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# Validation of a self-esteem inventory among bachelor-level students of a medical college in Kathmandu, Nepal

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## ABSTRACT

### Background

**The necessity of self-esteem is often discussed and taught but measurements of self-esteem are lacking in Nepal and a locally validated tool is a needed to measure self-esteem among Nepalese people. The aim of this study was to assess the reliability, validity and factorial structure of the Self Esteem Inventory (SEI).**

### Methods

**A total of 560 undergraduate students participated in the study. Explorative factor analysis was conducted to examine the underlying structure of the SEI. Concurrent validity evidence was gathered by correlating the Self Esteem Inventory with the established Rosenberg Self Esteem Scale (RSES).**

### Results

**The factor analysis suggested a four-factor solution labelled as Childhood and Family Background, Likeability, Wealth and Financial Background, and Purpose Needs. The SEI showed an overall internal consistency (α = 0.75) with a coefficient alpha of range 0.52–0.71 for the subscales and found a low correlation of the SEI with the Rosenberg Self-Esteem Scale (r=0.368).**

### Conclusion

**This study provides psychometric properties of 15 items retained from 56 on the original self-esteem scale, developed for the context of Nepal. The SEI is a valid and reliable measure that can be used to study self-esteem.**

**Keywords:** Self-esteem, Self-Esteem Inventory, factor structure, concurrent validity, psychometrics

## INTRODUCTION

Self-esteem (SE) is an important backbone to each person's everyday life. It contributes to health and quality of life[1] and plays a major role in human behaviour.[2] Self-esteem is the totality of the individual's thoughts and feelings with reference to themself as an object.[3] Thus, likes and dislikes regulate self-esteem. Self-esteem increases when there is a reflection on past achievements[4] and decreases when one is reminded of the ways s/he falls short of their ideals.[5] Self-esteem is the conviction that one is competent to live, worthy of living and, thus, is an integrated sum of self-confidence and self-respect.[6]

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Assessment of an adolescent's well-being should include an evaluation of self-esteem and therapy should attempt to address any self-esteem deficits.[7] In a theoretical model developed by Beck (1967), self-esteem was implicated as a vulnerability factor in the onset of depression. Low self-esteem has been linked to depression, aggression, less competency to overcome difficulties and decreased levels of well-being in adolescence.[8]

Various aspects of self-esteem have been differentiated: e.g. sense of power and sense of worth; 'inner' and 'outer' self-esteem;[9] evaluation and affection;[10] sense of competence and self-worth; self-evaluation and self-worth; and competence and morality. Self-esteem has been considered to be global or unidimensional by some scholars but to be a multidimensional construct by others.[11,12] The current review begins with the notion of global self-esteem. One of the most popular tools for evaluating self-esteem is the Rosenberg Self Esteem Scale (RSES), which is the most widely used measure of global self-esteem.[13] Principal Component Analysis has revealed one general factor and one other factor accounting for 12% of the variance of self-esteem in Nepal.[11]

Besides the concept of global self-esteem, various authors have reported the development, validation and multidimensional components of self-esteem. For example, in validating components of a Multidimensional Self Esteem Inventory (MSEI),[12] the developers initially conducted an item analysis based on data collection from a sample of 264 subjects. This was followed by a cross-validation study, a scale revision study, an internal consistency study, a stability study, a validity study and a factor analysis study. Three factors – factor 1: Self-evaluation and Effectance (the effect of self-esteem on the subject of their self-evaluation), factor 2: Social Self-esteem and factor 3: Defensiveness and Private Self-evaluation have eigenvalues equal to or greater than 1.0 (4.91, 1.32, 1.00). These factors accounted for 44.6%, 12.0% and 9.1% respectively of the total variance observed.[12]

According to Aryal (2017),[14] the psychological health of any country can be measured through the health of its young people. Though there has been progress in research on the Nepalese 'self' due to the advent of theories examining this from a multi-dimensional perspective, locally developed and validated tools to evaluate self-esteem amongst Nepalese subjects from a multi-dimensional perspective is missing. For empirical studies, a Self Esteem Inventory (SEI) developed by Nepalese psychologists has been used but, prior to this study, no factor analysis had been reported for the current tool. The SEI tool is an objective self-report inventory that provides measures of the components of self-esteem from a multi-dimensional perspective. To examine the underlying structure of the SEI, exploratory factor analysis is required. The current study aims to validate this inventory among Nepalese students.

## METHOD AND MATERIALS

### Study design and population

This was a descriptive cross-sectional study. Internal consistency and factor structure of the SEI was examined. Concurrent validity evidence was gathered by correlating the SEI with the Rosenberg Self Esteem Scale (RSES). The participants of the study were bachelor-level students at Maharajgunj Medical Campus (MMC) in Kathmandu, Nepal.

The bachelor-level courses taught in MMC are Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Public Health (BPH), BSc Medical Laboratory Technology (BSc MLT), Bachelor of Optometry (BOptom), Bachelor of Pharmacy (BPharm), Bachelor of Science in Medical Imaging Technology (BSc MIT) and Bachelor of Audiology and Speech Language Pathology (BASLP). In total, 809 students were studying at bachelor level at the MMC campus during the study period.

### Sampling and inclusion criteria

The sample size was determined as per the requirement for factor analysis. Several authors have mentioned the criteria of samples in relation to the number of items in the questionnaire (For instance, 3:1, 6:1, 10:1, 15:1, or 20:1). For the current study, the suggestion of 10:1 was taken, as this is recommended by several experts.[15-17] As there are 56 questions in the SEI, the required sample size was 560.

Quota sampling was used for the study. The sample was calculated using the following formula and, based on these values, the sample size (N) was calculated as shown in Table 1, using the following equation: $S = \frac{n}{N}h$

Where:
S = sample size
n = number of students on particular subject,
*N* = total no. of students in Bachelor levels, and
*h* = total no. of required sample size (560)

**Table 1 Sample size calculations**

| Bachelor-level Course | No. of students | Proportionate of each stream | Sample size |
|---|---|---|---|
| MBBS | 435 | 0.53 | 560 x 0.53 = 301 |
| BPH | 160 | 0.19 | 560 x 0.19 = 111 |
| BSc MLT | 44 | 0.054 | 560 x 0.054 = 30 |
| BOpt | 40 | 0.049 | 560 x 0.049 = 28 |
| Bpharm | 80 | 0.098 | 560 x 0.098 = 56 |
| BSc MIT | 40 | 0.049 | 560 x 0.049 = 28 |
| BASLP | 10 | 0.012 | 560 x 0.012 = 6 |
| **Total** | **809** | **1.0** | **560** |

**Measurements**

*Self Esteem Inventory (SEI)*

The Self Esteem Inventory (SEI) was developed by Professor Usha Kiran Subba, a psychologist, and Associate Professor Dr Timothy Aryal in 2017. The tool has 56 items and all items are answered in a 5-point Likert's Scale graded as 'Never, not at all – 0', 'Rarely – 1', 'Sometimes–2', 'Often–3' and 'Always–4'. There are eight domains, each of which is scored separately. Each scale has a number of items that are summed to derive the domain score: Power and Authority; Childhood and Family Background; Wealth and Financial Background; Intellectual Ability (competence); Love Needs; Likeability; Purpose Needs; Body Function and Appearance. There are 45 positive statement questions in total; the remaining 11 are negative questions. The questionnaire takes, on average, 30-35 minutes to complete.[14]

Interpretation of a healthy, integrated self-esteem score indicates that the person knows clearly who he/she is (identity); knows and accepts strong and weak aspects of life; knows what he/she wants out of life (purpose); knows how to set well-defined long-term goals (vision and mission); and does not claim to possess certain traits. A high score represents that the respondent is pleased with their self; feels significant as a person; feels self-confident; is pleased with the past; and expects the future will be fulfilling and that they will be successful, whereas a low score represents a respondent who is self-critical; dissatisfied with their self; feels insignificant as a person; is displeased with the past; expects the future to be filled with failure; and who does not feel that their love and security needs are fulfilled. An initial study, carried out to determine the level of self-esteem among campus students in Nepal, determined a Cronbach's Alpha – a measure of reliability of the test – for the SEI of 0.725.[14]

*Rosenberg Self Esteem Scale (RSES)*

RSES is a self-esteem measurement used widely in research and practice due to its ease of administration, relative briefness, high reliability and validity. RSES has been translated and validated among college students across 53 nations.[18] The Rosenberg Scale is one of the most widely used measures in research[19] and it is the most widely used measure of global self-esteem.[13] The Cronbach's Alpha of the RSES was found to be 0.735 in Nepal, indicating RSES as a reliable tool for Nepalese adolescents. This held true for factor analysis: Principal Component Analysis revealed that one general factor and one other factor accounted for 12% of the total variance.[11]

The RSES is a 10-item questionnaire that rates items from 1 (strongly disagree) to 4 (strongly agree), with

five items reverse scored (Q3, Q5, Q8, Q9, and Q10). Scoring involves a summation of all 10 items to produce an overall self-esteem score within the range 10–40. This scale is available in the public domain and can, therefore, be used openly for research. It takes on average 5 to 10 minutes to complete the test. [18]

**Data collection**

Background information on the study population was collected from the consulting faculties and class representatives at the start of the study. Permission to use the tool was granted by its developers.

Approval for the study was granted by the Institutional Review Board (IRB) of the Research Department of Institute of Medicine, Tribhuvan University Teaching Hospital, Nepal. A date for the assessment and data collection was confirmed through contacting class representatives.

The researchers introduced themselves to the participants in a classroom setting. Written and verbal consent was taken from participants once the objectives of the study and the methodology of data collection had been explained to them. Instructions on how to fill in the questionnaire was provided.

All the participants were given a semi-structured questionnaire schedule to collect information on their sociodemographic status and to undertake the SEI and RSES. The researchers helped participants whenever they expressed confusion.

**Ethical approval**

This study involved human participation and thus was reviewed and approved by Institutional Review Board, Institute of Medicine, Tribhuvan University Teaching Hospital. The study was approved by the Research Department of Institute of Medicine (ref. no. 242 (6-11-E)$^2$/075/076).

Questionnaires were administered to 560 students in classrooms at the Maharajgunj Medical Campus (MMC). Informed consent was obtained from all the participants involved in the study. Participants read and confirmed they understood the information sheet and consent forms for the study.

**Data analysis**

The demographic questionnaire contained questions about the participants' age, gender, sex, marital status, religion, education, parental status, father's and mother's education level and the main source of the family income.

Explorative factor analysis (EPA) was conducted to explore the factor structure of the SEI. The 56 questions related to self-esteem were factor-analysed using principal axis factoring with Varimax (Kaiser normalization) rotation. Kaiser-Meyer-Olkin (KMO) was checked as a measure of sampling adequacy for the suitability of factor analysis. Factor loading with 0.35[20,21] and 0.2 over the gap between two factors were selected during the factor loading. Factors with low Cronbach's Alpha scores were discarded.[22]

The reliability coefficient of the original item scale, and each component factor along with its mean and standard deviation, were assessed. Finally, the relationships among factors with SEI and RSES scores was tested.

## RESULTS

**Sociodemographic characteristics**

The summary of descriptive statistics of selected variables included in the sociodemographic performa used in the study including age, gender, marital status, religion, education and family income. The sample characteristics are reported in Table 2, below.

**Explorative factor analysis**

The KMO measure was 0.848, indicating that the factor analysis was acceptable[22]. In the first run, 17 factors had an eigenvalue above 1.0 and the percentage of variance explained by first factor was 15.964%. The loaded factors were used as variables for further analysis. This process was continued for a total of six runs. In the final run, all factors with eigenvalues greater than 1.0 were then extracted, leaving seven factors. Factor 1 explained 18.925% of variance and remaining factors explained 8.522%, 7.608%, 6.887%, 6.334%, 5.536% and 5.065 % of the variance respectively. The final run of factor analysis is reported in Table 3 on the following page.

Table 2 Sociodemographic characteristics of respondents

| Characteristics | Frequency (%) |
|---|---|
| **Age (years)** | |
| 18-21 | 312 (55.7%) |
| 22-25 | 232 (41.4%) |
| 26-29 | 16 (2.9%) |
| **Gender** | |
| Male | 350 (62.5%) |
| Female | 210 (37.5%) |
| **Marital status** | |
| Single | 550 (98.2%) |
| Married | 9 (1.6%) |
| Divorced | 1 (0.2%) |
| **Religion** | |
| Hindu | 530 (94.6%) |
| Buddhist | 8 (1.4%) |
| Muslim | 7 (1.3%) |
| Christian | 2 (0.4%) |
| Atheist | 11 (2.0%) |
| Sikh | 2 (0.4%) |
| **Education** | |
| Bachelor of Medicine and Bachelor of Surgery (MBBS) | 301 (53.8%) |
| Bachelor of Public Health (BPH) | 111 (19.8%) |
| BSc Medical Laboratory Technology (BSc MLT) | 30 (5.4%) |
| Bachelor of Optometry (BOpt) | 28 (5.0%) |
| Bachelor of Pharmacy (BPharm) | 56 (10.0%) |
| Bachelor of Science in Medical Imaging Technology (BSc MIT) | 28 (5.0%) |
| Bachelor of Audiology and Speech Language Pathology (BASLP) | 6 (1.1%) |
| **Source of Family income** | |
| Government job | 222 (39.6%) |
| Business | 135 (24.1%) |
| Agriculture | 75 (13.4%) |
| Job but not government | 105 (18.8%) |
| Interest, pension and house rent | 23 (4.1%) |

Table 3 Loadings of explorative factor analysis

| Items | Factors | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| How often do you feel that you were accepted and well-treated as a child in your family? | .792 | | | | | | |
| How often do you feel that you were a valued child? | .581 | | | | | | |
| How often do you feel you were loved so you can love others? | .559 | | | | | | |
| How often do you think that your parents displayed a good role model for your upbringing? | .454 | | | | | | |
| How often do you think that your family members have a harmonious relationship? | .404 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| How often do you think that people you meet will like you? | .755 | | | | | |
| How often do you think that people enjoy spending their time with you? | .618 | | | | | |
| How often do you feel that you are an attractive person in your social groups? | .456 | | | | | |
| How often do you think that people have a high-level of trust in you? | .442 | | | | | |
| How often do you feel that you have enough resources to meet all your needs? | | .808 | | | | |
| How often do you feel that you grew up in a family with sufficient money? | | .679 | | | | |
| How often do you think that your parents had sufficient resources to invest in your health and education? | | .556 | | | | |
| How often do you feel that your body is healthy and energetic? | | | .804 | | | |
| How often do you feel that your body finds easy to perform day to day activities? | | | .618 | | | |
| How often do you set goals for the future? | | | | .690 | | |
| How often do you think about what your life will be like in five years' time? | | | | .527 | | |
| How often do you feel sure about what you want out of your life? | | | | .312 | | |
| How often are you sure that your friends include you in their plans? | | | | | .608 | |
| How often are you sure that your friends love and care for you? | | | | | .604 | |
| How often do you feel awkward in relationships with others because of your body appearances? | | | | | | .526 |
| How often do you feel that others who you know are more attractive than you? | | | | | | .484 |
| How often do you wish that you were more physically attractive? | | | | | | .483 |

***Values express factor loading***

**Reliability and validity**

The SEI 56-item scale has a mean of 137.03±17.30 and *r* = 0.8. The SEI 15 item-scale Cronbach's Alpha value was found to be 0.75, indicating acceptable value[16,22] with the mean of 41.40±7.04. The CFB (Childhood and Family Background) and WFB (Wealth and Financial Background) has a mean of 16.32±3.22 and 7.44±2.74 and good reliability, with a Cronbach's Alpha coefficient of >0.70; the LA (Likeability) scored slightly below this cut off and PN (Purpose Need) scored below this cut off. However, even though LA scored below cut the off, this domain was not completely disregarded as values above 0.60 are suggested to be acceptable.[20]. PN also scored below cut off but was not disregarded as the average item correlation values were between 0.15 and 0.41, indicating acceptability.[24] A primary reason for the low reliability value is that the scale has only a low number of items. Only two items were loaded in factor 4 and 6; they were discarded, as this is recommended when there are three items or fewer.[20]

Factor 4 was discarded due to low Cronbach's Alpha (0.47), as this is considered unacceptable.[22] The RSES was found to have Cronbach's Alpha value of 0.72.

An analysis of concurrent validity was performed using Pearson correlation between the SEI and its factors and RSES. The correlations between SEI and

its four factors were positive and low-high, with values between 0.12 and 0.74. In comparing the SEI, 15 items have positive or medium correlation (r = 0.36, p<0.01) with RSES. This could be because most of the studies carried out on factor analysis using RSES identify either a single common factor or two factors (Self-confidence and Self-depreciation), which is different from the factors identified in SEI.

**Table 4 Mean score, standard deviation and reliability coefficient of factors**

| Factor | Factor name | No. of items | Mean item score | Standard deviation | Reliability |
|---|---|---|---|---|---|
| 1 | Childhood and Family Background (CFB) | 5 | 16.32 | 3.22 | 0.71 |
| 2 | Likeability (LA) | 4 | 9.59 | 2.65 | 0.68 |
| 3 | Wealth and Financial Background (WFB) | 3 | 7.44 | 2.74 | 0.74 |
| 5 | Purpose Need (PN) | 3 | 8.04 | 2.26 | 0.52 |
| | SEI – 56 items | 56 | 137.03 | 17.30 | 0.83 |
| | SEI – 15 item | 15 | 41.40 | 7.04 | 0.75 |
| | RSES | 10 | | | 0.72 |

**Table 5 Relationship among factors, SEI and RSES (N=560)**

| Factor | CFB | LA | WFB | PN | SEI – 15 items | RSES |
|---|---|---|---|---|---|---|
| CFB | | .233** | .278** | .281** | .743** | .252** |
| LA | | | .216** | .166** | .620** | .271** |
| WFB | | | | .126** | .638** | .217** |
| PN | | | | | .560** | .206** |
| SEI 15-item | | | | | | .368** |

***P<0.01*****

## DISCUSSION

The questionnaire originally consisted of 56 items. This was reduced to 15 items with four factors, using the principal axis component. The resulting four factors were Childhood and Family Background; Likeability; Wealth and Financial Background; and Purpose Needs. Factor extraction helps to determine the set of items in the optimal number of factors. Factor analysis is used to understand the latent (internal) structure of a set of items and the extent to which the relationships between the items are internally consistent.[25] The extraction of factors is also used to reduce items. Originally, the author had eight factors: Power and Authority; Childhood and Family Background; Wealth and Financial Background; Intellectual Ability (competence); Love Needs; Likeability; Purpose Needs; and Body Function and Appearance. Each factor had seven items. In the present study, none of the question items in the original Power and Authority domain were sufficiently loaded after the third run of the factor analysis. All these items were discarded.

During the development and validation of the MSEI[12], the inventory had Personal Power as one of the components of self-esteem. This could be taken to indicate that self-esteem is comprised of Power and Authority but items on this factor were not retained in the SEI as we consider the concept of leadership to be different from self-esteem, whilst acknowledging that these factors may affect one another; for example Wojciszke and Kujalowicz-Struzynska (2007) have stated that power and self-esteem go hand-in-hand.[26] Similarly, all the question items from the Intellectual Ability of the original domains were dropped after the factor analysis. This could be due to the students not recognizing the structure of the

relationships between self-esteem and Intellectual Ability (competence). The students may not have related the concept of self-esteem to intellectual ability. In the first factor, the five questions relating to Childhood and Family Background were loaded; however, items that did not correspond to the latent structure of the domains were not retained. In addition, one question item, originally from the Love Needs domain, was retained in this factor. The retention of this item (How often do you feel that you were loved so you can love others?) in the first factor was due to a feeling that love and care, being accepted and being part of a satisfying relationship all begin in childhood and within the family. Likewise, four items were loaded in the second factor under the domain of Likeability (as originally proposed by the author). Out of the seven items in the original domain three were not retained. These items (How often do you express your opinions, ideas and feelings in groups?; How often do you make new friends easily?; How often do you feel that people enjoy listening and accepting your ideas?) were not retained. This was due to students not understanding concepts of likeability in reference to self-esteem clearly.

Self-esteem is a multidimensional personality trait encompassing characteristics such as worth, goodness, health, appearance, skill and social competence.[27] The three question items loaded in the third factor (How often do you think that your parents had sufficient resources to invest in your health and education?; How often do you feel that you grew up in a family with sufficient money?; and How often do you feel that you have enough resources to meet all your needs?) were originally under the domain of Wealth and Financial Background. As wealth measures the value of all the assets of worth owned, the concept of wealth and finances in relation to self-esteem was not easily comprehended by the participants, possibly because they were students at the beginning of their careers. These four questions items were not retained in the factors. Three items (How often do you feel sure about what you want out of your life?; How often do you set goals for the future?; and How often do you think about what your life will be like in five years' time?) were loaded in the fifth factor, which also included items under the Purpose Needs domain, as originally proposed by the authors. The items that were not retained may be due to the students being undecided about their life goals and long-term future. The remaining three factors (factor 4, factor 6 and factor 7) were discarded. There were only two items in factor 4 and 6, and hence these were discarded as per the recommendation to discard factors with less than three items.[20] Factor 7 was discarded, as the Cronbach's Alpha (0.47), was low enough to be unacceptable.[22]

The present findings provide clear support for the reliability of the SEI. The Cronbach's Alpha value of the SEI 15-item scale was 0.75, indicating acceptable value.[16,22] The reliability coefficient score of factor 1 (Childhood and Family Background) was 0.715, the second factor (Likeability) 0.682, the third factor (Wealth and Financial Background) 0.743 and the fifth factor (Purpose needs) 0.525. All these factors were found to be positively correlated between themselves and also with the RSES. RSES is widely used as a self-esteem measure in research and practice.[11,19] When comparing the SEI 15-item scale and RSES, the correlation was found to be 0.368, indicating low correlation. This could be because most of the studies undertaken on factor analysis using RSES identify either a single common factor or two factors (Self-Confidence and Self-Depreciation), which is different from the factors of SEI (Family and Childhood Background, Likeability, Wealth and Financial Background; and Purpose Needs). Also, the concept of self-esteem is different in the two scales.

## CONCLUSION

The Self Esteem Inventory (SEI) is a tool for measuring self-esteem. After the factor analysis, 15 items were retained in the SEI from the 56 items of the RSES. Factor 1 retained five items related to Childhood and Family Background, factor 2 retained four items related to Likeability, factor 3 retained three items related to Wealth and Financial Background and factor 5 retained three items related to Purpose Needs. Furthermore, the SEI demonstrated a positive but weak correlation with the RSES. In conclusion, the SEI is a valid and reliable measure that can be used to study self-esteem.

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