JBE Jurnal Berkala EPIDEMIOLOGI

JURNAL BERKALA EPIDEMIOLOGI
Volume 7 Issue 2 (2019) 155-162
DOI: 10.20473/jbe.v7i22019.155-162
p-ISSN: 2301-7171 ; e-ISSN: 2541-092X
Website: http://journal.unair.ac.id/index.php/JBE/
Email: jbepid@gmail.com / jbe@fkm.unair.ac.id

Jurnal Berkala EPIDEMIOLOGI

THE VALIDITY TEST OF DEPRESSION SCREENING INSTRUMENT IN ADOLESCENCES

Uji Validitas Instrumen Skrining Kecenderungan Depresi Pada Remaja

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ARTICLE INFO

Article History:
Received January, 7th, 2019
Revised form January, 17th, 2019
Accepted May, 24th, 2019
Published online August, 31st, 2019

Keywords:
depression;
adolescent;
screening;
validity

Kata Kunci:
depresi;
remaja;
skrining;
validitas

ABSTRACT

Background: The total estimates of people living with depression have increased by 2% from 2005 to 2015. Depression cases can be managed by screening for depression that has good validity. **Purpose:** This study aims to assess the validity of a depression screening instrument and provide suggestions for the development of depression screening programs. **Methods:** This study used an analytic observational study and the design study was a cross-sectional approach. The data were analyzed and presented in a descriptive manner. The sample size was 57 adolescents in senior high school. This screening used The Center for Epidemiological Studies Depression Scale (CES-D) questionnaire for instrument screening and Zung Self Depression Scale (SDS) questionnaire for gold standard. The screening was performed with interviews according to questionnaire guideline. The final screening evaluation was conducted by a psychologist. **Results:** The interview conducted using the screening instrument guideline gathered 47 respondents (82.46%) who have the tendency of depression and the gold standard showed 1 respondent (1.75%) who has the tendency of depression, while the prevalence based on the gold standard was 1.75%. The results of the validity test showed sensitivity 1 (100%), specifications 0.17 (17.85%), negative predictions 1 (100%), and positive predictions of 0.02 (2.12%). **Conclusion:** The validity result of screening instrument is not good enough. The weakness of this study is the results cannot be applied widely.

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ABSTRAK

Latar Belakang: *Estimasi total jumlah populasi yang hidup dengan depresi mengalami peningkatan sebesar 2% dari tahun 2005 ke tahun 2015. Kasus depresi dapat ditangani dengan upaya skrining kecenderungan depresi yang memiliki validitas yang baik.* ***Tujuan:*** *Menilai validitas instrumen skrining kecenderungan depresi dan memberikan saran untuk pengembangan skrining.* ***Metode:*** *Penelitian ini menggunakan jenis penelitian analitik observasional, dengan rancang bangun penelitian adalah cross sectional. Data*

dianalisis dan disajikan secara deskriptif. Sasaran skrining kecenderungan depresi yakni siswa SMA yang berjumlah 57 orang, lokasi kegiatan skrining di SMA Muhammadiyah 7 Surabaya, dengan jadwal pelaksanaan tanggal 30 Oktober 2018. Alat skrining yang digunakan adalah kuesioner The Center For Epidemiologycal Studies Depression Scale (CES-D) dan kuesioner Zung Self Depression Scale (SDS) sebagai baku emas. Skrining dilakukan dengan wawancara sesuai panduan kuesioner. Penilaian hasil skrining dilakukan oleh psikolog. ***Hasil:*** *Wawancara sesuai dengan panduan instrumen skrining menjaring 47 responden (82,46%) yang memiliki kecenderungan depresi dan baku emas menghasilkan 1 responden (1,75%) yang memiliki kecenderungan depresi, sedangkan prevalensi berdasarkan hasil baku emas sebesar 1,75%. Hasil perhitungan validitas instrumen skrining yakni sensitivisitas sebesar 1 (100%), spesifisitas 0,17 (17,85%), NPN 1 (100%), dan NPP 0,02 (2,12%).* ***Kesimpulan:*** *Nilai validitas instrumen skrining masih kurang baik. Terdapat kelemahan dalam penelitian yakni hasil belum dapat digeneralisasikan.*

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INTRODUCTION

Mental disorders are health problems that are being faced by all countries in the world and it can cause morbidity and mortality (Gardner, 2014). Moreover, it can raise health, social, and economical burdens. One of the mental disorders that often occur in society is depression. Depression disorders are the leading cause of morbidity worldwide (WHO, 2018).

Total estimates of population living with depression increased by 2% from 2005 to 2015,. Globally, more than 300 million people experience depressive disorders. Depression can generate an idea or desire to commit suicide in the patient. For these reasons, suicide is ranked number two cause of death in the world at the age of 15-29 years and almost 800 thousand lives are lost yearly due to suicide. Southeast Asia is the region with the highest prevalence of depression (27%) compared to other WHO regions (WHO, 2017).

Depression disorders are one of the mental health problems in Indonesia. Depression prevalence in Indonesia for people aged ≥ 15 years is 6%, from all of the patients only 9% received treatment and the remaining in 91% have not received treatment (Kemenkes RI, 2018).

In general population, not many people know about symptoms of depression specifically. They assume the symptoms that appear are a natural and normal thing. But in fact, it is eventually become a serious health problem. Depressed patients are not properly diagnosed because of the inaccurate targets and lack of diagnosis, with the result that patients do not get proper treatment and evolving into a more severe phase (Reynolds & Patel, 2017).

Depression screening programs on the general public or at risk community are one of the efforts to finding depressed patients, so that appropriate treatment can be given as early as possible (Lewandowski et al., 2016). One of the factors that can support the success of screening is the screening instrument has good validity. Screening instrument that has good validity can show depressed patients appropriately and it can support the success of the screening program (Maxim, Niebo, & Utell, 2014). The purpose of this research is to assess the validity of depression screening instrument and provide suggestions for the development of depression screening program.

METHODS

This study was observational with a cross-sectional design study. The data were analyzed and presented in descriptive manner. The targets of screening were students of class X in senior high school who studied at SMA Muhammadiah 7 in Surabaya. Samples were taken randomly with a total of 57 people. The screening activity was held on October 30 in 2018.

The gold standard for screening depression is Zung Self-Rating Depression Scale (SDS) and the

screening instrument is the Center for Epidemiologic Studies Depression Scale (CES-D). The screening was carried out by the researcher using interview technique with the questionnaires guidelines as the gold standard and screening instrument. The assessment and categorization of depression were carried out by psychologists.

The Zung Self-Rating Depression Scale (SDS) questionnaire has 20-item questions for measuring the symptoms of depression. Items are ranked from 1 to 4, which using a likert scale. The meaning of that scales are “1” if the symptoms a little of the time/ very rarely/rarely appear, “2” if the symptoms appear once in a while/ some of the time/ occasionally, “3” if the symptoms appear good part of the time/ very often/ often, and “4” if the symptoms appear most of the time/ always/ almost always. Therefore, for each item, participants have to score according to whether the item has occurred. Score range from 20 (lowest) to 80 (highest), and scores are categorized into one of the following four groups, they are not depressed, mildly depressed, moderately depressed and severely depressed (Table 1) (Álvarez, Valencia, Devia, Barrera, & Idarraga, 2016).

Questions of the Center for Epidemiologic Studies Depression Scale (CES-D) questionnaire were prepared to identify the main depressive symptom that occurred within a week before the screening, it has 20-item questions. The items are ranked from 0 to 3, which is a likert scale. The meaning of that scales are “0” if the symptoms appear rarely or none of the time (less than 1 day), “1” if the symptoms appear some or a little of the time (1-2 days), “2” if the symptoms appear occasionally or a moderate amount of the time (3-4 days), and “3” if the symptoms appear most or all of the time (5-7 days). Score range from 0 (lowest) to 60 (highest), and scores are categorized into one of the following two groups, they are Not depressed and depressed (Table 2; Table 3) (Vilagut, Forero, Barbaglia, & Alonso, 2016).

Table 1

The Depression Categories of the Zung Self-Rating Depression Scale (SDS)

Score	Categories
>70	Severely depressed
60-69	Moderately depressed
50-59	Mildly depressed
20-49	Not depressed

Source : Álvarez, Valencia, Devia, Barrera, & Idarraga (2016)

The screening conducted by interviewing respondents one by one according to the SDS and CES-D questionnaires that have been translated into Indonesian. The data collected were assessed and grouped into the categories of each questionnaire according to table 1 and table 2 by clinical psychologists.

Table 2

The Depression Categories of the Center for Epidemiologic Studies Depression Scale (CES-D)

Score	Categories
<16	Not depressed
≥16	Depressed

Source : Vilagut, Forero, Barbaglia, & Alonso (2016)

The data that have been grouped in table 6 were calculated to know about the validity value of the screening instrument against the gold standard. The calculation of validity is calculating the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). Those calculating formulas are:

$$\text{Sensitivity} = \frac{True\ Positive}{True\ Positive + False\ Negative}$$

$$\text{Spesificity} = \frac{True\ Negative}{False\ Positive + True\ Negative}$$

$$\text{NPP} = \frac{True\ Positive}{True\ Positive + False\ Positive}$$

$$\text{NPN} = \frac{True\ negative}{True\ Negative + False\ Negative}$$

The prevalence of depression according to the gold standard result is calculated by dividing the number of a case with the population. The screening test has two results; there are positive and negative. A positive result suggesting that the respondents have a tendency of depression and a negative result suggesting that the respondents do not have the tendency of depression; thus, the validity of screening instrument can be described into a 2×2 table (Maxim, Niebo, & Utell, 2014). The validity of screening instrument has been calculated into a 2×2 table, therefore it is categorized int two categories which are depressive and no depressive.

RESULTS

This result showed the distribution of male (56, 14%) is higher than women (43, 86%). The age range of all respondents is 14-19 years. Most of the respondents were 15 years (59, 56%). In this study, the age of respondents were not categorized because all respondents were classified as adolescence (Table 4).

Table 3
The Center for Epidemiologic Studies Depression Scale (CES-D) Questionnaire

No	Questions	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
1	I was bothered by things that usually don't bother me.				
2	I did not feel like eating; my appetite was poor.				
3	I felt that I could not shake off the blues even with help from my family or friends.				
4	I felt that I was just as good as other people.				
5	I had trouble keeping my mind on what I was doing.				
6	I felt depressed.				
7	I felt that everything I did was an effort.				
8	I felt hopeful about the future.				
9	I thought my life had been a failure.				
10	I felt fearful.				
11	My sleep was restless.				
12	I was happy.				
13	I talked less than usual.				
14	People were unfriendly.				
15	I felt lonely.				
16	People were unfriendly.				
17	I had crying spells.				
18	I felt sad.				
19	I felt that people dislike me.				
20	I could not get "going."				

Table 4
The Distribution of Respondents by Gender and Age at SMA Muhammadiyah 7 Surabaya in 2018

Variable	Frequency (n)	(%)
Sex		
Men	32	56.14
Women	25	43.86
Age (years)		
14	1	1.75
15	34	59.65
16	18	31.58
17	3	5.26
19	1	1.75
Total	57	100.00

The screening instrument managed to capture 47 respondents (82.46%) with depression and 10 respondents (17.54%) with no depression. The gold standard managed to capture 1 respondent (1.75%) with depression and 56 respondents (98.25%) with no depression. The prevalence value according to the gold standard result is 1.75% (Table 5)

Table 5
The Result of Screening Depression Assessment

Tool	Category	N	%
The (CES-D) Questionnaire (as screening instrument)	Depressive	47	82.46
	No depressive	10	17.54
The SDS Questionnaire (as gold standard)	Depressive	1	1.75
	No depressive	56	98.25
Total		57	100.00

The validity of CES-D showed sensitivity value was 1 (100%) which means the ability of screening instrument to get respondent who has positive depression among all respondents is 100%. Its specificity value was 0,17 (17,85%) which means the ability of screening instrument to get respondent who has negative depression among all respondents is 17,85%. In the prevalence of 1,75%, its positive predictive value was 0,02 (2,12%) which means the ability of screening instrument to find respondent who

actually has depression among assumed depressive respondents is 2,12%. Its negative predictive value was 1 (100%) which means the ability of instrument screening to find respondent who actually is not depressive among the ones assumed to be not depressive respondents is 100% (Table 6).

The validity screening instrument was not good enough to be used as a screening instrument because both specificity (17, 85%) and positive predictive value (2, 12%) have low values. However, the screening instrument has a good value on sensitivity (100%) and negative predictive value (100%).

DISCUSSION

According this study, the depression screening on adolescents that use CES-D as a screening instrument showed 82,46% of respondents have depression. The depression disorder can appear in childhood, then it develops in adolescence and get worse in adulthood. According to the study from Tang, Liu, Liu, Xue, & Zhang (2014), if the depression disorder in childhood were not treated as soon as possible, it could get worse in adolescence. It is caused by biological and social change. The biological change is caused by the puberty phase and the social change is caused by neighborhood, family, society, and school.

The instrument for screening program that has a good validity can show the people or groups who truly have a disease. According to Maxim, Niebo, & Utell (2014) that the higher the validity of screening instrument, the more valid the screening instrument used for screening. The ideal screening test shows a positive result only to the subjects who really have the disease, and shows a negative result only into subjects who really do not have the disease.

The validity of the screening instrument can be affected by choosing questions on the questioner and measurement method. The questions must be sourced from the relevant and up to date theories. The method of measurement must be correct according to the procedure (Leung, 2015). The Vilagut, Forero, Barbaglia, & Alonso (2016) study stated that the CES-D questionnaire can show the main depressive symptom and has good accuracy in the general population.

According to CDC (2018), the main depressive symptoms are feeling sad and anxious for a long period, loss energy or experiencing fatigue without doing anything, loss of desire to do activities that used to be fun, having trouble to sleep or having long period of sleep, loss of appetite or increased appetite than usual, experiencing headache, having trouble to communication and concentrating, feeling guilty and worthless, loss of confidence, and thinking or want to do suicide or hurting yourself. Generally, depression disorder cannot be detected easily and often considered as a natural cause or an ordinary thing. According to Andersson et al (2015) the depression disorder can increase the risk of autoimmune disease, and it can increase after eleven years. The Holt et al (2014) study states that the risk of diabetes can increase in people who have depression disorder.

The study of Zacharopoulou et al (2015) shows that the frequency of depressive symptoms in adolescence is significantly higher in women than men. It appears almost every single day in four of six girls who have depression. Albert (2015), in his study, revealed that the high prevalence in women is caused by internal factor which is the changes in reproductive hormones that often occur on menstrual period, early stages of pregnancy, postpartum and menopause phase. In men, experiences of the depression are caused by external factors such as work, etc. On the CES-D questionnaire, there are no questions that specialize for a particular gender; all gender is considered to have the same risk of experiencing depression. Based on the screening result, depression is more common in men than in women. As many as 47 out of 57 respondents who experience depression, 24 respondents (51%) are men and 23 respondents (49%) are women.

Table 6
Table 2×2 Depression Screening

Screening Instrument		Gold Standard		
		Positive	Negative	Total
	Positive	1	46	47
	Negative	0	10	10
	Total	1	56	57

In severe conditions, depressed people can be thinking about suicide and self-hurting. According to Ng, How, & Ng (2016) the depressed people tend to have thought about suicide. The question on CES-D does not ask about thinking of suicide specifically, but it is asking about “did you enjoy your life in the past week?”. The CES-D questionnaire is already relevant to be used to identify suicide thoughts in depression sufferers. The study by Heo, Choi, Yu, & Nam (2018) on Korean adolescences showed the CES-D have a positive correlation on negative psychological measurements such as anxiety and suicide idea, because of that, it is very useful and can be used as a depression screening instrument for adolescences.

The validity of the screening instrument can be affected by the gold standard, it means using the same instrument that can show different validity values on the different gold standards. Based on the research of Gelaye et al (2014) which compares the validity value of the PHQ 9 questionnaire by using different gold standard showed the different result on sensitivity value and specificity value on each of the gold standard. The evaluation of feasibility and accuracy on the use of the gold standard is important to do to avoid an error and bias.

According to Zenlea, Milliren, Mednick, & Rhodes (2015), the screening for adolescence are still very rare. The study by Roseman et al (2016) also showed that depression screening programs for adolescents are rare events and study for accuracy of the screening instrument is still rare to find. Only two screening instruments that have the accuracy of diagnostic results in three or more study; they are BDI (Beck Depression Inventory) and PHQ 9 (Patient Health Questionnaire 9). There are many studies about depression screening instruments; however, there is not enough evidence to suggest that the ability of the screening instruments can be accrued to detect depression on adolescence. Mostly, depression screening is performed by interviews using the instruments in the questionnaire form and clinical reports. There have been many studies to prove the reliability of the screening instrument that is used to assesst depression, but there are still little studies to prove the validity of the depression screening instruments. Specific researches for development or validation of relevant standards criteria for the local areas that will be applied to screening are needed. We need to produce the depression screening instruments that can be used in general throughout the world and all characteristics of individuals or groups (Mutumba, Tomlinson, & Tsai, 2014).

All questions on the CES-D are able to identify the lead depressive symptom that is in accordance with the CDC theory (CDC, 2018). This study showed the validity of the CES-D is still not good enough with a low value of sensitivity and positive predictive value. According to Yang, Jia, & Qin (2015), their study contradicts with current study because their study showed the CES-D has a good value of reliability and validity for depression assessment or depressive symptom assessment on respondents who have attempted suicide. In line with the study by Baron, Davies, & Lund (2017) has high validity value. Therefore, it is good for the screening instrument. According to the study by Chin, Choi, Chan, & Wong (2015), the CES-D has good values on validity, reliability, sensitivity, and response, so it is good for screening and monitoring depressive symptom. It has a higher sensitivity than PHQ 9 even though both are equally classified as having good validity. It also supports cross-cultural screening activities.

The low validity in this study is caused by the inappropriate filling of the screening instrument and the gold standard. This can be caused by respondents who did not know how to fill the screening instrument and the gold standard, and then the lack of a more detailed explanation from researchers. Another obstacle in this study is the majority of respondents claimed to be unaware of depressive symptom, and those who were aware of having experienced depressive symptom forgot about the time when the symptom occurred. According to CDC (2018), the depressive symptom can interfere daily activity, one of which is the decrease in productivity. According to Andreeva, Hanson, Westerlund, Theorell, & Brenner (2015) research, the people who have depression disorder showed a significant decrease in productivity.

Research Limitation

The weakness of the current study is the small number of respondents; thus, the results of this study cannot be generalized.

CONCLUSION

The validity of The Center for Epidemiologic Studies Depression Scale (CES-D) was not good enough to be used as a screening instrument because of the low value of both specificity and positive predictive value. However, the sensitivity

and negative predictive values are very good in which both have 100% value. Improvement and development for this study are needed by evaluating the characteristics of respondents and evaluating the technical screening activities.

ACKNOWLEDGMENT

The author expresses her gratitude to all parties of SMA Muhammadiyah 7 in Surabaya, to respondents, and to all parties who have helped the journal getting success.

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