



The Validity of the Self-Reporting Questionnaire-20 for Symptoms of Depression: A Sub- Analysis of the National Health Survey in Indonesia

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Abstract

Edited by: Sasho Stoleski
Citation: Idaiani S, Mubasyiroh R, Suryaputri IY, Indrawati L, Dharmayanti I. The Validity of the Self-Reporting Questionnaire-20 for Symptoms of Depression: A Sub-Analysis of the National Health Survey in Indonesia. Open-Access Maced J Med Sci. 2022 Oct 28; 10(E):1676-1682. <https://doi.org/10.3889/oamjms.2022.9999>
Keywords: Self-reporting questionnaire; Mini-International Neuropsychiatric Interview; Validity; Mental-emotional disorder; Symptom; Depression
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Received: 29-Apr-2022
Reviewed: 19-May-2022
Accepted: 18-Oct-2022
Copyright: © 2022 Sri Idaiani, Rofingatul Mubasyiroh, Indri Yunita Suryaputri, Lely Indrawati, Ika Dharmayanti
Funding: This research did not receive any financial support
Competing Interest: The authors have declared that no competing interest exists
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BACKGROUND: Adequate data are required to assess the validity of mental-emotional disorder for symptoms of depression based on Indonesia National Health Survey (NHS).

AIM: This study aims to assess the validity of mental-emotional disorder using self-reporting questionnaire-20 (SRQ-20) to the symptoms of depression evaluated through the means of a Mini-International Neuropsychiatric Interview (MINI) questionnaire.

METHODS: The data were obtained from a total sample of 555,066 subjects analyzed from the NHS in 2018. These subjects were at least 15 years old with their mental-emotional disorders and symptoms of depression assessed using the self-reporting questionnaire (SRQ) and MINI, respectively. This study used the calculation of sensitivity, specificity, positive and negative predictive value, likelihood ratio, receiver operating characteristic, kappa Brennan, and Prediger with the STATA version 15.00 to analyze the data.

RESULTS: The cutoff point in each group was different, ranging from 4 to 6 that almost all the area under curve values were above 0.90 and the SRQ agreement with MINI depression is good because they all have values above 0.80.

CONCLUSION: The results obtained are used as material to predict the rate of symptoms depression in Indonesian residents aged ≥ 15 years.

Introduction

Depression is a disorder discovered to be contributing to the burden of disease and disability-adjusted live years (DALYs). Moreover, certain improvements have been reported about its contribution to DALYs [1], (as observed in its 20th position in 2006 and 19th in 2016) [2]. Burden of disease is caused by the reduction in the productivity of life of patients and the severe circumstances accompanied by the threat of suicide. Depressive symptoms are expected to be exhibited by someone experiencing a sad event, but when drags on for a long time, it causes interference or even death [3].

The continuous increase in the burden of disease and the threat of death associated with suicide has led the Indonesian government to conduct a survey to obtain data on the prevalence of symptoms of depression disorder in the country. However, the National Health Survey (NHS) conducted in 2007 and 2013 only displayed the data on the mental-emotional disorder or psychological distress which is also called common mental disorder (CMD) that is assessed using self-reporting questionnaire-20

(SRQ-20). The term “mental-emotional disorder” has been used in the Indonesian household survey since 1995 and has continuously being applied even though it is not completely right. Meanwhile, distress is known as the neurotic state that causes anxiety and depression for people in the society. However, SRQ-20 is not the specific instrument to measure depression, and this means that a special measurement is needed for the next NHS.

The assessment of the depression in Indonesia NHS 2018 was conducted using a special questionnaire obtained from Mini-International Neuropsychiatric Interviews (MINI) [4], [5], [6], and the results showed that the prevalence among the population aged ≥ 15 years was 6.1% [7]. This tool has also been applied in the mental health surveys of several other countries such as India [8]. Furthermore, some mental-emotional disorders apart from depression were assessed in NHS 2018 using SRQ-20 due to its more practicality [9]. Therefore, the information above shows SRQ-20 as easy-to-use measurement tools that consider the answers designed to be yes or no, but it does not provide specific results to determine if an individual has

depression or anxiety. In contrast to the use of MINI, this questionnaire requires good training for enumerators to determine the right answer for the respondent besides it has been discovered to be the specific measurement tool to assess the symptoms of depression.

The health program implementers and practitioners expect Indonesian to have a specific or diagnostic number of mental disorders. This can only be produced through surveys with diagnostic instruments but not possible in the country because it consists of many islands and geographic difficulties, in the NHS 2018. Furthermore, it is allowed to assess with two measuring instruments, namely, the SRQ-20 and MINI, but only one for the next NHS for the fact that an extrapolation tends to be needed to answer it needs in the future. Therefore, this analysis was conducted to determine the validity of mental-emotional disorder assessed by SRQ-20 to the symptoms of depression evaluated using the MINI questionnaire through the use of the NHS 2018 data.

Materials and Methods

Study design

This study was a sub-analysis of Indonesia NHS 2018 conducted in all the provinces and districts or cities in the country. The NHS sample was carried out using two stages that in the first stages, determine census blocks, namely, selecting 30,000 census blocks from 25% of the master frame blocks of the most recent population census (in 2010). The selection was carried out by systematic probability proportional to size random sampling in every urban and rural strata, while in the second stage, 10 households in each census block were selected using systematic sampling. Therefore, there were 300,000 selected households spread across 34 provinces and 514 districts/cities. The method used in this study was written in the NHS's report [7] and socioeconomic level data were retrieved from the National Socioeconomic Survey (Susenas) conducted by the Central Statistics Body and integrated into the NHS. This approach was explained in previous article on the determinants of pre-diabetes and elderly in Indonesia, and the difference in the sampling frame for pre-diabetes is only in 26 provinces while for the elderly is for more than 59 years old [10], [11].

Subject

The respondents used were selected based on certain inclusion criteria which include being at least 15 years old, physically available, have the ability to answer all the questions, and not being represented by other people when answering the questions. The sample framework used in the NHS was the 2018

National Socioeconomic Survey and the data were obtained from the NHS questionnaire.

Measurements

Self-reporting questionnaire (SRQ)

Mental-emotional disorders were assessed using the 20 questions originally formulated in SRQ [12] and the cutoff point for Indonesia requires six "Yes" answers [13]. The SRQ was conducted since 1995 and has been periodically used in national surveys that assessed neurotic disorders which is more popular with the term mental emotional disorder in Indonesia within the past 1 month. However, it was recommended by the WHO as a mental disorder screening tool for the developing countries and has been proven to have good face, content, criterion, validity, construct validity, and also used in various surveys and research studies [12].

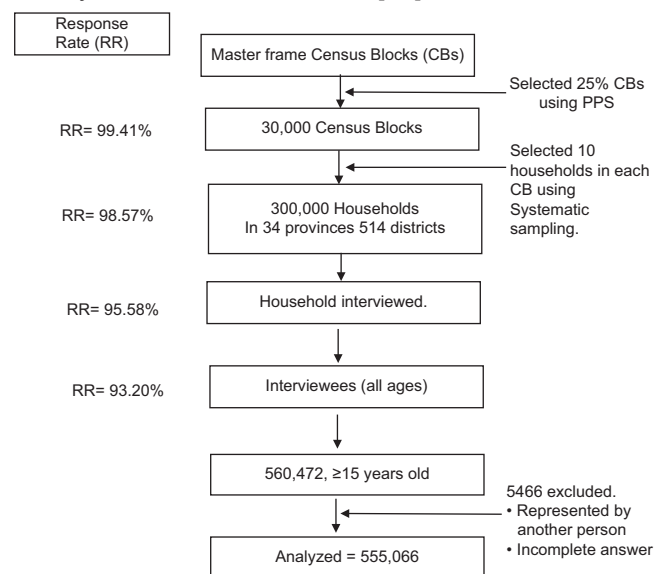


Figure 1 Flow chart of sampling stages

MINI

Symptoms of depression were evaluated using questions based on module of the MINI version 6 [4], [5], [6]. The MINI is an interviewed diagnostic tool assessing symptoms of depression in the past 2 weeks or life time. In this study, the depression module from MINI was used as a diagnostic reference (considered the gold standard). Depression module can be seen in Appendix 1. Both SRQ-20 and MINI questionnaires were read out by enumerators who had previously been trained on the content of the questionnaire and interview techniques.

Data analysis

The SRQ-20 in this study was applied as a screening test for validity while MINI depression was

used as a reference. The sensitivity, specificity, true and false positive, positive and negative predictive value, positive and negative likelihood ratio (LR), receiver operating characteristic (ROC), principal component analysis (PCA) and kappa Brennan, and Prediger [14] were calculated using the statistical program, STATA version 15.00 (Stata Corp. LLC).

Ethical approval

The ethical approval was obtained from Health Research Ethics Commission of the NIHRD of Ministry of Health number LB 02.01/3/KE 024/2018. The written informed consent was obtained from all participants prior the interview.

Results

Subjects

Figure 1 describes the sampling frame flowchart.

Following the inclusion criteria, a dataset consisting of 560,472 respondents was obtained but a total of 5361 were excluded because they were represented by other persons at the time of the interview. Furthermore, 45 others were excluded due to the provision of incomplete answers related to mental-emotional disorders or depression. Therefore, the total number of those used as samples was 555,066 subjects and their characteristics are presented in Table 1.

Table 1: Sociodemographic characteristics of subjects

Characteristic	n (%)
Age group (year)	
15–24	101,846 (18.35)
25–34	102,150 (18.40)
35–44	123,570 (22.26)
45–54	108,036 (19.46)
55–64	72,454 (13.03)
65–74	32,799 (5.91)
75+	14,211 (2.56)
Gender	
Male	274,832 (49.51)
Female	280,234 (50.49)
Education	
No schooling	34,735 (6.26)
Didn't finish elementary	73,933 (13.33)
Elementary school	143,039 (25.77)
Junior high school	113,457 (20.44)
Senior high school	142,905 (25.75)
Diploma/bachelor/more degree	46,997 (8.47)
Occupation	
Unemployed	148,600 (26.77)
Student	40,990 (7.38)
Housewife	22,024 (3.97)
Civil worker	41,175 (7.42)
Private	75,756 (13.65)
Farmer	140,688 (25.35)
Fishermen	6,990 (1.26)
Informal worker	45,201 (8.14)
Others	33,642 (6.06)
Residence	
Urban	237,234 (42.75)
Rural	317,737 (57.25)
Economy status*	
Quintile 1	118,689 (21.38)
Quintile 2	116,759 (21.04)
Quintile 3	112,960 (20.35)
Quintile 4	107,876 (19.43)
Quintile 5	98,782 (17.80)

*Quintile 1: The poorest, Quintile 5: The richest.

Analysis of the mean scores

The mean score of SRQ-20 for the entire population in Indonesia was 1.857, at a 95% confidence interval (CI) 0.004–1.865 and those identified not to be depressed by the MINI questionnaire had a mean score of SRQ 1.431 (95% CI 1.425–1.437) while those confirmed depressed had 8.677 (95% CI 8.629–8.725).

Prevalence

Table 2 shows the prevalence of mental-emotional disorders with different SRQ cutoff points in all populations ≥ 15 years, male and female, 15–59 and ≥ 60 years. However, depression was observed to be 5.90% (95% CI 5.80–5.95) among the ≥ 15 years population but not shown in the results presented on the table.

Validity of mental emotional disorders score of SRQ-20 compared to symptoms of depression from MINI

The quality of the measurement instruments used was assessed through several validity parameters as shown in Table 2 and several cutoff points were simulated to obtain the best from the results.

The table above shows a lower SRQ score that produces a higher sensitivity and NPV while those with higher scores gave higher specificity and PPV. Moreover, the positive LR was observed to be higher at lower SRQ scores and vice versa. There are various cutoff points shown in Table 2 which tends to be used as a reference for various purposes. Sub-samples based on the characteristics of the respondents such as male, female, age group, and also the resulting ROC show almost the same shape (Figure 2).

Figure 2a-e is the ROC curve of the SRQ-20 scores on symptoms of depression that shows high sensitivity and specificity, but these two parameters are not the determinants required to obtain the optimum value of 6 used as the cutoff point for symptoms of depression in SRQ-20, and also, the area under the curve value was found to be 93% and well based on the analysis.

Factorial validity

In PCA, two factors that form SRQ are found, as shown in Table 3. These are factors that have an Eigen value > 1 .

This study identifies factor 1 in the table above as depression, while factor 2 as a symptom of somatic and anxiety. The depression factors consist of thinking clearly, unhappy, cry more, difficulty to enjoy an activity, difficulty to make decisions, daily work suffering, unable to play a useful part, losing interest, and worthless

Table 2: Validity of self-reporting questionnaire-20

Cutoff point	n (%)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	LR+	LR-	AUC	Kappa
All population ≥15 years									
≥4	97,949 (17.65)	87.55	86.73	29.2	99.1	6.5956	0.1436	0.938	0.7355
≥5	72,692 (13.10)	81.16	91.16	36.50	98.70	9.1828	0.2066	0.862	0.8115
≥6	54,826 (9.88)	73.75	94.12	44.00	98.30	12.5370	0.2789	0.839	0.8584
≥7	41,902 (7.55)	65.60	96.08	51.20	97.80	16.7452	0.3580	0.808	0.8858
≥8	32,352 (5.83)	57.05	97.38	57.60	97.30	21.7360	0.4411	0.772	0.9000
Male									
≥4	38,625 (14.05)	84.90	89.30	27.3	99.2	7.9361	0.1690	0.87	0.7821
≥5	27,497 (10.17)	78.34	93.06	34.80	98.90	11.2874	0.2328	0.86	0.8479
≥6	20,800 (7.57)	70.80	95.43	42.3	98.6	15.4791	0.3060	0.83	0.8863
≥7	15,779 (5.74)	62.71	96.96	49.4	98.2	20.6060	0.3846	0.80	0.9082
≥8	11,989 (4.36)	54.16	98.00	56.1	97.8	27.0319	0.4677	0.76	0.9203
Female									
≥4	59,32421.17	89.17	84.13	30.4	99.0	5.6178	0.1287	0.87	0.6898
≥5	44,748 (15.97)	82.90	89.25	37.5	98.5	7.7079	0.1916	0.86	0.7757
≥6	34,028 (12.14)	75.56	92.80	45.0	98.0	10.4896	0.2634	0.84	0.8310
≥7	26,125 (9.32)	67.38	95.20	52.2	97.4	14.0363	0.3426	0.81	0.8638
≥8	20,365 (7.27)	58.82	96.75	58.5	96.8	18.0903	0.4256	0.78	0.8802
Age <60 years									
≥4	80,255 (16.80)	87.19	87.35	28.9	99.1	6.8949	0.1467	0.87	0.7469
≥5	59,319 (12.41)	80.75	91.62	36.2	98.8	9.6312	0.2101	0.86	0.8202
≥6	44,564 (9.33)	73.26	94.44	43.7	98.4	13.1834	0.2832	0.84	0.8653
≥7	33,988 (7.11)	64.95	96.30	50.8	97.9	17.5422	0.3640	0.81	0.8910
≥8	26,181 (5.48)	56.36	97.52	57.3	97.4	22.7318	0.4475	0.77	0.9046
Age >59 years									
≥4	17,69422.90	89.12	82.74	30.6	98.9	5.1650	0.1314	0.86	0.6649
≥5	13,376 (17.31)	82.96	88.28	37.6	98.4	7.0808	0.1930	0.86	0.7573
≥6	10,264 (13.28)	75.91	92.05	44.9	97.8	9.5522	0.2617	0.84	0.8157
≥7	7916 (10.24)	68.47	94.72	52.5	97.2	12.9631	0.3328	0.82	0.8531
≥8	6173 (7.99)	60.10	96.45	59.1	96.6	16.9411	0.4137	0.78	0.8720

n (%): Prevalence of mental emotional disorder, PPV: Positive predictive value, NPV: Negative predictive value, LR: Likelihood ratio, AUC: Area under curve.

person. Meanwhile, the somatic-anxiety factor consists of poor appetite, sleep badly, easy frightened, handshake, tense worried, and poor digestion.

Discussion

The results showed various validity parameters at various cutoff point and several groups and it can be

seen that the SRQ has good validity against symptoms of depression as assessed by the MINI. The optimum cutoff point was different for each group and that the SRQ agreement with MINI depression is good because almost all have values above 0.80. Based on PCA analysis, there are two structural factors on the SRQ, namely, the depression and a mixture of somatic and anxiety. The prevalence of symptoms of depression obtained by 5.9% was slightly different from the NHS 2018 report, which was 6.1% because the sample analyzed only the subjects that answer the questions themselves, while the NHS report still included subjects represented by a companion or caregiver [7].

Table 3: Factor loadings of principal component analysis self-reporting questionnaire-20

Serial number	Item	Factor 1	Factor 2
1	Do you often have headaches?		0.4587
2	Is your appetite poor?		0.4777
3	Do you sleep badly?		0.5128
4	Are easily frightened?		0.3934
5	Do your hands shake?		0.4690
6	Do you feel nervous, tense or worried?		0.3866
7	Is your digestion poor?		0.5558
8	Do you have trouble thinking clearly?	0.5886	
9	Do you feel unhappy?	0.4792	
10	Do you cry more than usual?	0.6639	
11	Do you find it difficult to enjoy your daily activities?	0.6020	
12	Do you find it difficult to make decisions?	0.5968	
13	Is your daily work suffering?	0.6092	
14	Are you unable to play a useful part in life?	0.6331	
15	Have you lost interest in the past?	0.6043	
16	Do you feel that you are a worthless person?	0.3484	
17	Has the thought of ending your life been on your life?		0.4931
18	Do you feel tired all your time?		0.5140
19	Do you have an uncomfortable feeling in your stomach?		0.5883
20	Are you easily tired?	0.5558	

The resulting ROC for total subjects, male, female, young, and old shows a similar image with area under curve (AUC) values and they are all above 0.90. This AUC value is even higher than previous studies in China, India, Vietnam, and Afghanistan which only had an AUC of around 0.80, even though it uses different reference instruments such as

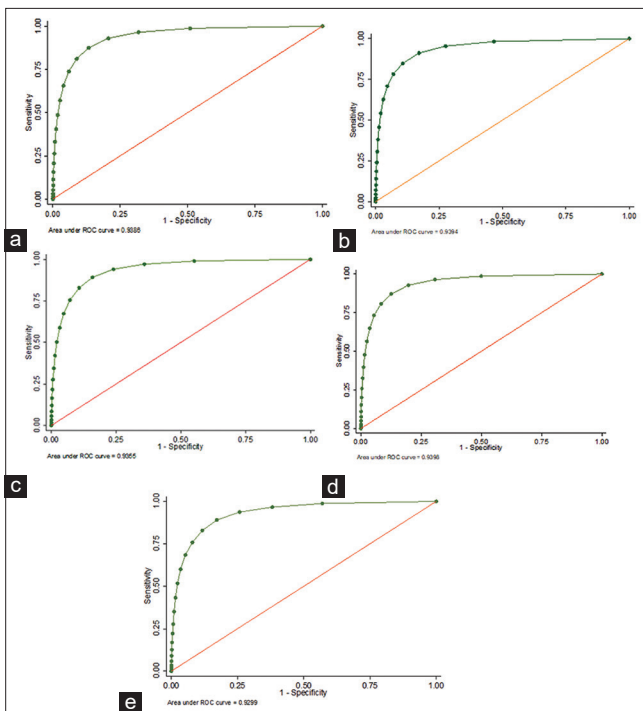


Figure 2: The ROC curve. (a) The ≥15-year ROC curve, (b) the male ROC curve, (c) the female ROC curve, (d) the <60-year ROC curve, and (e) the ≥60-year ROC curve

the clinical interview schedule revised, composite international diagnostic interview, and Hopkins symptom checklist-25 [15], [16], [17], [18]. Research using the same questionnaire such as SRQ and MINI was conducted in South Africa with an emergency department setting, the results also showed the AUC value of around 0.80 [19].

Regarding the forming factors, research in South Africa also showed two factors as depression-anxiety and somatic, while research in China showed three factors, including depression, anxiety, and somatic [18], [19]. In this study, there were two factors formed, and they include specifically anxiety-somatic and depression. This shows that there is not much difference with other populations in various countries in terms of the factors forming the SRQ.

Various validity parameters have been provided at various cutoff points and in groups by gender and age by showing the AUC. The agreement between SRQ and MINI depression on this finding is good because the values are above 0.70 and 0.80. These results can be used as a basis for extrapolating, for example, the previous NHS data will be able to calculate the symptoms of depression rate. A more important need is that the future NHS will also be able to obtain symptoms of depression rates in the population if they tend not to use the MINI depression mode anymore. Regarding the cutoff point, all groups showed that the optimal cutoff point was between 4 and 5 and this is slightly different from the previous studies which determined it to be about 5 or even 6 (in women) for any diagnosis [19].

This validity assessment procedure has been studied and the short and easy questionnaires were shown to be preferable to special ones requiring special skills from the enumerator. These methods have been used in other studies, for example, a patient care questionnaire (PHQ) which was validated with MINI [20], [21], the beck depression inventory has also been used as a reference by several studies [22].

SRQ has been used as a CMD screening tool, for example, in Eritrea and Afghanistan [23], [24]. Therefore, this means that both SRQ and patient health questionnaire are good enough but require confirmation for positive screening results from health-care facilities. A survey conducted in Iraq with the use of SRQ-20 as initial screening produced a CMD percentage of 35.5% [25]. In Mexico, SRQ was also used to assess people to be deported for violating the border area and the CMD was found to be 16% [26]. The variation in these results despite the use of the same instrument is associated with the characteristics and conditions of different populations. However, the use of MINI in measuring the prevalence of depression in India was able to produced 2.68% [27].

The validity assessed is a diagnostic test or a screening tool which is also referred to as convergent and concurrent validity in other studies [28]. Meanwhile,

some qualitative research has also been conducted to support the assessment of validity [29] with the focus on the appropriateness of tools, processes, and data [30].

The strength of this study was the use of a large sample which is an indication of high representation of the Indonesian population, and this means that it has the ability to reflect the real situation of the country. However, it was limited for the fact that NHS does not only assess mental health, but various diseases and matters related to the subject's health. Through all the questions asked in this study, there is the potential for fatigue in both enumerators and respondents.

Conclusion

The findings showed that SRQ-20 with cutoff point ≥ 6 (cutoff point that has been used by the NHS) is able to screen symptoms of depression, especially to detect those that are not depressive symptoms with a specificity of 94.12%. However, a person with an SRQ-20 score < 6 tends to be not depression with MINI questions and it is, therefore, recommended that when using a cutoff point ≥ 6 , it will obtain sensitivity at 73.75%, specificity at 94.12%, positive predictive value at 44%, and negative predictive value at 98.3%.

The implications for survey policies in Indonesia in the future are to make it possible that MINI is used to assess symptoms of depression like the survey in India, but if this is not possible then the results of this study can be used as a material to predict the rate of symptoms of depression in Indonesians aged ≥ 15 years.

Acknowledgments

The authors appreciate Iwan Ariawan, MD, MSPH, from the Faculty of Public Health Universitas Indonesia for technical assistance since pre-NHS stage. We also express our gratitude to Mrs. Ryoko Takahashi from the World Health Organization Indonesia for supporting our meetings during this study. Last but not least, thanks to the National Institute of Health Research and Development Ministry of Health Indonesia as the organizer of the NHS 2018.

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Appendix

Appendix 1: Depression mini international neuropsychiatric interview: The depression module of Mini-International Neuropsychiatric Interview International Classification of Disease-10 translated into Indonesian

A1	In the past 2 weeks	Answer	Answer
a	Have you been consistently sad, depressed or down, most of the day, nearly every day?	No	Yes
b	Have you been most of the time less interested in most things or less able to enjoy the things you used to enjoy?	No	Yes
c	Did you feel tired or without energy, most of the time? If < 2 yes in A1	No → STOP	Yes
A2	In the past 2 weeks, when you felt depressed/uninterested/ tired	Answer	Answer
a	Did your appetite change significantly or did your weight increase or decrease without trying intentionally?	No	Yes
b	Did you have trouble sleeping nearly every night (difficulty falling asleep, night or early awakenings, hypersomnia)?	No	Yes
c	Did you talk or move more slowly than normal, or were you fidgety, restless or having trouble staying still?	No	Yes
d	Did you lose your self-confidence, or did you feel worthless or even inferior to other people?	No	Yes
e	Did you have feelings of self-reproach or guilt?	No	Yes
f	Did you have difficulty thinking or concentrating, or did you have trouble making decisions?	No	Yes
g	Did you consider hurting yourself, feel suicidal, or wish that you were dead?	No	Yes
	Are 4 or more items since a1 coded yes?	F 32. Depressive episode	