Original Research Article

Prevalence and correlates of anxiety and stress in school going adolescents in Delhi national capital region: a cross sectional study

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ABSTRACT

Background: Anxiety and stress are notable health problems plaguing adolescents. Moreover, issues such as poor sleep quality and body image issues, common in adolescence, have also been linked to anxiety and stress previously.
Methods: A cross sectional study was conducted across 392 school going adolescents in Delhi NCR, India. Sociodemographic and lifestyle data was collected using a pre-tested semi-structured questionnaire. DASS-21 was used to screen the participants for anxiety and stress, Pittsburgh sleep quality index for sleep quality, and Stunkard figure rating silhouette for body image issues. Data was entered into MS Excel spreadsheets and Statistical Package for Social Sciences version-25 was used for analysis.
Results: 47.5% participants suffered from anxiety and 22.2% from stress. Anxiety was significantly associated with father's education and occupation, stressful occurrences in the family, poor sleep quality and inadequate exercise. Stress was significantly higher in females and those with poor sleep quality.
Conclusions: Anxiety and stress in adolescents show significant associations with familial and lifestyle factors. Identifying these risk factors can enable timely diagnosis and intervention.

Keywords: Adolescents, Anxiety, Body image issues, Meal skipping, Sleep quality, Stress, Substance abuse

INTRODUCTION

Anxiety disorders include generalized anxiety disorder, separation anxiety disorder, social phobia, panic disorder and specific phobias.[1] Stress is a distinct negative emotional state, characterized by chronic arousal, persistent tension and impaired functioning.[2] In 2017, anxiety disorders afflicted 284 million people worldwide and 3% of the Indian population.[3,4] Moreover, anxiety was the 6th largest contributor to years lived with disability globally, and 9th largest in South East Asia.[4]

Adolescents are one of the most susceptible groups to mental disorders.[5] The physical, behavioral and hormonal changes faced by this age group, coupled with dysregulation of social information processing mechanisms put them at considerable risk.[5,6] Academic

syllabus, exam preparation, rejection from peers and unsafe living environment also make them prone to anxiety and stress.[7] Moreover, an adolescent's attempts to build their own identity and concept of self often lead to conflict with their parents, contributing to the same.[8] A study in India found that 54.7% adolescents suffered from anxiety.[5] In children and adolescents, anxiety often manifests as somatic symptoms, e.g. headache or stomach ache, rather than cognitive feelings of fear, which can lead to under diagnosis.[1] Anxiety and stress are known to affect psychosocial functioning of adolescents. They have been associated with school avoidance, decline in academic performance, withdrawal from friends and social activities and even dropping out of school.[1,5,9] Anxiety in adolescence has also been associated with development of substance use disorder later in life, possibly as adolescents resort to substance use in order to cope with their anxiety.[1]

Mental health is not a level playing field for all adolescents either. Previous studies have shown that females and older adolescents are more prone to anxiety and stress.[7,8,10] Those who have faced adverse events such as death or illness in the family, or have a family history of physical or mental illness are also more vulnerable.[1,10,11] Substance abuse increases the risk whereas physical activity has shown a protective effect.[12,13]

A study in Delhi found that adolescents aged 12-13 experience a transition in their sleep pattern, resulting in reduced sleep.[14] This has been attributed to a combination of pubertal phase delays and earlier starting time for school.[15] Poor sleep quality has been related to anxiety in both adolescents and young adults.[16] The tendency of poor sleep during adolescence to precede anxiety symptoms later in life has prompted scientists to suggest that alleviating sleep problems might actually help prevent anxiety.[17]

Body image refers to one's perception of their body.[18] A study in Tamil Nadu, India, found that 77.6% girls were dissatisfied with their perceived body image. 64.8% of them were trying to reduce their weight, for which 42.7% engaged in skipping meals and 9.7% to vomiting after meals.[18] International studies have found significant associations between body image dissatisfaction and anxiety disorders.[19] Meal skipping and food insecurity have also predicted anxiety, particularly in females.[20] Moreover, stress levels have been associated with the quality of meals, not just their consumption or lack thereof.[21]

The COVID-19 pandemic necessitated the use of lockdown and isolation protocols which took a further toll on mental health.[22] Globally, one in 5 youths were found to experience elevated symptoms of anxiety during 2020.[23] Yet again, adolescents formed a vulnerable group since they rely significantly on peer interaction.[23] An Indian study reported a 28% and 11.6% prevalence of anxiety and stress respectively.[24] In this scenario, the importance of screening and early diagnosis is hard to overstate.

Mental disorders in adolescence are more common than diseases like diabetes and asthma, which receive extensive global attention.[25] Despite this, there is insufficient data about the same. There is a pressing need to identify the prevalence as well as factors associated with adolescent anxiety and stress, to enable efficient identification and subsequently timely treatment of those at risk.

With this background in mind, we propose our study with the following objectives: to identify the prevalence of anxiety and stress in school going adolescents in Delhi NCR and to study the association of the same with sleep quality, body image issues and lifestyle factors.

METHODS

A school based cross sectional analytical study was conducted over 2 months i.e. July to September 2021. The index study was part of a larger study evaluating depression as well as anxiety and stress in adolescents. From a previous Indian study, considering the prevalence of 40.8% with 5% absolute precision, 5% alpha level 386 using the formula for cross-sectional studies $n=4pq/d^2$.[5] Considering a 10% non-response rate, it was proposed that 425 students be enrolled.

The schools were selected by multistage sampling. From the 148 co-education senior secondary schools in Delhi NCR, contact details could be retrieved for only 60. They were contacted by email and phone since movement was limited due to COVID-19 pandemic. Ultimately, 10 schools gave a positive response and 2 of these were chosen by simple random sampling. Students studying in classes 8th-12th were enrolled by purposive sampling. The study was explained to all the students in these selected classes. Students who gave assent for participation and whose parents gave informed consent were enrolled in the study. In order to include students evenly divided between the 2 schools, 426 students were enrolled. After excluding students who did assent or whose parents did not consent (n=23), and incomplete questionnaires (n=11), 392 responses were obtained (response rate=92%).

Data was collected using a pre-tested semi structured questionnaire containing the following parts-

Data about sociodemographic characteristics: age, sex, family type, existence of siblings, parents' education, history of physical or mental illness in parents, substance abuse, substance abuse in parents, physical activity, meal skipping. Socioeconomic status was calculated using modified Kuppuswamy scale.[26] BMI was classified according to Asian criteria.[27] Substance abuse was defined as using drugs (alcohol, cannabis, cigarettes, e-cigarettes, glue sniffing, chewable tobacco) more than once in the last one month.[28] Daily physical activity for at least 60 minutes was deemed sufficient as per WHO criteria. Meal skipping was defined as skipping two or more meals in a week.[29]

DASS-21 scale was used to screen for depression, anxiety and stress.[2,30] It consists of 21 self-reported items, 7 each for depression, anxiety and stress, which are scored from 0 to 3. It has been validated among adolescents in India in both English and Hindi.[8] The values of Cronbach's alpha for stress (English =0.71; Hindi =0.63), and anxiety (English =0.73; Hindi =0.74) have been found acceptable.

Pittsburgh sleep quality index (PSQI) is based on self-reporting and assesses sleep quality over the past month.[31] A PSQI score greater than 5 indicates poor quality sleep. It has been validated in adolescents in India with high internal consistency (Cronbach's alpha=0.83).[32]

Stunkard figure rating consists of nine silhouettes of different male and female body types.[33] Students chose their perceived figure as well as the figure they considered ideal. A discrepancy between the two indicated body image dissatisfaction.[18]

The questionnaire was pilot tested among 20 students from a third school which consented to participate in the study but was not selected. All the questionnaires were translated from English to Hindi and back to English to ensure accuracy. Students were given a choice to fill the questionnaires in Hindi or English.

Prior to the starting of the study, due ethical clearance certificate was obtained from the institutional ethics committee. The procedures followed were in accordance with the ethical standards of the institutional ethics committee and with the Helsinki Declaration of 1975, revised in 2013. Data was entered into MS Excel and analyzed using Statistical Package for Social Sciences (SPSS) version-25. Categorical variables were analyzed as proportions. Bivariate analysis was used to find the association between different socio demographic/lifestyle related variables and DAS. P value less than 0.05 was considered significant. Variables thus found to be significant were entered into binary logistic regression model. Results of multivariate analysis have been reported as odds ratio with 95% confidence interval.

RESULTS

Table 1 depicts sociodemographic and lifestyle data of the respondents. Out of the 392 respondents, 198 were males (50.5%) and 194 (49.5%) were females. Their age ranged from 12-18 years with a mean age of 15.25 years (standard deviation=1.43). The average BMI of the students was 21.57 (standard deviation =2.3). Poor sleep quality was reported by 287 (73.2%) of the participants, with the mean PSQI score being 6.635 (standard deviation =3.28). Almost 70% (n=271) had body image issues. Of this, 135 (49.8%) wanted to have a larger body type whereas 136 (50.2%) wanted a smaller body type. Boys expressed greater dissatisfaction with thinness, whereas females majorly reported a desire to be thinner. Over 25% (n=99) skipped more than two meals a week. Only 60.7% met the criteria for adequate exercise, defined as at least one hour of physical activity everyday over the past 2 weeks. The average time spent exercising was 6.5 hours a week. Around 13 (3.3%) had engaged in substance abuse over the past month. The most common drug abused was cigarettes, followed by alcohol. Alcohol was the most common drug of abuse in participants' parents. Girls reported poor sleep quality, meal skipping and substance abuse more commonly, whereas body image issues were more common in boys. Sufficient physical activity was more common in boys. However, these differences were not statistically significant.

As per DASS-21, anxiety was the most common disorder amongst the participants (n=186, 47.5%), followed by

depression (n=158, 40.3%) and then stress (n=87, 22.2%). 26 participants (6.6%) were suffering from both anxiety and stress. 50 (12.8%) had concomitant depression with anxiety whereas 23 (5.9%) exhibited depression with stress.

Anxiety and stress were both significantly higher in girls than boys. Anxiety was higher in students aged 16 and above compared to 15 and below. Students of 11th and 12th had more stress compared to those in 8th, 9th and 10th. Although both anxiety and stress were higher in board than non-board classes, the differences were not significant. No significant correlation was seen between anxiety/stress and socioeconomic status either. Presence of siblings was associated with lower stress. Participants whose mothers were engaged in jobs other than being a housewife had higher levels of stress. Anxiety was more common in those whose fathers were educated above 10th standard and were engaged in semiprofessional/ professional jobs (Table 2).

Table 1: Sociodemographic and lifestyle data of the study population in Delhi NCR.

Variables		N (%)
Gender	Male	198 (50.5)
	Female	194 (49.5)
Age (years)	12-15	209 (53.3)
	16-18	183 (46.7)
Family type	Nuclear	347 (88.5)
	Joint	45 (11.5)
Family history of mental illness	Present	62 (15.8)
	Absent	330 (84.2)
Substance abuse	Present	13 (3.3)
	Absent	379 (96.7)
Substance abuse in parents	Present	95 (24.2)
	Absent	297 (75.8)
Sleep quality	Poor	287 (73.2)
	Good	105 (26.8)
Physical activity	Inadequate	238 (60.7)
	Adequate	154 (39.3)
Meal skipping	Present	99 (25.3)
	Absent	293 (74.7)
Body image issues	Present	271 (69.1)
	Absent	121 (30.9)
Can openly discuss thoughts and worries with family	No	123 (31.4)
	Yes	269 (68.6)
Recent stressful events	Present	166 (42.4)
	Absent	226 (57.6)

A family history of mental disorders was associated with higher anxiety and stress. A past history of mental disease was also associated with more anxiety and stress. Similarly, anxiety was higher in adolescents whose family members were afflicted by diseases (e.g. stroke, heart disease). Substance abuse in parents was associated with higher anxiety as well as stress (Table 3).

Table 2: Bivariate analysis of depression with subject factors.

Variables		Anxiety		Stress	
		Present	P value	Present	P value
Gender	Female	104 (53.6%)	0.016	56 (28.9%)	0.002
	Male	82 (41.4%)		31 (15.7%)	
Age (years)	16-18	97 (53%)	0.039	48 (26.2%)	0.072
	12-15	89 (42.6%)		39 (18.7%)	
Class	11th, 12th	78 (51.7%)	0.187	46 (30.5%)	0.002
	8th-10th	108 (44.8%)		41 (17%)	
Class	Board (10th, 12th)	97 (52.4%)	0.06	48 (26%)	0.09
	Non board (8th, 9th, 11th)	89 (43%)		39 (18.8%)	
Family type	Joint	53 (48.6%)	0.773	23 (21.1%)	0.747
	Nuclear	133 (47%)		64 (22.6%)	
Siblings	Present	170 (46.4%)	0.137	76 (20.8%)	0.011
	Absent	16 (61.5%)		11 (42.3%)	
Mother's occupation	Other	39 (51.3%)	0.452	26 (34.2%)	0.005
	Housewife	147 (46.5%)		61 (19.3%)	
SES	Lower middle and less	71 (51.4%)	0.242	30 (21.7%)	0.873
	Upper middle and above	115 (45.3%)		57 (22.4%)	
Father's education	Above 10th	150 (56.8%)	0.000	54 (20.5%)	0.234
	Upto 10th	36 (28.1%)		33 (25.8%)	
Father's occupation	Semi professional/professional	134 (60.4%)	0.000	45 (20.3%)	0.295
	Unemployed/unskilled/skilled/arithmetic skill	52 (30.6%)		42 (24.7%)	

Table 3: Bivariate analysis of anxiety/stress with subject and family health.

Variables		Anxiety		Stress	
		Present	P value	Present	P value
Somatic illness in subject	Present	9 (60%)	0.321	3 (20%)	0.835
	Absent	177 (46.9%)		84 (22.3%)	
History of mental illness in subject	Present	35 (79.5%)	0.000	24 (54.5%)	0.000
	Absent	151 (43.4%)		63 (18.1%)	
Substance abuse by subject	Present	10 (76.9%)	0.03	5 (38.5%)	0.151
	Absent	176 (46.4%)		82 (21.6%)	
History of mental illness in family	Present	45 (72.6%)	0.000	33 (53.2%)	0.000
	Absent	141 (42.7%)		54 (16.4%)	
History of somatic illness in family	Present	40 (62.5%)	0.008	17 (26.6%)	0.358
	Absent	146 (44.5%)		70 (21.3%)	
Substance abuse in parents	Present	67 (70.5%)	0.000	34 (35.8%)	0.000
	Absent	119 (40.1%)		53 (17.8%)	

Adequate exercise was associated with lower anxiety. Poor sleep quality was associated with anxiety and stress. Body image issues were associated with anxiety and stress. Skipping meals was also associated with higher anxiety and stress. Participants who felt that they could discuss their thoughts and worries openly with their family also showed lower levels of anxiety and stress. Similarly, recent stressful events in the family, e.g. death, divorce, separation, COVID-19 disease were also significantly associated with anxiety and stress. Stress was higher in students who were overweight as compared to those whose BMI was in the normal or underweight range (Table 4).

After multivariate analysis, anxiety was found to have significant associations with father's education, father's occupation, history of mental illness in subject, family history of somatic illness, open discussion of thoughts and worries with family, recent stressful events, exercise, substance abuse in parents and poor sleep. Stress showed significant associations with gender, family history of mental illness, open discussion of thoughts and worries with family, recent stressful events and poor sleep quality (Table 5).

Table 4: Bivariate analysis of depression with characteristics pertaining to subject lifestyle.

Variables		Anxiety		Stress	
		Present	P value	Present	P value
Exercise	Inadequate	90 (58.4%)	0.000	42 (27.3%)	0.052
	Adequate	96 (40.3%)		45 (18.9%)	
Sleep quality	Poor	161 (56.1%)	0.000	80 (27.9%)	0.000
	Good	25 (23.8%)		7 (6.7%)	
BMI	Overweight and above	80 (49.7%)	0.458	50 (31.1%)	0.000
	Underweight and normal	106 (45.9%)		37 (16%)	
Body image issues	Present	139 (51.3%)	0.023	69 (25.5%)	0.02
	Absent	47 (38.8%)		18 (14.9%)	
Meal skipping	Present	66 (66.7%)	0.000	33 (33.3%)	0.002
	Absent	120 (41%)		54 (18.4%)	
Can discuss thoughts and worries with family	No	73 (59.3%)	0.001	49 (39.8%)	0.000
	Yes	113 (42%)		38 (14.1%)	
Recent stressful events	Present	102 (61.1%)	0.000	61 (36.5%)	0.000
	Absent	84 (37.3%)		26 (11.6%)	

Table 5: Binary logistic regression depicting factors significantly associated with anxiety and stress.

Category		Anxiety		Stress	
		Significance level	OR (95% CI)	Significance level	OR (95% CI)
Gender	Female			0.007	2.256 (1.247-4.080)
Father's education	Above 10th	0.006	3.569 (1.429-8.913)		
Father's occupation	Semi-professional/ professional	0.028	2.475 (1.103-5.555)		
History of mental illness	Present	0.001	5.029 (1.891-13.374)		
Family history of somatic illness	Present	0.011	2.417 (1.221-4.785)		
Family history of mental illness	Present			0.010	2.502 (1.242-5.039)
Can discuss thoughts and worries with family	No	0.049	1.762 (1.003-3.096)	0.001	2.832 (1.574-5.094)
Recent stress	Present	0.003	2.254 (1.326-3.833)	0.002	2.625 (1.427-4.828)
Exercise	Inadequate	0.006	2.124 (1.247-3.618)		
Substance abuse in parents	Present	0.017	2.160 (1.148-4.064)		
Sleep quality	Poor	0.000	3.510 (1.875-6.570)	0.044	2.500 (1.025-6.101)

Nagelkerke R square= 0.448 (Anxiety). Nagelkerke R square= 0.379 (Stress).

DISCUSSION

This study found a 40.3%, 47.4% and 22.2% prevalence of depression, anxiety and stress respectively, with a certain degree of comorbidity. Jayashree et al. reported similar results in Bangalore, India.[5] Another Indian study by Sandal et al found a higher prevalence of all three.[12] However, the order of prevalence of these conditions, i.e. anxiety > depression > stress has been identical in most studies.[5,12,24] A previous study reported that the presence of anxiety was significantly associated with depression.[5] It is not entirely clear whether the observed comorbidity is a result of common risk factors shared by different disorders, or if one disorder is a risk factor for another.[34]

We found that both anxiety and stress were more common in girls than boys. Although the association for anxiety was not significant as per multivariate analysis, this remains one of the most consistent findings across different studies.[7,23,25] The propensity of girls to develop greater anxiety and stress has been attributed to various factors- increased biological susceptibility, lower self-esteem and gender inequality.[23] Higher levels of anxiety were seen in older adolescents, whereas students of higher classes i.e. 11th and 12th exhibited greater stress. Older adolescents tend to rely more on interaction with

their friends for emotional support and wellbeing. Thus, it is possible that constraints on peer interaction during lockdown affected their mental wellbeing more.[23] Additionally, uncertainty about exams or restoration of workplaces and jobs could be responsible for the stress faced by students who were closer to finishing school. Previous studies have reported higher stress levels in students due to give board exams i.e. classes 10th and 12th compared to non-board classes.[10,12] However, our study did not find a significant difference between the two, possibly since board exams were cancelled due to COVID-19 pandemic.

Anxiety and stress were not associated with socioeconomic status or family type in our study. This is similar to the findings of Bhasin et al.[10] Contrastingly, Sandal et al reported that students from joint families showed higher anxiety, whereas those belonging to poor socioeconomic status showed more anxiety as well as stress.[12] However, we found that the presence of siblings was associated with lower stress levels, possibly reflecting an effective support system. Our findings indicated that anxiety was higher in students whose fathers were educated beyond high school, or were engaged in semi-professional and professional jobs. This is opposite to the findings of Sandal et al, who reported an inverse relation between parental education and anxiety/stress in children.[12] A possible explanation for our findings is that these parents may have higher expectations from their children and be dissatisfied with their achievements or academic standing. Similar to Bhasin et al, we found that stress was more common in adolescents whose mothers were not housewives.[10] It is possible that working mothers might find it harder to spend time with their children, who are consequently deprived of a key support mechanism.

Both anxiety and stress were associated with a personal or family history of mental illness. Meanwhile, students whose family members were suffering from a somatic disease were more anxious. This is concurrent with previous studies and could be a direct consequence of increased worrying about the health of afflicted family members.[1,11] Students who had recently faced adverse events e.g. death or divorce in the family, COVID-19 etc. showed significantly higher anxiety as well as stress, in line with the findings of Bhasin et al.[10] This association indicates a pressing need for teachers as well as peers to be sensitive to such adolescents, since they may require greater emotional support to tide over stressful events. Similar to Bhasin et al, we also found significantly lower anxiety and stress in students who felt that they could openly discuss their thoughts and worries with their family.[10] Thus, it is crucial for parents to nurture a safe environment that encourages their children to convey their feelings openly.

We found that 287 (73.2%) adolescents in our study reported poor sleep quality, and this was more common in older adolescents. This agrees with the findings of Singh et al, who reported that the prevalence of poor sleep increased from 87% in ages 10-11 to 92.5% in 13-15 year olds.[8] Adolescents aged more than 15 have also demonstrated worse sleep quality than their younger counterparts.[32] Previous studies have established associations between poor sleep quality and anxiety.[16,17] In our study too, sleep quality emerged as an independent predictor of both anxiety and stress. Adequate sleep is essential for cognitive and emotional wellbeing.[16] Sleep deprivation is known to impair one's interpretation of social cues and facial expressions. It also leads to a negative memory bias, that is, sleep deprived individuals remember negative experiences more than positive ones. These factors can put adolescents at increased risk of bullying and social rejection, which further increase their susceptibility to mental health issues. Moreover, poor sleep leads to higher stress reactivity in the hypothalamo pituitary adrenal axis, increasing the likelihood of psychopathological disorders.[16]

Body image refers to one's feelings about their body size and attractiveness. In our study, participants who reported a discrepancy between their perceived and desired body type were considered to have body image issues. Based on this, 271 (69.1%) participants had body image issues. 135 (49.8%) desired a larger body type, while 136 (50.2%) wanted a smaller body type. Ganesan et al reported an even higher prevalence of body image issues i.e. 77.6% in their study.[18] Body image issues were associated with both anxiety and stress. Vannucci et al also discovered an association between body image dissatisfaction and symptoms of generalized anxiety disorder (GAD).[19] This can tentatively be explained by the theory that gonadal hormone surge during puberty affects the regulation of neurotransmitters related to both anxiety and body image issues. These changes increase adolescents' sensitivity to social evaluation of their appearance, thus making them more vulnerable to anxiety.[35] We also found higher stress in students whose BMI fell in the overweight range, which might be explained by the same. Moreover, body image issues also drive adolescents to skip meals in order to reduce their weight.[18] In our study, meal skipping was associated with anxiety and stress. This supports the result of a study amongst young adults in which food insecurity predicted anxiety in women.[20] This may be attributable to breakfast induced increase in blood glucose, which reduces adrenaline and cortisol, protecting the adolescent from stress and irritability to some extent.[36] Moreover, a Spanish study concluded that the highest levels of stress were seen in adolescents who ate a poor quality breakfast, followed by those who skipped breakfast, whereas stress was lowest in those who ate a high quality breakfast. Thus, it can be postulated that healthy eating, not just eating, is conducive to good mental health.[21] In our study, 60.7% participants engaged in adequate exercise by WHO standards, that is, more than 1 hour everyday.[13] This is higher than a European study which found that 17.9% boys and 10.7% girls worked out adequately.[13] In accordance with previous studies, we found that adequate

exercise was negatively associated with the presence of anxiety.[13] Adolescents who engaged in substance abuse showed higher anxiety in our study. Sandal et al also found that anxiety and stress were more common in those who consumed alcohol and cigarettes.[12] Additionally, those whose parents consumed drugs also showed higher levels of both anxiety and stress.

The outbreak of COVID-19 pandemic, coupled with isolation measures, has taken an undeniable toll on mental health, particularly in children and adolescents.[23] Racine et al. reported that one in five youth were experiencing anxiety during the pandemic.[23] A study found that 28% Indians were experiencing anxiety while 11.6% were experiencing stress.[24] This can be explained by loss of interaction with peers and teachers and social isolation. Females are again more susceptible, since they were at a greater risk of facing domestic violence.[23] Older adolescents also suffer more, since they have a greater reliance on peer interaction.[32] A systematic review has supported these findings.[22] In this context, it is more important than ever to keep risk factors for adolescent anxiety and stress in mind, to identify the adolescents at risk and encourage them to seek help. In India, the Mental Healthcare Act 2017 protects citizens' right to mental health.[37] However, the treatment gap is high for mental disorders. This has been attributed to a lack of resources, but also low perceived need to seek help, low inclination to seek help and stigma around mental disease.[38] In some cases, patients avoid seeking help because they believe that this would make them seem less intelligent, and poorly equipped to deal with stress.[39] Cohort studies following campaigns that improve mental health literacy and reduce stigma have observed an improvement in healthcare seeking behavior of participants.[40]

There are certain limitations to this study. Due to its cross-sectional nature, causality cannot be established. For instance, it is unclear whether poor sleep quality leads to anxiety or vice versa. Further, the assessment of anxiety and stress was based on self-reporting and not followed up with a clinical interview, which may lead to overestimation of the prevalence of these disorders. Students also had to answer several questions based on recall, thus the results may carry a recall bias. The number of schools that could be contacted and enrolled was limited due to phased school opening and restricted movement during the COVID-19 pandemic

CONCLUSION

Anxiety and stress are prevalent in adolescents and show an association with both modifiable and non-modifiable factors pertaining to the one's family and lifestyle.

Interpretations and implications

This study highlights that anxiety and stress commonly afflict adolescents and are associated with various lifestyle factors. Parents and teachers who are aware of these factors could understand when an adolescent is at risk of mental health issues, and encourage them to seek appropriate counselling.

Directions for future research

Future studies may explore the associations of anxiety and stress in adolescents and shed more light on their healthcare seeking behavior. Experimental studies could be designed to test the efficacy of interventional strategies targeting these issues.

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