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Depression, anxiety and stress amongst students in science verses non-science stream: a comparative study

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ABSTRACT

Background: Depression (D), anxiety (A) and stress (S) are common issues among students nowadays. The occurrence of D, A, and S was primarily considered to be associated with the students' academics, especially in twelfth standard because these groups are highly vulnerable to immense pressure, rising competition for undergraduate courses and constant changes in the education system. The objective of this study was to find the comparative magnitude of occurrence and severity of D, A, and S in the science and non-science stream among twelfth standard students.

Methods: This cross-sectional study was carried out across 460 students of twelfth standard from all streams. A sociodemographic questionnaire along with DASS-42 was distributed. The scores were calculated and percentage, mean scores, standard deviation, p values, odds ratio were obtained.

Results: A statistically significant difference was seen in the mean scores of depression and anxiety among science and non-science students (p<0.005). Students belonging to science stream showed more depression and anxiety overall as well as when compared on basis of age groups. Similar results were also observed among science students who said it was not their own decision to choose their stream. Anxiety was found to be higher in science students from nuclear families where as depression was higher in those from joint family. On the contrary, occurrence of all states was found to be more in females of non-science field as compared to science field.

Conclusions: Along with academic pressure, various other factors like gender, voluntary choice of stream, type of student's family etc. contributed to D, A, and S in students.

Keywords: Depression, Anxiety, Stress, Students

INTRODUCTION

Depression, anxiety and stress affect many teenagers and often go by unnoticed and untreated. These states silently affect their academic performance, family lives and rob them of their self-image.

Twelfth standard students are under great pressure to provide academic excellence, which can be the probable cause for a disturbed state of mind irrespective of their streams. Hence, this study was undertaken to determine and compare the occurrence and severity of depression (D), anxiety (A) and stress (S) amongst these students by the means of the DASS-42 questionnaire. Influences of various factors on the occurrence of these negative mental states have also been assessed.

METHODS

This cross-sectional, questionnaire based, comparative study was carried out in three different schools of Ahmedabad over a duration of two months- June and July

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2018, after obtaining the approval of the institutional ethics committee. Permission from the school authority was also sought before conduction of the study. All the apparently healthy students of both genders studying in twelfth standard who willingly agreed to participate were included in the study. The written informed consent of their respective parents/guardian/legally-acceptable representative in vernacular languages was also taken.^{2,3} Those students undergoing treatment for any chronic condition were excluded from the study. Socio-demographic profile, information about parent's education and occupation, information regarding their decision for choice of stream and various factors that affect their mental state were noted in a case report form. The students were given the consent form after explaining to them the various aspects of the study as well as giving them a preview of the DAS-42 questionnaire. It was a voluntary study and only interested participants were included. Disclosure of students name was not a mandatory field. Strict confidentiality of their personal information and the data collected was maintained.

Assessment tools

The DASS is a 42-item questionnaire which includes three self-report scales designed to measure the negative emotional states of depression, anxiety and stress.4 Each of the three scales contains 14 items, divided into subscales of 2-5 items with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, selfdeprecation, lack of interest/involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale (items) is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Respondents were asked to use 4-point severity/frequency scales to rate the extent to which they might have experienced in near past.

Data analysis

If one question was left unattended, it was scored 0. But the assessment was continued further based on scoring of the remaining questions. If the submitted form was left with more than one unattended question, the questionnaire was neither scored nor used in this study.

If the student had encircled 2 options, the lower score was considered.

The data from the forms was collected and entered manually in the Microsoft excel 2010. The comparison was made using mean, standard deviation and p values from the obtained DASS scores.

RESULTS

A total of 460 questionnaires were distributed to the students, out of which 443 students responded. After discarding incompletely filled questionnaires, 410 questionnaires were incorporated in this study for data analysis and for obtaining results.

These included 201 from science stream and 209 from non-science stream. The scores on the DASS-42 were assessed for each student. Higher scores on the DASS questionnaire indicated higher negative mental states of the student. In this study we were focused mainly on finding- (a) occurrence of D, A, and S in the students of each stream; and (b) difference in the severity of D, A, and S in science and non-science stream based on their mean DASS-42 scores.

The percentage of depressed students in science and nonscience streams was found to be similar. But among these students, those having mild (11%) and moderate (12.91%) grade depression was notably more in non-science stream; whereas those having severe (5.47%) and extreme (1.49%) grade depression were found to be more in science stream. Anxiety was found to be more in students of non-science stream than science stream. Occurrence of mild (16.74%) and moderate (17.22%) stress was higher in non-science students than science students.

Table 1 shows the mean value and standard deviation for the DASS scale scores for depression, anxiety and stress in non-science and science students respectively. P value for depression (p=0.002) and anxiety (p=0.004) was found to be statistically significant whereas no statistical significance was seen in the mean scores of stresses.

Table 1: Mean scores of depression, anxiety and stress in the study population.

Study nanulation	Depression		Anxiety	Anxiety		Stress	
Study population	Mean	SD	Mean	SD	Mean	SD	
Non-science students (N=209)	14.32	3.73	12.19	3.76	18.88	4.15	
Science students (N=201)	16.59	7.86	13.84	5.54	19.44	6.16	
P value	0.0002		0.0004		0.2793		

Age-wise distribution of DAS

In this study, the mean age for science students was 16.47 ± 0.55 and that for non-science students was 16.66 ± 0.58 . The study included 107 students of age 16, 88

students of age 17 and 6 students of age 18 from science stream. Also, 82 students of age 16, 116 students of age 17 and 11 students of age 18 had participated from non-science stream. As in Table 2, occurrence of depression,

anxiety and stress levels were found to be more in non-science students for age-17 students.

Among them, occurrence of mild (13.79%) and moderate (21.55%) anxiety in students of non-science stream was comparatively higher than in science students (47.53% difference and 23.83% difference for mild and moderate anxiety respectively between science and non-science stream students). Higher occurrence of moderate stress level was seen in non-science (17.24%) as compared to science (6.38%) stream. Whereas, occurrence of severe stress was higher in science students (4.3%) than non-science students (2.6%).

Among the 16-years-old students, those from non-science stream showed comparatively greater occurrence of depression, anxiety and stress overall. But when assessed discretely on the basis of grading, science students from the same age group showed more occurrence of severe depression (8.41%), severe stress (8.41%) and extreme anxiety (4.67%) as compared to non-science stream. No statistical significance was seen in the occurrence of depression, anxiety or stress in the students of non-science stream in all age groups (p>0.005). But statistically significant difference was seen in the severity of depression and anxiety in students of both age 16 (for D, p<0.0001; for A, p=0.0006), and 17 (for D, p<0.0001; for A, p<0.0001) when compared on the basis of their stream.

Table 2:	DAS in	different	age groups.
Table 4.		uniterent	. age groups.

Grades of DAS		Age 16 years		Age 17 years		
		Non-science (%) (N=82)	Science (%) (N=107)	Non-science (%) (N=116)	Science (%) (N=88)	
	Normal	74.4 (61)	78.5 (84)	77.6 (90)	71.3 (67)	
	Mild	8.5 (7)	5.6 (6)	12.1 (14)	11.7 (11)	
Depression	Moderate	15.9 (13)	6.5 (7)	8.6 (10)	6.4 (6)	
	Severe	0.00	8.4 (9)	1.7 (2)	2.1 (2)	
	Extreme	1.2(1)	0.9(1)	0.00	2.1(2)	
	Normal	64.6 (53)	67.3 (72)	52.6 (61)	57.4 (54)	
	Mild	11.0 (9)	7.5 (8)	13.8 (16)	8.5 (8)	
Anxiety	Moderate	15.9 (13)	13.1 (14)	21.6 (25)	17.0 (16)	
	Severe	8.5 (7)	7.5 (8)	8.6 (10)	5.3 (5)	
	Extreme	0.00	4.7 (5)	3.4 (4)	5.3 (5)	
Stress	Normal	67.1 (55)	72.0 (77)	62.9 (73)	69.1 (65)	
	Mild	14.6 (12)	7.5 (8)	17.2 (20)	13.8 (13)	
	Moderate	15.9 (13)	11.2 (12)	17.2 (20)	6.4 (6)	
	Severe	2.4(2)	8.4 (9)	2.6 (3)	4.3(4)	
	Extreme	0.00	0.9 (1)	0.0	0.0	

Gender-wise distribution of DAS

In this study out of the total of 410 students, 201 students were from science stream which included 94 males and 107 females whereas, 209 were from the non-science stream with 119 males and 90 females. As seen from Figure 1, showing gender-wise occurrence of D, A, and S in science and non-science streams; overall, the occurrence of depression, anxiety and stress was found to be higher among the female students of non-science stream. In nonscience stream, out of 35.56% depressed female students, the occurrence of mild and moderate depression was 13.33% and 20% respectively. Out of the 57.78% anxious female students, occurrence of mild, moderate, severe and extreme anxiety was found to be 17.77%, 21.11%, 13.33% and 5.55% respectively. Out of the 46.67% stressed female students, the occurrence of mild and moderate stress was 23.33% and 17.77% respectively.

In this study, about 25.55% female students from non-science stream suffered from all the three states (D, A and

S) as compared to 13.08% females from science stream. In the science stream, depression and anxiety were seen to occur more in male students than female students and a similar observation was made when compared to the males in the non-science fields. Among them 39.37% male students showed anxiety of which 21.27% had moderate level of anxiety.

As in Table 3, in non-science students, difference in occurrence of depression (OR=0.38, 95% CI 0.2 to 0.74, z=2.901, p=0.004) and anxiety (OR=0.32, 95% CI 0.18 to 0.56, z=3.93, p=0.0001) amongst males and females were statistically significant.

As shown in Table 4, in males, the difference in severity of anxiety between science and non-science streams were found to be statistically significant (p<0.0001). Similarly, in females, the difference in severity of depression (p<0.0001), anxiety (p=0.002) and stress (p=0.0028) levels of science and non-science fields were statistically significant.

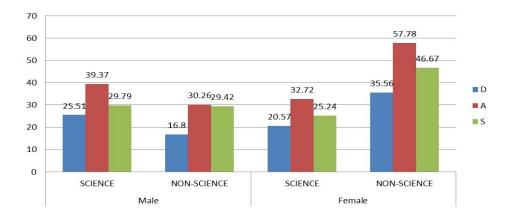


Figure 1: Gender-wise occurrence of DAS in science and non-science streams.

Table 3: Gender-wise occurrence of DAS in the two streams.

Variables		Odds ratio	95% confidence interval	P value	Significance
	Depression	0.3884	0.2050 to 0.7359	0.0037	Significant (p<0.005)
Non-science	Anxiety	0.317	0.1788 to 0.5620	0.0001	Significant (p<0.005)
	Stress	0.4762	0.2688 to 0.8436	0.0110	Not significant
Science	Depression	1.3247	0.6851 to 2.5613	0.4033	Not significant
	Anxiety	1.3353	0.7490 to 2.3807	0.3270	Not significant
	Stress	1.257	0.6755 to 2.3392	0.4704	Not significant

Table 4: Difference in mean scores of each gender in science and non-science stream.

Variables		Mean score		P value	Significance	95% confidence
variables		Non-science	Science	r value	Significance	interval
Males	Depression	13.9±4.3	14.87±7.71	0.1128	Not significant	-0.2310 to 2.1810
	Anxiety	11.83±3.325	13.67±5.06	< 0.0001	Significant (p<0.005)	-2.6682 to -1.0118
	Stress	18.57±3.44	18.39±7.345	0.7494	Not significant	-0.9268 to 1.2868
	Depression	14.59±3.35	18.45±7.76	0.0001	Significant (p<0.005)	-5.0129 to -2.7071
Females	Anxiety	12.44±4.06	14.02±6.08	0.0020	Significant (p<0.005)	-2.5802 to -0.5798
	Stress	19.14+4.69	20.51+4.53	0.0028	Significant (p<0.005)	-2.2657 to -0.4743

DAS in different types of families

Out of the 201 science students, 91 students belonged to nuclear family, 61 students to joint family and 49 students to the three-generation family. From the non-science field, out of 209 students, 94 students were from nuclear family,74 students from joint family and 41 students from the three-generation family.

Figure 2 shows the occurrence of DAS score- based on type of family. It was found that in joint families, non-science students showed higher occurrences of depression, anxiety and stress as compared to science students. Also, a statistically significant difference in severity of depression was found between both streams (p<0.0001).

In nuclear families, students from non-science stream showed four times more occurrence of moderate stress (13.82%) than students of science steam (3.29%). In students belonging to three generation families (Figure 2), higher occurrence of mild and moderate depression as well as mild stress was seen in non-science stream as compared

to science stream. Whereas, mild anxiety was found to be more in science than non-science stream. Based on the mean scores, a statistically significant difference in the severity of anxiety was found between science and non-science stream students belonging to nuclear family (p<0.0001) as well as three generation family (p=0.0002).

DAS based on the decision to choose their stream

Table 5 shows the data for the students who said "it was their own decision to choose their stream" versus the students who said "the decision was made by someone other than themselves".

In science stream, 43 students (21.39%) out of 201 said "it wasn't their own decision to choose this stream". Whereas, 27 (12.9%) out of 209 students from non-science stream said they did not make the decision for themselves. Among the students who did not make their own decision, a statistically significant difference was seen in the severity of depression and anxiety (p<0.0001) based upon their mean scores between both streams (p<0.0001).

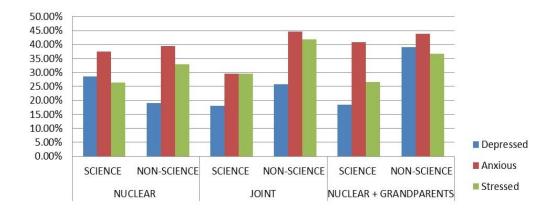


Figure 2: Occurrence of DAS depending on type of family in both the streams.

Own decision Not their own decision Variables Science Non-science Science Non-science (N=158) % (N=182) % (N=43)%(N=27) % Normal 78.48 (124) 74.2 (135) 72.09 (31) 77.77 (21) **Depression** Depressed 27.91 (12) 21.52 (34) 26.93 (47) 22.23 (6) Normal 65.82 (104) 60.43 (110) 58.13 (25) 40.74 (11) **Anxiety** Anxious 34.18 (54) 39.57 (72) 41.87 (18) 59.26 (16) Normal 75.64 (120) 64.28 (117) 60.46 (26) 55.55 (15) **Stress** Stressed 24.36 (38) 39.54 (17) 44.45 (12) 35.72 (65)

Table 5: DAS based on student's decision to choose the field.

DISCUSSION

According to the WHO, mental health conditions account for 16% of the global burden of disease and injury in the age group 10-19 years. Half among these mental health conditions begin by the age of 14 years and most cases go undetected and untreated. Globally, one of the leading causes of illness and disability among adolescents is depression. If this matter remains unaddressed, these conditions may often extend into adulthood, impacting both physical and mental health as well as limiting the opportunity to lead fulfilling lives as adults. The main objective of our study was to obtain a comparative data of occurrence and severity of depression, anxiety and stress in twelfth standard students studying in science and nonscience fields. This study was carried out in the schools of urban area and as per Table 1, it was found that the mean scores of the DASS scale were greater in science students than in the students belonging to non-science stream.

Our results concur with the observations noted by Sandal et al⁵ among students of class 11 and 12, where it was concluded that according to their stream, depression (extremely severe and mild) and anxiety were higher among science students. In the study carried out by Sandal et al among high school students, it was found that among 16-years-old students, nearly two-thirds of students suffered from depression and more than three-fourth had anxiety.⁵ Among 17-years-old students, three-fourth were found to be anxious. In this study they also concluded that depression, anxiety and stress were more in students of age

18 years who were in class 12. The level of depression and anxiety was found to be decreasing with age in our study. But at the same time, we do not have enough students of age 18 years in our study population to compare results with age 17 and 16 years.

Another study carried out for finding the presence of symptoms of depression and anxiety among adolescents in Sri Lanka by Rodrigo et al, found that age-18 years students showed highest depression and anxiety as compared to the other age groups and most of these cases were a result of examination related issues. ¹⁸ Both the studies showed that depression, anxiety and stress was more in students of class 12 compared to other grades. In our study, the mean score of D, A, and S was more in female students of non-science group when compared to the male students of the same group as well as females of science group.

In a similar study carried out by Bhasin et al, it was seen that there was more depression among the female students than the male students.⁷ The studies carried out in United States, Malawi, Korea and Imphal (Manipur) also concluded that female participants were more likely to report higher levels of depression than male participants.⁸⁻¹¹ These studies stated anxiety and stress levels in females were also significant.^{7,11} Studies carried out in undergraduate medical students of Kerala also concluded that higher depression scores were seen in female students in both relaxed state as well as stressed state.¹² These also showed more occurrences of anxiety

and stress than males. A study by Noble et al provides the reasons for increased levels of depression, anxiety and stress in women.¹³ This increased vulnerability has been attributed to be arising from changes in the endocrine control of the reproductive system. These changes usually occur during the pre-menstrual period. This interpretation was favoured by evidence indicating the existence of a powerful effect of sex hormones on serotonin-specific neurotransmitter function and on the mood.

Another study carried out by Lewinsohn et al, for high school students stated that the female students were more likely to be diagnosed with unipolar depression and anxiety disorders. ¹⁴ In another similar study, adolescent females were found to have three times increased odds of depression/stress symptoms as compared to adolescent males. ⁹ In our study there is higher mean score of depression, anxiety and stress in the science students as compared to non-science student but the occurrence of stress is higher in the non-science students. Similar findings were also found in other studies. ^{5,15}

In our study among the non-science stream, significantly high depression was seen in students who lived in three generation family, while the students of science stream, belonging to nuclear families are found to have higher levels of depression than the students belonging to other types of families. In our study we found that the level of anxiety was high in students of both the streams in those living in three generation family as well as in joint families. Similar results were found in the study carried out in Sandal et al.⁵ Students who came from joint family had more anxiety than those who came from nuclear family.

In our study we found that the level of anxiety was higher in students of both streams belonging to three generation as well as joint families. This can be because the students are under greater pressure to meet with the academic expectations of more family members as compared to nuclear families. A joint family may include several members having contrasting mind set, leading to differing opinions given to the students which may further confuse them and influence their decision-making process regarding their career.

In our study, a statistical significance was found among students who did not choose their own stream, showing that severe depression and anxiety was higher in science group as compared to non-science group (p<0.0001). Similar findings were reported in a study carried out by Mandar et al where students who did not make their own decision were found to be more depressed, anxious and stressed, in both fields. Higher DASS scores were seen in students who were under the pressure of expectations of the parents than the students who were not burdened. In our study, we have found that certain students were diligent on following their parent's occupation or their sibling's education choices. Among these students, few had not made this decision on their own. These students were found to suffer more from the negative mental states.

Despite covering all the major aspects regarding D, A, and S in the questionnaires distributed, there were certain limitations to our research. The scale used by the students was a self-rating scale, so under reporting of data may have taken place due to the stigma related to mental disorders. The DAS scale is a cross-sectional questionnaire and not a longitudinal one. Also, the study was limited to only a few schools belonging to a particular geographical area and so the results cannot be generalized.

CONCLUSION

In our study statistical significance was found in the occurrence and severity of depression, anxiety and stress in the science students as compared to non-science students. Despite the belief that non-science students are not much affected, more than expected level of negative states were found in these students; especially among females. It was seen that many other factors apart from academics and the pressure to perform well, affected the mental health of the student such as parent's expectations, family background, age and gender. There is a paucity of studies in Indian population especially those focusing on the 12th standard and the factors affecting their mental status. This issue needs to be addressed at a national level since these students are the future of the country. Introduction of health programs, focusing on mental health as one of its major aims, should be introduced in all schools across the country including rural areas.

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