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Development and Assessment of Adolescent Boys Stress Questionnaire (ABSQ-2015)

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Abstract

Aim: The aim of the study was to develop and assess an instrument to measure the stress level among adolescent boys in relation to school, family, personal and social life.

Methods: Before administering the ABSQ-2015 to adolescent boys (N=380), experts from nursing and psychology in research, practice, tool development reviewed it twice, known as the two step validation process. Reliability, construct validity assessment such as content, face, contrasting groups and exploratory factor analysis (EFA) was done. Out of 26 items, 16 items were selected and loaded as three factors after EFA, deemed to be interpretable and meaningful.

Results: The assessment of ABSQ-2015 supported construct validity (0.93), reliability (0.97) and Factor analysis, KMO and Bartlett's Test 0.82 (P<0.01), which is highly significant.

Conclusion: The ABSQ-2015 is found to be useful psychologically and statistically to elicit the stress level among adolescent boys effectively, in relation to various determinants of life.

Keywords: *Adolescence, adolescent boys, Research instrument, Standardized tool, Stress questionnaire, developing tool.*

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Introduction

Adolescence is a period that is full of opportunities and adolescent boys are great assets to the world of the future. As they stand at the bridge of childhood and adulthood, they experience role transition struggles, which lead to acute or chronic stress. It is seen that society focuses more on adolescent girls as future progenitors. Where are the boys? It is a well-known fact that today, the stress level among adolescent boys increases dangerously due to the pressure of academics brought on by parents and society, as they are the leading workforce of tomorrow. One can notice that not all children can cope with the high levels of expectation of parents and society and even parents don't agree with this fact. Here, the investigators tried to develop and assess the ABSQ-2015, which can be applied to assess the stress level of adolescent boys in the community. Assessment of stress level among adolescent girls would be considered as future implications by the authors.

The adolescent stress questionnaire was developed and validated with a large sample of school going adolescents (N>1000) and Principal Component Analysis yielded 10 reliable dimensions of adolescent stress that were suggested to have the potential for measurement of stress in research and clinical context [1].

Among European adolescents, the adolescent stress questionnaire was administered to assess the stress level. It was showed that Cronbach's Alpha values for the questionnaire was 0.88 and demonstrated with a moderate internal reliability, intra class correlation coefficient (0.45) established insufficient test-retest reliability [2].

It is seen that the adolescent life style questionnaire was tested on 292 adolescents residing in Canada, in which seven factors such as identity awareness, nutrition, physical participation, safety, health awareness, social support and stress management were extracted and Alpha reliability was 0.91 [3]. In Greece [4], the adolescent stress questionnaire was tested among 256 adolescents and confirmatory factor analysis showed a good fit to the original version of adolescent stress questionnaire [1].

One can easily identify that contributing factors of stress among adolescent girls and boys are distinctly different [5], as their physical, psychological and social development processes are unique. Therefore, this paper attempts to develop and test a standardized measurement scale to measure the level of stress among adolescent boys.

Materials and Methods

Population

The adolescent boys, who studied from VIII to XII standard (N=380), were selected from 10 randomly selected schools, who agreed to participate in the study and were administered ABSQ-2015 by one of the researchers (P.J) within a six week period of time. It was decided to use convenient versus random selection of samples from the target population of all adolescent boys in Vellore District, Tamil Nadu, and India by considering finance, distance and time.

The investigator selected English medium schools in Vellore, Tamilnadu, India by using the simple random technique. Using probability proportionate to size, the number of students from each school was decided as –

• Voorhese Higher Secondary school-40

- St.Paul's Higher Secondary school-40
- Venketeswara Higher Secondary school-30
- Government Muslim Higher Secondary school-40
- Holy Cross Higher Secondary school-50
- Don Bosco Higher Secondary school-47
- Bharath Higher Secondary school-11
- Vidyanikethan Higher Secondary school-43
- Cluny Higher Secondary school-23
- Government Boys Higher Secondary school-56

The lists of adolescent boys studying in 8^{th}, 9^{th}, 10^{th}, 11^{th} and 12^{th} grades were collected from the selected schools to select the study subjects. Using the proportionate and purposive sampling technique, 380 study subjects were selected from the selected schools. The study population is hypothesized to be similar to the target population and proportionate sampling was used to select samples from different standards. It is recommended that environmental scanning in a study helps to acquire information regarding events, relationships and unexpected events and helps the researchers to plan the future course of action [6][7]. To enhance the generalizability of the study results and to be familiar with the study setting, an environmental scanning of randomly selected schools was undertaken. Demographic data, mainly age group of adolescent boys in relation to level of grades in which they are studying, was collected and compared with the demographic data in the study sample. It helped the researchers to ensure the coverage of adolescent boys who were in the age group of 10-19 years in Vellore city, Tamilnadu, India.

Scale development procedure

Construct validation methods included content and face validity assessment [8]. Before developing the items, the researchers did an extensive review of literature of developed stress questionnaires [1][7].

Stress is a response to stimulus that disturbs physical and mental equilibrium[9]. The researcher (P.J) interviewed, face to face, 30 adolescent boys and 43 adults (who crossed the adolescent stage) from South India, aimed to pick up factors contributing to stress among them by using an unstructured questionnaire. Moreover, the researcher contacted 56 adolescent boys from North India through social network media (Whatsapp, Facebook and Twitter) and email, to elicit the response to factors contributing to stress in their life. After collecting data, the researchers derived the content by content analysis and constructed the items using Likert scale, in English language.

Given that the aim of the current study was the development of a tool to measure the stress level among adolescent boys in relation to school, family, personal and social life, several factors were worded as items in the first draft of ABSQ-2015. Following initial item development and pruning, a draft of a 35 item scale was developed and submitted to a panel of experts (n=7) for assessment. Panel members were chosen from Community Health nursing, Child Health Nursing, Mental Health Nursing and Psychology, based on the expertise in nursing education and tool development. The panel was requested to conduct the content and face validity assessment. Items that 50% or more of the expert panel considered as irrelevant were removed. After first panel review, the ABSQ-2015 contained 30 items and the items noted by the panel to be unclear and irrelevant were omitted and reviewed. A subset of the expert panel (n=4) reviewed the instrument one month later in the two step process [10][7]. They recommended that the second panel be a subset of the first panel and it include

individuals who have expertise in the appraisal of measurement items. The content validity [11] was done by scoring the items as 3 or 4 as relevant and cleared by the final panel, based on a Likert scale of 1 to 4.

Before data collection, the researcher (P.J) selected a set of adolescent boys and requested to provide feedback regarding the instrument in relation to understandability and readability. Finally, 26 items were derived, which were deemed to be relevant and clear by researchers, expert panel members and a set of adolescent boys. The scale with 26 items were categorized into four, labeled as family life (8 items), school life (6 items), personal (4 items) and social life (8 items). In addition to this, demographic data without identity was added to the scale by the researchers. To make the instrument look pleasing aesthetically, the items were scrambled and directions to fill up the scale were included. Permission to administer the scale was obtained from Institutional Research Committee, College of Nursing, Christian Medical College, Vellore, Tamil Nadu, India and the District Education Officer, Vellore, Tamil Nadu, India, Principals of the selected schools and parents of the study subjects, prior to data collection. The researcher (P.J) visited the schools twice, ahead of the data collection, to select samples using the proportionate and simple random sampling method and had a discussion with the students regarding the research topic, objectives and process. It also provided an opportunity to build rapport, clear doubts and get the consent from the students and their parents.

As part of ethical considerations, the researcher (P.J) considered the right of a study participant to determine whether he would or not participate in the study. No gifts were given to study participants. The primary concern of the researcher was to maintain safety of the research participants. The researcher assured privacy and confidentiality, and obtained informed consent. The participant was informed, as fully as possible, of the nature and purpose of the research, expected benefits to the target population including participants and society from future research implications, the potential of reasonably foreseeable risks, stress and discomfort; and alternatives to participate in the research. The researcher was assured that the participants understood what had been explained and were given the opportunity to ask questions and had them answered by the researcher. The participant's consent to participate in the research was voluntary, free of any coercion or inflated promises of benefits for participation in the current study.

The data was collected by using a self administered pencil and paper numerical rating scale [10][7]. As stress is an emotional response, the wording at the beginning of the stem of each item was the phrase 'I experience stress'. To enhance the discrimination among categories, ABSQ-2015 scale consists of a stem and begins with 'I experience stress' format on a five point numerical response. The format ranges from (Not at all stressful, A little stressful, More than a little stressful, Very stressful and Extremely stressful). In a scale development study, administering the scale personally has many advantages rather than the mailing or electronic process. The researchers decided to conduct the study in a natural setting to minimize the response bias. The ABSQ-2015 was administered by one of the researchers (P.J) in the classrooms. The study subjects were arranged to sit at a gap of two meters apart from each other to avoid discussions so that they were not able to determine how the others were responding. The scale was administered without faculty members of the selected schools and verbal assurance of confidentiality was given to decrease the social desirability and enhance fairness in the student's response. The researchers encouraged the study subjects to fill the items completely to ensure a good response rate.

To check reliability, the researchers adopted the test-retest stability reliability [12]. The researcher (P.J) asked the students to select a token number and requested them to write the same token number to the response sheets at both sittings. Using the proportionate sampling method, 20 study subjects were selected from standard VIII to XII in a selected school. The ABSQ-2015 was administered twice (Phase 1 and Phase 2) by maintaining a gap of 7 days. This process maintained the student's trust on confidentiality of the information and ability to match the two data sets and reduced the potential risk of students revealing their identity[7]. During the pilot study, the ABSQ-2015 was administered to early and late adolescent boys, because these study subjects are hypothesized to have different stress level in relation to family, school, personal and social life. Known group comparison can contribute to construct validity, which means the results are in the expected direction by answering the precision level. Precision is defined as an instrument that can discriminate between people with different amounts of an attribute as precisely as possible [10].

Scoring can be done by summing responses for all items under each component and higher scores indicate higher stress experienced for that stressor dimension. Interquartile range can be used to measure the variation in level of stress scores. First, second and third quartile indicate low, moderate and high levels of stress respectively.

Statistics

The data was cleaned prior to analysis (G.R). An assessment of normal distribution was conducted using Shapiro-Wilk statistic, the Skewness and Kurtosis measures and visualization of the histogram and quantile-quantile plot [13]. Construct validity and reliability was conducted.

Construct validation

Face validity was begun with an in-depth assessment of the other scales to assess stress among adolescents [1]. This was followed by a two step content validation process by expert panels as recommended by Polit and Beck,2004[10]; understandability assessment by a set of adolescent boys and assessment with the Flesch-Kincaid measure of readability [14]. Contrasting group validity was assessed by using ANOVA test statistic to compare the early adolescent stress level to late adolescent stress level [10]. An exploratory factor analysis (EFA) was preceded by an assessment of sample size adequacy by the Kaiser-Meyer-Olkin output assessment and Bartlett's test of sphericity[15] was done.

Reliability

Cronbach's Alpha statistics [16] was used to assess the reliability of the ABSQ-2015 scale and the test retest stability reliability of the ABSQ-2015 was assessed by Pearson Correlation Coefficient [17]. The statistical analysis was conducted using SPSS version 17.0 software.

Results

Totally, 380 adolescent boys participated to complete the ABSQ-2015. The descriptive analysis of the socio demographic variables of the subjects revealed that 29.73%, 42.63% and 27.64% of the subjects belonged to the age group of 10-13 years, 14-16 years and 17-19 years respectively. Among early adolescent subjects 29.2%, 17.7% and 10.6% of them were extremely stressful about the family life, school life and personal life respectively. Among the middle adolescent subjects, it was reported that 40.6% of them were very stressed about their school life, 40.2% of them about family life and 14.8% of them about their personal life. When it comes to late adolescents, 48.8%, 46.6% and 20.9% were much stressed about their family life, school life and personal life respectively.

ABSQ-2015 Data

The response rate was achieved at 100%. In total, 26 items were administered to 380 study subjects, which resulted in 9880 items. The out-lier labeling rule [18] was applied and all the extreme outliers were found to be valid and it was decided to include them as valid data.

The data in this study is considered as normally distributed. The Shapiro-Wilk statistic suggested a normally distributed data. A visual inspection of the histogram and normal quantile-quantile plot contributed to the assumption of a normally distributed data.

Construct validation

The Flesch-Kincaid measure of readability confirmed the reading level of the ABSQ-2015 to be grade VII [14][7]. The content was validated by two sets of expert panel members through two step assessment of item content validity = 0.93. The student readers evaluated the ABSQ-2105 for clarity and understandability of the items. Contrasting group validity was tested using ANOVA, which accepted the research hypothesis of difference in the means (P<0.00) between the scores of early and late adolescent cohorts.

Table 1: Exploratory factor analysis of three factor solution for the 16 items ABSQ-2015

Item: I experience stress	Factor 1: Stress of academic life	Factor 2: Stress of family life	Factor 3: Stress of personal and social life
ASQ1:Studying for tests and exams	**.600**		
ASQ2:Expectation of teachers from me	.572		
ASQ3: Results of the exam	.561		
ASQ5:When teacher asks questions	.557		
ASQ6:Rules and regulations of the school	.546		
ASQ16:Advice from teachers and parents for good future life	.509		
ASQ9:Family's financial status for my studies		**.600**	
ASQ7:Disagreements between myself and parents		**.653**	
ASQ10: Arguments between my parents		**.614**	
ASQ12:Lack of freedom in my family		.511	
ASQ14:Taking responsibilities in my family		.508	
ASQ19: Fear of disappointing family		.500	
ASQ21:Propose to a girl friend			**.677**
ASQ22:Maintaining relationship with a girl(talking, going out together)			**.661**
ASQ23.Breaking up with a girl friend			**.623**
ASQ25:Not having a girl friend			**.612**

Exploratory Factor Analysis was administered to all 26 items in the ABSQ-2015. Using Principal Component Analysis extraction with Varimax with Kaiser Normalization method, 16 items were extracted and highly loaded by three factors. These three factors were interpretable to the researchers.

Factor 1 consists of 6 items which reflected family-related determinants andwas named as stress of family life, Factor 2 contains 6 items related to school life and was labeled as stress of academic life and Factor 3 has 4 items related to social and personal life and was named as stress of social and personal relationships as seen in the Table 1. Overall, after EFA, three factors with 16 (ABSQ-2015) items were evolved, which helps to determine analyzing factors, which contributes stress among adolescent boys.

Table 2: Correlations among factors

N=380

Component	1	2	3
1	**.640**	**.606**	.472
2	-.260	**.749**	-.609
3	-.723	.268	**.637**

Reliability

The Cronbach's Alpha for the revised 26 items of ABSQ-2015 was 0.987, which is highly reliable. The stability of the ABSQ-2015 was supported by a positive correlation between the ABSQ-2015 administration at Phase 1 and Phase 2 on test-retest stability reliability Pearson's Correlation Coefficient (r=0.974 (p<0.000), 95% of confidence interval = 0.935,0.990). It was suggested that a Pearson Correlation of higher than (r>0.50) is considered as strong. As expected, a moderate positive correlation exists between all three factors as seen in Table 2.

It was shown in the present study that Kaiser-Meyer-Olkin and Bartlett's Test of Sphericity Measure of Sampling Adequacy was 0.818 (should be more than 0.5), which means the sample size was adequate to test the scale and is highly significant at p<0.000.

Discussion

In the present study, the assessment of ABSQ-2015 supported construct validity (0.93), reliability (0.97) and Factor analysis KMO and Bartlett's Test 0.82 (P<0.01) which is highly significant with 380 adolescent boys. Similarly, the adolescent stress questionnaire was developed and validated with a large sample of school going adolescents (N>1000)[1]. It is shown in the present study that using Principal Component Analysis extraction with Varimax with Kaiser Normalization method, 16 items out of 26 items were extracted and highly loaded by three factors, named as stress of academic life, stress of family life and stress of personal and social life. Likewise, in another study to develop and test adolescent stress, the questionnaire extracted 10 stress component stress scales such as stress of home life, school performance, school attendance, romantic relationships, peer pressure, teacher interaction, future uncertainty, school/leisure conflict, financial pressure and emerging adult responsibility.

Limitations
Construct Criterion Validation is not determined in the present study and the relevance of the ABSQ-2015 in other countries has not yet been determined.

Implication for future research and practice
It is well known that no individual study can establish or prove the reliability and validity of an instrument, therefore, the need of replication of the studies using ABSQ-2015 scale has to be considered in future research and practice.

Conclusion
Little attention has been given to adolescent boys, as everyone thinks they are healthy groups. In fact, they are vulnerable to stress which may lead to anxiety, chronic stress, depression, suicidal behavior and other mental illness. Hence, it is of paramount importance to address the issues related to adolescent behavior to sustain a healthy and productive work force in the succeeding years. Therefore, this attempt contributes a newly developed standardized measurement scale, which can be applied to assess the level of stress among adolescent boys by school health nurses.

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