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# Psychometric properties of the Telugu version of Rosenberg Self-esteem scale (RSES-T)

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*Key words: Self-esteem, Rosenberg Self-esteem Scale, Telugu, psychometric reliability, validity*
*Parole chiave: Scala di autostima di Rosenberg, versione Telugu, proprietà psicometriche, coerenza, validità*

## Abstract

***Background.*** *The Rosenberg Self-esteem Scale (RSES) is the most commonly used tool for measuring global self-esteem. Till date, RSES has been translated into different languages and the reports are good for their validity and reliability. Telugu being the fourth most spoken language in India, it is timely to translate and validate the Telugu version of RSES. The aim of this study thus is to assess the psychometric properties of the Telugu version of Rosenberg Self-esteem Scale (RSES-T).*
***Study design.*** *Cross-sectional study.*
***Methods.*** *This study was carried out to assess the psychometric properties of RSES-T among undergraduate students of a dental college. For this purpose, the English version of RSES was translated into Telugu and was administered to the participants along with the revised English version of Self-Liking/Self-Competence Scale (SL/SC-R) to evaluate the construct validity. The internal consistency of RSES-T was assessed using Cronbach´s α and the temporal stability was tested by test-retest reliability. Confirmatory factor analysis was conducted to examine the underlying dimensional structure of the questionnaire by assessing the correlation of RSES-T with SL/SC-R.*
***Results.*** *Confirmatory factor analysis revealed a positive one-factor structure with Model 3 showing the best fit to data. Internal consistency for RSES-T was found to be good with Cronbach's α of 0.82 at follow-up and the test-retest reliability was found to be satisfactory (0.42) after a two weeks' interval. Furthermore, the item-wise mean score differences showed higher scores for male students than females. Likewise, the item-total correlation of RSES-T showed positive correlation with scores varying from 0.17 to 0.69 at the follow-up.*
***Conclusion.*** *The Telugu version of RSES exhibited a unidimensional structure and showed good psychometric properties in terms of internal consistency, construct validity and reliability. Hence, these findings provide empirical support to evaluate global self-esteem among Telugu speaking population in future.*

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## Introduction

Self-esteem is a fundamental component of the holistic development in an individual. As defined by Rosenberg (1), "Self-esteem is an individual's overall sense of self-worth, which can be positive or negative, build [sic] through an evaluation of one's own characteristics." Negative self-esteem plays a critical role in the development of psychopathology, leading to the lack of confidence, self-loathing and pessimism (2). Whereas individuals with positive self-esteem appreciate their own worth, take pride in their abilities, skills and accomplishments. Hence, self-esteem tends to grows with each successful experience and interaction.

The components of self-esteem are self-liking and self-competence. Self-liking refers to the overall assurance that individuals have in their ability to achieve their goals. Self-competence refers to the overall positive or negative conception of oneself as a source of power and efficacy. It has been asserted that self-esteem is the most influential motivator and regulator of behaviour in everyday life and is an integral component of overall health (3).

Though several instruments (4-7) have been developed to measure self-esteem, Rosenberg self-esteem scale (RSES) (1) is most routinely used and regarded as a standard questionnaire since it is short, uncomplicated, and easy to understand and administer. It comprises of ten items with self-rated responses on a four-point Likert scale from 0 (strongly agree) to 3 (strongly disagree). It has been translated into different languages (8-14) and on an average has been found to be reliable and valid. In a multicultural study (15) involving 28 languages, the reliability of RSES was reported to be 0.75. Likewise, its Japanese translation (8) has a highly satisfactory reliability with the Cronbach's α being 0.81. Similarly, for the Spanish version of RSES (9), the values for internal consistency obtained in the first and the second administration were 0.85 and 0.88 respectively with a test-retest correlation of 0.84. Swedish RSES (10) also exhibited high internal consistency (>0.90). For the Urdu version of RSES (11), the reliability inferred by Cronbach's α was 0.77 while four weeks' test-retest correlation coefficient was 0.80. The convergent validity was also found to be adequate.

According to the literature, RSES has not been translated in any Dravidian language. The Indian Census of 2011 (16) reports Telugu to be the fourth most spoken language in India and the present study aims to assess the reliability and validity of the Telugu version of Rosenberg Self Esteem Scale (RSES-T).

## Materials and method

The English version of RSES was translated into Telugu by two independent translators with one translator being aware of the aim and objectives of the current study. A unified translated version was developed with consensus from the translations by both translators, which was then back-translated into English by two other independent translators. An expert committee consisting of all translators and two dentists from the public health department developed the final version of RSES-T as per the guidelines proposed by Beaton et al (17).

A cross-sectional study was carried out to assess the psychometric properties of RSES-T among undergraduate students of the Government Dental College & Hospital, Hyderabad. The permission to conduct the study was obtained from the authorities of Government Dental College and Hospital, Hyderabad. Ethical approval for the study was obtained from the Institutional Ethics Committee of Osmania Medical College, Hyderabad (IEC/OMC/2021/M.No.(04)/Acad-38). All undergraduate students who

gave informed consent and could read and understand Telugu and English were included in the study and the purpose of the study was explained to them orally and in written form. After the consent for participating in the study and the explanation, signed consent forms based on the Declaration of Helsinki were obtained from all participants.

Questionnaires were distributed in the class rooms and the participants were assured that the data obtained from them will be used only for research purposes and their identities will not be revealed at any stage. Self-Liking/Self-Competence scale (English) – Revised Version (SL/SC-R) (18) was also administered to evaluate construct validity. Sufficient time was given to answer the questionnaires and serial number method was used to enable following up for test-retest reliability.

Responses for the 10-item RSES-T were recorded on a four-point Likert scale that varied from 0 (strongly agree) to 3 (strongly disagree). The five negatively worded items (2, 5, 6, 8, and 9) of the questionnaire were reverse-coded. The calculated total score ranged between 0-30, with a score <15 indicating lower level of self-esteem, >25 indicating a higher level of self-esteem and a score ranging from 15-25 indicating the normal level of self-esteem. The 16-item SL/SC-R (18) with eight items for each of the two dimensions (self-competence and self-liking) was rated on a five-point Likert scale (1: strongly disagree; 5: strongly agree). The eight negatively worded items (1, 6, 7, 8,10,13,15 and 16) of SL/SC-R were reverse-coded. The item scores were then summed up and combined into an overall subscale score ranging from 8 to 40, with higher scores signifying higher self-competence or higher self-liking.

Statistical analysis was performed using SPSS 22.0 (IBM, New York). Cronbach's α was computed to test the internal consistency of RSES-T. The temporal stability of RSES-T and SL/SC-R was examined by assessing the test-retest reliability of the scale. Construct validity of the translated questionnaire was tested by assessing the correlation of RSES-T with the other measure (SL/SC-R) used. Following the recommendations of Hu and Bentler (19), to assess the fit of the models we used the Goodness-of-Fit Index (GFI), Incremental Fit Index (IFI) and Comparative Fit Index (CFI) and their values ranged from 0 to 1. A good fit of the model was considered if their value was equal to or higher than 0.95. The level of significance was set at $p<0.05$.

## Results

Out of the 330 questionnaires we distributed, one questionnaire was returned unanswered and was not included in the study (response rate, 99.6%). The final sample of 329 participants included 83 (25.2%) males and 246 (74.7%) females with the mean age of 20.5 ±1.70 years. Majority of the participants studied in the first year (108; 32.8%) followed by fourth-year students (86; 26.1%), second-year students (80; 24.3%) and third-year students (55; 16.7%). It was observed that though the item-wise mean scores of RSES-T were higher among males for items 1, 2, 3, 4, 7, 8 and among the females for items 5, 6, 9, 10. The difference was not significant though. Also, the total mean scores for males (27.9 ±5.0) and females (27.8 ±4.4) were comparable ($p = 0.9$) (Table 1).

For the SL/SC-R, no significant gender difference was observed for item-wise mean scores though males scored higher for items 1, 2, 3, 5, 7, 8, 9, 11, 12, 13 than females. The total mean scores among males (55.5 ±10.7) and females (53.7 ±9.9) were found to be similar ($p = 0.4$).

A sample of 64 participants was randomly selected from the original sample of 329 to examine the test-retest reliability after two weeks. The item-total correlation

Table 1 - Item-Wise and Total Mean Score comparison of Telugu Version Rosenberg Self-Esteem Scale (RSES-T) based on Gender

| Items | Males Mean ± SD | Females Mean ± SD | p-value |
|---|---|---|---|
| **1** | 3.08 ± 0.78 | 2.90 ± 0.71 | 0.33 |
| **2*** | 2.75 ± 0.85 | 2.65 ± 0.77 | 0.62 |
| **3** | 2.92 ± 0.65 | 2.85 ± 0.66 | 0.69 |
| **4** | 3.17 ± 0.56 | 3.00 ± 0.64 | 0.29 |
| **5*** | 2.46 ± 0.83 | 2.53 ± 0.85 | 0.76 |
| **6*** | 2.58 ± 0.93 | 2.65 ± 0.86 | 0.77 |
| **7** | 3.13 ± 0.54 | 3.08 ± 0.66 | 0.75 |
| **8*** | 2.46 ± 0.83 | 2.40 ± 0.71 | 0.76 |
| **9*** | 2.46 ± 0.88 | 2.75 ± 0.78 | 0.17 |
| **10** | 2.96 ± 0.69 | 3.08 ± 0.47 | 0.42 |
| **Total** | 27.9 ± 5.03 | 27.8 ± 4.40 | 0.94 |

* negatively worded items

Table 2 - Item-Total Correlation of the RSES-T at Baseline and Follow-up

| Items | Baseline | | Follow up | |
|---|---|---|---|---|
| | Item total correlation | Cronbach alpha | Item total correlation | Cronbach alpha |
| **1** | 0.38 | 0.73 | 0.56 | 0.80 |
| **2** | 0.46 | 0.72 | 0.50 | 0.81 |
| **3** | 0.33 | 0.73 | 0.59 | 0.80 |
| **4** | 0.57 | 0.70 | 0.62 | 0.80 |
| **5** | 0.48 | 0.71 | 0.54 | 0.81 |
| **6** | 0.66 | 0.68 | 0.69 | 0.79 |
| **7** | 0.35 | 0.73 | 0.58 | 0.80 |
| **8** | 0.28 | 0.75 | 0.46 | 0.81 |
| **9** | 0.25 | 0.75 | 0.44 | 0.82 |
| **10** | 0.37 | 0.73 | 0.17 | 0.84 |

Table 3 - Reliability analysis of RSES-T at Baseline and Follow-up

| Reliability analysis | Baseline | Follow up |
|---|---|---|
| Cronbach alpha, full scale | 0.49 | **0.82** |
| Standardized alpha | 0.75 | **0.82** |
| Corr. 1st & 2nd half | 0.78 | 0.85 |
| Split-half reliability | 0.71 | **0.80** |
| Guttman split-half | 0.71 | **0.80** |
| Intrinsic validity | 0.84 | **0.89** |

Table 4 - Test and Retest Reliability of RSES-T and SL/SC Scales by Dependent T-Test

| Type | Test | Mean ± SD | Mean Diff. | SD Diff. | p-value | r-value |
|---|---|---|---|---|---|---|
| RSES-T | Test | 28.45 ± 3.88 | | | | |
| | Retest | 27.91 ± 4.61 | 0.55 | 5.53 | 0.43 | **0.42** |
| SL/SC | Test | 55.31 ± 8.38 | | | | |
| | Retest | 54.45 ± 10.18 | 0.86 | 12.86 | 0.59 | **0.48** |

r → mean correlation coefficient

of RSES-T revealed that all items were positively correlated with the total score. At the baseline, the scores ranged from 0.25 to 0.66 whereas the scores after the two-week follow-up varied from 0.17 to 0.69 (Table 2). The Cronbach's α of the total scale ranged from 0.49 at the baseline to 0.82 at the follow-up. Similarly, the split-half reliability, Guttman split-half reliability and intrinsic vLikewise, item-total correlation of SL/SC-R showed positive correlation of all items with the total score, ranging from 0.36 to 0.63 and 0.44 to 0.68 at the baseline and follow-up, respectively. The internal consistency of SL/SC-R was found to be good at the baseline (0.95) as well as at the follow-up (0.91). In addition, the split-half reliability, Guttman split-half reliability and intrinsic validity of the scale revealed improved scores at the follow-up.

The test-retest reliability of RSES-T and SL/SC-R was 0.42 and 0.48, respectively. The mean scores at the baseline (test) and follow-up (retest) for both RSES-T and SL/SC-R signified that the mean scores of self-esteem were equivalent in both test and retest (Table 4).

Confirmatory factor analysis was conducted to examine the underlying dimensional structure of the questionnaire. Six factor models were studied and contrasted in the study. Model 1 represented a 10-item unidimensional model with uncorrelated errors. Model 2 represented a two-factor model of self-esteem, in which the first factor was defined by all positively worded items and the second factor by all negatively worded items. Model 3 represented one global self-esteem factor and one method factor that included positive items. Model 4 represented one global self-esteem factor and one method factor that included negative items. Models 5 and 6 postulated the existence of one factor taking into account the residual co-variances of the positive and negative items, respectively (Figure 1).

With regard to standardized factor loading, the overall highest factor loading was 0.97 for item 10 (Model 2) and the lowest factor loading was -0.01 for item 1 (Model 2). The loadings of the positive items were high for Model 1 (>0.5). The loadings of the negative items were high for Models 4 and 6 (>0.5). In general, Model 1 (unidimensional model) presented the highest loadings that ranged from -0.13 to 0.82. Model 2 presented the lowest loadings ranging from -0.01 to 0.2 except for item 10 (0.97) (Table 5).

The goodness-of-fit indexes for the total sample showed that Models 1, 2 and 5 had the acceptable fit. Model 3 proved to have the best fit to the data and fulfilled the cut-off criteria in the goodness-of-fit indexes established by Hu and Bentler (19). Whereas, Models 4 and 6 provided better and worst goodness-of-fit indexes, respectively (Table 6).

## Discussion

To the best of our knowledge, this is the first study to translate, validate and analyze the psychometric properties of the Telugu

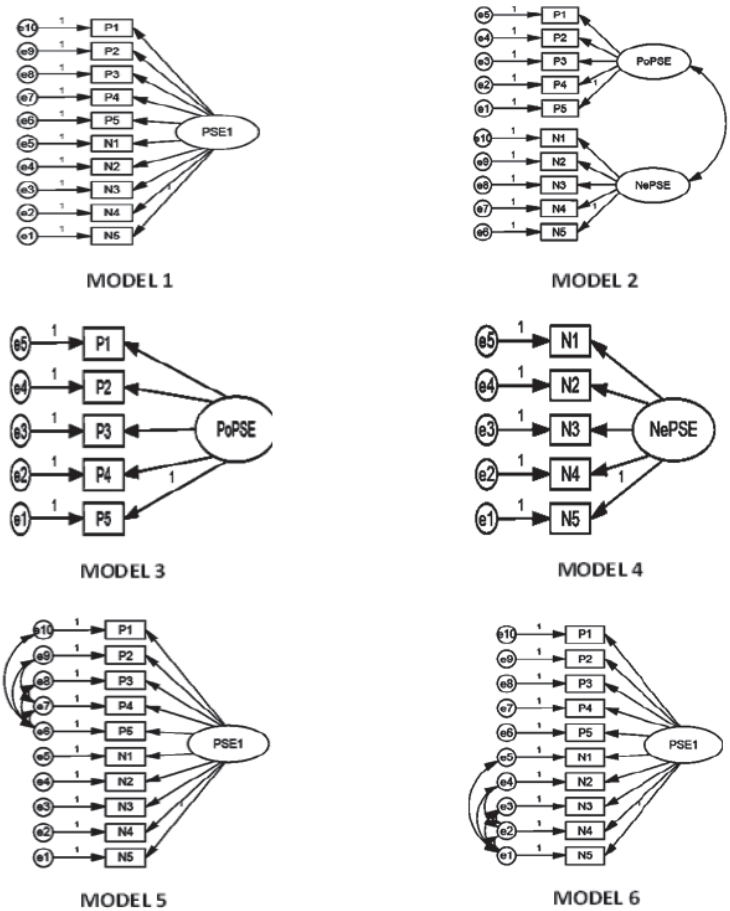


Figure 1 - Factorial Validity of RSES-T by using Confirmatory Factor Analysis (CFA)
p = positively worded items; n = negatively worded items; pse1 = perceived self-esteem; popse = positively perceived self-esteem; nepse = negatively perceived self-esteem.

version of RSES (RSES-T) in a sample of Telugu population. A cohort of Telugu-speaking young adults were included as self-esteem shows a healthy transition from childhood to adulthood through adolescence. Therefore, a relatively stable and enduring level of self-esteem can be noted in this age group. Since the entire study sample was pursuing a professional degree, the process of rumination may have been similar. In this study, RSES-T proved to be a valid and reliable measure for assessing the global self-esteem in Telugu speaking undergraduate students of a dental college and the translated Telugu version of RSES can be recommended for further cross-cultural research among adults for assessing global self-esteem.

A unidimensional psychometric scale has all items measuring a single construct with no correlated residuals. Whereas a bidimensional model represents a two-factor model, in which the first factor is defined by all positively worded items and the second factor by all negatively worded items. This study demonstrated highest factor loadings (-0.13

Table 5 - Standardized Loadings of the Items on the Factor Models in the Total Sample

| Items | Factor loadings | | | | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
| 1 | 0.38 | -0.01 | **0.75** | 0.03 | 0.32 | 0.14 |
| 2* | 0.15 | 0.09 | 0.14 | **0.90** | 0.00 | 0.07 |
| 3 | **0.62** | 0.22 | **0.52** | 0.21 | -0.16 | 0.13 |
| 4 | **0.73** | -0.12 | 0.08 | 0.34 | 0.15 | 0.19 |
| 5* | 0.31 | 0.13 | 0.01 | 0.09 | 0.08 | **0.86** |
| 6* | 0.43 | 0.05 | -0.05 | **0.72** | 0.31 | 0.24 |
| 7 | **0.82** | 0.11 | 0.18 | 0.10 | 0.21 | 0.03 |
| 8* | -0.13 | -0.02 | **0.51** | 0.23 | 0.16 | **0.70** |
| 9* | 0.18 | -0.03 | 0.17 | 0.12 | **0.91** | 0.13 |
| 10 | 0.05 | **0.97** | 0.02 | 0.08 | -0.02 | 0.08 |

*negatively worded items

Table 6 - Goodness-of-fit Indexes of the Factor Models tested for the RSES-T

| Model | $\chi^2$ | df | $\chi^2$/df | RMR | GFI | IFI | CFI | RMSEA |
|---|---|---|---|---|---|---|---|---|
| 1 | 67.0 | 35.0 | 1.91 | **0.04** | 0.83 | 0.83 | 0.83 | 0.12 |
| 2 | 55.6 | 34.0 | 1.63 | **0.04** | 0.85 | 0.89 | 0.88 | 0.10 |
| 3 | **4.9** | 5.0 | 0.98 | **0.01** | **0.97** | **1.00** | **1.00** | **0.0001** |
| 4 | 15.1 | 5.0 | 3.02 | **0.05** | **0.91** | 0.87 | 0.86 | 0.17 |
| 5 | 57.7 | 29.0 | 1.99 | 0.44 | 0.85 | 0.86 | 0.84 | 0.12 |
| 6 | 53.3 | 29.0 | 1.83 | **0.04** | 0.86 | 0.88 | 0.87 | 0.11 |

$\chi^2$- chi-square; df- degree of freedom; rmr- root mean square residual; gfi- goodness of fit index; ifi- incremental fit index; cfi- comparative fit index; rmsea- root mean square error of approximation

to 0.82) for Model 1 (unidimensional model) and lowest loadings were noted for Model 2 (bidimensional model), which ranged from -0.01 to 0.2. Thus, providing evidence for a high internal consistency of the instrument for unidimensional model in comparison to the bidimensional model. The construct validity of the RSES-T scale also confirmed its positive one-factor structure. Similar findings have been noted when RSES was translated in different languages (9, 13, 20).

When comparing the approximate fit indices, Model 3 showed a superior fit as compared to the unidimensional and bidimensional models. Likewise, both unidimensional and bidimensional models were rejected by the chi-square global model test. This could be due to the large sample size (N model), which may have influenced the dimensionality of the scale as suggested by Franck et al. in the Dutch version of RSES (14). On the contrary, studies by Goldsmith (21), Hensley et al (22), Dobson et al (23) and Greenberger et al (24) supported the bidimensional model of RSES in various languages. Regardless of whether the scale was unidimensional or bidimensional, the translated versions of RSES have similar validity in determining the global self-esteem of an individual as does the original English version of RSES (1).

Like other validated versions (8, 9, 13) of RSES, RSES-T indicated good internal consistency (0.82 at the follow-up). Item-total correlation of the scale was also found

to be satisfactory except for item 10 which was 0.17 (at the follow-up).

In this study, the temporal stability of RSES-T was found to be satisfactory with test-retest reliability of 0.42 after a two weeks' interval. This finding is comparable with those in other Indian languages where RSES has been translated and validated. The Urdu version of RSES (11) showed the test-retest reliability of 0.44, for example. Therefore, these findings justify the use of RSES-T with good reliability in the Telugu context. However, the authors of the Gujarati version of RSES (12) did not perform test-retest for reliability. Our findings also show that individuals with high self-esteem obtained similar scores of RSES-T on the two subsequent occasions of testing.

In recent years, Tafarodi et al (18) have defined self-esteem under two domains: self-liking and self-competence. Self-liking relates to an affective judgement of oneself as socially relevant whereas self-competence refers to the evaluation of oneself as capable, effective and confident. Hence, SL/SC-R (18) was used for comparison with RSES-T.

In this study, RSES-T demonstrated a positive moderate correlation with SL/SC-R in terms of construct validity ($r = 0.4$). Furthermore, Schmitt and Allik (15) in a study on 53 nations note that the subcomponents of global self-esteem (i.e., self-liking and self-competence) are significantly correlated with RSES ($r = 0.5$).

Item-wise mean score differences in RSES-T and SL/SC-R were observed in this study based on gender. Male students were found to score higher than females. This finding was consistent with several other translated versions of RSES (9, 14, 25). Martin et al. (9) have reported higher self-esteem in males with the mean score of 32.5 for the Spanish version of RSES. Likewise, Franck et al. (14) and Verkuyten (25) also revealed that male participants scored significantly higher on self-esteem for the Dutch version and English version RSES, respectively.

One plausible explanation for this difference could be that men tend to see themselves as an independent and autonomous entity (26). In contrast, women have more collectivistic attitudes towards self, wherein the representation of others and significant relationships constitute a distinctive part of the self. Various factors including gender roles, peer interactions and cultural emphasis on a woman's physical appearance (27) could also impact the self-esteem.

There are certain limitations of this study. First, the findings might be generalizable only for young adults (18-23 years). Second, we could not discover an association of age with self-esteem due to the narrow age gap among the participants. Future studies can be conducted with a larger age group using a diverse sample. Moreover, planning of qualitative investigation can allow us to get an in-depth understanding of gender and age difference for self-esteem.

## Conclusion

The current study validates the single-factorial structure of RSES-T. The internal reliability and temporal stability were found to be good, supporting the consistency of the RSES-T scale. The results of this study thus strongly provide empirical support for the use of RSES-T scale as a reliable and valid self-reported instrument for further research on the Telugu population to measure global self-esteem.

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## Riassunto

### *Proprietà psicometriche della versione Telugu della scala di autostima di Rosenberg*

**Premessa**. La scala di autostima di Rosenberg è lo strumento più comunemente utilizzato per misurare l'autostima globale. Fino ad oggi, La scala di autostima di Rosenberg è stato tradotto in diverse lingue ed i risultati appaiono apprezzabili per la loro validità e affidabilità. Essendo il Telugu la quarta lingua più parlata in India, è stato a nostro parere opportuno produrre e convalidare la versione Telugu della scala di autostima di Rosenberg. Lo scopo di questo studio è quindi quello di valutare le proprietà psicometriche di detta versione.

**Disegno dello studio**. Indagine trasversale.

**Metodi.** Questo studio è stato condotto per valutare le proprietà psicometriche della versione Telugu della scala di autostima di Rosenberg tra gli studenti universitari di un college di odontoiatria. A tale scopo, la versione inglese della Scala di autostima di Rosenberg è stata tradotta in Telugu ed è stata somministrata ai partecipanti insieme alla versione inglese rivista della scala Self-Liking/Self-Competence, per valutare la validità della versione. La coerenza interna della versione Telugu della Scala di autostima di Rosenberg è stata valutata utilizzando l'α di Cronbach e la stabilità temporale è stata documentata tramite test-retest. È stata condotta un'analisi fattoriale di conferma per esaminare la struttura dimensionale sottostante del questionario, verificando la correlazione della versione Telugu della Scala di autostima di Rosenberg con la versione inglese della scala Self-Liking/Self-Competence.

**Risultati**. L'analisi fattoriale di conferma ha rivelato una struttura positiva a un fattore con il Modello 3 che mostra il miglior adattamento ai dati. La coerenza interna della versione Telugu della scala di autostima di Rosenberg è risultata buona, con α di Cronbach di 0,82 al follow-up e l'affidabilità test-retest è risultata soddisfacente (0,42) dopo un intervallo di due settimane. Inoltre, le differenze di punteggio medio per item hanno mostrato punteggi più alti per gli studenti maschi rispetto alle femmine. Allo stesso modo, la correlazione item-totale della versione Telugu della scala di autostima di Rosenberg ha mostrato una correlazione positiva con punteggi variabili da 0,17 a 0,69 al follow-up.

**Conclusione**. La versione Telugu della Scala di autostima di Rosenberg mostrava una struttura unidimensionale e mostrava buone proprietà psicometriche in termini di coerenza interna, validità costruttiva e affidabilità. Quindi, questi risultati forniscono un supporto empirico per valutare d'ora in poi l'autostima globale tra la popolazione di lingua Telugu.


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