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Validation of the Long-term Difficulties Questionnaire-Youth Version as a Measure of Chronic Stress in Adolescents in Sri Lanka

Abstract

Introduction: As a validated stress questionnaire to assess ongoing adversities of adolescents in developing countries is not available, we developed a brief general checklist, the “Long-term Difficulties Questionnaire-Youth” version (LTD-Y) to measure daily stressors of adolescents and examine the psychometric properties of the instrument. **Methods:** In 2008, 755 schoolchildren in Sri Lanka (54% girls), age 12–16 years, completed a self-reported questionnaire with four sections: (1) demographic information (2) daily stressors and social support (3) trauma exposures measures; different trauma exposures and tsunami impact, (4) current psychological problem measures; posttraumatic stress symptoms, emotional and behavioral problems, functional impact, happiness at home, and happiness at school. In July 2009, a subsample of 90 adolescents repeated these measures. Internal consistency factor structure, concurrent validity, construct validity, and temporal stability were assessed in the scale. **Results:** LTD-Y adequately identified the ongoing adversities of adolescents. The scale showed an excellent internal consistency with Cronbach’s alpha = 0.79. The principal component analysis showed two-factor solutions which concern “external” and “internal” stressors. The concurrent validity was indicated by its positive association with all measures of current psychological problems. The discriminant ability of the adversity measure was evident in cumulative trauma exposure and all variables with current psychological problems. The stability of reporting was satisfactory. **Conclusion:** This school-based screening showed that the LTD-Y has sufficient validity, competency, and stability in measuring ongoing adversities of adolescents.

Keywords: Adolescents, daily stressors, ongoing adversity, psychology, trauma, validation

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Introduction

Stressors are environmental events or chronic conditions that objectively threaten the physical and/or psychological well-being of individuals. Identifying these stressors of the young is, therefore, important to improve their physical and mental health. Although several stress measurements have been developed, a shorter comprehensive instrument to measure chronic stress in young is scarce. The Long-term Difficulties Questionnaire (LDQ) formulated by Hendriks *et al.* is a validated instrument that measures different domains of chronic stressors in adults.^[1] The Long-term Difficulties Questionnaire-Youth version (LTD-Y) is adapted from the LDQ and formulated as a short comprehensive checklist to examine chronic stress in adolescents. This study conducts a descriptive analysis of the LTD-Y.

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Methods

Setting and participants

The study was designed in two phases in Galle District, Sri Lanka, for the purpose of investigating trauma exposure and related psychological problems among adolescents.^[2] Sample size was calculated for the initial study to identify the prevalence and associated factors of posttraumatic stress disorder (PTSD). This obtained 755 participants, and the secondary data analysis was done to validate the instrument. As the LTD-Y with 10 items requires minimum of 100 sample for analysis, this permitted to validate the questionnaire in a large sample of children in the mid-adolescent age group, using a longitudinal design.

The initial study (T1) was performed among 755 adolescents, Grades 7 and 9, in 10 selected schools from high and low tsunami impact areas during January–March 2008. Hikkaduwa area was in the severely

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affected coastal belt, and the less tsunami-impacted area, Bope-Poddala, was situated 6 km inland to the coast. According to the government analysis, 9 out of 40 schools in the high-impacted area and none of the schools in tsunami less-impacted area, were directly affected by the disaster. Five schools from each area were selected randomly, and all students in Grades 7 and 9 who were present on the day of data collection were enrolled in the study. A self-reported questionnaire measured trauma exposure, tsunami impact, PTSD, emotional and behavioral problems (EBPs), EBP impact, social support, daily stressors, happiness at home, and happiness at school. Data collection was done during the interval in a separate hall with the help of the research assistance. There were <5% of absentees and 1% of refusals.

The follow-up study (T2) was conducted in July 2009, 16 months later, to investigate the pathophysiological role of stress hormones as a biological risk factor for PTSD.^[3] Based on trauma exposure and psychological problems assessed in the initial screening, individuals were categorized into three groups: trauma exposed with PTSD, trauma exposed without PTSD, and no trauma exposed. For sample recruitment, 5 schools were selected out of 10 due to logistical reasons, and 20 students from each school were invited to participate in above three groups to represent the sample as a whole. Finally, a subsample of 90 adolescents remained for the analysis. The same questionnaire used in the initial study was repeated and saliva was collected for cortisol assay.

Ethical approval was obtained from the Ethics Review Committee, Faculty of Medicine, University of Ruhuna, Sri Lanka (November 05, 2007: 3.1). Permission was taken from the Ministry of Education, and the school principals. Information sheet was given to students 1 week prior to the study, and then, the consent was obtained from the parents and assent was taken from the participants before data collection.

Measures

Ongoing adversity

The LDQ was developed by Hendriks *et al.* in 1990 to screen chronic stress in adults (age 16–65 years) related to work, school, finances, housing, health, societal developments, and relationship problems with family and friends. Subjects rated each item on a four-point intensity scale ranging from 1 “no difficulties” to 4 “serious difficulties.”^[1] They first studied this questionnaire on primary care patients and demonstrated a satisfactory concurrence between the self-reported 32-item questionnaire and semi-structured interview. Later, this instrument was condensed into 17 items by removing health-related items and adding one item on leisure activities. This questionnaire was used in a large cohort study to investigate the psychological characteristics of primary care patients with chronic morbidities.^[4]

Rosmalen *et al.* further shortened the questionnaire into 12 items and formulated the Long-term Difficulties Inventory (LDI).^[5] They investigated the psychometric properties of the instrument in a general population cohort and demonstrated satisfactory stability and sufficient validity in measuring chronic stressors in adults. Either the LDQ or the LDI has been used to measure chronic stressors in the younger population.

The present study developed the Long-term Difficulties Questionnaire for Youth (LTD-Y) from the 17-item version^[6] of the original LTQ.^[1] The LTQ was chosen because it measures several domains of ongoing adversities in a household which are common to most family members. Further, many versions of the LTQ were developed and validated, and those questionnaires have shown good psychometric properties. For the current study, we removed the items that were believed to be unsuitable for adolescents in the LTQ (e.g., questions about difficulties in sexual or marital relationships, own children, with work) and retained eight items concerning problems with school, peer relations, leisure activities, financial situation, the living situation in the neighborhood, problems with health, family relations, and relations with other people. Two new items were added that assess worries about family members and worries about the future [exact item formulations are listed in Table 1]. The face validity was assessed by an expert psychologist. The questionnaire was translated into the local language (Sinhala) according to the standard method of questionnaire translation and pretested before using it in the proper study. Adolescents indicated whether they had experienced difficulties in these ten areas during the last 4 weeks on four-point scales (0 no problems to 3 serious problems). The responses were summed to obtain a total score, with higher scores indicating more serious problems across the various domains.

Lifetime traumatic experiences

The adolescent version of the UCLA PTSD Reaction Index for Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), a validated questionnaire for the country,^[7] was used to assess lifetime exposure to 13 categories of traumatic events.^[8] The original category “being in a big earthquake that badly damaged the building you were in” was replaced by “being in the tsunami.” The cumulative trauma score (range 0–13) was calculated by the number of different event types an adolescent endorsed.

Tsunami exposure

Measured by a checklist consisting of nine questions on the nature of the exposure, and two questions on the intensity of the experience which rated from 0 no to 1 yes. The sum of scores generated the tsunami impact score. A similar checklist was used to measure the tsunami exposure of children.^[9]

Table 1: Frequency and severity of daily stressors, reported for the past month

Adversity question	Percentage reporting the problem	Percentage with high level of problem	Mean (SD)	Examples of difficulties
Have you had problems with money?	29.81	4.54	0.48 (0.82)	Low income Father unemployed Parents are on debts House was robbed Lack of money to buy books, food, and medicines
Have you had problems with your health?	23.35	3.07	0.34 (0.71)	Headache Asthma Allergic rhinitis Problems with eyes Repeated failing Abdominal pain Hole in the heart Epilepsy Rheumatic fever Problem with the hip Menstruation problem Poor growth I got pregnant
Have you had problems in interactions with your friends?	18.87	2.4	0.29 (0.67)	Fight with friend Get angry very quickly Misunderstanding with the friend I am friendly but deep in my mind I have anger toward them
Have you had difficulties at school?	17.69	2.14	0.27 (0.66)	Learning difficulties Fights with friends Punished by teachers Financial problems Only good students are loved by teachers
Have you had problems or difficulties in contact with other people?	15.68	2.01	0.23 (0.59)	I believe others are not good to have relationship I am not allowed to be friends with others Others are not very friendly with me Family members are not friendly with the others I have a problem of stammering If I talk with boys, others misunderstand
Have you had problems with your free time activities?	15.26	1.47	0.21 (0.57)	Financial problems to buy cricket bat/ball Not allowed to play as I didn't complete homework Try to find solutions for the problems during free time
Have you had difficulties with the living situation in your neighborhood?	14.85	2.40	0.24 (0.65)	Fight with the neighbor Neighbors play very loud music and we get disturbed
Have you had worries about family members?	13.92	2.81	0.23 (0.64)	Fights in the family Parents are manual laborers Financial problems The effort mother takes to feed us Lost a parent, grandparent or relatives Father's alcoholism

Contd...

Table 1: Contd...

Adversity question	Percentage reporting the problem	Percentage with high level of problem	Mean (SD)	Examples of difficulties
Have you had worries about your future?	11.24	2.27	0.18 (0.58)	Brother not being obedient Scared that bad thing will happen Father left mother Mother transferred always Younger sister refuse to go to school I feel I don't have a future No future as I don't have parents My mother will get more sick Poor in academic work Could I be a good citizen I overheard that I am going to die at 29 years of age Worry whether I would have a happy future Worry whether I could complete my education Worry that my wishes will not come true
Have you had problems in interactions with your family members?	7.61	1.06	0.11 (0.44)	Parents fight with each other Financial problems Fight with siblings Family members always scold me and sometimes hit me

SD: Standard deviation

Post traumatic stress disorder

The UCLA PTSD Index was also used to screen for PTSD symptoms.^[8] This assessed DSM-IV PTSD criterion “A” which measures whether the event is life threatening and extremely fearful and then the symptoms of re-experience, avoidance, and hyperarousal. This measured experience of each symptom during the past month on a four-point likert scale rated none of the time to most of the time. A PTSD severity score was generated by summing the scores over the three symptom clusters (Cronbach's alpha = 0.88).

Emotional and behavioral problems

The self-report version of Strengths and Difficulties Questionnaire (SDQ) for adolescents (age 11–17) assesses Emotional and behavioral problem (EBP).^[10] This is a validated questionnaire for Sri Lankan adolescents.^[11] The 20-items measures emotional symptoms, conduct problems, hyperactivity, and peer problems on a three-point likert scale. The total problems score was calculated by summing all items (Cronbach's alpha = 0.66).

Emotional and behavioral problem impact

This was assessed by the impact supplement of SDQ.^[10] Problems related to distress and interference with life were rated on a three-point scale. Sum of the 5 items formed the total impact score (Cronbach's alphas = 0.73).

Social support

The Multidimensional Scale of Perceived Social Support^[12] measured perceived support, with three, four-item

subscales: support from family, friends, and special person, rated on seven-point scales. Since children in the current sample found it difficult to define a “special person,” this subscale was excluded and used the total family and friends support score (Cronbach's alpha = 0.76).

Child's level of happiness at school and at home

Happiness at home and happiness at school were measured on four-point scales ranging from 0 not happy to 4 very happy.

Statistical analysis

Analyses were performed with SPSS v24 (IBM Corp., Armonk, NY), with two-tailed $P \leq 0.05$ considered significant. We excluded two participants from the baseline study and one participant from the follow-up study as they did not complete the daily stressors scale. In the rest of the sample, the maximum percentage of missing value was 1.32% in all variables. The analysis was conducted as follows: we considered the trauma exposure and the tsunami impact as past traumatic experiences while PTSD symptoms, EBP, the impact of EBP, low social support, unhappiness at home, and at school as present psychological problems.

Internal consistency of LTD-Y was estimated by Cronbach's alpha at baseline and at the follow-up.

Factor structure of LTD-Y scale was tested by principal component analysis using the 10-item scale. Due to expected correlation between factors, an oblique rotation (direct oblimin) was chosen.

Concurrent validity was examined by estimating the Pearson's correlation between LTD-Y scale and all scales that measured past trauma exposure and present psychological problems. Multiple regression analysis was conducted to see the predictive power of ongoing adversity (independent variable) on present psychological problems. All models were controlled for age and gender as these are known to influence psychological outcomes.^[13]

Construct validity was next examined. Due to the reason that problems in multiple domains tend to have a greater impact on the quality of life than a single problem, the students who experienced 2 or more problems each rated more than 2 (moderate to high severity) in the scale, which measured both frequency and severity of the experience of adversity, were categorized as adolescents with high level of life adversities and the others as low level of adversities. We compared the two groups in terms of their demographic characteristics, prior trauma exposure measures, and current psychological problem measures with Chi-square analysis. Discriminant analysis was performed to determine which variables from prior trauma and present psychological problems could uniquely differentiate the high versus low adversity groups.

Temporal stability of the LTD-Y was estimated by calculating Pearson's correlation coefficients between the scores at baseline and at follow-up, and then comparing the two groups with the *t*-test to examine whether the values differed significantly with time.

Results

Sample characteristics

The initial screening was conducted on a total of 753 adolescents with 54% of girls, ranging in age from 12 to 16 years (mean 13.6). Here, the majority represented the high tsunami damage area (53%), but in the total sample, only 45% had experienced the disaster. The follow-up study had 90 adolescents (57% of girls; age 13–18 years).

Adversities measured by the LTD-Y scale

The quantitative and qualitative information of different adversities experienced by adolescents is presented in Table 1. In the total sample, 63% reported having experienced at least one adversity during the last 1-month period. Most often reported adversities were financial problems, health problems, and problems in interacting with friends. In the initial study, the total LTD had a mean of 2.62 (standard deviation [SD] = 3.69), a median of 1, interquartile range (IQR) of 3, and a range of 0–24. In the follow-up sample, 56% had experienced adversities and the three most common adversities they experienced were the same as of the initial study. The total LTD had a mean of 2.32 (SD = 4.09), a median of 1, IQR of 3, and a

range of 0–24. The internal consistency for the scale was high, Cronbach's alpha = 0.79 at baseline and Cronbach's alpha = 0.87 at the follow-up.

The statistical tests confirmed the adequacy for performing a principal component analysis. The KMO (Kaiser-Meyer-Olkin) statistics showed 0.86 verifying the adequacy of the sample size. The Bartlett's test of sphericity indicated satisfactory large correlations between items χ^2 (45) 1274.16, $P < 0.001$. The principal component analysis showed two factors with an eigenvalue above 1.0 which explained 44.4% of the variance. Question numbers 1, 3, 4, 5, 7, and 10 loaded more on the first factor (eigenvalue 3.43), and this factor could be interpreted as "external stressors." The rest of the questions loaded more on the second factor, and it could be interpreted as "internal stressors" (eigenvalue 1.21).

Relationship between current adversities with measures of experiential background and psychological problems

We believed that individuals with more current life adversities would have more traumatic experiences and have more psychological problems. As expected, all measures showed small to medium size correlations with life adversities [Table 2]. Table 3 presents the association between each of the outcomes and ongoing adversities. The results show that ongoing adversity score significantly associated with current psychological symptoms among adolescents. Next to examine the ruinous effects of life adversity on adolescents, the high versus low adversity experienced groups were compared. Among the adolescents who had experienced adversities, 23.2% had experienced a high level of life adversity according to our parameter. There was no gender or age differences observed (χ^2 [1,753] = 1.33; $P = 0.25$, t [751] = 0.24, $P = 0.80$, respectively). The two groups differed significantly in their experiential background measures and all present psychological problems [Table 4]. In the discriminant analysis, there was an overall significant model (Wilks' lambda = 0.731; χ^2 [10,358] = 122.44; $P \leq 0.001$) with six variables. One discriminant function separated the two groups (eigenvalue = 0.369; explained variance = 51.9) and divided high from low or no life adversity. This function indicated that all variables except age, sex, tsunami impact, and happiness at home were able to significantly discriminate the two groups.

Temporal stability of long-term difficulties score

The rank-order stability was measured by Pearson's correlations on participants who completed the adversity scores both baseline and follow-up assessments. It showed a significant positive relationship $r(89) = 0.24$, $P < 0.05$. The total adversity score at follow-up did not change significantly from the baseline (t [89] = -0.68, $P = 0.49$), and it is similar for all separate responses ($P > 0.05$).

Table 2: Descriptive statistics and intercorrelations between key variables

Variables	Mean (SD)	Pearson correlation (r)							
		1	2	3	4	5	6	7	8
1. LTD-Y total score	2.59 (3.69)								
2. Total trauma exposure	1.60 (1.98)	0.408***							
3. Tsunami impact score	1.47 (1.75)	0.179***	0.439***						
4. PTSD symptom severity	17.05 (12.97)	0.435***	0.385***	-0.192***					
5. EBP symptom severity	9.91 (5.19)	0.362***	0.279***	0.130***	0.363***				
6. EBP impact severity	0.46 (1.3)	0.450***	0.235***	0.171***	0.344***	0.305***			
7. SS by family and friends	48.24 (7.70)	-0.258***	-0.106**	-0.096*	-0.222***	-0.315***	-0.255***		
8. Happiness at home	4.51 (1.09)	-0.201***	-0.175***	-0.128**	-0.107*	-0.247***	-0.175***	-0.218***	
9. Happiness at school	4.75 (0.56)	-0.190***	-0.059	-0.012	0.048	-0.137***	-0.125***	-0.154***	-0.222**

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. LTD: Long term difficulties, PTSD: Posttraumatic stress disorder, EBP: Emotional and behavioral problem, SS: Social support, SD: Standard deviation

Table 3: Regression estimates of the effects of ongoing adversity on current psychological symptoms in adolescents (n=753)

Outcome	B	β	CI	R ²	Adjusted R ²	Overall F
PTSD symptoms	1.33	0.44	1.07-1.59	0.205***	0.199	26.60***
EBP	0.52	0.35	0.43-0.62	0.151***	0.147	6.30***
EBP impact [†]	0.41	0.39	0.12-0.17	0.228***	0.202	64.65***
SS by friends and family	-0.54	0.26	0.68-0.39	0.066***	0.065	18.31***
Happiness at home	-0.06	-0.20	-0.08--0.04	0.054***	0.050	13.94***
Happiness at school	-0.03	-0.19	-0.04--0.02	0.040***	0.036	10.20***

[†]Model controlled for EBP, *** $P \leq 0.001$. All models are controlled for age and gender. PTSD: Post traumatic stress disorder, EBP: Emotional and behavioral problem, SS: Social support, CI: Confidence interval

Table 4: Comparison between high and low level of adversity subgroups in their prior trauma exposure and current psychological problems

Variables	Mean (SD)		t	P
	High level of adversity (n=124)	Low level of adversity (n=629)		
Cumulative trauma exposure	3.68 (2.44)	1.50 (1.82)	8.28	***
Tsunami impact	2.25 (1.70)	1.39 (1.72)	3.36	***
PTSD severity	28.35 (14.20)	15.35 (11.88)	7.35	***
EBP total	14.03 (5.57)	9.51 (4.98)	6.75	***
EBP impact	2.14 (2.54)	0.30 (0.99)	11.68	***
SS by family and friends	42.59 (8.62)	48.77 (7.40)	-6.30	***
Happiness at home	4.48 (0.81)	4.77 (0.51)	-4.00	***
Happiness at school	3.95 (1.46)	4.57 (1.03)	-4.38	***

*** $P \leq 0.001$. SD: Standard deviation, PTSD: Posttraumatic stress disorder, EBP: Emotional and behavioral problem, SS: Social support

Discussion

This study examined the validity of the LTD-Y in measuring ongoing adversities as a measure of chronic stress in mid-adolescent age group children. Though the study was designed for another purpose, it permitted us to conduct this analysis in a large sample, using a longitudinal design. The results shows that the LTD-Y, even as a brief measure, can adequately identify the ongoing adversities of adolescents. Further, the questionnaire showed an excellent internal consistency.

The LTD-Y showed a strong concurrent association with relevant outcomes of present psychological problems. Supporting our findings, data collected by LTD-Y have shown good statistical power in detecting the relationship

between stressors and psychological outcomes.^[2,14] In addition, in the followed up subsample, ongoing adversity an association with EBP even after controlling for baseline EBP symptoms providing strong evidence for the predictive validity of the instrument.^[2] Construct validity is indicated by results showing a significant difference between the two groups in all variables that measured past traumatic experiences and present psychological problems. The discriminating analysis further supported the finding by demonstrating the discriminant ability of the adversity measure in all variables except for the tsunami impact score, which may be due to the time gap from tsunami to the present study.

LTD-Y showed stability across time both within and across informants. The frequency of endorsement and

the qualitative information obtained were almost the same at the baseline and at the follow-up study. It was expected to have a high test–retest correlation, but the results showed a weak significant positive correlation. This could be because of the recall effect, or change in the appraisal of past adversities with the maturity of adolescents in this age group. However, there was no statistically significant difference in the two total scores and separate responses. This indicates, satisfactory stability of retrospective reporting in different adversities by the adolescents.

Based on the above findings, the LTD-Y is suitable for screening ongoing adversities of adolescents in many ways. It is a brief, simple, easily understandable, less time-consuming, compact, self-reported, general checklist that can be easily administered to collect data in a large sample. As LTD-Y inquires on common types of daily stressors, it can measure the adversities of youth in different cultures, which enhances the generalizability of findings. With the qualitative descriptions, it provides insight into the adolescent's adversities. Measuring proximal adversities within 1-month period could determine the role of the occurrence of stressors in relation to the onset and remission of psychological problems. Giving evidence, ongoing adversities measured by LTD-Y have appeared to be a transmitter of the impact of trauma on psychological problems.^[2,14]

The current study has some important strengths; first, the study had a large sample with almost full participation by the representative schools. There was a minimum amount of missing values which increased the reliability and validity of the findings. Second, measuring the psychological symptoms using both the symptoms and the impact scores of EBP provided more reliable estimates for analysis.^[15] Finally, using LTD-Y in an adolescent sample in a less developed country showed the applicability and generalizability of the findings, especially to developing countries.

The current study also has several limitations. First, the study was not able to compare the LTD-Y score with another validated questionnaire measuring the same for criterion validity. Second, no standardized stressor taxonomy is available or basic psychometric data are not presented in many of the questionnaires to compare the findings.^[16] Third, the time gap between the first and the second assessments is overly distance to test the temporal stability of the questionnaire. Finally, given the many statistical tests performed, barely significant finding (at the $P < 0.05$) level must be interpreted with caution.

Conclusion

The LTD-Y appeared to have sufficient validity, competency, and stability in identifying ongoing adversities of mid-adolescent age group children.

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Conflicts of interest

There are no conflicts of interest.

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