Dhaka stress scale—adolescent: A scale for assessing psychosocial stressors among adolescents

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Abstract

This study was aimed to produce a culturally validated scale to determine the presence of stressful life events among adolescents in Bangladesh and formulate the relative life change units for each event. The study used qualitative research, including a focus group and questionnaire, and quantitative analysis in the validation process. Researchers first developed a provisional stress scale that was translated in Bangla through a translation exercise. Using an open-ended question along with this provisional scale on a school sample of 449 (228 rated on imagination and 221 on actual experience) adolescents, researchers developed Dhaka stress scale—adolescent with 56 items and predictive interpretation of the overall score was made. Content validity was found excellent as item level content validity index was around 1 and the scale level validity index was 0.93. The correlation coefficient was 0.72 between this scale and adolescent life events stress scale. For reliability, Cronbach’s alpha values were ranged from 0.83 to 0.97. The scale is simple to administer to assess stress in adolescents and usable in both clinical and research settings.

Introduction

Adolescence is often associated with profound changes in multiple contexts concurrently give rise to an increased load of potential stressors.1,2 The implication of stress for children and adolescents can be far-reaching, depending on its level, persistency and vulnerability in term of developmental factors and low resiliency.3 The relation of stressful life events with wide range of symptoms and disorders has been well documented in adults.4,5 Studies of this relation in children and adolescents have also demonstrated that stressors can cause negative physical, mental and cognitive outcomes for them.6 Stressors are associated with later development of internalizing as well as externalizing problems,7,8 anxiety, depression, psychosis, impaired memory and language skills,9,10 stress related problems,11,12 and more psychiatric problems overall. Stressors also cause weakened immune system, diverse physical disorders like psychosomatic disorders, heart disease, obesity diabetes, and asthma.13-15 In considering this relationship researchers identified several vulnerability factors, such as genetic predisposition, difficult temperament, tendency to blame negative events on themselves, social, economic and environmental factors.16-20

In Bangladesh, significantly higher rate of stressors both in frequency and severity was found in adolescents with self-harm,21 somatoform disorders,22 school refusal,23 conversion disorder,24 anxiety and stress related disorders,25 internalizing and externalizing problems,26 juvenile idiopathic arthritis and chronic physical disorders.27 In these studies, assessments of stressful life events were carried out using relevant section of DSM-III-R, ICD-10, Social Readjustment Rating Scale (SRRS)28 and other foreign tools.29 Studies have attempted to evaluate the cultural validity of stressful life events scales among adolescents or children.30-32 Several authors have attempted to use the SRRS and its technique,33,34 and to validate this scale culturally.35 Other studies have used focus groups and surveys.36 Perhaps the most relevant attempts of SRRS cultural validation for adolescent stress assessment are Life Event Record37 and Adolescent Life Events Stress Scale.38 These scales were found unsuitable in the context of Bangladesh as experienced and judged by the researchers and thereby could not assess stress more perfectly.39-41 With the same reasons, researchers of the present study initially developed a new scale named Dhaka stress scale—Adults (DSS-A) to measure stressful life events among adults in Bangladesh.42 This research was conducted as a continuum of fulfilling the same requirement for adolescents in Bangladesh. The objectives of the study were to produce a new culturally validated stress scale for assess-
ing stressful life events in Bangladeshi adolescents and to estimate the mean stress score for each stressor experienced by adolescent population in the past year.

**Materials and Methods**

**Design**

This mixed methodological i.e. qualitative and quantitative type of study was conducted from July 2016 to June 2017. For development and cultural validation of an adolescent stressful life event scale with life change units, the study was broken down into a two-phase process. Phase one was cultural validation that all the stressful life events on the scale, potentially stressful to the population to be surveyed and no culturally relevant life events had been excluded. Phase two was validation of the mean stress scores in terms of life change units for each event on the scale. As there was no clearly defined gold standard to validate each event, a multi-step validation for each phase was utilized in this research with mixed methodology for each phase.

**Scale formulation**

Initial stress items of Dhaka stress scale-Adolescent (DSS-Ad) were selected from the life event record. Adolescent life events stress scale-ALESS were all the relevant research on psychosocial stressors in Bangladesh and extensive clinical experiences of researchers to construct a culturally relevant primary list of stressful life events.

**Focus group discussion**

A focus group was formed involving 10 mixed mental health professionals (five women and five men) familiar with working on these with mental distress and life stressors among adolescents. They were of different professional backgrounds and experiences: five psychiatrists, three clinical psychologists and two psychologists. In total five sessions of focus group discussions were held in July and August, 2016. Each session was for 90 min.

It was an adequate length for a group of ten professionals to provide situatation for the research topic. The group was moderated by the primary investigator, with a supplementary researcher. The group discussion was took place in English as primary language with Bangla used where appropriate. The focus group was participant lead, with the moderator ensuring that the focus remained on the primary research questions. The discussions were audio-taped that agreed by participants, and transcription verbatim for analysis. The recordings were securely stored until transcribed and then destroyed. The transcription did not contain information that could allow individuals to be linked to specific statements. Confidentiality was strictly preserved. The preliminary list of stressful life events was available for the focus group to guide discussion. Through the focus group discussions, the researchers wanted to make sure that the items chosen were relevant with regard to the developmental period and also gathered information about possible stressful life events not relevant to Bangladeshi adolescents and identify additional stressful life events needed to add to generate provisional DSS-Ad.

The moderator initiated the discussion and asked the group members to give their input one by one. Moderator recited all the stressful life events included in the primary list then asked to the group members to identify the possible events not relevant to Bangladeshi adolescents. Most of the items of the provisional list were agreed by members. Some of them were discarded because the members argued that they were not culturally appropriate. The members explored some new events appropriate for Bangladeshi culture and were not in the list. In this way at the last sessions of focus group discussion, data were transcribed and researchers got some culturally relevant stressors which added and some stressors were discarded from the primary list. Following stressors were discarded as it had been agreed that these were either not relevant to adolescents in Bangladesh or incorporated and merged into other suitable stressor items. From LER, discarded items were: increase in number of arguments with parents, decrease in number of arguments with parents, beginning another school year, suspension from school, fathering of unwanted pregnancy, pregnancy of unwed sister, discovery of being adopted child, not making an extracurricular activity, beginning to date, change of parents' financial status, accepted at college of choice, being a senior in high school, and addition of third adult to family. From ALESS, discarded items were: change in eating habits, change in social activities, change in sleeping habits, change in living conditions, change in health of family member, death of pet, change in financial status of parents, serious argument with teacher, and marriage of an emotionally closed sibling. Following stressors were added as it was agreed that these were not relevant to adolescents in Bangladesh: sexual harassment, excessive parental pressure for academic performance, increase in number of arguments with parents, harsh behavior of teacher, downgrading financial status of parents, dropped out from study, lack of boy/girl friend, excessive abuse of internet or mobile, lack of recreational facilities, failure to get admission in a school or college of choice, and change in personal habit (sleeping, eating etc.). Culturally relevant stressful life events for adolescents generated by the focus group discussion contributed a lot to the development of a culturally validated screening tool and thus 56 itemed provisional DSS-Ad was prepared.
Translation exercise

Provisional DSS-Ad then translated and back translated to Bangla and English by four psychiatrists and psychologists having competency on both Bangla and English and four language experts according to the guideline proposed by Beaton et al. (2006). After random ranking of items, this provisional Bangla version of DSS-Ad with 56 items was pretested to resolve discrepancies and applied for data collection.

Data acquisition

This part of the study was conducted in a school of Dhaka city. The school was located in a moderately prosperous urban residential area where most families were of mainly middle and partly low and high socioeconomic status and almost all adolescents of targeted age group attended school. Both boys and girls were available for recruitment as it was co-educational school and had up to Grade-12 educational facilities. It was chosen after informal local consultation at least as one of the representative schools of that area. Students between 12-18 years of either sex were recruited through class register of educational school and had up to Grade-12 educational facility. The sample, 449 students, consisting of both boys (n=199) and girls (n=250) of different socio-demographic strata were enrolled. A total of 449 students, consisting of both boys (n=199) and girls (n=250) of different socio-demographic strata were enrolled. Of the sample, 228 subjects were asked to rate the imaginary stress that they have experienced each event of provisional DSS-Ad though they had not really experienced that item in a Likert scale ranging from 1 to 5 where 1 represented not at all stress, 2, 3, 4 and 5 represented a little stress, a mild amount of stress, a moderate amount of stress and a good deal of stress respectively. Another 221 subjects were asked to rate only those events of provisional DSS-Ad which they had actually experienced in the last year in the same way. In the original version of the scale, mean stress scores were presented after multiplying these range of severities with 20. Every subject was requested to add additional events in the blank space which were not in the scale. Several responses received from both imagined and experienced groups. These were considered and evaluated carefully and were discarded as the items were either included in one of the items already existing in the provisional DSS-Ad or were chronic/ongoing in nature or were description of a state or too vague to be included. According to statistical leading, mean score of 25 or above was considered as cut-off to include a stressful life event as an item of this scale.

Scale validation

The two principle psychometric properties namely reliability and validity for this scale were measured. A 6-membered expert committee (psychiatrists having competency on both Bangla and English) reviewed the DSS-Ad. They provided their valuable opinion about the face validity. Content validity was assessed by choosing items for the content validity index (I-CVI) and the scale-level content validity index (S-CVI). Content validity indices were assessed by three psychiatrists. Each expert rated each item either 1 (not relevant), 2 (somewhat relevant), 3 (quite relevant) or 4 (highly relevant). Then, for each item, the I-CVI was computed as the number of experts giving a rating of either 3 or 4 (thus dichotomizing the ordinal scale into relevant and not relevant), divided by the total number of experts. The S-CVI was measured by averaging calculation method (S-CVI/Ave), i.e. by the average of the I-CVs for all items on the scale. The scale was judged to have good content validity if the I-CVI = 1 for each item and the S-CVI/Ave ≥ 0.9, as recommended by Bullit and Beck (2006). Internal consistency was assessed by Cronbach’s alpha. Instrument that are used clinically should have coefficient alpha of 0.80 or higher often closer to 0.90. Cronbach’s alpha should lies between 0 and 1. Values are usually expected to be above 0.7 and below 0.9. The alpha below 0.7 broadly indicates poor internal consistency and above 0.9 suggests that the items are very similar and perhaps fewer items could be used to obtain the same overall information.

Interpretation

For the DSS-Ad, general guideline of the interpretation of score was made to assess the individuals with the level of stress. According to the total score on 3-point scale - mild, moderate and severe levels were categorized. As follows: score 150 or less suggesting mild level of stress, score 151 to 300 suggesting moderate level of stress and score 301 or more suggesting severe level of stress.

Data analysis

Data analysis was performed by statistical package for social science (SPSS), version-20. Statistical analysis was done using frequencies and percentages and by applying Spearman’s rank correlation test, Intra-class correlation coefficient and t-test. All tests were two tailed and p<0.05 was considered statistically significant.

Results

Sample characteristics

Of the sample of 449 adolescents, 199 were boys and 250 were girls and boy: girl ratio was 1:1.3. Their age ranged from 10 to 18 years with a mean of 14.2 ± 3.1 years. Most of the subjects (25.8%) were in Grade-6 followed by Grade-8 (22.7%) and lowest (2.9%) were in Grade-12 level of education. Among the subjects, 422 were from urban and 27 were from rural background (Table 1). Majority of the subjects were Muslims (93%) followed by Hindus (4.9%) and...
Of the cases, Grade-12 subjects experienced highest numbers of life events with a mean of 4.2. It was 4.1, 3.6 and 3.5 in the Grade-10, 9 and 8 groups respectively. This result revealed that an individual experienced an average of three and half stressful life events in a year without having any psychiatric disorder. Girls experienced slightly more life events (3.1) than boys (2.9) with a ratio of 1:1.3.

### Mean stress score by different characteristics

Mean stress scores according to different characteristics is also shown in Table I. Highest mean score was found 63 among 17-year old subjects. That was lowest among 10 years old with the mean score of 27. Mean stress score among the boys was 40 and that was higher among girls which was 56. According to the educational level, highest mean score was found among Grade-11 subjects with the mean of 67 and the lowest was among Grade-6 subjects with the mean of 37. Undesirable stressful life events were higher than desirable life events with the mean score of 51 and 48 respectively. Further, mean stress score was higher among the imaginary group which was 82 than experienced group which was 17. Mean stress score was 53 among the group with combined controlled and uncontrolled life events than the groups with either controlled or uncontrolled life events with the mean score of 48 for each. Mean stress score of personal life events was 51 which was slightly higher than impersonal events with the mean score 47.

### Individual stress score

In DSS-Ad, death of a parent perceived as most stressful life event with a mean stress score of 94 and outstanding achievement of a sibling ranked as least stressful life event with a mean stress score of 27. The items were ranked according to decreased in severity of perceived stress. In case of same mean stress score, researchers considered the fraction of that score.

### Mean stress score according to area of stressful life events

The individual events were grouped into nine types according to social area of activities. Again, these areas were ranked according to decreased in severity of perceived stress. Of the nine types, other interpersonal (number of life events was 4) ranked as most stressful area with mean stress score of 57. Educational area (number of life events was 13) was the next with mean stress score of 55. The mean stress score of others seven areas were: Familial (number of life events was 18) 50, conjugal (number of life events was 3) 50. Living circumstances (number of life events was 3) 47. Physical illness/injury (number of life events was 3) 47. Financial (number of life events was 1) 43. Legal (number of life events was 2) 36.

### Table I

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mean stress score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>11</td>
<td>46</td>
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<tr>
<td>12</td>
<td>48</td>
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<td>13</td>
<td>53</td>
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<td>14</td>
<td>50</td>
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<td>15</td>
<td>54</td>
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<tr>
<td>16</td>
<td>48</td>
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<tr>
<td>17</td>
<td>63</td>
</tr>
<tr>
<td>18</td>
<td>50</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Boy</td>
<td>40</td>
</tr>
<tr>
<td>Girl</td>
<td>56</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
</tr>
<tr>
<td>Grade-6</td>
<td>37</td>
</tr>
<tr>
<td>Grade-7</td>
<td>46</td>
</tr>
<tr>
<td>Grade-8</td>
<td>60</td>
</tr>
<tr>
<td>Grade-9</td>
<td>48</td>
</tr>
<tr>
<td>Grade-10</td>
<td>48</td>
</tr>
<tr>
<td>Grade-11</td>
<td>67</td>
</tr>
<tr>
<td>Grade-12</td>
<td>30</td>
</tr>
<tr>
<td>Desirable vs. undesirable</td>
<td></td>
</tr>
<tr>
<td>Desirable</td>
<td>48</td>
</tr>
<tr>
<td>Undesirable</td>
<td>51</td>
</tr>
<tr>
<td>Experienced vs. imaginary</td>
<td></td>
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<tr>
<td>Experienced</td>
<td>17</td>
</tr>
<tr>
<td>Imaginary</td>
<td>82</td>
</tr>
<tr>
<td>Controlled vs. uncontrolled</td>
<td></td>
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<tr>
<td>Controlled</td>
<td>48</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>48</td>
</tr>
<tr>
<td>Combined</td>
<td>53</td>
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<tr>
<td>Personal vs. impersonal</td>
<td></td>
</tr>
<tr>
<td>Personal</td>
<td>51</td>
</tr>
<tr>
<td>Impersonal</td>
<td>47</td>
</tr>
</tbody>
</table>

The mean of total numbers of life events experienced by the subjects was 3.5 with a range of 2.2-4.2. Of the cases, Grade-12 subjects experienced highest numbers of life events with a mean of 4.2. It was 4.1, 3.6 and 3.5 in the Grade-10, 9 and 8 groups respectively. This result revealed that an individual experienced an average of three and half stressful life events in a year without having any psychiatric disorder. Girls experienced slightly more life events (3.1) than boys (2.9) with a ratio of 1:1.3.

**Life events experienced in last year**

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Table II
Mean ranked stress scores of each item of stressful life events

<table>
<thead>
<tr>
<th>Rank No.</th>
<th>Stressful life events</th>
<th>Mean stress score</th>
<th>Rank No.</th>
<th>Stressful life events</th>
<th>Mean stress score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Death of a parent</td>
<td>94</td>
<td>29</td>
<td>Loss of academic year</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>Excessive parental pressure for academic performance</td>
<td>88</td>
<td>30</td>
<td>Dropped out from study</td>
<td>47</td>
</tr>
<tr>
<td>3</td>
<td>Fall in love</td>
<td>84</td>
<td>31</td>
<td>Downgrading, financial status of the family</td>
<td>47</td>
</tr>
<tr>
<td>4</td>
<td>Increased academic workload</td>
<td>78</td>
<td>32</td>
<td>Having a visible congenital deformity</td>
<td>47</td>
</tr>
<tr>
<td>5</td>
<td>Lower grade in examination than expected</td>
<td>71</td>
<td>33</td>
<td>Unwanted pregnancy</td>
<td>47</td>
</tr>
<tr>
<td>6</td>
<td>Failed in examination</td>
<td>68</td>
<td>34</td>
<td>Becoming involved with drug addiction</td>
<td>47</td>
</tr>
<tr>
<td>7</td>
<td>Upcoming examination</td>
<td>66</td>
<td>35</td>
<td>Becoming pregnant</td>
<td>46</td>
</tr>
<tr>
<td>8</td>
<td>Divorce of parents</td>
<td>65</td>
<td>36</td>
<td>Mother beginning to work</td>
<td>46</td>
</tr>
<tr>
<td>9</td>
<td>Broke up with boy friend or girl friend</td>
<td>63</td>
<td>37</td>
<td>Extramarital relationship of parents</td>
<td>46</td>
</tr>
<tr>
<td>10</td>
<td>Excessive abuse of internet or mobile</td>
<td>61</td>
<td>38</td>
<td>Death of a close friend</td>
<td>46</td>
</tr>
<tr>
<td>11</td>
<td>Having step parent</td>
<td>61</td>
<td>39</td>
<td>Serious illness requiring hospitalization of a parent</td>
<td>45</td>
</tr>
<tr>
<td>12</td>
<td>Sexual harassment</td>
<td>59</td>
<td>40</td>
<td>Imprisonment or jail sentence of a parent</td>
<td>44</td>
</tr>
<tr>
<td>13</td>
<td>Failure to get admission in a school or college of choice</td>
<td>59</td>
<td>41</td>
<td>Harsh behavior of teacher</td>
<td>44</td>
</tr>
<tr>
<td>14</td>
<td>Parental separation</td>
<td>57</td>
<td>42</td>
<td>Loss of job of a parent</td>
<td>43</td>
</tr>
<tr>
<td>15</td>
<td>Death of a close family member</td>
<td>57</td>
<td>43</td>
<td>Lack of recreational facilities</td>
<td>43</td>
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<tr>
<td>16</td>
<td>Serious illness requiring hospitalization of self</td>
<td>55</td>
<td>44</td>
<td>Brother or sister leaving home</td>
<td>40</td>
</tr>
<tr>
<td>17</td>
<td>Serious illness requiring hospitalization of a sibling</td>
<td>54</td>
<td>45</td>
<td>Acquiring a visible deformity</td>
<td>40</td>
</tr>
<tr>
<td>18</td>
<td>Discord with parents</td>
<td>53</td>
<td>46</td>
<td>Increase absence of a parent from home for changing profession</td>
<td>35</td>
</tr>
<tr>
<td>19</td>
<td>Trouble with bully</td>
<td>52</td>
<td>47</td>
<td>Change of school</td>
<td>34</td>
</tr>
<tr>
<td>20</td>
<td>Beginning or ending of school</td>
<td>52</td>
<td>48</td>
<td>Outstanding personal achievement</td>
<td>33</td>
</tr>
<tr>
<td>21</td>
<td>Sex problem</td>
<td>50</td>
<td>49</td>
<td>Change of academic subjects or branch</td>
<td>33</td>
</tr>
<tr>
<td>22</td>
<td>Parental discord</td>
<td>50</td>
<td>50</td>
<td>Theft of personal belongings</td>
<td>31</td>
</tr>
<tr>
<td>23</td>
<td>Marriage</td>
<td>49</td>
<td>51</td>
<td>Change in personal habit (sleeping, eating etc.)</td>
<td>31</td>
</tr>
<tr>
<td>24</td>
<td>Birth of a sibling</td>
<td>49</td>
<td>52</td>
<td>Lack of school attendance</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>Discord with peer</td>
<td>49</td>
<td>53</td>
<td>Change in family role and responsibilities</td>
<td>30</td>
</tr>
<tr>
<td>26</td>
<td>Serious illness of a family member</td>
<td>48</td>
<td>54</td>
<td>Relocation of family</td>
<td>28</td>
</tr>
<tr>
<td>27</td>
<td>Lack of boy or girl friend</td>
<td>48</td>
<td>55</td>
<td>Minor violation of law</td>
<td>28</td>
</tr>
<tr>
<td>28</td>
<td>Discord with sibling</td>
<td>48</td>
<td>56</td>
<td>Outstanding achievement of a sibling</td>
<td>27</td>
</tr>
</tbody>
</table>

Severity of stress
The distribution of the subjects reveals that mild level of stress was found among 60% of the subjects. Subjects with moderate stress level were 28% and the rest 16% subjects were at severe level.

Validity and reliability
Result shows that all items had good content validity except 6 items. Scale level content validity index (S-CVI) was measured by averaging the I-CVIs of all items and the value was 0.93. Concurrent validity was assessed between ALESS and DSS-Ad. Table III shows the correlation between these two scales. It depicts that the correlation coefficient was 0.723 which reflected very strong positive correlation between two scales. Moreover, correlation was statistically significant as p value was <0.05.

For reliability, Cronbach’s alphas were calculated from various permutations of the DSS-Ad. Internal consistency for the 56 items of DSS-Ad was 0.89. DSS-Ad was explained by two-factor model. The first factor consisted of 32 items with salient loadings (p>0.40). The second factor consisted of 24 items. No item had salient loading on more than one factor and there were 6 items that failed to load on either factor. Cronbach’s alpha according to the
area of stressors of different areas of stressors is presented in the Table IV. Cronbach's alpha of stressors was ranged from 0.83 to 0.97. All social areas were moderately to strongly correlated with each other. The term communality for a given variable can be interpreted as the proportion of variation in that variable explained by the two factors. The term communality for a given variable can be interpreted as the proportion of variation in that variable explained by the two factors. For example, communality=0.67 implies that 67% of the variation. Communality of 56 items was ranged from 0.36-0.85. Communality of 5 items was slightly below the expected level.

### Discussion

Several authors have highlighted the importance of health research in South Asia, citing large population numbers and health policies that are often unsupported by research. Research quantity is increasing in South Asia including Bangladesh, and there is a need to develop culturally validated research tools to support this. This study has produced a culturally appropriate scale for measuring stressful life events among adolescent population in Bangladesh for both clinical and research use that is equally applicable in Bangladeshi communities in other countries.

The DSS-Ad is designed to identify stressful life events experienced by normal adolescent population of Bangladesh in the past year and measuring the types, frequency and quantity of stressors but can be used for any time frame to life long. It has both Bangla and English versions. It is a self-reported scale applicable for either sex of 10-18 year olds. It comprises 56 items that are rated on given mean stress score and takes 15-20 min. The items are rated on given mean stress score on the left of each event. If the adolescent experienced that event in the past year, is written that number on the blank space to the right. If any event happened more than once, is multiplied for each occurrence. The simple sum of all items rating constitutes the total score.

### Concurrent validity-correlation of DSS-Ad and ALESS

<table>
<thead>
<tr>
<th></th>
<th>DSS-Ad</th>
<th>ALESS</th>
</tr>
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<tbody>
<tr>
<td>DSS_Ad</td>
<td>Pearson correlation 1 0.723a</td>
<td>0.723a 0.028</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed) 9 9 9 9</td>
<td>9 9 9 9</td>
</tr>
<tr>
<td>ALESS</td>
<td>Pearson correlation 0.723a 1</td>
<td>0.028 9 9 9</td>
</tr>
</tbody>
</table>

>Correlation is significant at the 0.05 level (2-tailed)

On the basis of the other valid stress scales and research reports, researchers have extrapolated the general guidelines of interpretations of the overall scores of DSS-Ad. Thus it can screen the potential risk population. However, this interpretation is not absolute because of the large differences in individual's ability to cope and particular reaction to stress, and because of the lack criterion referred validity tasted on large healthy as well as sick adolescent population. Therefore, the interpretation should be considered as probable and approximate.

In the present study, 56 stressful life events of diverse nature were included as items of DSS-Ad. Higher ranking top 10 stressful life events in descending order were: Death of a parent, excessive parental pressure for academic performance, fall in love, increased academic workload, lower grade in examination than expected, failed in examination, upcoming examination, divorce of parents, broke up with boy friend or girl friend, excessive abuse of internet or mobile. These stressful life events are of academic, familial and interpersonal in nature. Education, and family and interpersonal relationship were found higher among normative as well as sick young population are the prime concerned areas because life events related two these areas were reported to have higher causal relationship with psychiatric as well as other medical disorders among adolescents. School was the most common source of stress across all points. In depth studies on adverse impact of these type of stressful life events and broadly, detrimental effect of stressful life events in health and disease is necessary with the aim of preventing and managing disorders.

In this study, 16% of the subjects who were normative adolescent population in Bangladesh had severe level of stress. It can be assumed that this proportion of adolescent population is the risk population group and strong possibility of having psychiatric problems. This rate simulates with the prevalence of psychiatric disorders among children and adolescents. In developed countries, the prevalence of psychiatric disorder among the adolescents is ranged from 11 to 27%. In developing countries, few studies reported the nearly similar

<table>
<thead>
<tr>
<th>Area</th>
<th>Cronbach's alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjugal</td>
<td>0.84</td>
</tr>
<tr>
<td>Family</td>
<td>0.97</td>
</tr>
<tr>
<td>Living circumstances</td>
<td>0.83</td>
</tr>
<tr>
<td>Other interpersonal</td>
<td>0.86</td>
</tr>
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<td>Educational</td>
<td>0.87</td>
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<td>Legal</td>
<td>0.82</td>
</tr>
<tr>
<td>Physical illness/injury</td>
<td>0.90</td>
</tr>
<tr>
<td>Others</td>
<td>0.83</td>
</tr>
</tbody>
</table>

### Cronbach's alpha according to area of stressful life events

<table>
<thead>
<tr>
<th>Area</th>
<th>Cronbach's alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conjugal</td>
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<td>0.82</td>
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<tr>
<td>Physical illness/injury</td>
<td>0.90</td>
</tr>
<tr>
<td>Others</td>
<td>0.83</td>
</tr>
</tbody>
</table>
range of prevalence of psychiatric disorder which is
13 to 20%. In Bangladesh, prevalence of psychiatric
disorder is reported 18% among 4-6 years old. As
the proportion of severe level of stress in this
study among adolescent population is similar to the
prevalence rate of psychiatric disorders among
adolescents. DSS-Ad has certain predictive value
particularly those having severe level of stress score
in this scale. Subsequent large scale studies are
required to refine the interpretation of DSS-Ad
score and its predictive value.

Construction of items of DSS-Ad was based on
LER and ALES developed for the assessment of
stressors among Indian adolescents. Both the scales
are further based on most reputed Homes and Rahi
Scale and other scales developed on sound
methodology. The item construction was further
strengthened by careful analyzing the identified
psychosocial stressors in the relevant research in
Bangladesh and clinical experience of the research­
ers. The items were cross checked and finally
considered through extensive and in-depth
qualitative analyses with the inclusion of culturally
prevailing stressful life events among adolescents
efficiently and ranked accordingly through quanti­
tative analyses on the basis of response of adoles­
cents in Bangladesh. Therefore, it can be said that
the items of this scale are culturally relevant
obtained through a sound systemic way.

In the present study, mean stress score for each
event was calculated on the summery of the scores
of the individual response of the subjects. Individual
responses to a life event vary widely and it
depends upon several factors including individu­
al coping ability, developmental status, social
support systems, relationship and temperament/
personality. Therefore, overall summery score of the
stressful life events may not reflect the individual’s
perception. This is one of the drawbacks in majority
of the stress scales including this scale and that can
be minimized by clustering of the events in many
ways and thereby assessed along with considering
individual perception.

In this study, on an average an individual
adolescent experienced 3.5 number of stressful life
events in a year. This finding simulates with the
findings of other studies on psychosocial stressors
among adolescents. This finding also indicates
that adolescents suffer from nearly equal number of
stressful life events like adults in Bangladesh
reported in a study of developing stress scale for
adult population in Bangladesh which was 4 in
number for an adult individual. In present study,
female cases experienced slightly more life events
(3.1) than male (2.9). Excess of stressful life events
experienced by the girls are reported in several
studies. Especially girls in mid to late adolescence
report high levels of stress and stress-related symp­
toms such as anxiety, depressive symptoms, sleep­ing
difficulties and somatic complaints.

This study establishes some psychometric
properties of the DSS-Ad. Development of a new scale
was driven by the need of an interview-based measure
of potentially stress-causing life events in Bangla­
deshi adolescents, specially meant for the Bangla­
deshi milieu. Furthermore, it is expected that such
an instrument would permit the assessment of
ancestors caused due to them and their
relationship to psychiatric and physical disorders.
In terms of a consistent and reliable measures of
stressful life events among adolescents, it was
found that this instrument revealed substantially
similar internal consistency between two independ­
ent and nearly age, sex and socio-economic status
matched samples. The samples of both studies
broadly share general milieu of the Indian Subconti­
nent.

In this study, face validity of the DSS-Ad was
excellent. In assessing content validity of the scale,
item level content validity index (I-CVI) was 1
except 6 items and scale level validity index (S-CVI)
was 0.93. According to Polit and Beck (2006), the
scale will be judged to have excellent content
validity if the I-CVI=1 for each item and SCVI ≥0.9.
So, the content validity of the DSS-Ad was excellent
as both I-CVI and S-CVI were within expected level.
In factor analysis of two factor model, no item had
salient loading on more than one factor. According
to these criteria, each factor obtained in the present
study appeared stable. Similar finding was observ­
ed by Deacon et al. (2004) where two factor
analysis was done. Item 1–10 loaded similarly like
this study but communalities were different. For
assessing concurrent validity, correlation coefficient
was 0.72 between DSS-Ad and ALESS that was
fairly acceptable. For the internal consistency for the
DSS-Ad, Cronbach’s alpha values were ranging
from 0.83-0.97 which was in acceptable range.
Therefore, it can be viewed that DSS-Ad has excelle­
nt reliability and validity. Subsequent studies are
required to strengthen its psychometric properties.

DSS-Ad is the first culturally appropriate, valid and
reliable scale in Bangladesh to assess stressful life
events among adolescent population developed
both in English and Bangla. It is based on sound
methodology and provides a straight forward,
reproducible model for the development of further
culturally- validated screening tools for use in
Bangladesh and other Countries. The stressors of
this scale are culturally loaded thus suitable for
assessing stressors in Bangladeshi culture.

Conclusion

This new scale is culturally valid and reliable to
measure the stressful life events among Bangladeshi
adolescents. This research highlights that academic
related stressors is one of the key concerned areas of
this population in relation to health that needs to be
addressed. The scale can be used in identifying
potentially risk adolescent population of having disorders.

Ethical Issue

The ethical clearance was obtained from the Institutional Review Board of the University. Informed consent was taken from the participants of focus group in written format, explaining the research, its purpose and their expected role. The participants were informed that they could leave the group at any point, including after consent has been given.

Conflict of Interest

Authors declare no conflict of interest.

Acknowledgement

This research project was supported by a grant from University Grant Commission through Bangabandhu Sheikh Mujib Medical University, Dhaka.

References


Below are stressful life events which you may have experienced. To the left of each event is the mean stress score. If you experienced that event in the past year, write that number on the blank space to the right. If the event happened more than once, multiply for each occurrence. When you are finished enter your total value at the end of the list.

<table>
<thead>
<tr>
<th>Mean stress score</th>
<th>Stressful Life events</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>94</td>
<td>Death of a parent</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Excessive parental pressure for academic performance</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>Fall in love</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>Increased academic workload</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>Lower grade in examination than expected</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Failed in examination</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Upcoming examination</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Divorce of parents</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Broke up with boy friend or girl friend</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>Excessive abuse of internet or mobile</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>Having step parent</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Sexual harassment</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Failure to get admission in a school or college of choice</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Parental separation</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Death of a close family member</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Serious illness requiring hospitalization of self</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Serious illness requiring hospitalization of a sibling</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Discord with parents</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Trouble with bully</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Beginning or ending of school</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Sex problem</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Parental discord</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Marriage</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Birth of a sibling</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Discord with peer</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Serious illness of a family member</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Lack of boy or girl friend</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Discord with sibling</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Loss of academic year</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Dropped out from study</td>
<td></td>
</tr>
<tr>
<td>Score</td>
<td>Event Description</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Downgrading financial status of the family</td>
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</tr>
<tr>
<td>47</td>
<td>Having a visible congenital deformity</td>
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<tr>
<td>47</td>
<td>Unwanted pregnancy</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Becoming involved with drug addiction</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Becoming pregnant</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Mother beginning to work</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Extramarital relationship of parents</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Death of a close friend</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Serious illness requiring hospitalization of a parent</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Imprisonment or jail sentence of a parent</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Harsh behavior of teacher</td>
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</tr>
<tr>
<td>43</td>
<td>Loss of job of a parent</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Lack of recreational facilities</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Brother or sister leaving home</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Acquiring a visible deformity</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Increase absence of a parent from home for changing profession</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Change of school</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Outstanding personal achievement</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Change of academic subjects or branch</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Theft of personal belongings</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Change in personal habit (sleeping, eating etc.)</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Lack of school attendance</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Change in family role and responsibilities</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Relocation of family</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Minor violation of law</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Outstanding achievement of a sibling</td>
<td></td>
</tr>
</tbody>
</table>

**Total Score**

**Interpretation:**

Score 150 or less = Mild level of stress
Score 151 to 300 = Moderate level of stress
Score 300 or more = Severe level of stress

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টাকা মানসিক চাপ পরিমাপক-ফিশের সংক্ষেপ

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<td>পিতা বা মাতার গুল্লক শরীরিক অসুস্থতার জন্য হাসপাতালে ভিত্তি</td>
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<tr>
<td>প্রশ্নাঙ্ক</td>
<td>বিষয়</td>
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<td>৪৪</td>
<td>পিতা বা মাতার কারারাম বা কারাদণ্ড</td>
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<td>শিক্ষকের ক্ষুর আচরন</td>
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<td>পিতা বা মাতার চাকুরী হারানো</td>
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<td>৪৭</td>
<td>বিদেশের প্রথমের অভাব</td>
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<td>৪৮</td>
<td>ভাই বা বোনের লাড়ি ছেড়ে যাওয়া</td>
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<td>দুঃখান্ত অস্তিত্ব ঘটা</td>
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<td>৫০</td>
<td>পেশার পরিবর্তনের জন্য সুইট পিতা বা মাতার দীর্ঘ অনুপস্থিতি</td>
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<td>৫১</td>
<td>স্কুল পরিবর্তন</td>
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<td>৫২</td>
<td>অসাধারণ ব্যক্তিগত কৃতিত্ব অর্জন</td>
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<td>৫৩</td>
<td>পড়াশুনার প্রধান বিষয় বা শাখা পরিবর্তন</td>
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<td>৫৪</td>
<td>ব্যক্তিগত জ্ঞানপত্র ছুঁইয়ে যাওয়া</td>
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<td>৫৫</td>
<td>ব্যক্তিগত অভাবের পরিবর্তন (মূল, স্বীকার ইত্যাদি)</td>
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<td>৫৬</td>
<td>স্কুলে কম সংখ্যক</td>
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<td>৫৭</td>
<td>পরিবারের কঠোর ও বিচারের পরিবর্তন</td>
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<td>পরিবারের আবাস মুল পরিবর্তন</td>
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<td>হোটেলের অর্থনৈতিক লক্ষণ</td>
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<td>৬০</td>
<td>ভাই বা বোনের অসাধারণ কৃতিত্ব অর্জন</td>
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</tr>
</tbody>
</table>

সর্বমোট প্রাতঃ মান

প্রশ্নাঙ্কের ব্যাখ্যা:

প্রশ্নাঙ্ক ১৫০ বা তার কম= মূল মাতার চাপ

প্রশ্নাঙ্ক ১৫১ থেকে ৩০০= মধ্য মাতার চাপ

প্রশ্নাঙ্ক ৩০১ বা তার বেশী= উচ্চ মাতার চাপ