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## Development of Scale for Knowledge Test and Questionnaire Behavior of Prevention HIV/AIDS Student College in Surabaya City

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# Development of Scale for Knowledge Test and Questionnaire Behavior of Prevention HIV/AIDS Student College in Surabaya City

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**Abstract.** The Questionnaire and Knowledge Test are a research instruments that can be used to find out information about the epidemiology study on HIV/AIDS in Surabaya city. The latest report shows an increase in HIV/AIDS cases in Indonesia with the highest incidence in East Java amounting to 1,614 people and dominated by adolescents. The purpose of this study was to develop an instrument for HIV/AIDS prevention behavior questionnaire and knowledge Test to reduce HIV / AIDS transmission among teenagers in Surabaya city. The methods used follow the Environmental attitude scale (EAS) by testing the validity, reliability, and factor analysis of each variable item. Cronbach  $\alpha$  questionnaire reliability (0.904) is a very good category, KMO and Bartlett's Test (0.822) a total of 7 valid variables. Reliability Test Alpha Cronbach for knowledge test (0.702) with the good category, KMO and Bartlett's Test (0.822) a total of 6 items of valid variables. Instrument valid can be tested. The result of UINSA Student prevention behavior on HIV / AIDS is categorized as "poor" and knowledge of HIV/AIDS is categorized as "Good enough."

**Keywords:** Questionnaire, knowledge test, HIV/AIDS, Cronbach  $\alpha$ , KMO and Bartlett's Test.

## 1. Introduction

A Questionnaire is a tool that can be used to measure and know information regarding knowledge and behavior in a population. [1]. Questionnaires can be used to find information about epidemiological studies in a human population affected by an outbreak of disease [2]. HIV/AIDS is the most common secondary immune deficiency disease in the world and is now a severe epidemic problem [3]. Acquired immunodeficiency syndrome (AIDS) could be a genuine, life-threatening ailment, caused by the human immunodeficiency virus (HIV) [4].

Indonesia incorporates a fast-growing HIV-AIDS epidemic. Concurring to national data, up to June 2010, the number of cases come to 21,770 which are twice from the number in 2007. It is assessed that the number of individuals living with HIV-AIDS reaches 500,000 individuals by the year 2014 [5]. The latest situation report on HIV/AIDS in Indonesia HIV infection in East Java was ranked first, 1,614 people. The age range of 20 - 24 years ranked second 17.6% of 1,823 inhabitants. The age range 25 - 49 years ranked first 69.6% of 7,220 inhabitants. Based on gender male sex is 6,865 (66%), female sex is 3,511 (34%). A report on the developmental situation of AIDS in East Java was ranked



second in number 103. The data reports from 1987 - 2017 ranged in age from 20 until 29 was ranked second 29.3% as many as 197 people. The age range 30 - 39 was ranked first 38.6% as many as 260 inhabitants. Based on male sex, the first rank of 70.9 % is 477 inhabitants, female genitals 28.7% are 193 inhabitants [5].

The questionnaire distributed to 259 undergraduates Chinese. The Questionnaire provides information about knowledge and behavior about HIV/AIDS. The results show that HIV/AIDS can know the condition of knowledge, human behavior regarding HIV/AIDS. [6]. The sexual behavioral restraint and shirking of high-risk circumstance survey can be utilized as a substantial and solid device to degree restraint and evasion of high-risk circumstances concerning HIV/AIDS disease. In any case, it is prescribed to test the legitimacy of the device in different communities such as students, researchers, etc. [7]. Validating the questionnaire validation process by producing 31 questions that focus on controlling HIV/AIDS in primary health [4].

Increasing cases of HIV/AIDS in Indonesia, especially in East Java region is higher. The incidence of HIV/AIDS is dominated mostly by the age range entering the youth category. The purpose of this study was to develop an instrument for HIV/AIDS prevention behavior questionnaire and knowledge Test to reduce HIV/AIDS transmission among teenagers in Surabaya city. The questionnaire and knowledge test are the instruments that can measure and find out information about HIV/AIDS incidence among adolescents so that researchers try to develop questionnaires in the form of HIV/AIDS knowledge test and questionnaire of HIV/AIDS prevention behavior for adolescents in Surabaya city.

## 2. Methods

Sample: Pre-Test Knowledge test and questionnaire can be tested Student active outside State Islamic University of Sunan Ampel Surabaya (UINSA) suing purposive sampling with total respondents of knowledge test involving 129 students and questionnaires involving 59 students. The development stages of questionnaires adapted Environmental attitude scale (EAS) following five stages of the process that is (1) Development of item pool (2) validation of item pool (3) Taking expert opinion (4) Pilot testing (5) Test instrument [8]. Post – Test Knowledge and a questionnaire about HIV/AIDS can be tested inside UINSA student with total respondent N=223 Student. The research location was at UINSA at Ahmad Yani Street No. 117, Jemur Wonosari, Surabaya City, East Java.

Stage 1. Development of item pool: 15 items each for knowledge test and questionnaire prevention behavior HIV/AIDS based on scientific literature by selecting several variables related to HIV/AIDS knowledge and questionnaire tests among adolescents. The test of knowledge consisted of multiple choice with five-option multiple choices; the correct answer was assessed 1 and wrong point was 0. The questionnaire was made with sentence statements of effort of HIV/AIDS prevention behavior among adolescent with Likert scale 4 = always, 3 = often, 2 = sometimes, 1 = rare, 0 = never. Stage 2 validation of item pool: 15 items that have been made into a test of knowledge and questionnaires validated by an expert about the content of sentences, accuracy, sentence comprehension, scale. Stage 3. Taking expert opinion knowledge test and questionnaire validated by expert again and checked each variable about the content sentence, accuracy, comprehension, scale. Stage 4. Pilot testing: Sentence items can be checked based on respondents' opinions on questions on knowledge tests and questionnaire statements if they are ambiguous, inappropriate and difficult to understand. Stage 5. Instrument Test: In the validity test table R-value, each qualified variable ( $r > N-2$ : R-value) on the item table Corrected item-total correlation can be tested further. If there are variables did not pass the test, then the variable was eliminated and re-tested. The valid Instrument was tested.

Variables that passed the validity test in the Cronbach  $\alpha$  test and factor analysis was applied. Variables that met the value of Cronbach  $\alpha$  then proceeded into analysis factor to know value loading factor.

### 3. Results and Discussion

#### 3.1. Validity test

Table 1 Corrected item - total. Test the validity of the questionnaire viewed from Corrected item-total correlation. Total respondents were 59 then  $R$ -value  $> 0.2564$ , if it fulfilled the value then, can further testing, from 15 items that are eliminated and passed the test is seven variables. Test validity knowledge test total 129 respondent then  $R$ -value  $> 0.1750$ , if it meets that value then in the further test, from the 15 items that are eliminated and passed the test is six variables. Knowing the validity of the questionnaire is done by comparing the  $r$  table value with the value of  $r$  arithmetic.

**Table 1.** Corrected item-total for Questionnaire and Knowledge test.

Questionnaire	Validities Value N=59	Knowledge test	Validities Value N=129
Access to counseling and health services	0.738	Sexual transmission	0.391
Voluntary HIV test	0.740	Perinatal transmission	0.612
Friendly health services	0.633	Blood Transmission	0.410
Sex education	0.705	HIV effect	0.336
Community development about the social norm	0.766	Intermediary activity	0.404
Mass media to change the norm and behavior values	0.664	Intermediary activities 2	0.448
Counseling on HIV test	0.770	-	-

The validity Test saw from Corrected item-total correlation. Validity for questionnaire Total respondents were 59 then  $r > 0.2564$ , if it meets the value then in the advanced test. 15 items eliminated and passed the test were 7 variables: (1) access to counseling health services (0.738), (2) voluntary HIV testing (0.740), (3) friendly health services (0.633); (4) sex education; (5) community development about social norms (0.766), (6) mass media for changing norms and behavioral values (0.664), (7) counseling on HIV test (0.770).

The validity for knowledge test results, Total respondents were 129 then  $R$ -value  $> 0.1750$ , if it meets the value then in the advanced test. 15 items that were eliminated and passed the test were six variables. sexual transmission (0.391); perinatal transmission (0.612); blood transmission (0.410); intermediary activities (0.404); intermediary activities 2 (0.448); HIV effect (0.336). Items had low ( $<0.25$ ) point biserial relationship (uncorrected item-total correlation) but were held because they may be part of a more auxiliary calculation [9].

#### 3.2. Reliability test

Cronbach  $\alpha$  for questionnaires are categorized very good and can be applied for research purposes while Cronbach  $\alpha$  for knowledge tests are categorized good. Table 2. Reliability Cronbach's  $\alpha$ . Results Cronbach  $\alpha$  questionnaire showed 0.904 with 7 item variables. Cronbach  $\alpha$  test results showed 0.702 with 6 item variables. The limit value of reliability instrument can be taken as 0.70. It is expressed that for pilot testing  $\alpha$  can be taken as 0.60, in basic research it should be 0.80, and for applied research, the value of  $\alpha$  should be around 0.90-0.95 [10]. The Cronbach's  $\alpha$  coefficient for the post-questionnaire was 0.68, Acceptable for newly development scale [11]. Values of  $\alpha$  of 0.7-0.8 may be respected as worthy, whereas those over 0.8 are great. The item-total relationships are relationships between each aspect on the scale and the complete scale [12]. The attitude towards EBP subscale Cronbach's  $\alpha$  was 0.79 [13]. The  $\alpha$  values between 0.8 and 0.9 appear a tall inside consistency show a high internal consistency and  $\alpha$  values of 0.7 and higher present good internal stability [14], knowledge tests on AIDS with Cronbach  $\alpha$  of 0.70 can be used to obtain information about HIV, condom use and relationships regarding HIV knowledge [15].

**Table 2.** Reliability Cronbach's Alpha.

Alpha values Questionnaire N = 7	Alpha values Knowledge test N=6
0.904	0.702

### 3.3. Factor analysis test

Table 3 KMO and Bartlett's Test. KMO value questionnaire 0.822, Chi-Square count 238,543 with 0.000 significance. KMO value of knowledge test 0.641, Chi-Square count 151.343 with significance 0.000. The value of KMO questionnaires and knowledge tests above 0.6 can be concluded accepted and can be tested further.

The reality that KMO value was over 0.60 and Bartlett test was important demonstrating the qualification of information for figure examination [16]. According to the Environmental Attitude Scale (EAS) development research, it states that in the parametric analysis, they include toricity test that may be a factual method which can be utilized to check out whether the information comes from a multivariate ordinary dissemination or not. Bartlett test was carried out the current ponder was critically thin the current study was significant ( $\chi^2 = 3432.77$ ;  $p < 0.00$ ) [8]. A Kaiser-Meyer-Olkin score of 0.861 was achieved ( $p < 0.001$ ), suggesting that factor analysis was appropriate for this data set [13].

**Table 3.** KMO dan Bartlett's Test.

	KMO dan Bartlett's Test.	Chi-Square	Sig. Value
Questionnaire	0.822	238.543	0.000
Knowledge test	0.641	151.343	0.000

Table 4 Anti-image matrices. The number marked (a) indicating the number of *Measures of Sampling Adequacy* (MSA) a variable. The selectable Variable whose value  $> 0.2$ ; if not then, the variable must be out. Fifteen items were eliminated into seven valid variables. Whereas, for knowledge tests of 15 items were eliminated into six logical variables. Factor analysis has been carried out four times on the information. The reason for that was to dispense with items whose item-scale relationship esteem of underneath 0.20 [8].

**Table 4.** Anti-image matrices.

Questionnaire	Anti-image matrices (a)	Knowledge test	Anti-image matrices (a)
Access to counseling and health services	0.859	Sexual transmission	0.604
Voluntary HIV test	0.772	Perinatal transmission	0.617
Friendly health services	0.883	Blood Transmission	0.641
Sex education	0.815	HIV effect	0.838
Community development about the social norm	0.817	Intermediary activity 1	0.630
Mass media to change the norm and behavior values	0.857	Intermediary activities 2	0.644
Counseling on HIV test	0.783	-	-

Fifteen items in the knowledge test were eliminated into six valid variables. Sex Transmission 0.604; perinatal transmission 0.617; blood transmission 0.641; intermediary activity 0.630; intermediary activities 2 0.644; HIV effect 0.838. Fifteen items in the questionnaire were eliminated into seven valid variables. Variable access to counseling and health services 0.859; voluntary HIV test

0.772; friendly health services 0.883; education sex 0.815; community development on normal social 0.817; mass media to change the norm and behavior values of 0.857; counseling on HIV test 0.783.

**Table 5.** Communalities variance.

Questionnaire	Communalities (%)	Knowledge test	Communalities (%)
Access to counseling and health services	0.664 (66.4%)	Sexual transmission	0.490 (49 %)
Voluntary HIV test	0.671 (67.1 %)	Perinatal transmission	0.785 (78.5%)
Friendly health services	0.526 (52.6 %)	Blood Transmission	0.462 (46.2%)
Sex education	0.526 (52.6%)	HIV Effect	0.758 (75.8%)
Community development about normal social	0.699 (69.9%)	Intermediary activity	0.760 (76 %)
Mass media to change the norm and behavior values	0.572 (57.2%)	Intermediary activities 2	0.285 (28.5%)
Counseling on HIV test	0.705 (70.5%)		

**Table 6.** Total variance.

Questionnaire	Eigenvalue > 1	Total variance (%)	Knowledge test	Eigenvalue > 1	Total variance (%)
Transmission and the effects of HIV / AIDS	2.420	40.336 %	HIV prevention behavior	4.462	(63.743%)
Intermediaries of HIV / AIDS	1.120	18.674 %			
Tot. 59.010 %.			Tot. 63.743%		

Table 5 Communalities questionnaire, for example, variable access to health counseling services 0.664. This means a 66.4% variation of the variables described by the factors formed. This is similar to other variables. Table 5 Communalities knowledge test, for Variable sexual transmission 0.490. This means 49% variation of the sexual transmission variables described by the factors formed, similar to other variables. The smaller the extraction value, the weaker with the relationship factor formed.

Table 6. Total variations. There are two factors formed from 7 questionnaire variables. Factor eigenvalue > 1. Factor 1 eigenvalue of (2.420) with variance (40.336%); factor 2 (1.120) with variance (18.674%). The total variance of 6 variables is extracted to 59.010%. The amount of variance that can be explained by the new factor that formed 59.010%. While the rest is explained by other factors not investigated.

Only 1 factor for Knowledge test formed from 7 variables. Eigen factor value > 1. Factor 1 eigenvalue equal to 4.462 with variance (63.743%); The amount of variance that can be explained by the new factor formed 63.743% while the rest is explained by other factors not examined.

Principal component factor analysis yielded three factors, each with eigenvalue > 1 [13]. Value discovered from 4 factors which 5.351 for the first factor shows value 4.996, two factors 2.095 for third and fourth factors 1.434 and almost all the factor values have eigenvalue or Eigen factor value > 1 [8]. The variance clarified within the second-factor analysis must be 30% or more [16]. A four-factor solution was acknowledged. The four factors explained 40% of the full change which is a satisfactory value [8]. The calculating investigation uncovered the nearness of five-factor with eigenvalues of more noteworthy than 1.0 clarifying 66.56% of the whole variance [11].

**Table 7.** Loading factor each variable item.

<b>Questionnaire</b>	<b>F1</b>	<b>Loading factor</b>		
HIV prevention behavior	Access to counseling and health services	0.815		
	Voluntary HIV test	0.819		
	Friendly health services	0.725		
	Sex education	0.791		
	Community development about normal social	0.836		
	Mass media to change the norm and behavior values	0.756		
	Counseling on HIV test	0.840		
<b>Knowledge test</b>	<b>F1</b>	<b>Loading factor</b>	<b>F2</b>	<b>Loading factor</b>
Transmission and the effects of HIV / AIDS	Sexual transmission	0.698		
	Perinatal transmission	0.874		
	Blood Transmission	0.669		
	HIV Due	0.490		
Intermediaries of HIV / AIDS			Intermediaries of HIV / AIDS 1	0.861
			Intermediaries of HIV / AIDS 2	0.853

Table 7 Loading factors for each questionnaire variable and knowledge test. The Rotated component of the above matrix table explains the loading factor values of each variable. Value loading factor must be above 0.4. Loading factor is the amount of correlation between factors formed with these variables. The results of loading value of questionnaire factor formed 1 variation of the variable that is HIV/AIDS prevention behavior, while the result of loading value of the variable of questionnaire test factor formed 2 variations of Transmission and consequences and intermediaries of HIV/AIDS. Factor loading was below 0.40 cannot be processed further [8]. The figure relationship matrices were further inspected to confirm the nearness of related components, which class for oblique rotation. The two-factor arrangement was interpretable with 26 items loading  $\geq 0.40$  on the assigned components [17].

The questionnaire behavior of prevention HIV/AIDS can be used to determine the condition of behaviors that have been done by adolescents with the status of students and students' college. The information obtained can be used to reduce HIV/AIDS transmission. The HIV/AIDS knowledge test can be used to measure the extent to which teens (students or students' college) know about HIV/AIDS. HIV/AIDS knowledge is essential to raise awareness of healthy teenagers. High awareness to know about HIV/AIDS among adolescents contributes to preventing HIV/AIDS transmission with HIV/AIDS prevention behaviors, so the spread of HIV/AIDS can be reduced.

Valid questioner development can be used to assess the satisfaction of patients infected HIV with pharmaceutical services provided in HIV/AIDS care center in Nigeria [18]. Surveys can be used to know information about knowledge, attitude, and confidence by youth about HIV/AIDS in San Francisco. The data were obtained from 1,326 youth. The questioners provide information that can be used to take prevention steps that must be taken to reduce the risk of HIV/AIDS infections [13]. Useful questionnaires were utilized to survey HIV chance and information related to anticipation. Items adjusted from measures detailed by Carey and Schroder and reflected data on HIV transmission,

condom utilize, and AIDS-related information. The AIDS knowledge test was internally consistent,  $\alpha=0.70$ . Questionnaire surveys can be used to contribute research on a large scale to measure sexual behavior and become a methodological challenge in survey research [19].

### 3.4. *Valid instrument*

The instrument that has been valid can be tested in a UINSA student population. The total number of respondents 233 UINSA students. Total Male 57 (24.5%) people and female 176 (75.5%). Student age ranged between 17 - 24 years. Grade 1 – 9. Faculty Humanities (1.7%), Communication (2.1%), FDK (4.3%), Economic (12.4%), Politic (2.1%), FPK (5.6%), FSH (5.2%), FST (1.7%), FTK (29.2%), Law (6.0%), PGMI (0.9%), Psychology and Health (3%), Science (3.4%), Syariah (0.4%), Tarbiyah (4.7%), Ushuludin (4.3%). Student Spread in Indonesia region such as Java, Batavia, Sumatera, Borneo, Madura.

The results of UINSA Student prevention behavior on HIV/AIDS were categorized into “poor” with mean value (9.3391) standard deviation of (6.33144). UINSA students' knowledge of HIV/AIDS was categorized “good enough” with the mean score of (3.9957) standard deviation of (1.32450).

Scale for questionnaire has 4 categorized namely excellent (21-28), good enough (14-21), poor (7-14), and not good (0-7). Scale for knowledge test has 4 categorized namely very good (4.5-6), good enough (3-4.5), less good (1.5-3), and not good (0-1.5).

The efforts to reduce transmission of HIV/AIDS (1) information about HIV/AIDS. The importance of HIV/AIDS knowledge such as knowledge of the use of condoms, brochures, pamphlets as a medium for promoting HIV/AIDS learning in the classroom, (2) School-based second education. The importance of sex education programs to find out health norms in schools, and (3). Deliberate advising and testing. Intervention empowers individuals to know their HIV status and gives advising back to assist them to adapt with the results, and (4) Peer-based programs. Peer mediations utilize compelling individuals of a focused-on community to spread data or instruct specific abilities [20].

Behavioral strategies to reduce HIV prevention included we must accomplish (1) radical behavioral changes both between people and over huge bunches of at-risk people to decrease rate, (2) cognitive behavioral, powerful communications, peer-instruction, and dissemination of advancement approaches to alter are useful inside a combination of avoidance system, behavioral alter objectives for behavioral procedure include information, disgrace diminishment, get to the administrations, delay of onset of to begin with intercut, a diminish in a few accomplishes, increments in condom deals or utilize, and diminishes in sharing of sullied infusion hardware. A multilevel approach that includes behavioral procedures must be taken behavioral HIV contamination [21].

Antiretroviral therapy begins by calculating the amount of CD4 in the individual body. Biomedical importance in efforts to promote antiretrovirals to reduce HIV transmission. Recommendations for special conditions and condition are provided. The reasons for switching therapy includes convenience, tolerability, simplification, the anticipation of potential new drug interactions, pregnancy, elimination of food restrictions, virologic failure, or drug toxicities [22].

## 4. Conclusion

The questionnaires were performed using with Cronbach  $\alpha$  reliability (0.904), KMO and Bartlett's Test. (0.822), loading factor formed 1, total variance factor 1 eigenvalue equal to 4,462 with total variance (63.743%). The knowledge test with Cronbach  $\alpha$  reliability (0.702), KMO value and Bartlett's Test knowledge test was 0.641, loading factor formed 2 is, factor 1 (Transmission and effect of HIV/AIDS) eigenvalue of 2,420 with variance (40.336%); factor 2 (Intermediary of HIV/AIDS) was 1.120 with variance of (18.674%). The total variance factor 1 eigenvalue was 59.010%. The questionnaire of HIV/AIDS prevention behavior and HIV/AIDS knowledge test can be used to identify the relationship between knowledge and behavior of HIV/AIDS prevention among adolescents.



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