Factors contributing to stress amongst adolescents in Colombo District, Sri Lanka: A cross sectional study

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ABSTRACT

Introduction: In Sri Lanka, adolescents comprise 16.1% of the population. Stress during adolescence may impact maturation of emotional and cognitive capabilities. The objective of the study is to determine the psychosocial factors and other factors that contribute to stress amongst adolescents aged 14 to 16 years living in the Colombo District, Sri Lanka.

Methods: A descriptive cross-sectional study was conducted on adolescents aged 14 - 16 years (n = 331) from randomly selected schools in the Colombo District, Sri Lanka. A self-administered questionnaire was used to collect baseline socioeconomic data. Baseline anthropometric measurements of height and weight were measured and BMI was calculated. Adolescent stress was assessed by using the Adolescent Stress Questionnaire (ASQ).

Results: In the current study, 179 (54.1%) adolescents were males. The mean ages of male and female adolescents and their social characteristics were similar. There was a statistically significant increase in the mean height ($p<0.001$) and mean weight ($p<0.001$) of male adolescents when compared with female adolescents. The mean total stress scores of female and male adolescents were similar ($p = 0.063$). The mean score of stress of home life of female adolescents was significantly higher than male adolescents ($p<0.001$). The mean score of stress of school attendance was significantly higher among male adolescents than female adolescents ($p = 0.012$).

Conclusions & recommendations: Both male and female adolescents experience considerable stress. Measures to overcome preventable stressors should be implemented at school and at home by parents, teachers and education administrators.

Keywords: *Adolescence, adolescent stress questionnaire, stress.*

Introduction

The World Health Organization (WHO) identifies adolescence as the period in human growth and development that occurs after childhood from ages 10 to 19 years (1). Adolescents constitute about 16% of the world's population (2). In Sri Lanka adolescents comprise 16.1% of the total 20.35 million population (3).

Adolescence is a key period of maturation of emotional and cognitive capabilities that are essential for independent functioning during adulthood (4). The influence of various psychosocial stressors affecting Sri Lankan adolescents has not been extensively studied in Sri Lanka. However, Sri Lankan adolescents are also often under considerable stress (5, 6). Although most of them enjoy the comfort, safety and security of a parental home within the traditional family structure, they have to face many stressful situations in their day-to-day life.

These stressors are more predominant in mid and late adolescence when the adolescent understands the socioeconomic issues of the family, becomes aware of the competitive nature to obtain higher education and realizes the emerging adult responsibilities (7, 6).

Schooling is compulsory by law to every child in the country. In Sri Lanka, primary, secondary and tertiary education is non-fee levying and funded by the state. Often educational attainment is considered a priority amongst Sri Lankan adolescents to achieve better job opportunities and living standards. However, due to constraints in resources, continued free education at higher level is restricted to a limited number of university entrants each year. The combined stressors of having to face highly competitive university admission examinations, along with parental based pressures and demands are high among Sri Lankan adolescents. This places excessive stress on adolescents throughout their growing years and impact their physical and mental health.

The development of interpersonal relationships, self-awareness, empathy, effective communication, critical thinking, negotiation, coping and problem-solving skills are paramount for adolescents to cope with stress (2). These skills can be attributed to relatively advanced cognitive functioning and development, which can be influenced by various stressors. In several studies, home, school, and peer environments have been shown to impact on mental and physical development of adolescents (7). However, most of these studies have been conducted in western populations where adolescent environments and socio-cultural contexts differ from the Sri Lankan context.

Despite adolescence being a particularly significant stage of development, research on the impacts of stressors on adolescent mental and physical development are limited (5). Studies on Sri Lankan children and adolescent cognitive development to date have focused on stress and its association with nutritional status, inadequate cognitive stimulation, iodine deficiency and iron deficiencies (8, 9). This study thus attempts to provide better understanding of the psychosocial factors that contribute to stress amongst adolescents aged 14 to 16 years living in the Colombo District, Sri Lanka.

The objective of the study is to determine the psychosocial factors that contribute to stress amongst adolescents aged 14 to 16 years living in the Colombo District.

Methods

Study population and Design: A descriptive cross-sectional study was conducted on randomly selected schools in the Colombo District, Sri Lanka. 24 schools were included in the study (six schools from each of the four educational zones of the Colombo District were randomly selected). Each zone was represented by one national school and five provincial schools. All schools were mixed government schools to ensure uniformity of selection. Adolescents aged 14 - 16years (n = 331) were recruited randomly using the class attendance registers. Voluntary informed written consent from parents / guardian and assent from the adolescents were obtained before being recruited for the study. One parent did not give consent for the participation of their adolescent in the study of 332 adolescents (0.30%).

Assessment of socioeconomic status

A self-administered questionnaire was used to collect basic socioeconomic data of adolescents.

Assessment of psychosocial adversities

Adolescent stress was assessed by using translated and validated Adolescent Stress Questionnaire (ASQ) (7, 10). The questionnaire was translated and back translated with language and subject experts' assistance and pre-tested before administration.

The ASQ consists of a 58-item inventory that assesses 10 dimensions of stress experienced by the adolescent over the previous twelve months. The stress dimensions assessed by the ASQ are; stress of 1) home life, 2) school performance, 3) school attendance, 4) romantic relationships, 5) peer pressure, 6) teacher interaction, 7) future uncertainty, 8) school/leisure conflict, 9) financial pressure and 10) emerging adult responsibilities. Each item is rated on a 5-point Likert scale where a score of 1 = not at all stressful/irrelevant to me, score of 2 = a little stressful, score of 3 = moderately stressful, score of 4 = quite stressful and score of 5 = very stressful. The minimum score of the scale is 58 and the maximum score is 290. Higher the score on the scale, higher the stress. The Cronbach's alpha score for the complete ASQ was 0.91.

Further on completion of the ASQ, several groups of adolescents and teachers participated in focus group discussions to explore other stressful factors that affect adolescents in a Sri Lankan setting. Three focus group discussions (FGD) were conducted until data saturation.

Assessment of anthropometric measurements

Anthropometric measurements of height and weight were measured and BMI was calculated. Height for age Z-score (HAZ) and weight for age Z-score (WAZ) were calculated using WHO sex specific growth reference values for adolescents (11). Data were analysed using *SPSS* 20 version software. Descriptive statistics were used to describe psychosocial status of adolescents.

Statistical analysis

Data analysis was done using IBM *SPSS* Statistics version 23 software. Normality was assessed by the histogram and Kolmogorov-Smirnov statistics. Normally distributed data were analysed using appropriate parametric tests. Independent sample t-test was used for comparison of means. Categorical variables were analysed using Chi-square test. Skewed data were analysed using nonparametric statistics. The level of significance was set at $p < 0.05$.

The ethical approval to conduct the study was obtained from the Ethics Review Committee, Faculty of Medical Sciences, University of Sri Jayewardenepura (ERC Ref: 28/15)

Results

A sample of 331 adolescents were recruited to the study. Among them 179 (54.1%) were males. The baseline data of the adolescents are tabulated in Table 1. There was no statistically significant difference in mean parental age between female and male adolescents. Further, statistically significant difference was not observed in the level of parental education between female and male adolescents in the present study.

Most mothers (n = 214, 65%) were housewives and most fathers (n = 230, 69%) were engaged in managerial and middle level occupations. Most adolescents had one and more siblings in the family. Majority of adolescents (n = 287, 80.7%) were living with both parents. Over 80% of adolescents live within the radius of five kilometers from the school. There was no statistically significant difference in the modes of transportation to school among male and female adolescents. Most female adolescents were accompanied by a family member to school whereas it was not so in male adolescents. Over 50% of male adolescents travelled to school on their own. The median monthly family income was SLR 30,000.00 with an inter quartile range (IQR) of SLR 3,000.00.

The baseline characteristics and anthropometric parameters of the adolescents are depicted in Table 2. There was no significant difference in the mean age of the male and female adolescents. There was a statistically significant increase in the mean height ($p < 0.001$) and mean weight ($p < 0.001$) of male adolescents when compared with female adolescents. This is an acceptable norm in most populations.

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Table 1: Baseline Socioeconomic and family data of adolescents

Variables	**Female (n=152) Mean (SD)**	**Male (n=179) Mean (SD)**	***p* value**
Age of parents			
Mother	41.90 (6.12)	41.81 (6.13)	0.658
Father	45.14 (6.22)	45.50 (6.32)	0.691
Family characteristics	**n (%)**	**n (%)**	**χ^2 ; df ; *p* value**
Education level - mother			
No schooling/ Primary	34 (23.4)	36 (20.4)	$\chi^2 = 0.458$
Secondary	78 (53.8)	100 (56.8)	df = 2
Tertiary	33 (22.8)	40 (22.7)	$p = 0.795$
Education level - father			
No schooling/ Primary	39 (28.5)	35 (21.3)	$\chi^2 = 3.606$
Secondary	75 (54.7)	89 (54.3)	df = 2
Tertiary	23 (16.8)	40 (24.4)	$p = 0.165$
Economic status - mother			
House wife	89 (61.4)	125 (71.0)	$\chi^2 = 2.905$; df = 1
Employed	56 (38.6)	51 (29.0)	$p = 0.088$
Occupation - father			
Managerial level	53 (38.6)	74 (45.1)	$\chi^2 = 1.879$
Middle level	49 (35.08)	54 (32.90)	df = 2
Elementary level	27 (19.7)	25 (15.2)	$p = 0.391$
Others	8 (5.8)	11 (6.7)	
Number of siblings			
None	10 (6.6)	19 (10.6)	$\chi^2 = 6.658$
One	53 (34.9)	73 (40.8)	df = 3
Two	62 (40.8)	50 (27.9)	$p = 0.084$
Three or more	27 (17.8)	37 (20.7)	
Co-residents of the adolescent			
Both parents	117 (77.0)	150 (83.8)	$\chi^2 = 3.621$
Mother only	17 (11.2)	18 (10.1)	df = 3
Father only	8 (5.3)	5 (2.8)	$p = 0.305$
Relative/Other	10 (6.6)	6 (3.4)	
School related factors	**n (%)**	**n (%)**	**χ^2 ; df ; *p* value**
Distance to school			
< 1 km	24 (15.8)	39 (21.8)	$\chi^2 = 1.970$
1 - 5 km	102 (67.1)	110 (61.5)	df = 2
> 5 km	26 (17.1)	30 (16.8)	$p = 0.037$*
Mode of transport			
Public transport	58 (38.2)	68 (38.0)	$\chi^2 = 1.003$
Private transport	54 (35.5)	56 (31.3)	df = 2
Walking	40 (26.3)	55 (30.7)	$p = 0.606$
Person accompanying adolescent to school			
Alone	41 (27.0)	90 (50.3)	$\chi^2 = 20.453$
Mother	15 (9.9)	7 (3.9)	df = 4
Father	43 (28.3)	35 (19.6)	$p < 0.001$*
Brother/sister	31 (20.4)	26 (14.5)	
Other	22 (14.5)	21 (11.7)	

Continuous variables were analysed using Independent sample t test, Categorical variables were analysed using Chi -square test, * = $p<0.05$. Data was not recorded for 30 fathers (19 fathers passed away and 11 left the family) and 10 mothers (3 mothers passed away and 7 had left the family)

Psychosocial factors contributing to stress amongst adolescents were determined by the Adolescent Stress Questionnaire as depicted in Table 3. The mean total stress score between female and male adolescents was similar (p = 0.063). The mean score of stress of home life of female adolescents was significantly higher than that of male adolescents (p<0.001). The mean score of stress of school attendance of female adolescents was significantly lower than that of male adolescents (p = 0.012).

Considering the mean score of total ASQ amongst the adolescents, the stress score was used to categorize male and female adolescents into stressed and non-stressed groups. The cut-off score to differentiate between stressed and non-stressed subjects was set at 150 according to previous similar studies (6). When comparing the stressed and non-stressed categories of female and male adolescents there was no significant difference in the degree of stress experienced by both genders in the current study (Table 4).

Table 2: Baseline anthropometric parameters of adolescents

Variables	Total (n=331) Mean (SD)	Females (n=152) Mean (SD)	Males (n=179) Mean (SD)	*p* value
Age (years)	15.22 (0.53)	15.27 (0.54)	15.18 (0.52)	0.158
Height (cm)	160.07 (7.99)	155.35 (5.40)	164.07 (7.64)	**< 0.001***
Weight (kg)	48.48 (11.41)	45.91 (8.46)	50.66 (13.05)	**< 0.001***
BMI (kg/m^2)	18.84 (3.71)	19.01 (3.32)	18.69 (4.02)	0.427

Independent sample t test, *= p<0.05.

Table 3: Factors contributing to stress amongst adolescents as determined by the ASQ

	Total (n=331) Mean (SD)	Females (n=152) Mean (SD)	Males (n=179) Mean (SD)	*p* value
Total Stress Score	159.21 (31.06)	162.65 (29.35)	156.29 (32.23)	0.063
Stress of Home Life	37.39 (9.27)	39.34 (8.75)	35.73(9.39)	**<0.001***
Stress School Performance	22.68 (5.76)	23.23 (5.93)	22.22 (5.57)	0.111
Stress of School Attendance	6.40 (2.85)	5.97 (2.56)	6.76 (3.03)	**0.012***
Stress of Romantic Relationships	12.25 (5.19)	12.32 (5.00)	12.20 (5.35)	0.834
Stress of Peer Pressure	18.86 (5.03)	19.38 (4.96)	18.43 (5.06)	0.089
Stress of Teacher Interaction	19.03 (5.28)	19.53 (5.41)	18.60 (5.15)	0.111
Stress of Future Uncertainty	9.03 (2.96)	9.08 (3.19)	8.99 (2.75)	0.783
Stress of School/leisure Conflict	16.37 (4.42)	16.45 (4.24)	16.29 (4.57)	0.738
Stress of Financial Pressure	10.68 (3.69)	10.72 (3.75)	10.65 (3.64)	0.876
Stress of Emerging Adult Responsibilities	6.52 (2.97)	6.64 (2.94)	6.42 (3.00)	0.515

Independent sample t test, *p<0.05.

Table 4: Categorizations of adolescents in to stress groups

Gender	Stress status of adolescents		χ^2 ;
	Non-stress n (%)	Stress n (%)	df ; p value
Female	55 (36.2)	97 (63.8)	$\chi^2 = 0.187$
Male	70 (39.1)	109 (60.9)	df=1 ; $p = 0.665$

Discussion

In this study, factors contributing to stress were studied on female and male adolescents living in urban areas of the Colombo District. The baseline socioeconomic characteristics, family characteristics and factors contributing to travel to school were similar amongst female and male adolescents. Further, when comparing the stress scores amongst stressed adolescents with non-stressed adolescents, there was no significant difference between females and males indicating that stress is a common feature in both genders. Several studies have found that female adolescents are more vulnerable to stress than male adolescents due to stimulation of the hypothalamic - pituitary - adrenal (HPA) axis, post pubertal onset of menstruation and cyclical secretion of female gonadal hormones (7, 13, 14). However, in the current study higher prevalence of stress was observed in both genders. This indicates that male adolescents too experience stress almost as much as the female subjects in the current study. The current study sample consisted of adolescents preparing for their first competitive examination – the General Certificate of Education (G.C.E.) Ordinary Level examination conducted by the Ministry of Education, Sri Lanka. A previous study conducted in Sri Lanka showed evidence of examination stress amongst adolescents of the same age group (14).

Several studies using ASQ have concluded that the mean stress levels of female adolescents are higher than male adolescents (7, 10). This observation is similar to the findings of the current study where the mean stress scores of female adolescents were greater than the male adolescents.

The mean score of stress of home life of female adolescents was significantly higher than that of male adolescents. This indicates that female adolescents are more emotionally stressed by stressful factors at home, as shown in the ASQ as arguments at home, disagreement between parents, disagreements between the adolescent and parents, lack of understanding by parents, abiding by petty rules at home, not being taken seriously by parents and parent expecting too much from the adolescent. This is common in females in Asian context where females are expected to be more oriented in house work and they have to support the mother to serve and take care of the male members of the household (15).

The mean score of stress of school attendance of male adolescents was significantly higher than that of female adolescents. However, in the world literature specially in the African and Asian contexts it was indicated that school attendance is more stressful to females than males (16-19). However, in the current study, male adolescents experienced more stress when attending school. In the current study, over 50% of male adolescents travelled alone to school. When a parent or a sibling accompanies a female adolescent to school it could motivate the adolescent and provide the necessary emotional security. Lack of this support in males may contribute to the stress of school attendance amongst the male adolescents. Further, Asian female adolescents are more attentive and obedient to the commands of their teachers/elders and thus, more prone to attend to tasks assigned by the school teachers. There is also a higher tendency for females to engage in higher education in Asian countries in recent times. Hence, female adolescents are more prone to attend school with less stress than male adolescents.

The current study assessed the chronic stress as derived by the ASQ in an Asian setting in Sri Lanka. The study assessed confirmatory factor analysis of

the items included in the ASQ, in a Sri Lankan setting. The ASQ was established as a validated tool that can be used to determine stress in the Sri Lankan setting.

At the end of the administration of ASQ, the qualitative data obtained from the FGDs were insightful in a Sri Lankan context. It provided several Sri Lankan specific factors that may contribute to stress amongst adolescents. The factors that emerged were; 'obstacles faced by the adolescent whilst travelling to school using public transport', 'stress of attending tuition classes after school' and the 'lack of modern technology to enhance education'. The lack of technology, and amenities to move forwards with the current IT advances of the 21st century was a stressful factor that emerged from the adolescents. These factors may contribute to the stress of future uncertainty amongst adolescents. These factors are unique to the Sri Lankan setting and were not assessed in the ASQ. Further, the emerged new information was conveyed to the original author to further enhance the scientific accuracy of the ASQ, especially in its application in an Asian context.

As a follow up on the study, the stressed adolescents were referred to clinical psychologists who personally attended to counsel these affected adolescents. The minor changeable issues contributing to stress were discussed with relevant teachers and parents on a case-by-case basis and appropriate amendments were suggested in school and home. The anxious and stressed adolescents were appropriately counselled by clinical psychologists without resorting to medications. Four adolescents who were diagnosed as having signs and symptoms suggestive of depression were referred to appropriate long term counselling. In order to enhance representation and awareness amongst the adolescents, they were personally addressed by the investigators to highlight the importance of education and how to address the issues of examination stress. Further, the adolescents had the opportunity to visit and experience a higher educational environment of the medical faculty and the university (when they attended the university for further objective clinical assessments conducted under the study).

One limitation in the current study is it was not conducted in private and international schools in Colombo district. The stressors and factors may be different in the adolescents of higher socio-economic status, attending these private and international schools. Further, the study was conducted amongst a narrow age group of adolescents engaged to sit the first main academic examination conducted nation - wide, the General Certificate of Education (Ordinary Level) examination. The stress of the studies and the examination may have contributed to further stress amongst this age group which could not be separately quantified in the ASQ.

Conclusions

This study addresses important aspects contributing to stress amongst 14 to 16-year-old adolescents in an urban setting in Sri Lanka. Despite the sociocultural and school attendance factors being similar in male and female adolescents, the study concludes that adolescents of both genders experience considerable stress. Measures to overcome these preventable stressors should be implemented at school and at home. Parents, family members and teachers should be made aware to be empathic towards the adolescents so that stress free adolescents would strive to attain better emotional and psychological outcomes.

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