result of this research study is in line with the result of a research study on the internal consistency of the HIV-KQ-18 conducted in Vancouver, Canada, which revealed good internal consistency with Cronbach's alpha value of 0.82 (Johnston et al., 2011). The HIV-KQ-18 also has good internal consistency with a Cronbach's alpha value of 0.87 according to a study in Nigeria (Ezegbe et al., 2018). Another study conducted in Kelantan, Malaysia, also stated that the HIV-KQ-18 has good internal consistency with Cronbach's alpha value of 0.78 (Saddki et al., 2016).

3.4. Research Limitations

Data collection was done online due to the high number of COVID-19 cases in Indonesia. Therefore, the research respondents were only people who are literate about social media. People who live in remote areas and people who do not have social media accounts did not participate in the study. As a result, the ratio of the respondents who participated in this study, whether based on sex, age, or educational attainment, became unbalanced.

Table 2. The results of the validity test on the items of HIV-KQ-18

1	Statement	r-xy	r-table	Conclusion
	Coughing and sneezing do not spread HIV.	0.378	0.112	Valid
	A person can get HIV by sharing a cup of water with someone who has HIV.	0.564	0.112	Valid
	Pulling out the penis before a man climaxes/cums/ejaculates keeps a woman from getting HIV during sex.	0.522	0.112	Valid
	A woman can get HIV if she has anal sex with a man.	0.234	0.112	Valid
	Showering, or washing one's genital/private parts, after sex keeps a person from getting HIV during sex.	0.511	0.112	Valid
	All pregnant women infected with HIV will have babies born with AIDS.	0.475	0.112	Valid
	People who have been infected with HIV quickly show serious signs of being infected. These serious signs will appear a maximum of 5 (five) days after infection.	0.555	0.112	Valid
	There is a vaccine that can stop adults from getting HIV.	0.512	0.112	Valid
	People are likely to get HIV by deep kissing, putting their tongue in their partner's mouth if their partner has HIV.	0.462	0.112	Valid
	A woman cannot get HIV if she has sex during her period.	0.450	0.112	Valid
	There is a female condom that can help decrease a woman's chance of getting HIV.	0.197	0.112	Valid
	A natural skin condom works better against HIV than does a latex condom.	0.510	0.112	Valid
	A person will not get HIV if he/she takes antibiotics.	0.543	0.112	Valid
	Having sex with more than one partner can increase a person's chance of being infected with HIV.	0.177	0.112	Valid
	Taking a test for HIV one week after having sex will tell if a person has HIV.	0.515	0.112	Valid
	A person can get HIV by sitting in a hot tub or a swimming pool with a person who has HIV.	0.536	0.112	Valid
	A person can get HIV from oral sex.	0.240	0.112	Valid
	Using Vaseline or baby oil with condoms lowers the chance of getting HIV.	0.562	0.112	Valid

Table 3. The Results of the Test on Known-groups Validity of HIV-KQ-18 (n=305)

Variable	Mean (SD)	P-value
Age (In Years)		
18-28	10.64 (3.46)	0.244
29-76	10.02 (4.17)	
Sex		
Male	9.51 (3.87)	0.001
Female	10.95 (3.55)	
Educational Attainment		
High school or "less than high school" education	7.98 (3.49)	0.000
Post-high school education	11.51 (3.30)	

4. Conclusion

A valid and reliable instrument is needed to obtain comparable assessment of public knowledge about HIV/AIDS from time to time. The HIV-KQ-18 is a valid and reliable instrument and therefore, it can be used to measure public knowledge in the Special Region of Yogyakarta about HIV/AIDS.

Author Contribution Statement: Bustanul Arifiin is the proponent of the research idea. Muh. Deni Kurniawan collected and analyzed data and wrote manuscripts. Muh. Deni Kurniawan, Bustanul Arifin, M. Rifqi Rokhman, and Dyah Aryani Perwitasari contributed in the process of data

interpretation and manuscript preparation. All authors were involved in conceptualizing and designing the research study, providing input, and reading and approving the manuscript. All authors have read and approved the final manuscript.

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Competing Interests

The authors have no conflicts of interest to declare.

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