

RELIABILITY OF THE GENERAL ANXIETY DISORDER -7 QUESTIONNAIRE FOR NON-HEALTHCARE WORKERS

Sri Idaiani¹⁾, Maria Holly Herawati¹⁾, Rofingatul Mubasyiroh²⁾,
Lely Indrawati²⁾, Indri Yunita²⁾, Nikson Sitorus²⁾, Siti Isfandari³⁾

¹⁾Center for Research and Development of Health Resources and Services, Jakarta

²⁾Center for Research and Development of Public Health Efforts, Jakarta

³⁾Center for Research and Development of Humaniora and Health Management, Jakarta

ABSTRACT

Background: To conduct a population study, there is a need to first assess the validity and reliability of the measuring instrument such as a questionnaire. This study aimed to examine the reliability of the GAD-7 questionnaire in the non-healthcare workers' population.

Subjects and Method: This was a cross-sectional study conducted in April 2020. A sample of 1,020 subjects was selected for this study. The data were collected using the General Anxiety Disorder questionnaire 7 (GAD-7). The inter-item correlation and Cronbach alpha were calculated to assess the instrument reliability using STATA 15.

Results: The inter-item correlation as well as the item-rest correlation of the 7 items GAD-7 questionnaire ranged from 0.57 to 0.83 with $p < 0.050$. The Cronbach alpha = 0.88.

Conclusion: The reliability of GAD-7 questionnaire is high so it can be used to measure anxiety in the non-healthcare workers' population.

Keywords: reliability, GAD-7, non-healthcare workers

Correspondence:

Sri Idaiani. Center for Research and Development of Health Resources and Services. Jl Percetakan Negara No. 29, Central Jakarta. Email: sriidaiani@gmail.com. Mobile: +62 8121177658.

BACKGROUND

The COVID-19 pandemic in Indonesia started in March 2020 after it was first discovered in Wuhan, China (Giorgi et al., 2020; Xiang et al., 2020). All sectors were affected, especially health workers at the forefront in healthcare facilities. At the end of March, wide-scale restrictions were introduced in Indonesia, while several studies were subsequently carried out in the health sector, especially among health workers with various aspects, including exposure, psychological problems, stigma, and other impacts.

However, not only health workers are at risk of being affected by this

pandemic, as non-health workers and even families including children also feel the impact. Psychologically, there are several anxiety disorders associated with the pandemic such as depression, sleep disorders, and others (Alshekaili et al., 2020; Traunmüller et al., 2020; Trumello et al., 2020; Wang et al., 2020). Furthermore, the questionnaire widely used to assess one of the psychological disorders namely anxiety, is General Anxiety Disorder (GAD), which consists of seven questions (Spitzer et al., 2006). Several studies have been carried out on the health sector, but only a few assessed the non-healthcare workers' mental

condition. Therefore, the study is needed on populations of non-health workers. Before conducting the study, a questionnaire was prepared as a standard. Therefore, the items, forming factors, and reliability were analyzed to ensure that the results obtained are based on a questionnaire that has been tested on the population.

The characteristics of a good questionnaire include having a good variable relationship with the total score, consist of strong forming factors, and having good reliability (Norman and Cairney, 2015). This is evidenced by testing on the same population as previously assessed. Therefore, this study aims to test the items, factors, and reliability of the GAD-7 questionnaire on the population of non-healthcare workers.

SUBJECTS AND METHOD

1. Study Design

This was a cross-sectional study, which was carried out online, involving the employees of the head office of Ministry of Health (Kemenkes). In this study it was conducted validation test of GAD-7 instrument.

2. Population and Samples

The target population is workers who are not working at health service facility. The source population is workers who are working at head office of Ministry of Health. Purposive sampling technique was applied and the minimum sample size using the formula of sample size $n = z^2 p(1-p)/d^2$ with $p = 0.45$ and $d = 0.05$ was obtained 420 respondents (Lwanga et al., 1991). The respondents filled in the questionnaire using a link of google

form. Data collection was carried out in earlier of April 2020.

3. Study Variables

The main variable is anxiety. Characteristics of respondent such as age, gender, education, marital status and employee status were described as well.

4. Operational Definition of the Variables

The anxiety was assessed according the study instrument criteria. Age group was divided into ≤ 29 , 30-39, 40-49, 50-59 and ≥ 60 years old. Male and female as gender variable, and education was divided into three groups namely senior high school and postgraduate then magister or doctoral degree. There are three marital groups namely married, divorce/widowed and single (unmarried).

5. Study Instruments

The GAD-7 questionnaire consisted of 7 questions, each of which could be answered with the choice of "not at all," "several days," "more than half the days", and "nearly every day", with respective scores of 0, 1, 2 and 3. The questions and answers were about things that happened during the last 2 weeks. Therefore, the total score ranged from 0 to 21. Based on the total score, the following groups were determined: 0-4 = not anxiety, 5-9 = mild anxiety, 10-14 = moderate anxiety, >14 = severe anxiety (Spitzer et al., 2006). This anxiety questionnaire used was the General Anxiety Disorder questionnaire 7 (GAD-7), which was originally developed by Pfizer and has been tested for validity and reliability. In Indonesia, the GAD 7 has been translated and validated for epilepsy patients (Budikayanti et al., 2019).

Due to time constraints, the translation that was carried out in Indonesia was used. Besides questions about anxiety, questions concerning the characteristics of subjects were asked. Several variables were determined through questions, including gender, age, highest educational level, employment status (permanent or non-permanent), and marital status.

6. Data Analysis

The data used were transferred from a Google Excel sheet to STATA15 version (Stata Corp LLC) and then analyzed by frequency, items correlation, factor analysis with principal component analysis and Alpha Cronbach reliability (Bland and Altman, 1997, Norman and Cairney, 2015).

7. Research Ethics

The research protocol was reviewed by Scientific Committee of National Institute of Health Research and Development (NIHRD). Ethical approval was obtained by the Research Ethics Commission of the NIHRD of the Ministry

of Health, number LB 02.01/2/-KE.256/2020. All respondents read a brief informed consent describing the general objective of the study, voluntariness, and confidentiality of participation.

RESULTS

There were 1070 respondents participated, but in data cleaning, 58 respondents was dropped therefore the number of subjects assessed was 1020. By 1020 respondents, most of them living in Jakarta and 169 respondents (16.2%) living in other cities. Table 1 shows the characteristics of the subjects with a total number of 1020. The majority were females and aged between 30-39 years with mean=37.8, SD= 11.4. The educational level was mostly magister or doctoral degree with the marital status of married, and the majority were also state civil servants (ASN) or interpreted as permanent workers.

1. Characteristics of study subjects

Characteristics	Category	Frequency	Percentage
Age (year)	≤ 29	113	11.1%
	30-39	437	42.8%
	40-49	313	30.7%
	50-59	147	14.4%
	≥60	10	1.0%
Gender	Male	354	34.7%
	Female	666	65.3%
Education	Magister and Doctoral	452	44.3%
	High School and Postgraduate	568	55.7%
Marital Status	Married	826	81.0%
	Widowed/Divorce	154	15.1%
	Single	40	3.9%
Employee Status	Permanent (ASN)	895	87.7%
	Non-Permanent (Non ASN)	125	12.2%

The reliability was calculated through the correlation between each question item with the total score, while the

validity was calculated through the forming factors of the GAD-7

questionnaire with the results as shown in Table 2.

Table 2. Correlation of question items with total scores and loading factors forming constructs

Description of items		Item-total correlation	Factor	Cronbach Alpha.
1	Feeling nervous, anxious, or on edge	0.828*	0.818	
2	Not being able to stop or control worrying	0.815*	0.822	
3	Worrying too much about different things	0.827*	0.833	
4	Trouble relaxing	0.811*	0.818	
5	Being so restless that it is hard to sit still	0.701*	0.725	
6	Becoming easily annoyed or irritable	0.574*	0.548	
7	Feeling afraid as if something awful might happen	0.761*	0.752	
Item 1-7				0.878

*p=0.001

Table 3 Distribution of items and Anxiety proportion

Items	Description	Not at all	Several days	>12 hours/ days	Nearly everyday
1	Feeling nervous, anxious, or on edge	39.2%	48.6%	7.0%	5.2%
2	Not being able to stop or control worrying	58.0%	35.8%	3.5%	2.7%
3	Worrying too much about different things	53.3%	40.8%	3.4%	2.2%
4	Trouble relaxing	57.2%	37.0%	3.7%	2.2%
5	Being so restless that it is hard to sit still	82.8%	14.7%	1.7%	0.8%
6	Becoming easily annoyed or irritable	60.8%	35.2%	3.0%	1.0%
7	Feeling afraid as if something awful might happen	48.7%	44.5%	3.6%	3.1%
Anxiety (%)		n	%		
Not anxiety		693	67.0		
Mild		272	26.7		
Moderate		47	4.6		
Severe		18	1.7		

Reliability of GAD-7

All questions have a good correlation which was all above the r table (r count > r table). Moreover, the correlation

coefficients between the 7 items of the GAD-7 and the total score ranged from 0.57 to 0.83 with p=0.01, while the Cronbach Alpha assessment was

carried out and obtained a value of 0.878.

Validity of GAD-7

The validity was assessed based on the forming factors as shown in table 3 where the column on the right shows the loading factors forming the questionnaire. However, in the analysis, only one forming factor was obtained with a loading factor ranging from 0.55 to 0.83.

DISCUSSION

The GAD-7 questionnaire shows high overall reliability of internal consistency and consists of a one-factor structure among the subjects with Cronbach's alpha coefficient of 0.878. These results are similar to studies related to the validity and reliability of GAD-7 in various populations. The general population in Germany obtained item correlation with a total score which ranged from 0.57 to 0.83, factor loading ranged 0.55 to 0.83, while Cronbach alpha = 0.89 (Löwe et al., 2008). A study on a population of pregnant women in China also found similar results, item correlation with a total score of 0.64-0.77, and Cronbach alpha= 0.84 (Gong et al., 2021). Meanwhile, the pregnant women population in Peru had one forming factor, Cronbach alpha= 0.89, item correlation of 0.61 to 0.73, and a loading factor ranging from 0.64-0.80 (Zhong et al., 2015). The adolescent population in Finland also had almost similar results, with a good internal consistency as indicated by Cronbach's alpha= 0.91, and the instrument's unidimensional factor structure was supported. Moreover, the associations between GAD-7 total scores with self-

reporting measures of depression and social anxiety support construct validity (Tiirikainen et al., 2019).

GAD-7 validation studies were also carried out on Filipino and Portuguese ethnicities with good results (Garabiles et al., 2020; Sousa et al., 2015). The study on Filipinos not only assessed reliability but also the criteria's validity in the form of sensitivity and specificity values compared to other measuring instruments such as Patient Health Questionnaire-9 (PHQ-9). Meanwhile, the Portuguese population did not assess sensitivity and reliability, but it was associated with the Hospital Anxiety and Depression Scale (HADS), the State-Trait Anxiety Inventory (STAI), and Euro Quality of Life five dimensions (EQ5D) (Sousa et al., 2015).

In a drug addict population, the GAD-7 and GAD-2 questionnaires were also assessed, the results showed a GAD-7 score ≥ 9 with a sensitivity of 80% and a specificity of 86% for any anxiety disorder and displayed adequate temporal stability at repeated measurements (intra-class correlation = 0.85) and high internal consistency indicated by Cronbach's alpha= 0.91. Meanwhile, the GAD-2 score with ≥ 2 had 94% sensitivity and 53% specificity, as well as adequate internal consistency of 0.82. Therefore, GAD-7 with version 7 questions, has better quality compared to GAD-2 (Delgadillo et al., 2012).

The population of workers that were not anxious was 66.96% (95% CI, 64.01-69.81), while those that were anxious comprised 33% of the study population. This was similar to the proportions obtained in other studies

among health workers and the general population. (Pappa et al., 2020, Salari et al., 2020).

The limitation of this study is that it did not assess the validity of the criteria by comparing with other anxiety measures. This is because GAD-7 has been commonly used in various anxiety-related studies, hence, the validity and reliability assessment carried out in this study was mainly aimed at testing the population to be assessed namely non-healthcare workers as a general procedure. However, previous studies assessed the sensitivity and specificity of GAD by comparing with the other assessment carried out by clinicians including Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) guidelines, Mini International Neuropsychiatric Interview (MINI), Revised clinical interview schedule (CIS-R), as well as Composite International Diagnostic Interview (CIDI) or Patient Health Questionnaire-9 (PHQ-9) (Delgadillo et al., 2012; Spitzer et al., 2006; Zhong et al., 2015; Garabiles et al., 2020; Gong et al., 2021). Based on the correlation of the questions with the total score and supported by one forming factor as in previous studies, the GAD-7 questionnaire has good validity and reliability. Moreover, internal consistency assessment with Cronbach's alpha method also proves good results. Therefore, GAD-7 is applicable as an assessment tool in future studies on the population of non-healthcare workers.

AUTHOR CONTRIBUTION

SI drafted the manuscript, MH, RM, LI, IY, NS contributed in protocol

study and questionnaire developing, SI contributed in finalization of the manuscript. All authors read the manuscript.

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CONFLICT OF INTEREST

No conflict of interest

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