Diagnostic Accuracy of Post-traumatic Stress Disorder Checklist - Civilian Version and Modified Versions of Center for Epidemiologic Studies Depression Scale among 1988 Spitak Earthquake Survivors

(A cross-sectional study)

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ABBREVIATION LIST

AUC- Area under the curve

CAPS- Clinician-Administered PTSD Scale

CES-D- Center for Epidemiologic Studies Depression Scale

CI- Confidence interval

DSM-IV-TR- Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (Text Revision)

DTS- Davidson Trauma Scale

IQR- Interquartile range

MDE- Major Depressive Episode

NCS-R- National Comorbidity Survey Replication

NPV-Negative Predictive Value

PCA- Principal Component Analysis

PCL-C- PTSD Checklist Civilian

PCL-M- PTSD Checklist Military

PCL-S- PTSD Checklist Specific

PPV- Positive Predictive Value

PTSD- Post-traumatic stress disorder

QUADAS- Quality Assessment of Diagnostic Accuracy Studies

ROC- Receiver operating characteristic

SCID- Structured Clinical Interview for DSM Disorders

SD-Standard deviation

SE- Standard error

STARD- Standards for Reporting of Diagnostic Accuracy

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ABSTRACT

Background: Post-traumatic stress disorder (PTSD) is one of the most commonly studied and central psychopathologies in the aftermath of disasters. Depression in its turn is another significant contributor to the global burden of disease and is estimated to affect 350 million people worldwide. Considering short- and long-term adverse affects of depression and anxiety disorders, routine screenings of their symptoms become more and more important. The growing awareness of the issue favors the focus of scientific studies on the generation of "psychometrically sound" instruments and accurate detection of those conditions in epidemiological research, in particular assessing performance of corresponding screening tests among various samples.

Significance: Notwithstanding the number of instruments that have been employed in the investigations to measure PTSD and depressive disorders among survivors of 1988 Spitak earthquake, no criterion validity studies of PTSD Checklist Civilian (PCL-C) or Center for Epidemiologic Studies Depression Scale (CES-D) modified scale yielding clinically validated measures have been conducted in Armenia.

Aim: Investigate diagnostic accuracy of the Armenian versions of PCL-C and CES-D modified (16 item scale vs. 20 item scale with negatively restated Positive Affect items) among 1988 Spitak earthquake survivors.

Methods: The study was a cross-sectional quantitative analysis. People aged 39 and older who were in Gyumri during the1988 earthquake comprised the study population. Sample size was calculated to be 126, and study participants were recruited based on a two-stage cluster sampling strategy. Study used two screening tests: PCL-C and CES-D modified version with negatively restated Positive Affect items. Structured Clinical Interview for DSM Disorders (SCID) was chosen as the reference standard for the screening instruments.

Results: The majority of the sample was female (75.6%), married (66.9%), with university (33.9%) or professional/technical (30.7%) education. The mean age of the participants was 55.7 years; 26.2% of the participants met the criteria for current PTSD diagnosis and 28.4%- for current major depressive episode based on SCID. PCL-C performed well in the study population (Cronbach's α=0.861), resulting in an AUC of 0.903 and an optimal cutoff score of 50. Both versions of CES-D demonstrated acceptable internal consistency for the total scores (Cronbach's α=0.879 for CES-D (16) and 0.911 for CES-D (20). Items 4 (restated item "not as good as other"), 15 ("unfriendly people") and 19 ("people disliked") demonstrated relatively low corrected item-total correlations. Principal component analysis showed that negatively restated Positive Affect items, did not construct the factor of (lack of) Positive Affect. The AUCs for CES-D (16) and CES-D (20) were 0.895 and 0.902, while the optimal cutoffs 19 and 21, respectively. CES-D (16) and CES-D (20) did not differ significantly in their overall diagnostic performance. CES-D (16) performed better among males than among females.

Conclusions: The Armenian version of PCL-C is an accurate screening tool for identifying PTSD symptomatology among Armenians with a trauma history with the most optimal and efficient cutoff score of 50 among 1988 Spitak earthquake survivors. Armenian versions of CES-D (16) and CES-D (20) with negatively restated positive affect items are valid tools to measure major depression symptomatology in Armenian population with optimal cutoff scores of 19 and 21, respectively. Given the failure of the negatively restated items to construct a separate factor of (lack of) Positive Affect, CES-D (16) is a more practical alternative for measuring depressive symptomatology in the Armenian population.

LITERATURE REVIEW

Introduction

According to the World Mental Health (WMH) Survey conducted in 17 countries, mental disorders are quite common in the countries studied (with the interquartile range (IQR) of 18.1–36.1% for lifetime prevalence estimates of any DSM-IV disorder (Diagnostic and Statistical Manual of Mental Disorders)[1]. Moreover, consistent with a number of literature reviews[2-4], anxiety disorders are found to be the most prevalent class of mental disorders (with lifetime prevalence estimates averaging to ~16%), while mood disorders are found to be the second most prevalent set of mental disorders (with the approximate lifetime prevalence estimates of 12%) in epidemiological surveys[1,5]. In addition, according to the National Comorbidity Survey Replication (NCS-R), approximately half of the US residents can be diagnosed with a DSM-IV disorder during their life with lifetime prevalence estimates of anxiety disorders constituting 28.8% and mood disorders – 20.8 % [5].

Post-Traumatic Stress Disorder (PTSD) and Depression

Post-traumatic stress disorder (PTSD) is an anxiety disorder with characteristic symptoms resulting from experiencing or witnessing a traumatic event such as combat, natural disaster, terrorist attack, accident, death and other physical, sexual or emotional abuse [6,7].

Exposure to a traumatic stressor is very common in the general population; studies conducted on the US population have demonstrated that approximately two thirds (~60%) of the general population report experiencing a traumatic event during their lifespan[8,9]. Meanwhile, NCS-R has estimated the US general population lifetime prevalence of PTSD to be 6.8% [5]. As shown by a number of systematic reviews[10-12], PTSD is one of the most commonly studied and central

psychopathologies in the aftermath of the disasters. PTSD-induced functional and social impairment is significant and can vary from one individual to another in terms of duration of the symptoms and associated levels of comorbidity and somatization[13].

The diagnostic criteria for PTSD outlined in the DSM-IV-TR include: extreme traumatic stressor threatening the integrity of the person (A_1), reactions of intense fear, helplessness and horror (A_2), persistent re-experiencing of the event (B), avoidance of the stimuli associated with the trauma (C), symptoms of increased arousal (D), duration of the symptoms for more than 1 month (E) and impairment of social and occupational functioning (F)[6].

Depression in its turn is another significant contributor to the global burden of disease and is estimated to affect 350 million people worldwide[14]. Major depressive episode (MDE) is the common syndrome comprising depression[6,15]. DSM-IV-TR criterion A for MDE diagnosis consists of nine symptoms, five of which must be present and at least one of the five must be "depressed mood" or "loss of interest or pleasure" in order for the diagnosis to be met[6] (see Appendix 1).

Considering the vast short- and long-term adverse affects of depression and anxiety disorders[1], the routine screenings of their symptoms become even more important. Thus, the growing awareness of the issue has led to proliferation of scientific studies focusing on the generation of "psychometrically sound" instruments and accurate detection of these conditions in individuals in epidemiological research, in particular assessing the performance of corresponding screening tests among various samples. Moreover, special guidelines and tools have been developed in the last decade to assure the complete and thorough reporting of the diagnostic accuracy studies and assess their quality in systematic reviews (STARD, QUADAS)[16,17]. Diagnostic accuracy is an indicator of the performance of a test and is measured through the agreement with its reference

or the "gold" standard[16,18]. Another term, widely applied in the literature along diagnostic accuracy, is the criterion validity defined as "the degree to which a measure covaries with previously validated or "gold-standard" measures of the same constructs" [19].

PTSD Checklist (PCL) and its Validation

One of the most frequently used self-report screening tests of PTSD symptoms is the 17-item PTSD Checklist (PCL)[18]. The Checklist has been developed by Weathers and his colleagues in 1993 and since has been widely applied in clinical and research settings[20]. The 17 items correspond to the symptoms of PTSD in the DSM-IV-TR. Respondents identify the extent to which they have experienced each symptom in the past month using a five-point Likert scale (ranging from "Not at all" to "Extremely"). Different scoring mechanisms can be applied to yield either a continuous measure of PTSD symptom severity (17-85) or a dichotomous indicator of diagnostic status[21,22]. The latter can include either an overall cutoff score or a symptom cluster scoring approach (Criteria B, C, D symptoms). The checklist does not assess the traumatic event in detail or the feelings of fear/helplessness or horror, which correspond to the Criteria A1 and A2.[18,22,23].

There are 3 types of PCL: a "specific" version for assessing a particular event (PCL-S), a "military" version for assessing the events' impact during military services (PCL-M) and a "civilian" version designed for the assessment of any stressful event (PCL-C) [21].

Since its introduction, PCL has undergone a number of validation studies and psychometric analyses on various population groups and subgroups which have demonstrated considerable variability across different settings in terms of optimal cutoff scores[20,22-31].

A cutoff score of 50, originally recommended by the authors of PCL yielded a sensitivity and a specificity of 0.82 and 0.83 respectively on a sample of male veterans [20]. However, a replication

study on a similar subgroup conducted later by Keen et al. (2008) [22] yielded an optimal cutoff score of 60 with a sensitivity of 0.56 and a specificity of 0.92. Using the original cutoff score of 50 on the sample of women with breast cancer authors calculated a sensitivity of 0.60 and a specificity of 0.99 [24]. In another study including victims of vehicle accidents and sexual assaults the cutoff score of 50 yielded a sensitivity of 0.78 and a specificity of 0.86, while moving the cutoff score down to the 44 improved the overall diagnostic efficiency to 0.90 with a sensitivity of 0.94 and a specificity of 0.86[25]. As PCL validation studies accumulated, a pattern has emerged showing that a cutoff score around 30 was more efficient when used in primary care settings [26,31,32] as opposed to much higher scores (≥50) among high-risk, treatment seeking individuals [20,24,26,33].

Yet in 1996, Blanchard and colleagues made a perceptive recommendation highlighting the need to understand the PCL cutoff score in the context of trauma type and gender differences[25]. A more recent critical review of diagnostic accuracy studies of PCL conducted by McDonald and colleagues provides a rigorous examination of various factors for understanding the variation patterns of PCL operating characteristics[18], emphasizing the need for expanding the diagnostic accuracy studies of PCL. The major argument the authors make is that sensitivity and specificity of the PCL are not fixed across settings and populations and might be amenable to various spectrum characteristics (such as demographics, disease severity, comorbidity and other sample characteristics)[18,34,35]. Moreover, based on the findings from a validation study using the Davidson Trauma Scale (DTS), McDonald and colleagues recommend considering the peculiarities of the comparison group used in the validation study, since the latter in its turn might significantly alter the operating characteristics of the instrument[36]. As shown by McDonald et al[36], the ability of the DTS to discriminate between the veterans with PTSD and

veterans with no other Axis I diagnosis was quite different in comparison with its ability to discriminate between the veterans with PTSD and veterans without PTSD but with a current diagnosis of another Axis I disorder.

Major biases specific to diagnostic accuracy studies (such as work-up, test-review, incorporation bias, etc.) can also affect operating characteristics being measured [16,18,34,37,38]. As described by Ransohoff et al.[34], bias can occur in diagnostic accuracy studies when the test results are not independent from the diagnoses; the prior knowledge of negative or positive test results might affect the further diagnostic decisions thus resulting in so called work-up bias[18]. When the diagnosis may affect the test results, test-review bias becomes an issue[37]. Finally, when using a screening test in the diagnostic process, incorporation bias[34] becomes the threat .

Apart from the concerns of various spectrum effects and biases, the ability of a screening test to accurately estimate the prevalence of a condition in a give population is strongly affected by the true prevalence (base rate) of the condition in that population[39] – when the true prevalence is low, the screening test will have a tendency to overestimate it (with the recommended cutoff) and conversely -underestimate it when the true prevalence is high. Hereby, the choice of different cutoff scores for the settings with different base rates becomes the issue when the estimation of the prevalence of the condition is of interest. As shown by Terhakopian and colleagues, lower cutoff scores are most optimal in populations with high base rates, while higher cutoff scores- in populations with low base rates to yield close-to-the-real prevalence estimates[40].

Thus, the conclusion to draw from the above presented discussion is that the mere reliance on "conventional" cutoff scores might lead to misapplication of a screening test creating additional

challenges when trying to make predictions about the efficiency of the cutoff score for a specific subgroup without the investigation of the performance of the latter in the given setting.

Center for Epidemiologic Studies Depression Scale (CES-D)

CES-D is a 20-item self-report depression scale developed to identify depression in the general population[41]. It is one of the most widely applied instruments for depression symptoms' screening in various demographic and health subgroups. CES-D has been translated and validated in many languages and across different population subgroups[42-46]. A wide range of studies have demonstrated good psychometric properties of the instrument in various settings with corresponding modifications suggested[43,45,47].

CES-D covers the major symptoms of depression (Criteria A symptoms) identified in the literature with a highlight of affective components: depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disturbances[48]. The original version of CES-D consists of four dimensions as described by Radloff[41]: Depressed Affect, (lack of) Positive Affect/Anhedonia, Somatic-Retarded Activity and Interpersonal Relations, which collectively construct a depression score (summative score of 4 factors). However, studies conducted among different cultural/ethnic populations have demonstrated that the original four factor model might not be applicable[47,49] in a given setting, suggesting a different latent structure of the scale in some population groups and ensuing modifications to the original scale.

The Conventional optimal cutoff score of 16 originally suggested by the author [41] is subject to variance across different demographic and cultural groups (as is the case with most of the screening tests applied in different ethnic/cultural settings). A number of validation studies of

CES-D have determined different optimal cutoff scores specific for a given setting and population subgroup[42,43,46,50,51].

The Armenian version of CES-D has been used in several household health surveys to measure the prevalence of depressive symptoms in the general population aged 18 and over[52]. However, lacking data of the psychometric property analyses and validation studies of the instrument on the Armenian population, conventional cutoffs from general literature were applied, which yielded exaggerated prevalence of depressive symptoms in the population[52]. In order to address these concerns with measurement properties of the instrument, data from a countrywide health survey of the general population aged 18 and over were used by Demirchyan and colleagues, to assess the psychometric properties of the translated instrument. The authors found a three-factor structure of the scale (combined Depressed/Somatic, (lack of) Positive Affect/Anhedonia and Interpersonal) with the latter factor weakly correlated with the other two factors, thereby reducing the overall internal consistency of the whole scale. Further analysis of the construct yielded a possible explanation that the positively worded Positive Affect/Anhedonia items measured lifestyle- or attitude-related characteristics rather than depressive symptomatology of the Armenians. Accordingly, it was concluded that the positively stated Positive Affect items of CES-D may not appropriately represent depression symptoms for Armenian population. Hence, it was suggested that either the modified version of CES-D using the score of the 16-item negatively formulated subscale only or a restatement of the four positively worded questions with negative wording, could both be considered as more valid options for the Armenian population. However, the prior study did not estimate the criterion validity of the Armenian CES-D, thereby leaving the question regarding the optimal cutoff score applicable for the Armenian population unanswered. Meanwhile, no previous studies have been conducted in

Armenia to assess the properties of the negatively restated Positive Affect questions in measuring the dimension of the (lack of) Positive Affect/Anhedonia defined as a failure to perceive pleasure[53].

"Reference" Standard

The two most commonly employed standardized interviews for PTSD diagnosis are the Clinician-Administered PTSD Scale (CAPS)[54] and the Structured Clinical Interview for DSM IV (SCID)[55].

CAPS has been widely applied as a "gold" standard for PTSD assessment along with SCID demonstrating good psychometric properties[18,56]. It provides more detailed information about PTSD, including overall PTSD severity and frequency of the symptoms[54]. Validation studies and psychometric property analyses have been reported concerning CAPS's performance in various population groups[57,58].

SCID is another criterion standard for PTSD as well as depressive disorder diagnoses[44,59]. SCID is a semi-structured interview for making the major DSM-IV diagnoses[55] and has been widely used in validation studies[18,23,26,36]. SCID-I represents one version that is designed for all DSM-IV Axis I diagnoses, consisting of corresponding modules. It is designed to be administered by appropriately trained health professionals[60]. In comparison with CAPS, it is less structured, thus its administration requires a thorough prior training by a specialist in the field.

Armenian Experience

The 1988 Spitak Earthquake (registering 6.9 on the Richter scale) that struck Northern part of Armenia caused 25 000 deaths and left 700 000 people homeless. In Gyumri, the city with the highest magnitude of losses, 7% of the entire population died, while 50% of the city was

destroyed[61,62]. Since the earthquake, a number of epidemiological studies including a cohort study with a number of follow-ups have been conducted among the survivors[61-68]. However, notwithstanding the number of instruments that have been employed in the investigations to measure PTSD and depressive disorders among the survivors, only one of the studies has diagnostic accuracy data for PTSD Reaction Index scale in this population[69]. No criterion validity studies of PTSD Checklist or CES-D scale yielding clinically validated measures have been conducted in Armenia so far, regardless of their application in the most recent follow-up study of the cohort ("personal communication with V. Khachadourian and A. Demirchyan", American University of Armenia, Center for Health Services Research and Development). Meanwhile, as discussed above, without population-specific data it becomes a challenge to make inferences about the accuracy and operating characteristics of a screening test applicable in a given setting.

STUDY AIM AND OBJECTIVES

Based on the literature review provided above, which indicates variations of optimal cutoff scores and diagnostic characteristics of the screening tests within and between population groups, this study was conducted with the ***aim*** to investigate the diagnostic accuracy of the Armenian versions of PCL-C and CES-D modified versions (16 item scale vs. 20 item scale with negatively restated Positive Affect items) among 1988 Spitak earthquake survivors.

The specific objectives of the study were:

1.1 Assess diagnostic characteristics of Armenian translated PCL-C in relation to SCID-I PTSD module (Criteria A, B, C, D, E)

- Evaluate the area under the receiver operating characteristic (ROC) curve

- Assess the sensitivity, specificity, positive and negative predictive values, likelihood ratios and diagnostic efficiency of PCL-C at different cutoff scores
- Assess the level of agreement between PCL-C and SCID
    - Compare PCL-C with SCID for symptom clusters (Criteria B, C, D)

1.2 Recommend an optimal cutoff score for PCL-C for the target population

1.3 Compare the diagnostic efficiency of the PCL-C in relation to the SCID based on two different scoring procedures (dichotomized sum score vs. symptom cluster scoring).

2.1 Assess diagnostic characteristics of Armenian modified versions of CES-D (16 and 20 item scales with negatively restated positive affect items) in relation to SCID-I Major Depressive Episode module (Criterion A)

- Evaluate the areas under the ROC curves
- Assess the sensitivity, specificity, positive and negative predictive values, likelihood ratios and diagnostic efficiency of CES-D (16) and CES-D (20) at different cutoff scores
- Assess the level of agreement between both versions of CES-D and SCID

2.2 Recommend optimal cutoff scores for CES-D (16) and CES-D (20) for the target population

2.3 Compare the diagnostic accuracies of the CES-D (16) vs. CES-D (20)

METHODOLOGY

Study Design, Setting and Population

The study was a cross-sectional quantitative analysis conducted in the city of Gyumri among 1988 Spitak earthquake survivors. People aged 39 and older who were living in Gyumri during 1988 earthquake witnessing the disaster comprised the study population. Eligible participants were chosen according to the following inclusion criteria:

- People aged 39 and older; this age choice ensured that the participants were at least 14 years old in 1988, thus, they were expected to remember the traumatic event and be able to provide appropriate reflections for PTSD diagnosis; meanwhile this age category was selected in prior studies of the earthquake region, which in its turn ensured the comparability of the data with those studies[61-68] ("personal communication with V. Khachadourian and A. Demirchyan", American University of Armenia, Center for Health Services Research and Development).
- People who lived in Gyumri during 1988 earthquake and witnessed the disaster.

Those who could not freely communicate nor read Armenian were excluded from the study.

Sample Size

Since one of the major objectives of the study was the assessment of the area under the receiver operating characteristic (ROC) curve (AUC) to measure the overall diagnostic accuracy of the instruments, sample size calculation based on AUC estimation was employed. For that purpose, the formula for the calculation of standard error (SE) of AUC suggested by Hanley and McNeil[70] was applied:

$$SE(\hat{\theta}) = \sqrt{\frac{\hat{\theta}(1-\hat{\theta}) + (n_A - 1)(Q_1 - \hat{\theta}^2) + (n_N - 1)(Q_2 - \hat{\theta}^2)}{n_A \cdot n_N}}$$

Where,

θ = anticipated area under the ROC curve

n_A = number of abnormal cases in the sample

n_N = number of normal cases in the sample

In addition, $\boldsymbol{Q_1}$ and $\boldsymbol{Q_2}$ estimated by:

$$Q_1 = \theta \div (2 - \theta)$$
$$Q_2 = 2\theta^2 \div (1 + \theta)$$

Previous studies conducted on the same target population in the region and a bulk of validation studies of the instruments conducted on various population subgroups provided all of the assumed information needed for the sample size calculation. Based on the last follow-up data ("personal communication with V. Khachadourian and A. Demirchyan", American University of Armenia, Center for Health Services Research and Development), the proportion of individuals in the cohort with depression was estimated to be around 0.25, while PTSD ranged from 0.15 to 0.25 depending on the cutoff score used. In addition, a twenty-year follow-up study conducted by Najarian and colleagues[71] revealed a probable rate of PTSD among 1988 Earthquake survivors of 0.21. Literature suggests various estimates for area under ROC curve for PCL-C ranging from 0.84-0.98[22,26,31] and CES-D- from 0.88 to 0.94[72,73]. Table 1 displays different assumed standard error scenarios with the application of different estimates of AUC, prevalence and sample size. The sample size calculation with the smallest standard error is most preferable. In this regard, AUC for Armenian population was anticipated to be 0.84 and above. For sample size calculation, an AUC estimate of 0.88 (a balance between literature and feasibility issues) was applied. Based on all of the above, a sample size of 105 (with n_A=26, n_N=79 derived from an anticipated 25% prevalence of the conditions) and AUC estimate of 0.88 yielded a standard error of 0.046 (see Table 1). After adjusting for homogeneity effect (1.2) due to cluster sampling design, the final sample size was calculated as 126.

Sampling Frame and Sampling Strategy

For the recruitment of the study participants in Gyumri, a two-stage cluster sampling strategy (probability proportional to size) was applied based on considerations of feasibility and rigor. At

the first stage, clusters were randomly chosen from 81 districts (electoral districts) of Gyumri with probability proportional to size. Subsequently, starting points for each of the clusters were randomly chosen within the districts using election lists of the Republic of Armenia. With the sample size of 126, and the chosen feasible cluster size of 9, 14 clusters were included in the study.

Study Procedure

For each cluster (electoral district), the interviewers found the randomly chosen starting address, building and apartment number. The main direction for finding the appropriate respondent was always moving right/up. When no more eligible respondent could be found in the building, the interviewers moved right to find the next building. If the interviewers reached the end of the street, they continued looking for the respondent in the street adjacent to the one that was assigned. The first attempt of the survey/interview was the starting address. Interviewers completed "Journal forms" (see Appendix 2) for each cluster to assess the response rate. Introduction to the household and selection of the respondent from a household was conducted in accordance with the screening form protocol (see Appendix 3). Subsequent selection of households to complete 9 required interviews per cluster depended on whether a completed survey/interview was obtained from the previous household or not:

- If the visit to the prior household resulted in a completed survey/interview, the interviewers passed by the next four households moving always to the right/up from the prior household and attempted the fifth household.
- If the attempt in the prior household was not successful (refusal, no eligible respondent, incomplete survey/interview, etc.), the interviewers attempted the next household on the right/up to the prior without skipping any households.

- If four consecutive interviews were completed with females in the cluster, interviewers chose a male respondent, if there was an option in the next household. However, the female respondent was approached if there was no eligible male in the next household.

If positive feedback was received after the introduction of the study to the household, the 2 interviewers conducting the survey/interview entered the household. The eligible participant was then introduced to the research purposes and consented to participate. Data collection was organized in two sessions: first, the interviewer gave instructions and kept track of the self-administration of the PCL-C and CES-D instruments. Next, the interviewer (a psychologist with specific training in SCID PTSD and Mood Episode modules' administration) who stayed completely blind to the procedure and the instrument completion results, rated the participant using SCID diagnostic interview (after he/she completed the two self-administered scales). The mean duration of SCID Modules' administration was 22 minutes, ranging from 5 minutes to 1 hour depending on the case severity.

Study Instruments

The following instruments were used in the study (see Appendix 4):

- ✓ Armenian version of PTSD Checklist - Civilian (PCL-C)[20]
- ✓ Armenian modified version of Center for Epidemiologic Studies Depression (CES-D) scale[41] (with negatively restated questions)
- ✓ Structured Clinical Interview for DSM Axis I Disorders Research version Non-patient edition (SCID-I/NP): PTSD and Mood Disorders Modules

SCID-I Research Version Non-Patient edition was used as the "reference standard" for PTSD and Major Depressive Episode assessments. A 2nd year public health graduate student with a background in psychology was trained in accordance with the training package offered by the

Biometrics Research Department of the Columbia University Medical Center[74] in both PTSD and MDE modules' administration prior to data collection.

Statistical Analysis

Data were analyzed using Stata version 10 and MedCalc statistical software packages. Diagnostic characteristics of the instruments including sensitivity (proportion of those with the disorder correctly identified by the test), specificity (proportion of those without the disorder correctly identified by the test), positive predictive value (proportion of those having the disorder of those testing positive), negative predictive value (proportion of those not having the disease from those testing negative), likelihood ratios (how much a test result changes the odds of having the disease), diagnostic efficiency (proportion of those correctly identified by the test), calculated using the base rate (true prevalence rate measured via the reference standard), and the Youden index J (estimated as [Sensitivity +Specificity-1] at any observed score) were calculated for the instruments in comparison with SCID modules. The optimal cutoff scores were chosen based on the point corresponding to the maximum value of the Youden index. Bias-corrected and accelerated bootstrapping ($BC_{a,}$ with 10000 iterations) was used to calculate 95% confidence intervals for Youden indices[75]. Weighted kappa coefficients (K (0.5)) were calculated to measure the level of agreement of the instruments with SCID providing equal values to sensitivity and specificity (K (0.5)). Values for kappa were summarized according to the Landis and Koch magnitude categorization[76].

Internal consistency of the scales was calculated based on Cronbach's α statistic. Two-sided confidence intervals for Cronbach's α coefficient were calculated according to the formula suggested by Feldt and collegues[77,78]. Item level analysis (corrected item-total correlations and

Cronbach's α if item deleted) was conducted to test the CES-D (20) item fit with negatively restated Positive Affect items.

Agreement between PCL-C and SCID was investigated (Cohen's kappa statistic) for each of the three symptom clusters in DSM-IV (at least 1 B item, 3 C items and at least 2 D items). Symptoms rated as "Moderately" or above (responses 3 through 5 in PCL-C) were counted as present[21].

Nonparametric receiver operating characteristic (ROC) curve analysis was conducted to determine the areas under the ROC curves (AUC). The nonparametric choice was justified by skewed test values[79] for CES-D (16) in non-diseased group (skewness=0.87, kurtosis=3.35) and for PCL-C in diseased (skewness=0.58, kurtosis=2.45). AUC is a single global metrics that assesses the discriminative performance of the test. Standard errors for AUCs were calculated in accordance with Hanley and McNeil's approach[70]. In addition, separate ROC curves were generated for gender and age groups. Age was dichotomized at the mean of the sample (<56 years old and ≥56 years old). Differences in test performance between the demographic groups were statistically compared using the method suggested by Delong[80].

Principal component analysis (PCA) with Quartimax rotation was conducted to explore the factor structure of CES-D 20 with negatively restated Positive Affect items, in particular – to check whether these four items still measure a single construct – (lack of) Positive Affect/Anhedonia (what they are originally intended for).

ETHICAL CONSIDERATIONS

The study project was reviewed and approved by the Institutional Review Board #1 Committee on Human Research at the American University of Armenia.

All study participants were willing to participate and gave oral informed consent. Since the study involved diagnostic interviews, participants with threshold or sub-threshold diagnoses of PTSD or Major Depressive Episode were provided with a list of free of charge treatment options and referrals in Gyumri. For the latter, prior arrangements with the Gyumri Mental Health Center were made.

RESULTS

Sample Characteristics

Overall, it took 708 attempts to complete 126 interviews (see Figure 1). Of those, 277 resulted in either no one at home or an unoccupied house. Out of the remaining 431 attempts, 75 refused without providing information about the number of eligible participants in the household, and 60 were ineligible. Overall, 296 eligible participants were found and asked to participate. Of those, 126 completed the interviews (43%), 75 (25%) refused to participate due to various reasons (e.g. busy at home/with the children, not in the mood, etc.); 42 (14%) were unable to participate due to poor health conditions, 52 (18%) selected eligible participants were not at home and one interview was left incomplete with the available data only for CES-D scale and SCID MDE module.

The total sample of 127 participants (including 1 incomplete interview) consisted of ethnic Armenians only. The majority of the sample was female (75.6%), married (66.9%) with University (33.9%) or professional/technical (30.7%) education. The mean age of the participants was 55.7 years. The demographic information as a function of gender is displayed in Table 2. Males were more likely to be married than females (83.9% vs. 61.4%, $\chi^2(1) = 5.32$, p=0.02), less likely to be widowed than females (9.7% vs. 32.3%, $\chi^2(1) = 6.11$, p=0.01) and more

likely to be employed than females (45.2% vs. 17.7%, $\chi^2(1) = 9.57$, p=0.002). There was no statistically significant difference between genders in age and education level. Females had statistically significantly higher PCL-C mean score compared to males (t=2.21, p=0.03). No statistically significant difference was observed between genders in CES-D (16) or CES-D (20) mean scores.

Results of the SCID revealed that 33 participants out of 126 screened (26.2%) met criteria for current PTSD diagnosis (Criteria A, B, C, D, E). Females were more likely to have PTSD diagnosis than males (32.6% vs. 6.5%, $\chi^2(1) = 8.29$, p = 0.004).

On the other hand 36 participants out of 127 screened (28.4%) met criteria for current major depressive episode (Criteria A). There was no statistically significant difference between genders in current MDE status. Comorbidity of current PTSD and current MDE was present among 24 participants (19%). Of those diagnosed with current PTSD, the most commonly reported trauma was 1988 Spitak earthquake- related trauma (n=21; 63.6%), followed by the loss of a close person that was not related to the earthquake (n = 9; 27.3%).

Performance of PCL-C

Internal consistency of the PCL-C total scale was good with Cronbach's α=0.861 (95% CI=0.825-0.894). Internal consistency for PCL-C clusters B, C, D were acceptable (α=0.807, 95% CI=0.749-0.850; α=0.724, 95% CI=0.644-0.790; α=0.737, 95% CI =0.658-0.803, respectively). The mean score on the PCL-C for the entire sample was 44.4 (SD=12.8). Participants with current PTSD had a mean score on PCL-C of 57.1 (SD=6.6), which was statistically significantly (t=10.4; p=0.000) higher than the mean score of 39.9 (SD=11.4) of participants with no PTSD diagnosis. Figure 2 depicts the ROC curve for the PCL-C compared with the diagnosis of current PTSD based on SCID (Criteria A, B, C, D, E). PCL-C performed

well in the study population, resulting in an AUC of 0.903 (SE = 0.026; asymptotic 95% CI = 0.852- 0.953, z=15.58, p<0.0001). Table 4 presents operating characteristics for PCL-C. Findings indicated that PCL-C cutoff score of 50 resulted in the highest diagnostic efficiency (0.84) with 0.94 sensitivity (95% CI=0.80-0.99) and 0.81 (95% CI=0.71-0.88) specificity at the given base rate of 26.2%. At the same time, the cutoff score of 50 corresponded to the point of highest Youden index (J= 0.75, 95% CI=0.63-0.83) and the highest agreement after adjusting for chance agreement (K (0.5) = 0.65, 95% CI= 0.51 - 0.78). Repeating the analysis excluding participants with current MDE from non-PTSD group did not affect the optimal cutoff score of 50 or its diagnostic characteristics. Using the cutoff score of 50, the estimated PTSD prevalence was 38.9%. The latter overestimated the SCID defined prevalence by 12.7%. Moving the cutoff score to 54, prevalence estimate became equivalent to the base rate (26.2%).

The agreement with SCID was calculated to be moderate for the avoidance cluster ($K_{(0.5)}$ (95% CI) = 0.42 (0.27-0.57), sensitivity=0.88, specificity=0.60, PPV=0.55, NPV=0.90; diagnostic efficiency=0.70), slight for the re-experiencing ($K_{(0.5)}$ (95% CI) = 0.31 (0.08-0.53), sensitivity=0.96, specificity=0.29, PPV=0.82, NPV=0.60, diagnostic efficiency=0.84) and the hyper arousal clusters ($K_{(0.5)}$ (95% CI) = 0.37 (0.22-0.53), sensitivity=0.87, specificity=0.51, PPV=0.62, NPV=0.82; diagnostic efficiency=0.68).

Scale Characteristics of CES-D (20) with Negatively Restated Positive Affect Items

Table 3 presents means, standard deviations, corrected item-total correlations and Cronbach's α for items on the CES-D (20) with negatively restated positive affect items. Internal consistency of the CES-D (20) total scale was slightly higher (Cronbach's α=0.911, 95% CI= 0.887-0.932) than the internal consistency of CES-D (16) (Cronbach's α=0.879, 95% CI=0.846-0.908). Three of the four negatively restated items in CES-D (20) had high corrected correlations with the total

scale and their deletion would result in a lower Cronbach's α value for the total scale. However, negatively restated item 4, "not as good as others" was a relatively poor fit to the scale demonstrating lower mean score than other items, low corrected correlation with the whole scale and its deletion would not impact the internal consistency of the total scale at all. On the other hand, items of inter-personal relations (items 15 and 19) also demonstrated relatively poor fit to the total scale with low corrected item-total correlations; meanwhile deletion of item 15 resulted in higher internal consistency of the total scale, while deletion of item 19 did not affect the internal consistency of the total scale at all.

Notwithstanding sample size limitations, PCA with Quartimax rotation demonstrated that items 4, 8, 12 and 16 (negatively restated Positive Affect items) did not construct a separate factor of the (lack of) Positive Affect: rather, items 8, 12 and 16 showed high loadings on the combined depressed affect/somatic factor (factor loadings > 0.50) as suggested by Demirchyan and colleagues[81]. Item 4 did not load high on any of the factors identified for CES-D Armenian.

Performance of CES-D (16) and CES-D (20) with Negatively Restated Positive Affect Items

CES-D (16) mean score among individuals with current Major Depressive Episode (mean score 25.4, SD=7.1) was statistically significantly higher (t=8.83, p=0.000) compared to the ones with no current MDE (mean score 11.4, SD=8.4). CES-D (20) mean score among individuals with current Major Depressive Episode (mean score 31.6, SD=8.8) was statistically significantly higher (t=9.05; p=0.000) compared to the ones with no current MDE (mean score 14.0, SD=10.3). Figures 3 and 4 show ROC curves for the CES-D (16) and CES-D (20) compared to the reference standard (SCID, Criteria A). Both CES-D (16) and CES-D (20) performed well, with AUCs of 0.895 (SE=0.027, asymptotic 95% CI 0.842 - 0.948, z=14.57, p<0.0001) and

0.902 (SE=0.026, asymptotic 95% CI= 0.851 - 0.953, z=15.48, p<0.0001), respectively. Tables 5 and 6 present diagnostic characteristics for CES-D (16) and CES-D (20). The optimal cutoff score corresponding to the highest Youden index was 19 for CES-D (16) (J=0.67, 95% CI=0.54-0.75) with sensitivity of 0.86 (95% CI=0.71-0.95) and specificity of 0.81 (95% CI=0.72-0.89). The optimal cutoff score for CES-D (20) with the highest Youden index (J=0.70, 95% CI=0.57-0.77) was 21 with sensitivity of 0.92 (95% CI=0.78-0.98) and specificity of 0.78 (95% CI=0.68-0.86). In both cases, the diagnostic efficiencies for the cutoffs were high (0.83 for CES-D (16) and 0.82 for CES-D (20)) given the base rate of 28.4%. The Cohen's weighted kappa for the cutoff scores was 0.61 (95% CI 0.47-0.76) for both versions of CES-D. The cutoff score of 19 for CES-D (16) yielded 37.8% estimated prevalence of MDE, which overestimated the SCID defined base rate by 9.4%. The cutoff score of 21 for CES-D (20) yielded 41.7% estimated prevalence of MDE which overestimated the SCID defined base rate by 13.3%.

In order to be close to the SCID defined prevalence estimates, cutoffs need to be shifted from 19 to 21 for CES-D (16) and from 21 to 26 for CES-D (20) (prevalence estimates become 29.9% and 29.1 % for CES-D (16) and CES-D (20), respectively).

In addition, cutoffs corresponding to the highest diagnostic efficiency criterion were 20 and 26 for CES (16) and CES-D (20), respectively, given the base rate of 28.4%.

ROC analysis used to compare the performance of CES-D (16) vs. CES-D (20) with negatively restated positive affect items did not detect any significant difference between the AUCs ($\chi^2(1) = 0.83$, p=0.36).

AUC Comparisons by Gender and Age

ROC analyses were also performed to examine differences in the performance of the instruments by sex and age (see Table 7). No significant differences in the performance of PCL-C, CES-D

(16) or CES-D (20) were found as a function of age. AUCs for the PCL-C and CES-D (20) as a function of gender did not demonstrate statistically significant difference. However, there was a significant difference in the performance of CES-D (16) between males and females. The AUC of 0.967 (SE=0.03, asymptotic 95% CI 0.907-1.000, z=14.89, p<0.0001) for males was significantly higher compared to the AUC of 0.865 (SE=0.04, asymptotic 95% CI 0.795-0.935, z=10.18, p<0.0001) for females (see Figure 5).

DISCUSSION

The findings in this study support the use of the Armenian version of PCL-C as an accurate self-report measure for PTSD symptom identification among Armenians with known trauma history. Based on the data, the initially recommended cutoff score of 50[20] that was subsequently proven to be optimal on various populations [24,27] was optimal and most efficient in the population of 1988 Spitak earthquake survivors corresponding to a sensitivity of 0.94 and a specificity of 0.81 with the base rate of 26.2% and equal values placed on the false negatives and false positives. However, the chosen cutoff overestimated the SCID defined prevalence rate by 12.7%. This finding is consistent with the notion discussed by Terhakopian and colleagues[40] that, in the case of low prevalence rates, higher cutoffs will need to be applied to obtain prevalence estimates closest to the truth. As in our findings, shifting the cutoff to 54 yielded the closest estimate to the SCID defined prevalence of 26.2%.

Hereby, the cutoff score that a researcher will choose to apply in a given setting will depend upon the importance and costs associated with false positives and false negatives, as well as upon the study aims and interests. Since the base rate in the population highly affects the estimated prevalence and the diagnostic efficiency of the instrument[18], researchers might want to choose

cutoff scores other than 50 in order to minimize the misclassifications and have closer estimates to the true prevalence in settings with a base rate other than 26.2%.

As suggested by McDonald and colleagues[36] an attempt was made to see whether the exclusion of participants with co-morbid conditions in the comparison group (i.e. non-PTSD cases, who had MDE in the study) would affect the discriminative performance of PCL-C. In accordance with the findings from Hudson and colleagues[28] the exclusion of those observations did not affect the optimal cutoff score or the diagnostic characteristics of PCL-C. Consistent with a number of international studies the agreement between self-administered PCL-C and SCID was substantial[18,23,25,56]. However, in comparison with a dichotomized sum score of 50, the instrument performed poorer and demonstrated lower agreements when using symptom cluster scoring technique (moderate for avoidance and slight for re-experiencing and hyper arousal clusters).

Both CES-D (16) and CES-D (20) with negatively restated positive affect items demonstrated acceptable internal consistency for the total score (Cronbach's α=0.911 and 0.879, respectively). As displayed in the Result section, the four restated items did not construct a separate factor of the (lack of) Positive Affect/Anhedonia, while 3 of them (items 8, 12 and 16) loaded high on the depressive/somatic affect factor and item 4 did not load high on any of the factors as identified by Demirchyan and colleagues[81]. In addition, items 4 (restated item "not as good as other"), 15 ("unfriendly people") and 19 ("people disliked") demonstrated relatively low corrected item-total correlations. Items 15 and 19 had low corrected item-total correlations in the study by Demirchyan and colleagues[81] as well. This finding is consistent with recent discussions in the field suggesting that "socially-focused" items (i.e. items 15 and 19) in the CES-D should be omitted from the scale[82-84].

The results demonstrated that both of the Armenian versions of CES-D (20) with negatively restated positive affect items and CES-D (16) are valid screening tools for major depressive symptomatology identification in the population of 1988 Spitak earthquake survivors. The most optimal cutoff score for CES-D (16) was 19 with sensitivity of 0.86 and specificity of 0.81, while the most optimal cutoff for CES-D (20) was 21 with sensitivity of 0.92 and specificity of 0.78 with equal weights for false positives and false negatives. Thus, in both cases the optimal cutoffs well exceeded the conventional CES-D cutoff score of 16 originally suggested by Radloff [41]. These findings are consistent with a number of publications demonstrating optimal cutoff scores higher than 16 for various cultural and demographic groups[46,50,51,59,85]. As in case of PCL-C with a base rate other than 28.2%, the choice of the cutoff in a given situation, however, might differ to meet the highest diagnostic efficiency criteria and/or the need for estimates closer to the true prevalence.

Both versions of CES-D had substantial agreement with SCID at their optimal cutoff scores. The comparison of AUCs for CES-D (16) and CES-D (20) were not significantly different, thus not depicting any difference in their diagnostic performance.

The AUC comparisons conducted by demographic groups revealed a statistically significant difference in CES-D (16) performance between males and females. CES-D (16) performed better in the group of males compared to females. Comparison with other studies concerning the performance of CES-D in males vs. females cannot be made, since other studies did not examine CES-D performance by gender.

STUDY STRENGHTS AND LIMITATIONS

This study was designed and conducted in accordance with the Standards for Reporting of Diagnostic Accuracy (STARD) requirements addressing all the topics and items highlighted in

STARD checklist[16] . The study sample size was calculated based on the AUC estimation. However, the study had several limitations:

The participation rate of 52% among the eligible participants contacted might pose challenges for the generalizability of findings interfering with a variety of spectrum affects. On the other hand, the findings might not be generalizable to other demographic groups in Armenia, since changes in the spectrum characteristics will alter diagnostic characteristics of the instruments. Another limitation of the study was that the sample size of 127 did not allow the derivation of precise internal validity measures for the scales nor the development of an accurate factor structure for the CES-D (20) with negatively restated Positive Affect items. Moreover, the sample size of 127 with 96 females and 31 males might not be sufficient to make definite conclusions about the difference of diagnostic performance of CES-D (16) between genders. However, the last two points were not among the main objectives when designing the study.

CONCLUSIONS AND RECOMMENDATIONS

Based on the study results several conclusions can be made:

- Armenian version of PCL-C is an accurate tool for identifying PTSD symptomatology among Armenians with a trauma history
- The most optimal and most efficient cutoff score for PCL-C among 1988 earthquake survivors is 50 with equal values placed on sensitivity and specificity and a base rate of 26.2%
- The scoring procedure of PCL-C using a dichotomized sum score is more efficient for the Armenian population compared to symptom cluster scoring technique

- The Armenian versions of CES-D (16) and CES-D (20) with negatively restated Positive Affect items are valid tools to measure major depression symptomatology in Armenian population
- The most optimal cutoff score for Armenian CES-D (16) is 19 and 21 for CES-D (20) among 1988 Spitak earthquake survivors with equal values placed on sensitivity and specificity
- CES-D (16) and CES-D (20) do not differ significantly in their diagnostic performance
- Negatively restated Positive Affect items do not construct a separate factor of the (lack of) Positive Affect/Anhedonia and thus might not have practical application
- CES-D (16) performs better among males in the Armenian population than among females

Taking into consideration the study limitations, the study recommends conducting larger scale diagnostic accuracy studies of the instruments for different demographic groups and subgroups within the Armenian population to have "psychometrically sound" instruments applicable for various settings. In addition, it will be preferable to investigate AUC differences of CES-D (16) between genders on a larger sample in order to see whether gender needs to be factored into cutoff score selection when using the instrument in the Armenian population.

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TABLES

Table 1. Dependence of Standard Error on the Estimates of AUC, Prevalence of the Disorder and Sample Size

AUC estimate	# with the disorder	# without the disorder	Prevalence rate	Sample size	Standard Error
0.88	***26***	***79***	***0.25***	***105***	***0.046***
0.88	30	90	0.25	120	0.042
0.88	37	113	0.25	150	0.038
0.84	26	79	0.25	105	0.051
0.84	30	90	0.25	120	0.048
0.84	37	113	0.25	150	0.043
0.88	15	85	0.15	105	0.059
0.88	18	102	0.15	120	0.054
0.88	23	127	0.15	150	0.047
0.84	15	85	0.15	105	0.066
0.84	18	102	0.15	120	0.060
0.84	23	127	0.15	150	0.053

The sample size option considered in the study is underlined.

Table 2. Current PTSD and Current MDE Prevalence Rates and Demographic Characteristics of the Analytical Sample by Gender

	Female sample (n=96)	**Male sample (n=31)**	**Total sample (n=127)**
Current PTSD (SCID A, B, C, D, E Criteria; %)*	31 (32.6[1])	2 (6.5)	33 (26.2[2])
Current MDE (SCID A Criterion; %)	28 (29.2)	8 (25.8)	36 (28.4)
Current PTSD and Current MDE (SCID; %)*	22 (23.2[1])	2 (6.5)	24 (19.0[2])
Age			
Mean (SD)	55.7 (10.8)	55.5 (9.7)	55.7 (10.5)
Range	39 - 80	41 - 76	39 - 80
Level of Education (%)			
Less than 10 years of school	8 (8.3)	1 (3.2)	9 (7.1)
10 years of school	25 (26.0)	10 (32.3)	35 (27.5)
Professional/technical	32 (33.3)	7 (22.6)	39 (30.7)
University	30 (31.3)	13 (41.9)	43 (33.9)
Postgraduate	1 (1.0)	-	1 (0.8)
Marital Status (%)			
Single	4 (4.2)	2 (6.4)	6 (4.7)
Married *	59 (61.4)	26 (83.9)	85 (66.9)
Divorced	2 (2.1)	-	2 (1.6)
Widow *	31 (32.3)	3 (9.7)	34 (26.8)
Employment status (%)			
Employed*	17 (17.7)	14 (45.2)	31 (24.4)
Unemployed*	46 (47.9)	7 (22.6)	53 (41.7)
Working at home	3 (3.1)	1 (3.2)	4 (3.2)
Retired	30 (31.3)	9 (29.0)	39 (30.7)
Family's general standard of living (self-reported; %)			
Substantially below average	31 (32.3)	13 (41.9)	44 (34.6)
A little below average	19 (19.8)	3 (9.7)	22 (17.3)
Average	38 (39.6)	11 (35.5)	49 (38.6)
A little above average	7 (7.3)	1 (3.2)	8 (6.3)
Substantially above average*	1 (1.0)	3 (9.7)	4 (3.2)
Visited a mental health specialist (%)			
Ever	7 (7.3)	-	7 (5.5)
Never	89 (92.7)	31 (100)	120 (94.5)
PCL-C Score			
Mean (SD)*	45.8[1] (12.2)	40.1(13.8)	44.4[2] (12.8)
CES-D(16) Score			
Mean (SD)	16.3 (9.9)	12.6 (10.7)	15.4 (10.2)
CES-D(20) Score			
Mean (SD)	20.2 (12.4)	15.2 (13.0)	19.0 (12.7)

Notes: MDE=major depressive episode

[1] Calculated from a sample of 95 female respondents (one case was missing)

[2] Calculated from a total sample of 126 respondents (one case was missing)

*Significant difference between genders, $p<0.05$ (based on χ^2 analysis for proportions and t-test analysis for means)

Table 3. CES-D (20) with Negatively Restated Positive Items Means, Corrected Item-total Correlations, and Cronbach's α if Item Deleted

	Scale characteristics (n=127)			
CES-D20 items	***Mean***	***SD***	***Corrected item-total correlations***	***Cronbach's α if item deleted***
1.Bothered by things	1.07	1.05	0.49	0.908
2. Poor appetite	0.78	0.97	0.40	0.910
3. Could not shake blues	0.90	1.04	0.49	0.908
4. Not as good as others	*0.48*	*0.79*	*0.33**	*0.911*
5. Difficulty concentrating	0.78	0.87	0.51	0.908
6. Felt depressed	1.33	1.03	0.68	0.904
7. Everything an effort	1.20	1.05	0.62	0.905
8. Hopeless about future	*1.09*	*1.17*	*0.52*	*0.908*
9. Life a failure	0.98	1.15	0.66	0.904
10. Felt fearful	0.86	1.17	0.57	0.906
11. Restless sleep	1.26	1.16	0.56	0.907
12. Was unhappy	*0.86*	*1.15*	*0.73*	*0.902*
13. Talked less	0.86	1.04	0.55	0.907
14. Felt lonely	0.83	1.12	0.62	0.905
15. Unfriendly people	0.84	0.94	0.25*	0.913
16.Could not enjoy life	*1.15*	*1.13*	*0.60*	*0.905*
17.Crying spells	1.08	1.17	0.69	0.903
18. Felt sad	1.34	1.09	0.76	0.901
19.People disliked	0.46	0.72	0.36*	0.911
20. Could not get going	0.81	0.97	0.61	0.905
Total scale				0.911

Note. Negatively restated positive items are highlighted.
*Items with low corrected correlations to total.

Table 4. Diagnostic Characteristics of PCL-C by Cutoff Score

Cutoff Score	Sensitivity	Specificity	Predictive Value		Likelihood Ratio		Efficiency	Youden J	K (0.5)
			+	-	+	-			
17	1.00	0.00	0.26	-	1.00	-	0.26	0.00	0.00
18	1.00	0.01	0.26	1.00	1.01	0.00	0.27	0.01	0.01
20	1.00	0.02	0.27	1.00	1.02	0.00	0.28	0.02	0.01
21	1.00	0.03	0.27	1.00	1.03	0.00	0.29	0.03	0.02
23	1.00	0.07	0.28	1.00	1.07	0.00	0.31	0.07	0.04
24	1.00	0.09	0.28	1.00	1.09	0.00	0.33	0.09	0.05
25	1.00	0.11	0.28	1.00	1.12	0.00	0.34	0.11	0.06
26	1.00	0.12	0.29	1.00	1.13	0.00	0.35	0.12	0.07
27	1.00	0.15	0.30	1.00	1.18	0.00	0.37	0.15	0.09
28	1.00	0.19	0.31	1.00	1.24	0.00	0.41	0.19	0.11
29	1.00	0.22	0.31	1.00	1.27	0.00	0.42	0.22	0.13
30	1.00	0.23	0.31	1.00	1.29	0.00	0.43	0.23	0.13
32	1.00	0.24	0.32	1.00	1.31	0.00	0.44	0.24	0.14
34	1.00	0.32	0.34	1.00	1.48	0.00	0.50	0.32	0.20
35	1.00	0.34	0.35	1.00	1.53	0.00	0.52	0.34	0.22
36	1.00	0.36	0.36	1.00	1.55	0.00	0.52	0.36	0.22
37	1.00	0.40	0.37	1.00	1.66	0.00	0.56	0.40	0.26
38	1.00	0.43	0.38	1.00	1.76	0.00	0.58	0.43	0.28
40	1.00	0.44	0.39	1.00	1.79	0.00	0.59	0.44	0.29
41	1.00	0.47	0.40	1.00	1.90	0.00	0.61	0.47	0.32
42	1.00	0.51	0.42	1.00	2.02	0.00	0.64	0.51	0.35
43	1.00	0.56	0.45	1.00	2.27	0.00	0.68	0.56	0.40
44	1.00	0.59	0.47	1.00	2.45	0.00	0.70	0.59	0.43
45	1.00	0.63	0.49	1.00	2.74	0.00	0.73	0.63	0.48
46	1.00	0.67	0.52	1.00	3.00	0.00	0.75	0.67	0.51
47	1.00	0.71	0.55	1.00	3.44	0.00	0.79	0.71	0.56
48	0.97	0.72	0.55	0.99	3.47	0.04	0.79	0.69	0.56
49	0.94	0.80	0.62	0.97	4.60	0.08	0.83	0.74	0.63
50	**0.94**	**0.81**	**0.63**	**0.97**	**4.85**	**0.08**	**0.84**	**0.75**	**0.65**
51	0.85	0.82	0.62	0.94	4.64	0.19	0.83	0.67	0.60
52	0.79	0.83	0.62	0.92	4.58	0.26	0.82	0.62	0.57
53	0.67	0.86	0.63	0.88	4.77	0.39	0.81	0.53	0.52
54	0.64	0.87	0.64	0.87	4.93	0.42	0.81	0.51	0.51
55	0.58	0.88	0.63	0.85	4.87	0.48	0.80	0.46	0.47
56	0.52	0.90	0.65	0.84	5.32	0.54	0.80	0.42	0.45
57	0.46	0.90	0.63	0.82	4.70	0.60	0.79	0.36	0.39
58	0.42	0.94	0.70	0.82	6.58	0.62	0.80	0.36	0.41
59	0.36	0.95	0.71	0.81	6.76	0.67	0.79	0.31	0.37
60	0.30	0.97	0.77	0.80	9.39	0.72	0.79	0.27	0.34
62	0.27	0.97	0.75	0.79	8.46	0.75	0.79	0.24	0.30
63	0.27	0.99	0.90	0.79	25.36	0.74	0.80	0.26	0.34
64	0.18	0.99	0.86	0.77	16.91	0.83	0.78	0.17	0.23
66	0.15	1.00	1.00	0.77	0.00	0.85	0.78	0.15	0.21
67	0.12	1.00	1.00	0.76	0.00	0.88	0.77	0.12	0.17
68	0.06	1.00	1.00	0.75	0.00	0.94	0.75	0.06	0.09
73	0.03	1.00	1.00	0.74	0.00	0.97	0.75	0.03	0.04

Table 5. CES-D (16) Operating Characteristics by Cutoff Score

Cutoff Score	Sensitivity	Specificity	Predictive Value		Likelihood Ratio		Efficiency	Youden J	K (0.5)
			+	-	+	-			
0	1.00	0.00	0.28	0.00	1.00	0.00	0.28	0.00	0.00
1	1.00	0.06	0.30	1.00	1.06	0.00	0.32	0.06	0.03
2	1.00	0.08	0.30	1.00	1.08	0.00	0.34	0.08	0.05
3	1.00	0.14	0.32	1.00	1.17	0.00	0.39	0.14	0.09
4	1.00	0.19	0.33	1.00	1.23	0.00	0.42	0.19	0.12
5	1.00	0.22	0.34	1.00	1.28	0.00	0.44	0.22	0.14
6	1.00	0.26	0.35	1.00	1.36	0.00	0.47	0.26	0.17
7	1.00	0.33	0.37	1.00	1.49	0.00	0.52	0.33	0.22
8	1.00	0.39	0.39	1.00	1.63	0.00	0.56	0.39	0.26
9	1.00	0.41	0.40	1.00	1.69	0.00	0.58	0.41	0.28
10	1.00	0.48	0.43	1.00	1.94	0.00	0.63	0.48	0.35
11	1.00	0.52	0.45	1.00	2.07	0.00	0.65	0.52	0.38
12	1.00	0.57	0.48	1.00	2.33	0.00	0.69	0.57	0.43
13	1.00	0.64	0.52	1.00	2.76	0.00	0.74	0.64	0.50
14	0.97	0.67	0.54	0.98	2.95	0.04	0.76	0.64	0.52
15	0.97	0.69	0.56	0.98	3.16	0.04	0.77	0.66	0.54
16	0.92	0.71	0.56	0.96	3.21	0.12	0.77	0.63	0.53
17	0.89	0.76	0.59	0.95	3.68	0.15	0.80	0.65	0.56
18	0.86	0.80	0.63	0.94	4.35	0.17	0.82	0.66	0.60
19	**0.86**	**0.81**	**0.66**	**0.94**	**4.61**	**0.17**	**0.83**	**0.67**	**0.61**
20	0.78	0.86	0.68	0.91	5.44	0.26	0.84	0.64	0.61
21	0.69	0.86	0.66	0.88	4.86	0.36	0.81	0.55	0.54
22	0.61	0.88	0.67	0.85	5.06	0.44	0.80	0.49	0.50
23	0.58	0.89	0.68	0.84	5.31	0.47	0.80	0.47	0.49
24	0.53	0.90	0.68	0.83	5.34	0.52	0.80	0.43	0.46
25	0.50	0.91	0.69	0.82	5.69	0.55	0.80	0.41	0.45
26	0.47	0.91	0.68	0.81	5.37	0.58	0.79	0.38	0.42
27	0.42	0.92	0.69	0.80	5.42	0.63	0.78	0.34	0.39
28	0.39	0.92	0.67	0.79	5.06	0.66	0.77	0.31	0.36
29	0.36	0.95	0.72	0.79	6.57	0.68	0.78	0.31	0.36
30	0.33	0.97	0.80	0.79	10.11	0.69	0.79	0.30	0.36
31	0.28	0.98	0.83	0.77	12.64	0.74	0.78	0.26	0.32
32	0.25	0.98	0.82	0.77	11.38	0.77	0.77	0.23	0.29
33	0.22	0.99	0.89	0.76	20.22	0.79	0.77	0.21	0.27
35	0.19	0.99	0.88	0.76	17.70	0.82	0.76	0.18	0.24
36	0.11	0.99	0.80	0.74	10.11	0.90	0.74	0.10	0.14
38	0.00	0.99	0.00	0.71	0.00	1.01	0.71	-0.01	-0.02

Table 6. CES-D (20) Operating Characteristics by Cutoff Score (Negatively Restated Four Positive Affect Items)

Cutoff Score	Sensitivity	Specificity	Predictive Value		Likelihood Ratio		Efficiency	Youden J	K (0.5)
			+	-	+	-			
0	1.00	0.00	0.28	0.00	1.00	0.00	0.28	0.00	0.00
1	1.00	0.04	0.29	1.00	1.05	0.00	0.32	0.04	0.03
2	1.00	0.06	0.30	1.00	1.06	0.00	0.32	0.06	0.03
3	1.00	0.11	0.31	1.00	1.12	0.00	0.36	0.11	0.07
4	1.00	0.17	0.32	1.00	1.20	0.00	0.40	0.17	0.10
5	1.00	0.20	0.33	1.00	1.25	0.00	0.43	0.20	0.12
6	1.00	0.22	0.34	1.00	1.28	0.00	0.44	0.22	0.14
7	1.00	0.26	0.35	1.00	1.36	0.00	0.47	0.26	0.17
8	1.00	0.32	0.37	1.00	1.47	0.00	0.51	0.32	0.21
9	1.00	0.36	0.38	1.00	1.57	0.00	0.54	0.36	0.24
10	1.00	0.39	0.39	1.00	1.63	0.00	0.56	0.39	0.26
11	1.00	0.44	0.41	1.00	1.78	0.00	0.60	0.44	0.31
12	1.00	0.46	0.42	1.00	1.86	0.00	0.61	0.46	0.33
13	1.00	0.52	0.45	1.00	2.07	0.00	0.65	0.52	0.38
14	1.00	0.55	0.47	1.00	2.22	0.00	0.68	0.55	0.41
15	1.00	0.58	0.49	1.00	2.40	0.00	0.70	0.58	0.44
16	1.00	0.63	0.51	1.00	2.68	0.00	0.73	0.63	0.49
17	1.00	0.66	0.54	1.00	2.94	0.00	0.76	0.66	0.52
18	1.00	0.68	0.55	1.00	3.14	0.00	0.77	0.68	0.55
19	0.97	0.73	0.58	0.99	3.54	0.04	0.80	0.70	0.58
20	0.92	0.75	0.59	0.96	3.63	0.11	0.80	0.66	0.57
21	**0.92**	**0.78**	**0.62**	**0.96**	**4.17**	**0.11**	**0.82**	**0.70**	**0.61**
22	0.86	0.79	0.62	0.94	4.12	0.18	0.81	0.65	0.58
23	0.81	0.81	0.63	0.91	4.31	0.24	0.81	0.62	0.57
24	0.78	0.84	0.65	0.91	4.72	0.27	0.82	0.61	0.58
25	0.75	0.88	0.71	0.90	6.21	0.28	0.84	0.63	0.62
26	0.75	0.89	0.73	0.90	6.83	0.28	0.85	0.64	0.64
27	0.67	0.89	0.71	0.87	6.07	0.37	0.83	0.56	0.57
28	0.58	0.89	0.68	0.84	5.31	0.47	0.80	0.47	0.49
29	0.56	0.90	0.69	0.84	5.62	0.49	0.80	0.46	0.49
30	0.50	0.90	0.67	0.82	5.06	0.56	0.79	0.40	0.43
31	0.47	0.91	0.68	0.81	5.37	0.58	0.79	0.38	0.42
33	0.42	0.91	0.65	0.80	4.74	0.64	0.77	0.33	0.37
35	0.39	0.92	0.67	0.79	5.06	0.66	0.77	0.31	0.36
36	0.36	0.96	0.77	0.79	8.22	0.67	0.79	0.32	0.38
37	0.36	0.97	0.81	0.79	10.95	0.66	0.80	0.33	0.39
39	0.33	0.97	0.80	0.79	10.11	0.69	0.79	0.30	0.37
40	0.28	0.99	0.91	0.78	25.28	0.73	0.79	0.27	0.34
41	0.22	0.99	0.89	0.76	20.22	0.79	0.77	0.21	0.27
42	0.19	0.99	0.88	0.76	17.69	0.81	0.76	0.18	0.24
43	0.17	0.99	0.86	0.75	15.17	0.84	0.76	0.16	0.21
44	0.11	0.99	0.80	0.74	10.11	0.90	0.74	0.10	0.14
45	0.08	0.99	0.75	0.73	7.58	0.93	0.73	0.07	0.10
46	0.03	0.99	0.50	0.72	2.53	0.98	0.72	0.02	0.02

Table 7. AUCs for the PCL-C, CES-D (16) and CES-D (20) by Gender and Age

Demographic characteristics		AUC	SE	$\chi^2(1)$ (P)
	PCL-C			
Gender	Male	0.914	0.05	0.00 (0.96)
	Female	0.911	0.03	
Age	<56 years old	0.883	0.04	0.45 (0.51)
	≥56 years old	0.918	0.04	
	CES-D (16)			
Gender	Male	0.967	0.03	4.66 (0.03)
	Female	0.865	0.04	
Age	<56 years old	0.881	0.04	0.37 (0.54)
	≥56 years old	0.914	0.04	
	CES-D (20)			
Gender	Male	0.965	0.04	3.14 (0.08)
	Female	0.881	0.04	
Age	<56 years old	0.886	0.04	0.14 (0.71)
	≥56 years old	0.907	0.04	

FIGURES

Figure. 1 Flowchart of Finding Eligible Participants

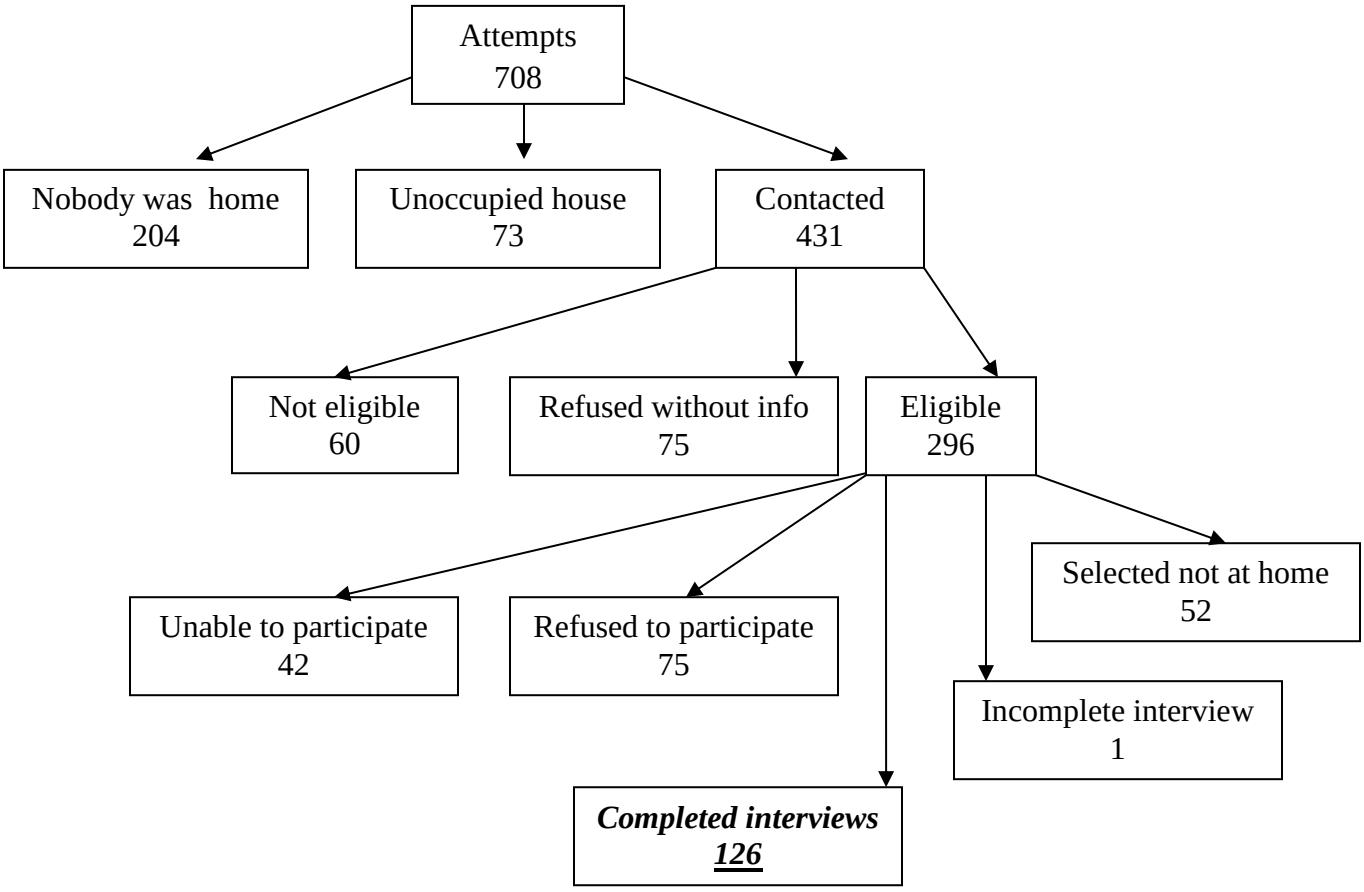


Figure 2. ROC Curve for PCL-C

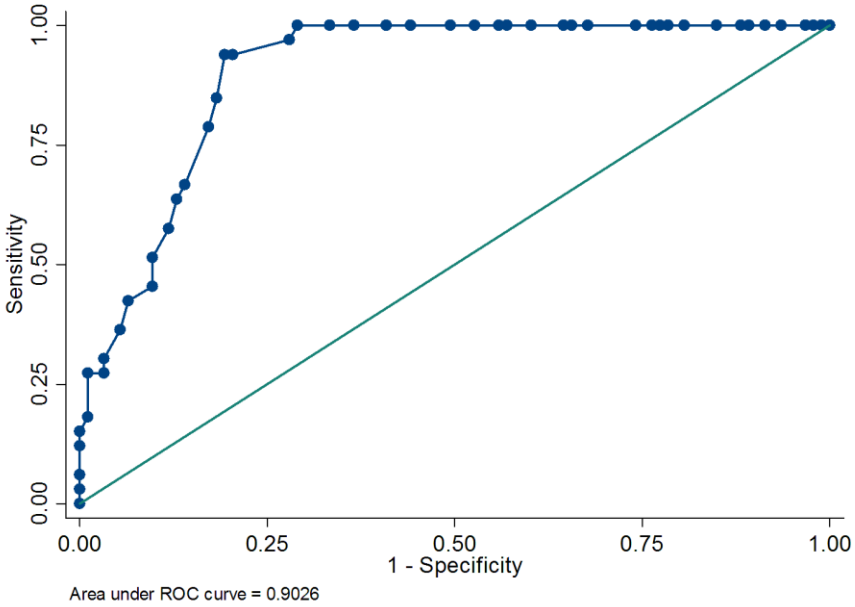


Figure 3. ROC Curve for CES-D (16)

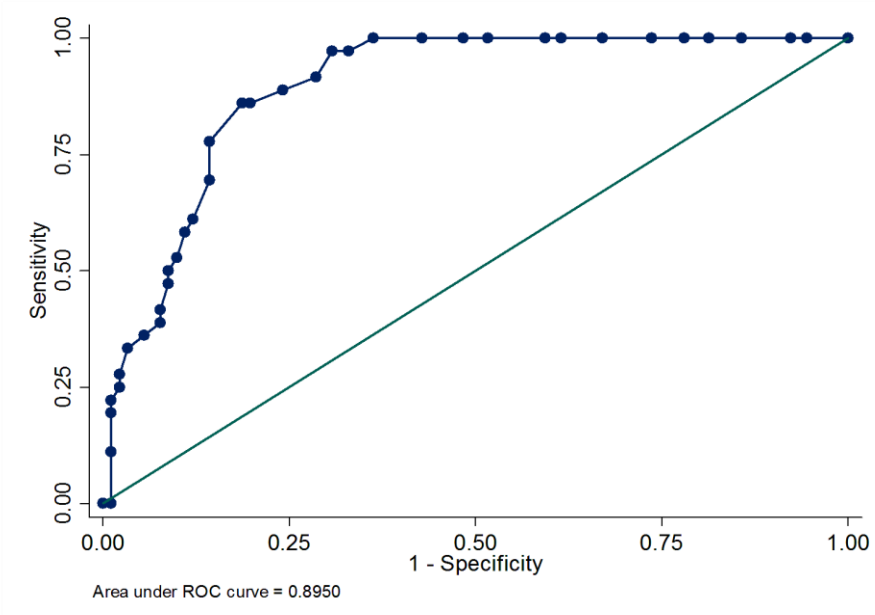


Figure 4. ROC Curve for CES-D (20)

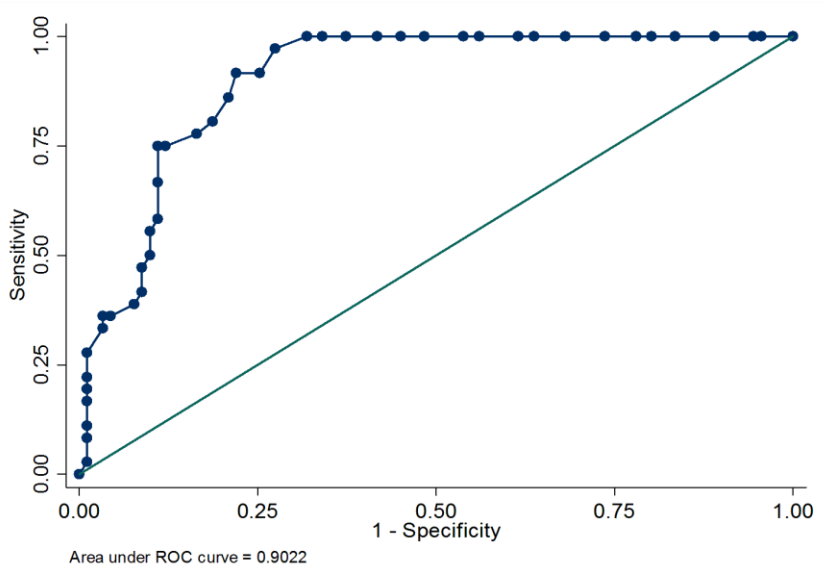
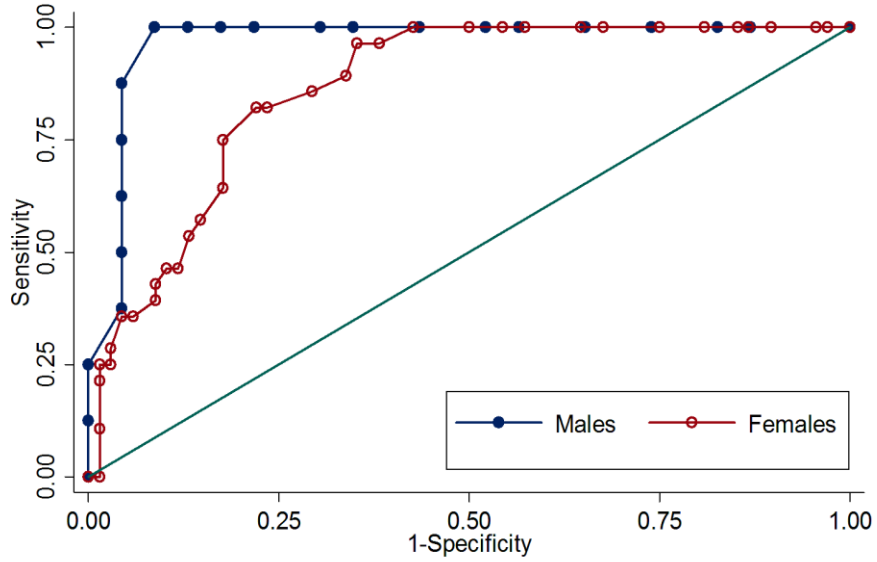


Figure 5. Comparison of ROC Curves by Gender for CES-D (16)



APPENDIX 1

Criterion A for Major Depressive Episode (DSM-IV-TR)

Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (l) depressed mood or (2) loss of interest or pleasure.

(1) Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feels sad or empty) or observation made by others (e.g., appears tearful)

(2) Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day

(3) Significant weight loss when not dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day.

(4) Insomnia or hypersomnia nearly every day

(5) Psychomotor agitation or retardation nearly every day

(6) Fatigue or loss of energy nearly every day

(7) Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self - reproach or guilt about being sick)

(8) Diminished ability to think or concentrate, or indecisiveness, nearly every day

(9) Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

APPENDIX 2

Journal Form

(One form per cluster)

Date _____
Cluster number: _____
Starting address: _____

Visit/attempt number	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015
# of eligible respondents															
Result															

Visit/attempt number	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030
# of eligible respondents															
Result															

Visit/attempt number	031	032	033	034	035	036	037	038	039	040	041	042	043	044	045
# of eligible respondents															
Result															

Visit/attempt number	046	047	048	049	050	051	052	053	054	055	056	057	058	059	060
# of eligible respondents															
Result															

Result codes:
1. Completed interview
2. Incomplete interview
3. No eligible participant
4. Nobody at home
5. Selected respondent is not at home
6. Refusal
7. Unoccupied house
9. Other_____

APPENDIX 3

Screening Form

<u>Interviewer's introduction to the household:</u>

Hello, my name is Ani. I am a graduate student of the Master of Public Health program at the American University of Armenia and within the scope of my thesis project, we are doing a study about the diagnostic accuracy of the instruments measuring psychiatric and psychological conditions. *Should I continue?*

- *If in* **<u>DOUBT</u>**

Try to explain more of the objectives

- *If* **<u>NO</u>**

Thank and leave

- *If* **<u>YES</u>**

<u>1. Sorry for troubling you. Do you have household members above the age 39, who has been in Gymri during 1988 earthquake?</u>

- *If* **<u>YES</u>** – follow participant selection guide
- *If* **<u>NO</u>** – thank the person and leave
- *If* **<u>DON'T KNOW</u>** – ask once again, if the answer is the same or **<u>NO apologize and thank the person for his/her time.</u>** **<u>If YES</u>** follow participant selection guide.

<u>After respondent is selected, continue.</u>

<u>3. Is the participant at home?</u>

- *If* **<u>YES</u>**- follow point 4.
- *If* **<u>NO</u>** - Select another respondent from the same household and continue. If there are no other eligible person in the household, apologize and thank the person for his/her time.

<u>4. Can I talk with his/her/you?</u>

- *If* **<u>YES</u>**– proceed with study objectives and consent form (point 5)
- *If* **<u>NO</u>**–try to find reason for refusal and in very accurate and polite form convince to participate, by explaining study objectives and purpose. Talk about confidentiality and value of her/his answers for the survey. **<u>WITHOUT ANY PERSISTENCE.</u>** If the

person still refuses and there is no other eligible person apologize and thank the person for his/her time.

5. Present introductory statement and read consent and proceed with the survey/interview.

6. After the interview thank participant for the time provided and leave the household

Selection of the Participant

Ask how many elderly 39 years old and above live in the apartment/house and have been in Gyumri at the time of earthquake. If more than one, choose the elder whose birthday is closest to the date of the survey/interview.

APPENDIX 4

Study Instruments (English and Armenian)

Instructions for Completing the Questionnaire

Please fill out the two questionnaires Yourself.

First questionnaire measures Your psychological state related to the most shocking event that has ever happened to you. Those kind of events include; ***earthquake or other kind of natural disaster, sudden death of a loved one, situations threatening one's life, physical assault or a rape towards oneself or towards a close person****. Please, focus on this kind of situations when answering to the questions, if those have ever happened to you.*

Please follow the instructions in ***Italics.*** *Afterwards, read carefully the questions and the response options.*

Carefully read each question and the response options. Choose the option that best represents your response and check (√) the box next to the option number.

Some questions may look like others, but each one is different. Please, take time to answer ***all of them.*** *If something is not clear, do not hesitate to ask for an explanation from the interviewer and be sure that your answers will be kept absolutely confidential.*

Examples

The following examples show how to answer to different types of questions.
How much did the following symptoms bother you during the last 30 days.

	Not at all	**A little**	**Moderately**	**Much**	**Extremely**
Headache	☐ 0	☑ 1	☐ 2	☐ 3	☐ 4
Nostalgia	☑ 0	☐ 1	☐ 2	☐ 3	☐ 4

Demographics

1. a. Your birth year _____ b. Age (completed years) _____

2. Record data as observed 1. Male 2. Female

3. What is your nationality 1. Armenian 2. Russian 3. Georgian 4. Other _____

4. What is the highest level of education that you have received?

- ☐ 1. School (less than 10 years)
- ☐ 2. School (10 years)
- ☐ 3. Professional technical education (10-13 years)
- ☐ 4. Institute/University
- ☐ 5. Postgraduate

5. What is your marital status?

- ☐ 1. Single
- ☐ 2. Married
- ☐ 3. Divorced
- ☐ 4. Widow

6. Do you currently work?

- ☐ 1. Yes
- ☐ 2. No
- ☐ 3. I work at home
- ☐ 4. Retired
- ☐ 5. Other (indicate) _____

7. How would you rate your family's general standard of living?

- ☐ 1. Substantially below average
- ☐ 2. Little below average
- ☐ 3. Average
- ☐ 4. Little above average
- ☐ 5. Substantially above the average

8. Have you ever visited a specialist for any psychological/emotional problem.

- ☐ 1. Yes
- ☐ 2. No

PTSD-Checklist Civilian (with a Question Added on Trauma Type Specification)

1. Below is a list of problems and complaints that people sometimes have in response to stressful life events or experiences. Please, concentrate on the **worst event** that has happened to you and indicate **how much you have been bothered during the past 30 days by each of the following problems that occurred or became worse after that event/experience**.

#	Response:	Not at all	A little bit	Mode rately	Quite a bit	Extre mely
1	Repeated, disturbing memories, thoughts, or images of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2	Repeated, disturbing dreams of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3	Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4	Feeling very upset when something reminded you of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
5	Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
6	Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
7	Avoid activities or situations because they remind you of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
8	Trouble remembering important parts of a stressful experience from the past	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
9	Loss of interest in things that you used to enjoy	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
10	Feeling distant or cut off from other people	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
11	Feeling emotionally numb or being unable to have loving feelings for those close to you	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
12	Feeling as if your future will somehow be cut short	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
13	Trouble falling or staying asleep	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
14	Feeling irritable or having angry outbursts	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
15	Having difficulty concentrating	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
16	Being “super alert” or watchful on guard	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
17	Feeling jumpy or easily startled	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Please mention which traumatic event you were considering while answering to above questions.

☐ 1. The 1988 earthquake
☐ 2. Death of a close one
☐ 3.Other ***(specify)*** _____

Center for Epidemiologic Studies Depression Scale (CES-D) (with Negatively Restated Positive Affect Items)

Below is a list of the ways you might have felt or behaved. Please mark how often you have felt this way during the past month.

	During the past week			
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 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 I was not 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 hopeless about the future				
9. I thought my life had been a failure				
10. I felt fearful				
11. My sleep was restless				
12. I was unhappy				
13. I talked less than usual				
14. I felt lonely				
15. People were unfriendly				
16. I could not enjoy life				
17. I had crying spells				
18. I felt sad				
19. I felt that people dislike me				
20. I could not "get going"				

Ցուցումներ հարցաթերթիկները լրացնելու վերաբերյալ

Հետևյալ երկու հարցաթերթիկը խնդրում ենք լրացնել ինքնուրույն:

Հարցաթերթիկներից առաջինը վերաբերվում է Ձեր հոգեվիճակին՝ կյանքում Ձեզ ամենամեծ ցնցում պատճառած որևէ իրադարձության հետ կապված: Այդպիսի իրադարձություն կարող է լինել ***երկրաշարժը կամ այլ տարերային աղետ, սիրելի մարդու անսպասելի մահը, կյանքին վտանգ սպառնացող իրավիճակը կամ բռնությունը ձեր կամ ձեր հարազատի հանդեպ:*** *Խնդրում ենք հարցերին պատասխանելիս կենտրոնացեք այս տիպի իրադարձության վրա, եթե այդպիսին եղել է Ձեր կյանքում:*

Հարցերին պատասխանելուց առաջ ուշադիր կարդացեք շեղատառ ցուցումները: Այնուհետև ուշադիր կարդացեք հարցերը և պատասխանների տարբերակները: Ամեն հարցի համար ընտրեք պատասխանի այն տարբերակը, որն ավելի մոտ է Ձեր զգացածին՝ նշում (√) կատարելով այդ պատասխանի համարին կից վանդակում:

Որոշ հարցեր կարող են իրար նման թվալ, սակայն խնդրում ենք պատասխանել ***<u>բոլոր հարցերին անխտիր</u>****: Մի՛ վարանեք դիմել հարցազրուցավարին, եթե ինչ-որ բան պարզ չէ:*

<u>Օրինակ.</u>

Հետևյալ օրինակը ցուցադրում է, թե ինչպես պետք է պատասխանել հարցերին:

Հետևյալ գանգատները որքանո՞վ են անհանգստացրել Ձեզ վերջին 30 օրվա ընթացքում.

	Ամենևին	Մի փոքր	Միջին չափով	Շատ	Չափազանց շատ
Գլխացավը:	☐ 0	☑ 1	☐ 2	☐ 3	☐ 4
Կարոտը:	☑ 0	☐ 1	☐ 2	☐ 3	☐ 4

ԺՈՂՈՎՐԴԱԳՐԱԿԱՆ ՏՎՅԱԼՆԵՐ

3. a. Ծննդյան թիվը _____ թ. b. Տարիքը *(լրացած տարիները)* _____

4. Սեռը ***(ՆՇԵՔ)*** ☐ 1. Արական ☐ 2. Իգական

9. Ո՞րն է Ձեր ազգությունը ☐ 1. Հայ ☐ 2. Ռուս ☐ 3. Վրացի ☐ 4. Այլ _____

10. Ո՞րն է ամենաբարձր կրթությունը, որ Դուք ստացել եք: ***(Կարդացեք պատասխանները)***

☐ 1. Թերի միջնակարգ (10 տարուց քիչ)
☐ 2. Դպրոց (10 տարի)
☐ 3. Միջին մասնագիտական (10-13 տարի)
☐ 4. Ինստիտուտ/համալսարան
☐ 5. Հետդիպլոմային/ասպիրանտուրա

11. Ձեր ամուսնական կարգավիճա՞կը: ***(Կարդացեք պատասխանները)***

☐ 1. Չամուսնացած
☐ 2. Ամուսնացած
☐ 3. Բաժանված
☐ 4. Այրի/ամուրի

12. Ներկայումս աշխատու՞մ եք: ***(Կարդացեք պատասխանները)***

☐ 1. Այո
☐ 2. Ոչ
☐ 3. Տանն եմ աշխատում
☐ 4. Թոշակառու եմ
☐ 5. Այլ (նշեք) _____

13. Միջինում, որքա՞ն է կազմում Ձեր ընտանիքի ամսական եկամուտը:

☐ 1. 50.000 դրամից քիչ
☐ 2. 50.000-100.000 դրամ
☐ 3. 101.000-200.000 դրամ
☐ 4. 201.000-300.000 դրամ
☐ 5. 300.000 դրամից ավելի

14. Դուք երբևէ դիմե՞լ եք մասնագետի հոգեբանական/հուզական խնդիրների պատճառով:

☐ 1. Այո
☐ 2. Ոչ

Այս աղյուսակում թվարկված են մի շարք գանգատներ, որ մարդիկ երբեմն ունենում են՝ իրենց ապրած ուժեղ ստրեսների հետևանքով: Կենտրոնացեք, խնդրեմ, կյանքում Ձեր տարած ամենաածանը իրադարձության վրա և ասացեք, թե հետևյալ գանգատները որքանո՞վ են անհանգստացրել Ձեզ վերջին 30 օրվա ընթացքում՝ *այդ միջադեպի հետ կապված: Խնդրում ենք՝ պատասխան ընտրեք բոլոր գանգատների համար անխտիր*:

#	Գանգատներ (վերջին 30 օրվա ընթացքում)	Ամե-նևին	Մի փոք ր	Միջին չափով	Շատ	Չափա-զանց շատ
1	Ձեր ապրած ծանր միջադեպի մասին կրկնվող ու անհանգստացնող հիշողությունները, մտքերն ու պատկերները	☐1	☐2	☐3	☐4	☐5
2	Կրկնվող ու տանջալից երազներն այդ միջադեպի մասին	☐1	☐2	☐3	☐4	☐5
3	Ակամա այնպիսի զգացում ունենալը կամ Ձեզ այնպես պահելը, ասես այդ միջադեպը կրկնվում է (կարծես Դուք կրկին վերապրում եք այն)	☐1	☐2	☐3	☐4	☐5
4	Շատ վշտանալը, երբ ինչ-որ բան Ձեզ հիշեցնում է այդ միջադեպի մասին	☐1	☐2	☐3	☐4	☐5
5	Ֆիզիկապես Ձեզ վատ զգալը, օրինակ՝ քրտնելը, սրտխփոց կամ շնչարգելություն ունենալը, երբ ինչ-որ բան Ձեզ հիշեցնում է այդ միջադեպի մասին	☐1	☐2	☐3	☐4	☐5
6	Այդ միջադեպի մասին մտածելուց կամ խոսելուց խուսափելը, կամ էլ դրա հետ կապված զգացողություններից խուսափելը	☐1	☐2	☐3	☐4	☐5
7	Խուսափելը այն գործողություններից կամ իրավիճակներից, որոնք Ձեզ հիշեցնում են այդ միջադեպի մասին	☐1	☐2	☐3	☐4	☐5
8	Ձեր ապրած ծանր միջադեպի կարևոր մանրամասները մտաբերել չկարողանալը	☐1	☐2	☐3	☐4	☐5
9	Հետաքրքրության կորուստը նախկինում Ձեր սիրած բաների նկատմամբ	☐1	☐2	☐3	☐4	☐5
10	Ուրիշներից մեկուսացած կամ կտրված լինելու զգացումը	☐1	☐2	☐3	☐4	☐5
11	Ձեր զգացմունքները կորցրած լինելու կամ Ձեր մտերիմներին սիրել չկարողանալու զգացումը	☐1	☐2	☐3	☐4	☐5

#	Գանգատներ (վերջին 30 օրվա ընթացքում)	Ամե-նևին	Մի փոք ր	Միջին չափով	Շատ	Չափա-զանց շատ
12	Այնպես զգալը, որ Ձեր ապագան երկար չի տևի	☐1	☐2	☐3	☐4	☐5
13	Քուն մտնելու կամ քնած մնալու դժվարությունները	☐1	☐2	☐3	☐4	☐5
14	Գրգռված լինելը կամ կատաղության նոպաներ ունենալը	☐1	☐2	☐3	☐4	☐5
15	Կենտրոնանալու դժվարություններ ունենալը	☐1	☐2	☐3	☐4	☐5
16	«Շատ զգոն» լինելը կամ անընդհատ վտանգի սպասելը	☐1	☐2	☐3	☐4	☐5
17	Սովորական երևույթներից «վեր թռչելը» կամ վախենալը	☐1	☐2	☐3	☐4	☐5

Նշեք, խնդրեմ, ո՞րն էր այն ծանր միջադեպը, որի վրա կենտրոնացաք՝ այս հարցերին պատասխանելիս:

☐ 1. 1988 թ.-ի երկրաշարժը
☐ 2. Մտերիմ մարդու կորուստը
☐ 3. Այլ միջադեպ _____

Նշեք, խնդրեմ, թե վերջին 7 օրվա ընթացքում Դուք որքա՞ն հաճախ եք զգացել Ձեզ այնպես, ինչպես նկարագրված է այստեղ

(Պատասխանեք, խնդրեմ, ԲՈԼՈՐ հարցերին):

Վերջին 7 օրվա ընթացքում	Հազվադեպ/ երբեք (1 օրից քիչ)	Երբեմն (1-ից 2 օր)	Բավականին հաճախ (3-ից 4 օր)	Մշտապես 5-ից 7 օր)
1.Ես հուզվում էի այնպիսի բաներից, որոնք սովորաբար ինձ չեն հուզում	☐1	☐2	☐3	☐4
2.Ես չէր ուզում ուտել: Վատ ախորժակ ունեի	☐1	☐2	☐3	☐4
3.Ես չէի կարողանում ազատվել տխրությունից՝ անգամ ընտանիքիս և ընկերներիս օգնությամբ	☐1	☐2	☐3	☐4
4.Ես զգում էի, որ ավելի վատն եմ, քան՝ մյուս մարդիկ	☐1	☐2	☐3	☐4

Վերջին 7 օրվա ընթացքում	Հազվադեպ/ երբեք (1 օրից քիչ)	Երբեմն (1-ից 2 օր)	Բավականին հաճախ (3-ից 4 օր)	Մշտապես 5-ից 7 օր)
5.Ես չէի կարողանում ուշադրությունս կենտրոնացնել արածիս վրա	☐1	☐2	☐3	☐4
6. Ես ինձ ընկճված էի զգում	☐1	☐2	☐3	☐4
7.Ես ամեն ինչ անում էի մեծ դժվարությամբ	☐1	☐2	☐3	☐4
8.Ես ապագայի հետ հույսեր չէի կապում	☐1	☐2	☐3	☐4
9.Ես մտածում էի, որ կյանքս իզուր է անցել	☐1	☐2	☐3	☐4
10.Ես վախ էի զգում	☐1	☐2	☐3	☐4
11.Ես վատ էի քնում	☐1	☐2	☐3	☐4
12.Ես դժբախտ էի	☐1	☐2	☐3	☐4
13. Ես ավելի քիչ էի խոսում, քան սովորաբար	☐1	☐2	☐3	☐4
14.Ես ինձ միայնակ էի զգում	☐1	☐2	☐3	☐4
15.Մարդիկ անբարյացկամ էին	☐1	☐2	☐3	☐4
16. Ես չէի կարողանում հաճույք ստանալ իմ կյանքից	☐1	☐2	☐3	☐4
17.Ես լացի պոռթկումներ էի ունենում	☐1	☐2	☐3	☐4
18.Ես տխուր էի	☐1	☐2	☐3	☐4
19.Ես զգում էի, որ դուր չեմ գալիս մարդկանց	☐1	☐2	☐3	☐4
20. Ես չէի կարողանում հունի մեջ ընկնել	☐1	☐2	☐3	☐4

APPENDIX 5

Consent Form (English and Armenian)

American University of Armenia
Institutional Review Board #1/Committee on Human Research

Consent form

Hello, my name is Ani. I am a psychologist and also a graduate student of the Master of Public Health program at the College of Health Sciences at the American University of Armenia and within the scope of my thesis project we are doing a study about the diagnostic accuracy of the instruments measuring psychiatric and psychological conditions.

I am inviting you to participate in this study, because you have witnessed and lived through the 1988 earthquake. You will be one of approximately 132 people who have been randomly selected to participate in this project. Participating will involve a onetime meeting with two sessions. The whole process will take about 45-60 minutes to complete. You will need to fill out two short questionnaires followed by an interview. Your name will not appear in any presentation of the results. None of your answers will be identified by your name or any other personal or identifiable information. All your answers will be analyzed and generalized with other participants' data.

Your participation in this study is voluntary. There is no penalty if you decline to take part in this project. You may refuse to answer any question or may stop the interview at any time.

Since the study involves a diagnostic interview measuring your psychological conditions, in case of need, you will be provided with options for further psychological consultation. It is your decision to accept or reject this support. Your participation in this project will help us better estimate the psychological status of the population of the earthquake zone.

If you have any questions regarding this study you can call the Principal Investigator Dr. Anahit Demirchyan at (37410) 51 25 92. If you feel you have not been treated fairly or think you have been hurt by joining the study you should contact Dr. Hripsime Martirosyan, the Human Subject Protection Administrator of the American University of Armenia (37410) 51 25 61.

Do you agree to participate? Thank you.

If yes, shall we continue?

Հայաստանի ամերիկյան համալսարան

Հանրային առողջապահության բաժին

Գիտահետազոտական էթիկայի թիվ 1 հանձնաժողով

Իրազեկ համաձայնության ձև

Բարև Ձեզ, իմ անունը Անի է: Ես հոգեբան եմ և այժմ սովորում եմ Հայաստանի ամերիկյան համալսարանում՝ Հանրային առողջապահության բաժնում: Իմ ավարտական թեզի շրջանակներում մենք իրականացնում ենք հետազոտություն, որի նպատակն է պարզել, թե որքան ճշգրիտ են գնահատում մարդու հոգեվիճակը այս հետազոտության մեջ կիրառվող հարցաշարերը:

Դուք հրավիրված եք մասնակցելու այս հետազոտությանը, քանի որ վերապրել եք 1988թ. երկրաշարժը : Դուք կլինեք այս հետազոտության 132 մասնակիցներից մեկը:

Ձեր մասնակցությունն այս հետազոտությանը կսահմանափակվի մեկանգամյա հանդիպումով, որի ընթացքում Դուք կլրացնեք երկու կարճ հարցաթերթիկ, ապա կմասնակցեք հարցարզրույցի՝ հոգեբանի հետ: Ամբողջ ընթացքը կտևի մոտավորապես 45-60 րոպե: Ձեր անունը չի նշվի ոչ մի զեկույցում: Ձեր կողմից տրամադրված ոչ մի տեղեկություն չի կցվի Ձեր անվան կամ անձնական այլ տվյալների հետ: Ձեր տրամադրած տեղեկությունները կօգտագործվեն միայն այս հետազոտության շրջանակներում՝ ընդհանրացված այլ մասնակիցների տվյալների հետ:

Ձեր մասնակցությունն այս հետազոտությանը կամավոր է: Ձեզ ոչինչ չի սպառնում, եթե Դուք հրաժարվեք մասնակցել այս հետազոտությանը: Դուք կարող եք հրաժարվել պատասխանել ցանկացած հարցի կամ ցանկացած պահի ընդհատել հարցազրույցը:

Դուք ոչ մի ռիսկի չեք դիմում՝ մասնակցելով այս հետազոտությանը:

Քանի որ հետազոտությունը ներառում է հարցազրույց հոգեբանի հետ, անհրաժեշտության դեպքում, Ձեզ կտրամադրվի հոգեբանական օգնություն ստանալու խորհրդատվություն: Դուք ինքներդ եք որոշում ընդունել կամ հրաժարվել այդ օգնությունից:

Ձեր անկեղծ պատասխանները կօգնեն մեզ ավելի ճիշտ գնահատել 1988թ. երկրաշարժը վերապրած անձանց հոգեվիճակը:

Այս հետազոտության վերաբերյալ հարցեր ունենալու դեպքում կարող եք զանգահարել հետազոտության համակարգողին՝ Անահիտ Դեմիրճյանին (37410) 51 25 92 հեռախոսահամարով: Եթե Դուք կարծում եք, որ այս հետազոտությանը մասնակցելու ընթացքում Ձեզ լավ չեն վերաբերվել կամ որ մասնակցությունը Ձեզ վնաս է պատճառել, կարող եք զանգահարել Հայաստանի ամերիկյան համալսարանի

Էթիկայի հանձնաժողովի քարտուղար՝ Հռիփսիմե Մարտիրոսյանին՝ (37410) 51 25 61 հեռախոսահամարով:

Համաձա՞յն եք մասնակցել:

Շնորհակալություն: Կարո՞ղ ենք շարունակել: