Urdu Version of the Center for Epidemiologic Studies Short Depression Scale (CES-D-10): A Psychometric Validation Study

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Abstract
Background: The Center for Epidemiologic Studies Short Depression Scale (CES-D-10) is one of the most commonly used instruments to screen depression among both general and clinical populations. Therefore, we aimed to determine the psychometric properties of its Urdu Version (CESD-U) that was developed by a two-step forward and back translation.
Materials and methods: A psychometric validation study was conducted among adult hemodialysis patients (N = 50) who could read/write Urdu, enrolled using convenience sampling method, at District Headquarter Hospital, Pakpattan, Pakistan. Content validity was determined by content validity index (CVI). Reliability was assessed by Cronbach's alpha coefficient and interclass correlation (ICC) coefficient whereas convergent validity was assessed by examining the correlation of CESD-U with Urdu version of Patient Health Questionnaire (PHQ-9). **Results:** Mean Item-CVI was 0.986 (individual item-CVI range 0.857-1.000). Value of Scale-level-CVI, universal agreement calculation method (S-CVI/UA) was 0.9. Cronbach's alpha value was found to be 0.754, showing satisfactory internal consistency. ICC of CESD-U was also satisfactory (ICC of individual items 0.740-0.947). Spearman's correlation testing between CESD-U and PHQ-9 Urdu indicated good correlation (Spearman's rho = 0.660; p < 0.001). **Conclusion:** CESD-U is a short, easy, valid and reliable instrument to screen depression among Urdu speaking populations.
Keywords: Depression, Patient reported outcomes measures, Psychometric, Urdu

INTRODUCTION

Depression is the leading cause of disability worldwide, affecting 4.4% of the global population [1]. Despite the availability of effective treatments for mental disorders, a wide majority (76-85%) of people in lower and middle-income nations do not receive treatment for their disorder due to lack of resources, social stigma, lack of trained health-care professionals and inaccurate assessment [2,3]. Depressive symptoms must be accurately assessed and recorded both in clinical practice and research. Patient-reported outcome measures provide a method for the standardized collection of data from patients. The Center for Epidemiologic Studies Depression (CESD) Scale is one of the most commonly used instruments to screen depression [4]. Since its development in late seventies [5], it has gained popularity due to its comparability with other well-acknowledged depression assessment instruments [5, 6] and the fact that it is freely obtainable (public domain). The original CESD scale had 20-items which was later shortened to 10 items to improve clinical utility and easiness of scoring [7]. CES-D-10 also demonstrated adequate psychometric properties in general as well as clinical populations [7-15]. CES-D-10 contains 3 items on depressed effect, 5 items on somatic symptoms and

2 positive affect items. These items are scored from 0-3, with 0 indicating "rarely or none of the time" and 3, "all of the time" for all the items except 5, (I felt hopeful about the future) and 8 (I was happy), which are reverse scored. The composite score of all the items ranged from 0-30, with score of 10 or more considered depressive. An Urdu version of the CES-D-10 (CESD-U) was developed by a two-step forward and back translation method by language experts (Urdu and English, respectively) in our previous study [16], as per the guidelines of The International Society for Pharmacoeconomics and Outcomes Research for translation and cross-cultural adaptation of questionnaires [17]. However, its psychometric properties were not completely assessed. Therefore, the present study was carried out to evaluate the psychometric properties of CESD-U.

METHODS
Design, setting and study participants
This psychometric validation study was conducted among adult patients receiving regular hemodialysis treatment, enrolled using convenience sampling method, at District Headquarter Hospital, Pakpattan, Pakistan. We excluded

those who were non-adults, could not read/write Urdu and who were not willing to take part in this study.

Ethical Approval

This study was approved by the Ethical Committee of the study setting. We obtained an informed consent from every individual prior administering the study instrument. Personal details were taken from the participants for the purpose of test-retest procedure and they were re-administered CESD-U by the investigators, within 2 weeks of enrollment, during re-visit for dialysis.

Sample size

The sample size calculation was based on the item-to-participants' ratio. Published literature suggests 5-10 participants' for every item in the instrument for factor analysis [18, 19]. Therefore, the required sample size was 50-100 participants'. Although we did not perform the factor analysis, our sample size (N = 50) was adequate for psychometric validation of the study instrument.

Study instrument

In addition to CESD-U, Urdu version of the Patient Health Questionnaire (PHQ-9 Urdu) was administered to evaluate convergent validity. PHQ-9 Urdu has been found to be valid and reliable (Cronbach's alpha = 0.91 and split-half reliability = 0.77) instrument to screen depression in Pakistanis [20]. It is consisted of nine items, each of which was scored 0 to 3, yielding a 0-27 severity score.

Statistical analysis

All statistical analysis were performed using Statistical Package for Social Science (SPSS) version 22. Categorical variables were presented as number and percentages whereas mean ± standard deviation (SD) were expressed for continuous variables. The content validity index (CVI) on the clarity and understandability was determined by evaluating the frequency of dichotomous responses "Yes" or "No". Items with CVI ≥ 0.8 were considered as having good content validity [21]. Internal reliability was determined by the Cronbach's alpha coefficient considering a cut-off value of more than 0.7 for satisfactory internal consistency [22]. Reproducibility was determined by Intraclass Correlation Coefficient (ICC) based on mean-rating, absolute agreement, two way mixed-effects model. The ICC values < 0.5 were indicative of poor reliability, values between 0.5-0.75 indicate moderate, values between 0.75-0.9 indicate good, and values > 0.90 indicate excellent reliability [23, 24]. Convergent validity was assessed by Spearmen's correlation between CESD-U and PHQ-9 using Correlation coefficient cut-off values of 0-0.25 as weak; 0.25-0.5 fair; 0.5-0.75 good; > 0.75 excellent [25].

RESULTS

Content validity index

Content validity index was determined by conducting interviews among seven Urdu-speaking hemodialysis patients (age range 27-60 years). Mean Item-CVI on understandability of CESD-U was found to be 0.986 (individual item-CVI range 0.857-1.000). Value of Scale-level-CVI, universal agreement calculation method (S-CVI/UA) was 0.9.

Psychometric performance of the study instrument

A total of 62 hemodialysis patients were approached and 50 were enrolled in the present study (response rate of 80.6%). Demographic data of the study sample are shown in Table 1. There was a preponderance of males (76.0%) belonging to 41-60 years age group (46%). Majority had secondary school education (16% middle and 24% matriculation level education) and only one had graduation degree. Regarding the history of dialysis treatment, majority (36%) of participants had been receiving hemodialysis treatment for less than 1 year.

Item-total statistics of CESD-U are shown in Table 2. The corrected item total correlation ranged raged from 0.229-0.700. Cronbach's alpha value for all the 10-items was found to be 0.754, showing adequate internal consistency. Test-retest reliability was assessed among 36 individuals. ICC estimates and their 95% confidence interval are shown in Table 2. The result of ICC showed that CESD-U had good reproducibility. Findings Spearmen's correlation testing between CESD-U and PHQ-9 Urdu indicated good correlation (Spearman's rho = 0.660; p < 0.001).

DISCUSSION

This study was sought to assess the validity and reliability of CESD-U among Pakistani hemodialysis patients. Regarding the content validity, It has been suggested that for '≤ 5 individuals, all should approve on the content for their rating to be considered a reasonable representation of the universe of possible ratings' [21]. This means that the item- level CVI should reach 1 when there are five or fewer individuals. However, in case for ≥ 6 individuals, this standard can be relaxed, but item-level CVIs must not be < 0.8. In the present study, results of CVI indicated good content validity of the study instrument. The corrected item-total correlation value must be positive and above 0.20 or even 0.30. In our study, all values of corrected item-total correlation were positive and above 0.20 (range 0.229-0.700). Moreover, Overall Cronbach's alpha value (0.754) indicated satisfactory internal consistency of the CESD-U. Our findings regarding the internal consistency were comparable to results of previous studies among healthy as well as clinical populations [7-15]. Regarding the test-retest reliability, Miller et al. reported an ICC value of 0.85 (ICC of individual items 0.11-0.73) for CES-D-10 [15]. Similar to their findings, we also found that CESD-U had good test-rest reliability. Björgvinsson et al. assessed the convergent validity of the CES-D-10 by examining correlations with the Behavior and Symptom Identification-24–Depression and Functioning subscale, worry, and overall well-being [14]. They reported that CESD-10 had a strong positive correlation with Depression and Functioning, moderate correlation with worry and a moderate negative correlation with overall psychological well-being. Miller et al. reported strong correlations of CES-D-10 with SF-36 outcomes representing mental health, vitality and the visual analogue scale for fear [15]. In the present study, CESD-U was found to have good correlation with PHQ-9 Urdu version, exhibiting adequate convergent validity.

CONCLUSION

CESD-U is an easy, valid and reliable instrument to screen depression among Urdu speaking population. Therefore, we

recommend the use of CESD-U in both clinical practice and future researches among Urdu-speaking people.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS USED

CESD: The Center for Epidemiologic Studies Depression. **CES-D-10:** The Center for Epidemiologic Studies Short Depression Scale. **CESD-U:** Urdu version of CESD 10-item scale. **CVI:** Content validity index. **ICC:** Intraclass Correlation Coefficient. **PHQ:** Patient Health Questionnaire. **S-CVI/UA:** Scale-level-CVI, universal agreement calculation method.

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Table 1: Characteristics of the study sample

Characteristics	N (%)
Age (years)	
≤ 40	21 (42.0)
41-60	23 (46.0)

> 60	6 (12.0)
Gender	
Male	38 (76.0)
Female	12 (24.0)
Education	
Primary/Middle	20 (40.0)
Matriculation	27 (54.0)
Intermediate	2 (4.0)
Graduation	1 (2.0)
Residence	
Urban	19 (38.0)
Rural	37 (62.0)
Smoking status	
Non-smoker	37 (74.0)
Current smoker	3 (6.0)
Former smoker	10 (20.0)
Duration of dialysis (years)	
< 1	18 (36.0)
1-2	15 (30.0)
2-3	8 (16.0)
> 3	9 (18.0)

Table 2: Item-total statistics of the study instrument

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Item 1	8.980	24.428	0.454	0.360	0.728
Item 2	9.520	27.438	0.327	0.421	0.746
Item 3	9.020	23.163	0.540	0.451	0.714
Item 4	9.120	25.659	0.404	0.349	0.736
Item 5	8.060	27.364	0.239	0.429	0.755
Item 6	9.720	27.308	0.437	0.482	0.739
Item 7	8.800	23.592	0.435	0.397	0.732
Item 8	8.040	26.162	0.229	0.236	0.764
Item 9	9.280	22.369	0.700	0.708	0.691
Item 10	8.740	22.441	0.495	0.383	0.722

Table 3: Intraclass correlation coefficient

Items	Intraclass correlation[*]	95% confidence interval	
		Lower bound	Upper bound
Item 1	0.925[a]	0.853	0.962
Item 2	0.740[a]	0.491	0.867
Item 3	0.900[a]	0.804	0.949
Item 4	0.943[a]	0.888	0.971
Item 5	0.832[a]	0.673	0.914
Item 6	0.790[a]	0.593	0.893
Item 7	0.880[a]	0.764	0.939
Item 8	0.827[a]	0.659	0.912
Item 9	0.947[a]	0.896	0.973
Item 10	0.932[a]	0.866	0.965
Total score	0.952[a]	0.906	0.975
Two-way mixed effects model where people effects are random and measures effects are fixed.			
*Type A intraclass correlation coefficients using an absolute agreement definition.			
[a]This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise			