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# Assessment of depressiveness in population. Psychometric evaluation of the Polish version of the CESD-R

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**Summary**

**Aim**. Psychometric evaluation of reliability and usefulness of the Polish version of the CESD-R – a revised version of the CES-D – screening test for depression.

**Methods**. In an online survey the CESD-R and the Beck Depression Inventory were applied to 260 participants (men and women). Reliability was assessed with Cronbach's method and split-half (odd-even) method. Same as in the original English publication, factor analysis was performed and three factors were distinguished. Additionally, the CESD-R results were compared with the Beck Depression Inventory results.

**Results**. Analysis of the CESD-R resulted in high values of reliability, for Cronbach's alpha coefficient the result was 0.95, for split-half (odd-even) method based on Spearman-Brown formula $\alpha = 0.95$. Factor analysis distinguished 3 principal factors such as cognitive-affective factors, physical factors, and self-destructive factors.

**Conclusions**. Polish version of the CESD-R appears to have reliability values (over 0.7) high enough to be applicable to assess depression in population-based samples. Usefulness of the CESD-R in an individual diagnosis needs further research. However, general analysis of the scale enables to expect the usefulness in at least introductory diagnosis in clinical practice.

**Key words**: depression, CESD-R, factor analysis

## Introduction

Depression is considered to be one of the most common mental disorders. It is estimated that every year 5% of US population suffer from major depression episode [1]. According to Polish studies over 20% of physicians' patients experience some kind of depressive symptoms [2].

The study was not sponsored.

Depressive symptoms affect everyone, regardless of place of birth, place of residence or occupation. According to WHO about 350 million people all over the world suffer from depression, [3]. Affective disorders, regardless of intensity, cause impairment of social and occupational functioning; that is why it is urgent to upgrade research tools to make the diagnosis of depressive symptoms easier and more effective and consequently to prevent the development of severe depression.

In Poland, most popular research tool used to assess prevalence of depression in general population as well as in clinical samples is the Beck Depression Inventory (BDI) [4], adapted and translated among others by Parnowski and Jernajczyk [5]. Despite its popularity, the BDI is widely criticized for being outdated with respect to DSM [6] and ICD [7]. The Hamilton Depression Rating Scale is also used in research [8], however, it is criticized for weak content validity, inadequate items, or inadequate answers which are not compatible with every question. According to Bagby et al. [9], all defects mentioned above result in multidimensional and unclear final rate of the Hamilton Depression Rating Scale, which makes the interpretation difficult.

Williams et al. [10] compared nine scales designed to assess depressiveness, i.e. the Center for Epidemiologic Studies Depression Scale – Revised (CESD-R), the Beck Depression Inventory, the Hamilton Depression Rating Scale (17-item version), and the Montgomery-Åsberg Depression Scale [8, 11, 12]. They concluded that every scale gained satisfying psychometric evaluation, However, it is worth mention that the CESD-R took less than 3 minutes to complete it, additional advantage is that it is a self-reporting scale (unlike the Montgomery-Åsberg Depression Scale, filled by the clinician); it also contains short and understandable items [10]. It is worth mentioning that the Minnesota Multiphasic Personality Inventory (MMPI-2) is also used within clinical sample – depressiveness is assessed on one of the subscales. Although, reliability of the MMPI-2 is satisfying, the length (567 items) is disheartening; also it may be properly interpreted only by a professional and experienced psychologist [13].

Concerned about uselessness of popular research tools for assessing depressiveness, L.S. Radloff created the tool useful for the study of depression in general population. The CES-D (the Center for Epidemiologic Studies Depression Scale) aimed to assess prevalence of affective symptoms, especially depressive mood. The fact that this tool is also directed to people whose symptoms in differential diagnosis will not qualify them to the group with clinical features is considered as an advantage [14].

The aim of Radloff's CES-D [14] was to assess prevalence of depression in general population, contradictory to scales existing at that time developed for and used in clinical diagnosis. The CES-D, as well acclaimed scale, has been translated to other languages and is also applicable to adolescents [15]. Approximately thirty years after the CES-D publication, W. Eaton with his team updated the original scale to actual, of that time, DSM-IV-TR criteria [16]. They developed the CESD-R which included 20 item concerning behavior and mood occurring within last two weeks [11]. Comparing to the original CES-D (one-week), the two-week period (CESD-R) of symptoms occurring was innovative and compatible with DSM-IV-TR criteria. The advantage of both scales is a possibility of assessment the level of depressive symptoms without dichotomous division into normal and pathological ones.

As an advantage of using the CESD-R we may consider the time needed to complete it (about 3–4 minutes), it is especially important while doing population-based research using a lot of research tools. Additionally, items of the CESD-R are clear and understandable for people of various age and education level.

## Material

1) Beck Depression Inventory – self-report scale designed by A. Beck [4] to measure the level of depression. The Polish adaptation of the scale, made by Parnowski and Jernajczyk, has been used in this study [5].
2) CESD-R – self-report scale to measure the level of depression, originally presented by Eaton et al. [11]. Translation and adaptation method is described below.

## Method

### Application of the CESD-R

The CESD-R [11] is a self-report 20-item scale. In reference to every item, describing mood or behavior, individuals choose one of five possible answers concerning its frequency. Answers from 0 (not at all or less than 1 day) to 4 (nearly every day for two weeks) need to be added. The sum of these results evaluates the level of depressive symptoms. The lowest score possible on the CESD-R scale is 0, and the highest is 80 points. The authors of the original tool suggested that the result of 16 points or higher, can be considered as alarming and in case of obtaining such a result one should consider visiting a professional counselor (psychologist or psychiatrist), however, further research are not conclusive and do not support that suggestion as a right one [17].

### CESD-R translation procedure

The CESD-R was translated to Polish with author's – W.W. Eaton (2014) – permission. At first, the scale was translated from English by 4 independent people (2 men, 2 women), differed by age and education. Next, another 4 people (2 men, 2 women) also differed by age and education, did the back-translation from Polish to English. Back-translations were almost identical as the original version of the scale, in both instruction and items. English philologist was asked for assessment of all versions (original scale, Polish translation and back-translation). After the final assessment of the Polish translation and language correction, the unified Polish version of the scale was presented to 10 independent people (4 men and 6 women, 19–36 years of age, 8 of them completed tertiary education, 2 had secondary education, none of them was a psychologist) asked to assess understandability of items and instructions. On the basis of their review the final form of the Polish version of the CESD-R was approved.

### Participants

260 people, including 175 women and 85 men, participated in an online survey. 63 people, including 50 women and 13 men, admitted getting professional help from psychologist or psychiatrist due to affective disorders. Mean age of participants was 23.5 years (SD = 5.92), the youngest person was 16 and the oldest one was 54 years old.

221 people (146 women, 75 men) identified themselves as heterosexual (85%), 19 as homosexual (13 women, 6 men), 18 as bisexual (14 women, 4 men). 2 women described their identity as "other".

The majority of participants live in cities with population exceeding 500,000 inhabitants (42.3%), 21% live in cities with population between 100,000 and 500,000 inhabitants, 5.8% live in towns with 50,000 – 100,000 inhabitants, and 31.2% live in towns with population under 50,000 inhabitants.

## Results

The maximum possible the CESD-R score is 80, the minimum – 0. Mean result within the research group was 22.12, SD = 17.60, minimum score was 0, maximum was 76.

Table 1 contains mean results for men and women, and the group in general. Men generally scored higher on the CESD-R (23 points), comparing to women (22 points). Both, women and men, who were not receiving professional help from counselor (psychologist or/and psychiatrist) obtained about 19 points (19.24 and 19.90 respectively). Men receiving professional help (psychologist/psychiatrist) obtained 40.77 points, while women obtained 27.68 points on average.

Table 1. **Mean values of the CESD-R scale for each group**

| | CESD-R results | | | |
|---|---|---|---|---|
| | M | SD | Min. | Max. |
| Total (n = 260) | 22.12 | 17.60 | 0 | 76 |
| Women (n = 175) | 21.65 | 17.56 | 0 | 76 |
| not treated* (n = 125) | 19.24 | 16.16 | 0 | 65 |
| treated** (n = 50) | 27.68 | 19.56 | 0 | 76 |
| Men (n = 85) | 23.09 | 17.74 | 0 | 71 |
| not treated* (n = 72) | 19.90 | 15.80 | 0 | 71 |
| treated** (n = 13) | 40.77 | 18.02 | 13 | 65 |

*participants who claimed receiving psychological/psychiatric help; **participants who denied receiving psychological/psychiatric help; M – mean; SD – standard deviation

## CESD-R validation

For comparison, the Beck Depression Inventory [4, 5] has been also presented to participants. Cronbach's alpha for the BDI was 0.89.

Reliability analysis for the CESD-R was assessed using Cronbach's alpha and split-test method. Cronbach's alpha for the CESD-R was 0.95, split-half (even-odd, with Spearman-Brown formula) was 0.95.

Correlation of the CESD-R and the Beck Depression Inventory was $r = 0.73$, $p < 0.0001$.

Factor analysis enabled to identify 3 groups of factors. Tables 2 and 3 present total variance explained and principal factors. Total variance explained is satisfying [18]. Groups of factors identified in the analysis may be described as cognitive-affective (factor 1), physical (factor 2) and self-destructive (factor 3). It is worth to mention that the authors of the original scale also identified 3 factors, however, they suggest interpreting the final score as a whole, without division into separate factors [11].

Table 2. **Factor analysis – explained variance**

| | Explained variance | |
|---|---|---|
| | % of variance | Cumulative % |
| Factor 1 | 51.51 | 51.51 |
| Factor 2 | 7.53 | 59.04 |
| Factor 3 | 5.80 | 64.83 |

Table 3. **CESD-R components**

| CESD-R item | factor 1 | factor 2 | factor 3 |
|---|---|---|---|
| 4. I felt depressed. (Czułem(am) się przygnębiony(a)). | 0.903 | | |
| 6. I felt sad. (Czułem(am) się smutny(a)). | 0.900 | | |
| 2. I could not shake off the blues. (Nie mogłem(am) pozbyć się chandry). | 0.877 | | |
| 3. I had trouble keeping my mind on what I was doing. (Miałem(am) problem ze skupieniem się na tym co robię). | 0.867 | | |
| 7. I could not get going. (Nie mogłem(am) zebrać się do działania.) | 0.844 | | |
| 20. I could not focus on the important things. (Nie mogłem(am) skupić się na ważnych rzeczach.) | 0.784 | | |
| 13. I felt fidgety. (Czułem(am) się niespokojny(a).) | 0.775 | | |
| 8. Nothing made me happy. (Nic mnie nie cieszyło.) | 0.758 | | |
| 16. I was tired all the time. (Cały czas byłem(am) zmęczony.) | 0.667 | | |
| 10. I lost interest in my usual activities. (Straciłem(am) zainteresowanie codziennymi zajęciami.) | 0.634 | | |
| 9. I felt like a bad person. (Czułem(am) się złym człowiekiem.) | 0.552 | | -0.313 |

*table continued on the next page*

| | | | |
|---|---|---|---|
| 12. I felt like I was moving too slowly. (Czułem(am) jakbym poruszał się zbyt wolno.) | 0.541 | | |
| 17. I did not like myself. (Nie lubiłem(am) siebie.) | 0.496 | | -0.406 |
| 5. My sleep was restless. (Mój sen był niespokojny.) | 0.485 | | |
| 18. I lost a lot of weight without trying to. (Mimowolnie straciłem(am) dużo na wadze.) | | 0.856 | |
| 1. My appetite was poor. (Miałem(am) kiepski apetyt). | | 0.770 | |
| 19. I had a lot of trouble getting to sleep. (Miałem(am) problemy z zaśnięciem.) | | 0.553 | |
| 15. I wanted to hurt myself. (Chciałem(am) zrobić sobie krzywdę.) | | | -0.756 |
| 14. I wished I were dead. (Chciałem(am) umrzeć.) | | | -0.736 |
| 11. I slept much more than usual. (Spałem(am) o wiele dłużej niż zazwyczaj.) | 0.426 | 0.366 | 0.429 |

Principal components (rotation: Oblimin with Kaiser normalization); rejected values < 0.3

## Discussion

The aim of the study was psychometric evaluation of the Polish adaptation of the CESD-R, the scale designed to measure depressiveness in general population. Reliability checked with split-half method and Cronbach's alpha method, shows values high enough (< 0.7) to validate the scale [18]. Factor analysis allowed us to identify three principal factors, which may be described as cognitive-affective, physical and self-destructive.

The CESD-R is worth using in population-based research because of short time needed to complete it (about 3 minutes), and clear and understandable items, accessible for people of various age and education. Easy and short the CESD-R is especially useful in research using a lot of tools, were it is important how tiring and time-taking the tools are for participants.

The general disadvantage of the CESD-R, especially in clinical context, may be lack of clear cut-off point enabling differentiation between healthy individuals and the ones with depression. The authors suggested the result of 16 points or higher as a result high enough to visit a professional counselor. Further research using the CESD-R are not conclusive as to the result of 16 points differentiate between clinical and non-clinical samples [17]. However, it must be underlined that the CES-D (as well as the CESD-R) was designed to assess depressive symptoms in population-based samples, not in clinical ones, and as that kind of tool is worth using within the research.

## Conclusions

The Polish version of the CESD-R, as reliable scale that correctly differentiates the severity of depressive symptoms in the study group, is applicable to research

among population-based samples. In individual diagnose and clinical practice, the CESD-R may be used as introductory tool, however, it is recommended to confirm the diagnosis.

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# APPENDIX

## CESD-R

Authors: Eaton W, Muntaner C, Smith C. et al.

Translation: Koziara K. et al.

Poniżej znajduje się lista stwierdzeń dotyczących samopoczucia i zachowania, proszę zaznaczyć odpowiedź, która najlepiej oddaje Pana/Pani stan w ciągu ostatnich 2 tygodni.

0. wcale lub krócej niż1 dzień
1. 1–2 dni
2. 3–4 dni
3. 5–7 dni
4. prawie codziennie przez 2 tygodnie

| | |
|---|---|
| 1. Miałem(am) kiepski apetyt. | 0 1 2 3 4 |
| 2. Nie mogłem(am) pozbyć się chandry. | 0 1 2 3 4 |
| 3. Miałem(am) problem ze skupieniem się na tym co robię. | 0 1 2 3 4 |
| 4. Czułem(am) się przygnębiony(a). | 0 1 2 3 4 |
| 5. Mój sen był niespokojny. | 0 1 2 3 4 |
| 6. Czułem(am) się smutny(a). | 0 1 2 3 4 |
| 7. Nie mogłem(am) zebrać się do działania. | 0 1 2 3 4 |
| 8. Nic mnie nie cieszyło. | 0 1 2 3 4 |
| 9. Czułem(am) się złym człowiekiem. | 0 1 2 3 4 |
| 10. Straciłem(am) zainteresowanie codziennymi zajęciami. | 0 1 2 3 4 |
| 11. Spałem(am) o wiele dłużej niż zazwyczaj. | 0 1 2 3 4 |
| 12. Czułem(am) jakbym poruszał(a) się zbyt wolno. | 0 1 2 3 4 |
| 13. Czułem(am) się niespokojny(a). | 0 1 2 3 4 |
| 14. Chciałem(am) umrzeć. | 0 1 2 3 4 |
| 15. Chciałem(am) zrobić sobie krzywdę. | 0 1 2 3 4 |
| 16. Cały czas byłem(am) zmęczony(a). | 0 1 2 3 4 |
| 17. Nie lubiłem(am) siebie. | 0 1 2 3 4 |
| 18. Mimowolnie straciłem(am) dużo na wadze. | 0 1 2 3 4 |
| 19. Miałem(am) problemy z zaśnięciem. | 0 1 2 3 4 |
| 20. Niemogłem(am) skupić się na ważnych rzeczach. | 0 1 2 3 4 |