

Translation and Psychometric Properties of Center for Epidemiological Studies Depression-Revised (CESD-R) Scale in Urdu

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Abstract

Depression is recognized as one of the leading causes of disability worldwide, with particularly high prevalence in low- and middle-income countries such as Pakistan. Addressing this burden requires valid and culturally adapted instruments for screening and research. The present study aimed to translate the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) into Urdu and evaluate its psychometric properties in Pakistani populations. The translation process followed internationally accepted guidelines, including back-translation and expert committee review, to ensure linguistic and conceptual equivalence. Two samples were recruited: a general population sample (N = 214) and a bilingual sample (N = 70). Results demonstrated strong internal consistency (Cronbach's $\alpha = .88$) and high test-retest reliability (.81–.93), indicating temporal stability. Exploratory factor analysis suggested two factors—*affective/functional impairment* and *self-destructive pattern*—though a one-factor model was endorsed for parsimony and practical use. Differential item functioning revealed one item varied significantly across gender, highlighting potential cultural differences in symptom expression. Overall, findings provide preliminary evidence that the CESD-R (Urdu) is a reliable and valid self-report screening tool for depression in Pakistan. This adaptation offers researchers and practitioners a culturally relevant instrument to facilitate community-based surveys and mental health research, while underscoring the need for further validation in larger, representative samples.

Keywords: CESD-R, depression, Urdu depression scale, factor analysis, differential item analysis

Introduction and Literature Review

Depression is one of the leading causes of disability worldwide, affecting over 300 million people (WHO, 2017). Its burden is disproportionately higher in low- and middle-income countries (LMICs), where limited resources exacerbate the impact of mental illness. In Pakistan, prevalence estimates remain alarmingly high, with recent studies reporting rates of

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40–43% in the general population (Khan et al., 2021; Ullah et al., 2022). Such widespread incidence translates into substantial economic costs, with depression alone estimated to contribute an annual burden of USD 10.54 billion (Gadit, 2004).

However, the absence of consistent national-level health data makes it difficult to track trends or design effective interventions. One major barrier to advancing research in LMICs is the lack of freely available, valid, and reliable instruments in local languages majorly Urdu. A national language spoken by approximately 8% of Pakistan's population as a mother tongue and widely used as the official language, is also prevalent across South Asia and diaspora communities. Despite this reach, only two indigenously developed Urdu depression scales exist: the Siddiqui Shah Depression Scale (SSDS; Siddiqui & Shah, 1997) and the Aga Khan University Anxiety and Depression Scale (AKUADS; Ali et al., 1998).

While SSDS offers cultural relevance, its 36-item length limits feasibility in studies requiring multiple instruments. AKUADS, though widely cited, measures both anxiety and depression, which can generate redundant data when researchers aim to isolate depressive symptoms. These limitations underscore the need for concise, depression-specific tools in Urdu that strike a balance between cultural appropriateness and practicality.

Internationally, widely used scales include the Beck Depression Inventory (BDI-II), the Center for Epidemiologic Studies Depression Scale (CESD-R), and the Hamilton Rating Scale for Depression (HAM-D) (Van Dam & Earleywine, 2011). The Urdu version of the BDI-II is available only through commercial purchase, which restricts accessibility. The Urdu HAM-D (Hashmi et al., 2016), though freely available, requires administration by trained clinicians and lacks a self-report format, making it unsuitable for large-scale community surveys.

In contrast, CESD-R is freely accessible, based on DSM-5 criteria, and designed for self-report. With 20 items and simple response categories, it is efficient, reliable, and validated across diverse populations (Kozziara, 2016). Despite its advantages and availability in multiple languages, an Urdu translation has yet to be developed, representing a critical gap for research in Pakistan and other Urdu-speaking communities.

Research Gap

Although depression prevalence in Pakistan is alarmingly high, there is no freely available, validated Urdu version of CESD-R. Existing Urdu scales are either lengthy, measure multiple constructs, or require professional administration, limiting their utility for large-scale surveys. This absence of a culturally adapted, self-report depression measure highlights a methodological gap in mental health research tools for Urdu-speaking populations.

Significance of the Study

This study will provide the first Urdu translation and validation of the CESD-R, enabling reliable assessment of depression in Pakistan and other Urdu-speaking communities. By ensuring cultural adaptation, psychometric soundness, and measurement invariance across gender, the instrument will support large-scale epidemiological surveys, clinical screening, and cross-cultural research. Ultimately, the availability of a free, accessible, and validated Urdu depression scale will strengthen evidence-based mental health practice, inform policy development, and contribute to reducing the burden of depression in LMIC contexts.

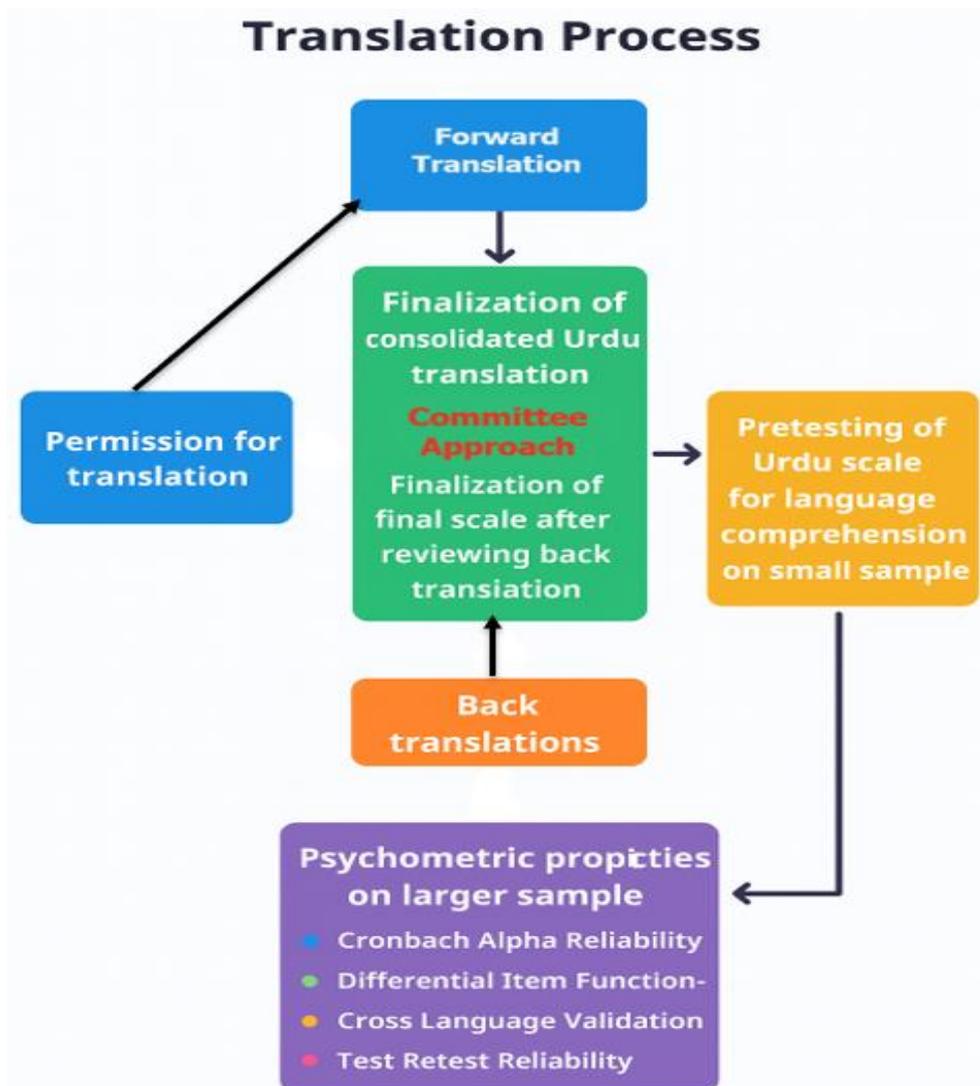
Rationale of the Study

Depression is a leading cause of disability worldwide, with LMICs such as Pakistan reporting prevalence rates as high as 40–43% in the general population. This burden translates into substantial economic costs, exceeding USD 10 billion annually. Despite the urgency, research progress is limited by the absence of freely available, culturally adapted, and psychometrically sound depression measures in Urdu. Existing indigenous scales are either lengthy, measure multiple constructs, or require professional administration, restricting their utility for large-scale surveys. The CESD-R, a free, self-report instrument based on DSM-5 criteria, offers a practical solution. Developing and validating an Urdu version addresses a critical gap in mental health research infrastructure.\

Objectives of the Study

1. This study aims to translate and culturally adapt the CESD-R into Urdu for Pakistan.
2. The study seeks to evaluate the Urdu CESD-R's psychometric properties, including reliability and validity.
3. The study intends to examine differential item functioning across gender to ensure measurement invariance.

Conceptual Framework of Study



Material and Methods

Research Design

Cross sectional research design was used to explore the psychometric properties of translated scale on local population.

Sample 1

The sample comprised of 214 (136 women and 78 men) participants from Pakistan's general population. Age of the participants ranged from 15 to 53 years (Mean Age= 23 years). Education of the participants in the sample ranged from no education to 18 years (Mean =14 years) of education. Researcher read the instructions, items and response options to facilitate completion by the participants having no education.

Sample 2

For cross language validation sample comprised of 70 individuals (38 women and 32 men) having bilingual competency. Age of the participants ranged from 16 to 67 years (Mean Age= 33.2 years, SD=11.5). Education of the participants in this sample ranged from 10 years to 23 years of education (Mean= 15.3 years, SD=2.8). 33 (47%) participants were unmarried, 34(49%) married and 3 (4%) were divorced. 34 (49%) participants were living in nuclear family system and 36 (51%) were living in joint family system.

Measure

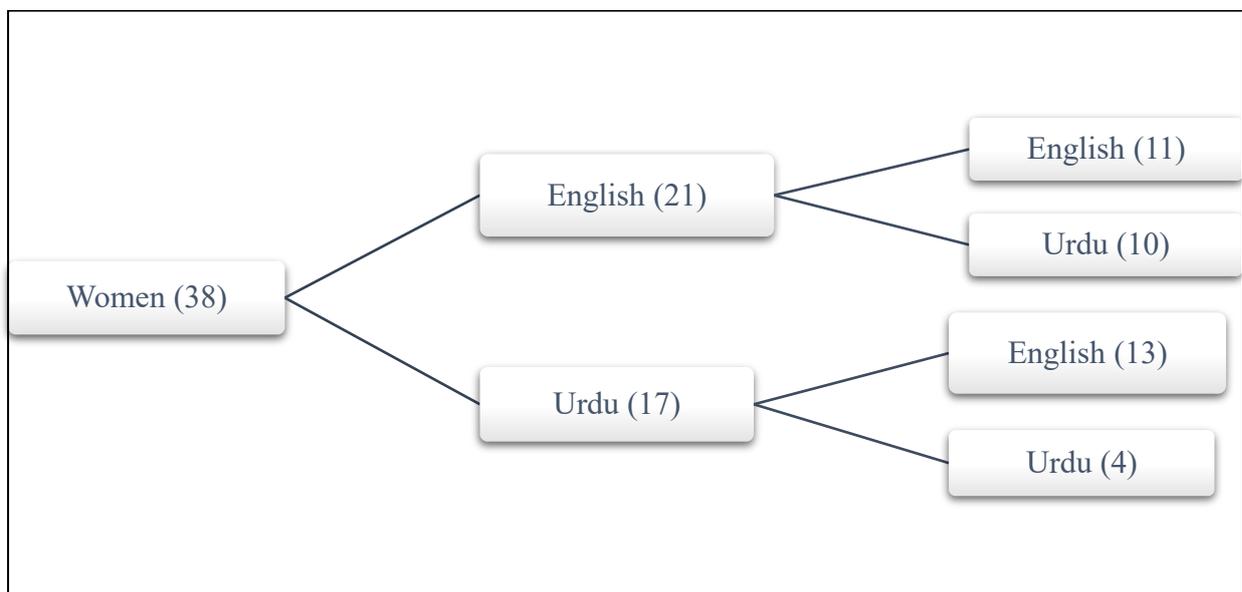
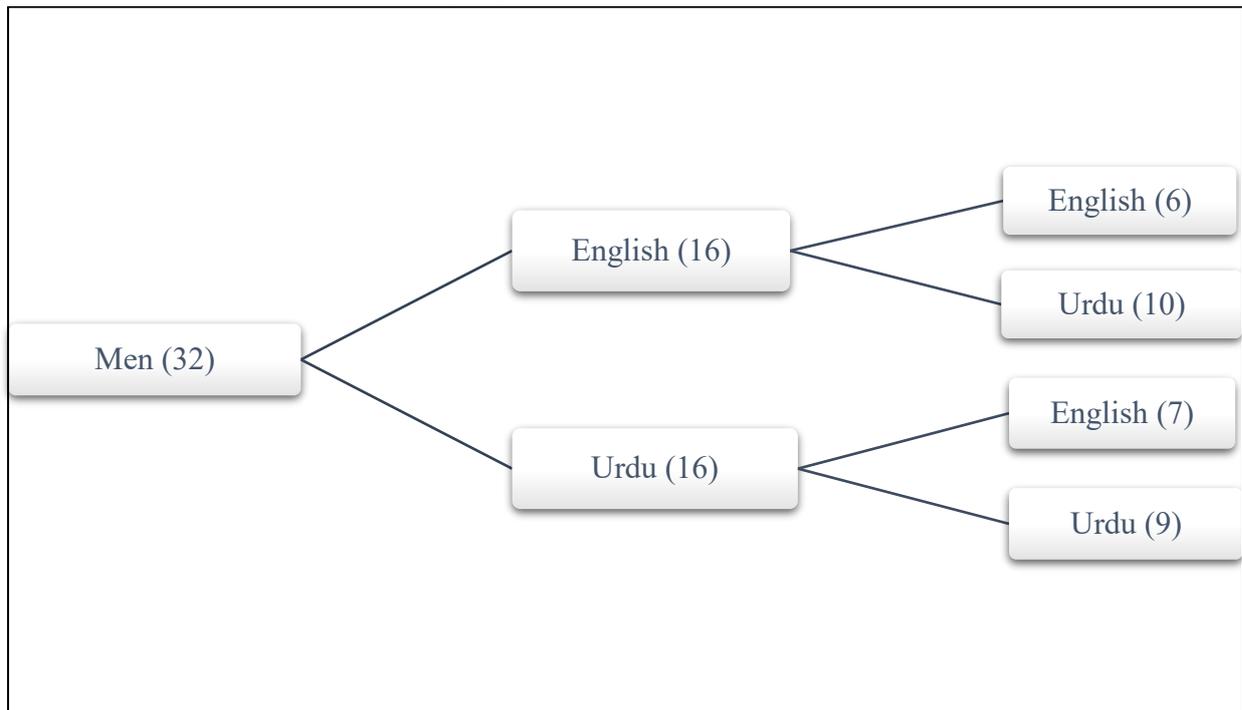
Center for Epidemiological Studies Depression Scale

Translation Procedure:

Permission was obtained from Prof. William W. Eaton to translate the CESD-R (2004) into Urdu. The English version was first translated by five bilingual psychology experts, who were briefed on the scale's purpose. A committee of five members with expertise in psychology and English reviewed the translations for accuracy, grammar, and clarity, replacing difficult words with simpler alternatives while following cross-cultural guidelines (Brislin, 1970). The Urdu version was then back-translated into English by two bilingual experts unfamiliar with the original scale. The same committee critically evaluated the back translations, ensuring authenticity and finalizing the Urdu version. To assess language comprehension, the scale was pretested with six participants from the general population (three men and three women).

Cross Language Validation Process

To determine the cross-language validation of scales people having bilingual competency were invited through online platforms to participate in research. The participants were provided with information about the nature of research. They completed the scales online with a gap of 15 days after providing informed consent. Participants were divided into two groups. Group 1 completed original version of the scales in first administration. Group 2 completed translated version of the scales in first administration. For second administration each group was further divided into two subgroups. First subgroup in each group completed the questionnaire in different language from the first administration whereas second subgroup in each group completed the questionnaire in same language.

Figure 2*Flow of Participants in Cross-Language Validation of Scales (70)***Statistical Analysis**

Data was analyzed using IBM SPSS 24. Item total correlations, Cronbach Alpha, Differential Item functioning, Exploratory Factor analysis and Cross-language validation were computed.

Ethical Consideration

To translate the scale, permission was acquired from the author through email. Informed consent was obtained from all research participants and they were assured that the use of data for research purposes only.

Results

Table 1

Item total correlations (N=214)

Items	r	Items	r
Item 1	.31*	Item 11	.35*
Item 2	.54*	Item 12	.52*
Item 3	.52*	Item 13	.72*
Item 4	.62*	Item 14	.61*
Item 5	.55*	Item 15	.35*
Item 6	.67*	Item 16	.53*
Item 7	.58*	Item 17	.58*
Item 8	.56*	Item 18	.49*
Item 9	.54*	Item 19	.62*
Item 10	.62*	Item 20	.64*

**Correlation is significant at .01 level*

In this study 214 participants completed all the items. CESD-R scores ranged from 0 to 72 (Mean=17.35, S.D. =13.68). Internal consistency was high (Cronbach's Alpha= 0.879). Table 1 shows the Item total correlations. All items correlated significantly ($p<.01$) with total score. Correlation coefficients ranged from 0.31 to 0.72.

Exploratory Factor Analysis

Principal factor analysis was carried out on 20 items of the Urdu version using IBM SPSS version 20. The Kaiser Meyer Olkin (KMO) value of .852 and Bartlett's test of sphericity value of 1307.31 ($p<.001$) indicated meritorious sampling adequacy (Hutcheson & Sofroniou, 1999, p. 225).

Table 2

Variance Explained in EFA (N=214)

	% of variance	Cumulative %
Factor 1	27.93	27.93
Factor 2	3.82	31.75

Preliminary exploratory factor analysis using Promax rotation revealed 5 factors having eigen values above 1 but some factors had just two items and did not make any sense together to be categorized as a factor. Scree plot pointed to the presence of 2 factors so exploratory factor analysis was computed again restricting the factor extraction to two factors. Explained variance of these factors is reported in table 2.

Table 3
Pattern and Structure Matrix

Items	Pattern Matrix		Structure Matrix	
	<i>Factor 1</i>	<i>Factor 2</i>	<i>Factor 1</i>	<i>Factor 2</i>
1. My appetite was poor.	.475		.322	
2. I could not shake off the blues.	.707		.579	.323
3. I had trouble keeping my mind on what I was doing.	.510		.514	.368
4. I felt depressed.	.655		.633	.434
5. My sleep was restless.	.386		.495	.428
6. I felt sad.	.578		.668	.538
7. I could not get going.	.519		.571	.442
8. Nothing made me happy.	.413		.533	.463
9. I felt like a bad person.		.516	.418	.552
10. I lost interest in my usual activities.		.510	.518	.620
11. I slept much more than usual.	.310			
12. I felt like I was moving too slowly.			.449	.427
13. I felt fidgety.		.502	.643	.705
14. I wished I were dead.		.846	.446	.736
15. I wanted to hurt myself.	.337	.721		.482
16. I was tired all the time.	.414		.480	.387
17. I did not like myself.		.358	.497	.530
18. I lost a lot of weight without trying to.	.390		.437	.343
19. I had a lot of trouble getting to sleep.	.317	.311	.538	.536
20. I could not focus on the important things.		.413	.560	.602

Factor loadings under 0.3 were suppressed (Table 3). Items related to sadness, fatigue, tiredness, thinking, appetite, loss of interest and sleep loaded on factor 1 named Affective and functional impairment. Factor 2 comprised of items from suicidal ideation, guilt, loss of interest, agitation and thinking and was named self-destructive pattern.

Table 4
Differential item functioning (N=214)

Items	Gender	N	Mean	SD	t	p																																																																																																																																																																																																														
Item 1	Male	78	.40	.86	-.424	.672																																																																																																																																																																																																														
	Female	136	.45	.84			Item 2	Male	78	.92	1.03	-1.06	.292	Female	136	1.09	1.21	Item 3	Male	78	.76	1.02	-.109	.914	Female	136	.77	1.01	Item 4.	Male	78	.77	.91	-2.19*	.030	Female	136	1.08	1.15	Item 5	Male	78	1.05	1.03	-.825	.411	Female	136	1.18	1.29	Item 6	Male	78	.91	1.05	-1.64	.102	Female	136	1.17	1.15	Item 7	Male	78	.71	1.08	.604	.546	Female	136	.62	.98	Item 8	Male	78	.68	1.04	.413	.680	Female	136	.62	1.06	Item 9	Male	78	.65	1.06	.144	.886	Female	136	.63	1.05	Item 10	Male	78	1.12	1.21	.921	.358	Female	136	.96	1.14	Item 11	Male	78	.94	.97	.366	.715	Female	136	.88	1.12	Item 12	Male	78	.72	.92	-1.19	.236	Female	136	.89	1.07	Item 13	Male	78	.76	.97	-.898	.370	Female	136	.89	1.09	Item 14	Male	78	.49	.91	-1.15	.254	Female	136	.65	1.09	Item 15	Male	78	.41	.90	1.53	.129	Female	136	.23	.72	Item 16	Male	78	.92	1.07	-1.45	.148	Female	136	1.15	1.21	Item 17	Male	78	.53	.94	-.130	.897	Female	136	.54	1.04	Item 18	Male	78	.74	1.09	.098	.922	Female	136	.73	1.15	Item 19	Male	78	1.04	1.27	.320	.749	Female	136	.98	1.36	Item 20	Male	78	1.00	1.17	.550	.583	Female
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* $p < .05$, $df = 212$

Differential item functioning by gender was analyzed. The result revealed item 4 (I felt depressed) was significantly different across gender (Table 4). Women scored significantly higher than men on this item.

Table 5

Cross-Language Validation and Test-Retest Reliability of the Center for Epidemiologic Studies Depression Scale revised (N=70)

N	1 st Administration	2 nd Administration	r
17	CESD-R English	CESD-R Urdu	.85*
20	CESD-R Urdu	CESD-R English	.81*
20	CESD-R English	CESD-R English	.86*
13	CESD-R Urdu	CESD-R Urdu	.93*

Note. * $p < .01$, CESD-R = Center for Epidemiologic Studies Depression Scale revised

Table 5 shows the cross-language validation and test-retest reliability scores of the Center for Epidemiologic Studies Depression Scale revised. The magnitude of correlation between two administrations ranges from .81-.93, reflecting the temporal stability of instruments.

Discussion

This research was carried out to translate the Centre for Epidemiologic Studies Depression Scale Revised CESD-R into Urdu and explore its psychometric properties. For this purpose, data was collected from two different samples. Both samples were from general population of Pakistan. Sample 2 was recruited online. Reliability scores for both samples were acceptable, reflecting adequate internal consistency and temporal stability (Sample 1: 0.88, Sample 2: .81-.93).

The higher correlation between two Urdu administrations of the scale as compared to other administrations (Table 5) reveals the appropriateness and need for Urdu version of the scale for the local population. Nunnally (1978) deems Cronbach's Alpha scores above 0.5 as acceptable. Item total correlation (table 1) was also computed, and all items were found to correlate significantly ($p < .01$) with the total.

Factor analysis (Table 2 & 3) was carried out to explore the underlying structure of the scale. Items grouped in two factors, namely Affective and functional impairment, and Self-destructive pattern. Items related to sleep (Item 5: My sleep was restless, Item 11: I slept more than usual and 19: I had a lot of trouble getting to sleep), Item 12 (I felt like I was moving too slowly) and Item 17 (I did not like myself) had factor loadings lower than 0.4.

Items with factor loadings lower than 0.4 are not considered for inclusion in the final scale (Field, 2013). The factor structure revealed in this study is not consistent with previous studies. Two distinct groupings of items in factor analysis may be reflective of cultural distinctiveness in the expression of depressive symptoms.

Previous studies report expression of symptoms may vary with cultural diversity (Kanazawa et al., 2007; Lehti et al., 2009) and gender differences (Naqvi & Khan, 2005). A validation study by Van Dam and Earleywine (2011) reported two factors, namely functional impairment and negative mood. In our study, the mood symptoms clustered with functional impairment items in factor 1.

Another study (Kozziara, 2016) carried out to evaluate the Polish version of the scale reported three factors, namely cognitive-affective, physical, and self-destructive. This analysis points to the cultural differences in the expression of depressive symptoms. As all the items in the scale are based on important DSM V criteria, none of the items are discarded and a one-factor model is endorsed. Van Dam and Earleywine (2011), despite reporting the presence of two factors, also propose a one-factor model due to its parsimonious nature. Preliminary differential item functioning was explored on sample 1 data. The scores on item 4 significantly varied across gender. This result may be reflective of actual gender differences in the expression of depressive symptoms in Pakistani culture.

Various studies have been carried out to explore gender differences in depression. Findings are mixed. Some studies do not report any gender difference (Ahmadi et al., 2014) whereas others report gender differences, like lesser number of men availing health services for depression (Arenliu et al., 2016; Karger, 2014; Naqvi & Khan, 2005), men reporting fewer depressive symptoms (Angst et al., 2002), Women experiencing a higher level of internalized stigma on suffering from depression (Khan et al, 2015), increased prevalence of atypical depression in women, increased alcohol dependence and abuse among depressed men (Schuch et al., 2014) but none of the studies report a higher level of affective symptoms in women participants.

Conclusion of the Study

The present research establishes that the CESD-R (Urdu) is a reliable and valid instrument for screening depressive illness among Urdu-speaking populations in Pakistan. Psychometric analyses confirmed strong internal consistency, factorial validity, and measurement invariance across gender, supporting its robustness as a diagnostic tool. Although designed as a self-report measure, the simplicity of language and culturally adapted wording ensure that it can be administered effectively even among individuals with low or no literacy skills, with assistance when required. The availability of this free, culturally relevant instrument addresses a significant methodological gap in mental health research. It enables large-scale epidemiological surveys, clinical screening, and cross-cultural comparisons, thereby contributing to evidence-based practice and policy development in Pakistan's mental health sector.

Limitations and Future Directions

This study was conducted on a small scale with a limited number of participants due to scarce resources. A larger and more representative sample is recommended for future research. Confirmatory factor analysis (CFA) was not performed; conducting CFA on a new sample would help validate the newly identified two-factor structure. Similarly, exploratory factor analysis (EFA) on a larger and more representative sample is advised. Only preliminary differential item analysis was carried out; applying more sophisticated statistical procedures with larger samples could provide deeper insights into item bias. The scale was validated on participants with diverse literacy levels, including those with little or no education, to enhance generalizability. However, lower literacy levels were associated with a slight decline in reliability scores. Although these scores remained within acceptable ranges, future studies should specifically examine participants with limited literacy to confirm the robustness of findings.

Implications of the Study

This study was conducted on a relatively small scale with limited participants due to scarce resources, which restricts the generalizability of findings. Future research should employ larger and more representative samples to strengthen the validity of results. Confirmatory factor analysis was not performed, and conducting it on a new sample would help validate the two-factor structure identified through exploratory analysis. Similarly, more advanced differential item analysis with larger samples could provide deeper insights into potential item bias. Although the scale was tested on participants with diverse literacy levels, including those with little or no education, slight declines in reliability scores were observed among lower literacy groups. While these scores remained within acceptable ranges, separate studies focusing on low-literacy populations are recommended to confirm robustness. Overall, the validated Urdu CESD-R offers a culturally adapted, reliable, and accessible tool for depression screening, with significant implications for large-scale surveys, clinical practice, and policy development in Pakistan's mental health sector.

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