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Reserach Article

PSYCHIATRIC MORBIDITY AMONG STUDENTS APPEARING IN FINAL SEMESTER BACHELOR OF ENGINEERING EXAMINATION

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A B S T R A C T

Aim: To study the psychiatric morbidity in students appearing for final semester bachelor of engineering examination.

Materials and methods: A cross-sectional, descriptive study was conducted for the exam going final semester Bachelor of Engineering students at Thapar Institute of Engineering College & Technology, Patiala. Total of 110 students were screened, 5 students dropped out at various stages of study. Finally, N=105 students were enrolled that fulfilled both inclusion and exclusion criteria. They were assessed using PGI-Health Questionnaire-N1 (PGI-HQ N1) for neurotic traits and Symptom Check List-90 (SCL-90) for psychiatric morbidity. Patients gave written informed consent and study was conducted as per the declaration of Helsinki, Geneva. Statistical analysis was performed at significance of p value of < 0.05.

Results: Out of 110 students that were screened, 105 participated in the study (response rate 95.45%). 83 (79.05%) were males and 22 were (20.95%) females. On PGI-HQ N1, 56.2% students showed neurotic traits with mean score of 11.02 ± 5.58. Males had higher rates of psychiatric morbidity (43.80%) than females (7.6%). Psychiatric symptoms on SCL-90 scale ranged from minimum of 11.42% (somatization and phobia) to maximum of 72.38% (anger hostility) with overall mean SCL-90 score of 64.86± 38.38. The overall individual psychiatric symptoms on SCL-90 sub-scales were 32.4% depression, 23.85% anxiety, 42.85% OCN (obsessive compulsive neurosis). Males students had higher anxiety score of 28.9% as compared to 4.54% in females which was statistically significant ($p<0.05$) and also for other psychiatric symptoms i.e., paranoid (24.1% versus 9.09%; $p<0.05$) and interpersonal sensitivity (42.1% versus 27.27%; $p<0.05$).

Conclusions: In our study, males had higher psychiatric morbidity than females and academic stress of exam showed detrimental effect on mental health whereas no relationship was found with education, economic and other socio-demographic parameters.

INTRODUCTION

Students are the most common group to face physical, psychological, social and economic stress while preparing for various competitive exams and can have both positive as well as negative outcomes. Relatively good health, optimistic approach and support of the family have positive outcomes.[1] Self-concept or self esteem is central to good psychological adjustment, personal happiness and effective functioning in children and adolescents. Children with overall high self-worth are confident about their abilities to accomplish their goals, academic competence and relationship with peers. Parent's favorable attitude towards child is positively related to child's self esteem. In authoritarian homes, the adolescents become submissive and afraid to take initiative. They obey parental dictates even though it is in conflict with self or peer standards, which discourages selfworth.[2] Academic stress is harmful when it exceeds limit and inhibits creativity, health and general well being of students and can be a source of concern for parents, educators and policy makers in the development of competitive human resources.[3] Stress is a state of tension, strain or demand between internalization (anxious-misery, fear-emotional) and externalization factors (antisocial, alcohol, substance, environmental or cultural etc.,) that is placed on body of an organism whereas distress is an unease or disruption to the homeostasis. Hans Selye described that perceived stress activates the bio-psychological system of a person, which undergoes general adaptation syndrome (GAS) as a response to overcome the stress. GAS has three components i.e., alarm reaction, resistance stage and exhaustion phase. There are many factors where perceived stress can be detrimental for persons health.[4] Stress helps an individual to cope with certain demands. However, if it is prolonged, it alters body's harmony and balance. Continuous activation harms the body

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and leads to burnout, fatigue or mal-adaptation. The adverse effect of psychological distress among students reduces their self-esteem that leads to cascade of consequences both at personal and professional level, which leads to college dropout, impaired ability to work effectively, poor academic achievement, disturbed relationship and suicide.[5]

Tension in students may result in conflict between old & new values. The tension areas are: (i) personal emotional problems, (ii) recurrent, financial difficulties, (iii) maladjustment in family life, (iv) lack of adequate communication with the members of opposite sex, (v) difficulty in following new fashions, (vi) indifference of teachers, (vii) lack of employment opportunities, (viii) undue political influence in students affairs, (ix) contradictory social values, (x) government's anti-student policies. To combat these stressors, they may engage in potentially harmful methods of coping by taking tobacco, alcohol and other substance. The non-medical students suffer more from psychiatric morbidity than other counterparts. Naveen *et al*., (2015) reported stress and anxiety to be the highest among engineering students as compared to medical students but proportion of students suffering from depression among engineering and medical students were comparable.[6] Gowda S *et al*., (2000) in an assessment of vulnerability in executives, managers and engineers concluded that the engineers are to be the most vulnerable group.[7]

The present study was carried out with following aims and objectives:

1. To measure the magnitude of psychiatric morbidity among students appearing in final semester Bachelor of Engineering examination.
2. To study socio-demographic attributes of students and their parents.
3. To test Null Hypothesis of any difference of psychological stress and psychiatric morbidity between male and female students.

Materials and methods

The present study was a cross-sectional, descriptive and analytical study conducted by Department of Psychiatry, Government Medical College, Patiala from October 2015 to November 2015. Total 110 final year engineering students of Thapar Institute of Engineering College & Technology Patiala were screened, out of which 105 Engineering students were finally enrolled comprised of 83 males & 22 females. The study had an approval from Institutional Ethical Committee.

Inclusion Criteria

Final year Engineering students in the range of 21-23 years and willing to participate were included in the study. Consent was implicit by respondent's decision to fill the proforma thoughtfully and return the completed questionnaire.

Exclusion Criteria

1. Students with any major Medical ailment.
2. Students with any gross Psychiatric illness.
3. Students who abused some substance or drugs.
4. Students who did not give the consent to fill the proforma seriously and thoughtfully were excluded from the study

The data collected by using a self-administered, standardized, semi-structured proforma. The information was collected on the students' socio-demographic characteristics, academic achievement, positive and negative event in the recent past. Other variables included age, academic record, category, domicile, marital status, economic status of father and mother, educational and occupational profile of parents. Further details were listed referring to daily routine, like time and money spent in academic and non-academic activities and choice of subject made by students. Participants were assured that all data would remain anonymous, confidential and stored safely.

Instruments

The students were assessed for any neurotic component by PGI HEALTH QUESTIONNAIRE (PGI-HQ)-N1 and psychiatric morbidity by SYMPTOM CHECK LIST-90 (SCL-90).[8,9]

PGI-HQ-N1

It consists of two domains with 16 and 22 items respectively. The subject was required to put (√) against question/item, he/she agreed with. The number of ticks on both domains indicated the respective scores, which were then added up to give a total score. If a candidate ticked more than 10 items (question) he/she was considered to be neurotic or had marked propensity to develop neurotic symptoms under stress.

SCL-90

Its score ranged from less than 20 to 220 with a cut off value of more than 60 being considered as a clinical case. It consisted of 90 items which were further divided into ten sub-scales namely: 1.Depression sub-scale (13), 2. Anxiety sub-scale (10), 3. Interpersonal sensitivity sub-scale (9), 4. Somatization sub-scale (12), 5. Phobic anxiety sub-scale (7), 6. Obsessive compulsive neurosis sub-scale (10), 7.Anger hostility sub-scale (6), 8. Paranoid ideation sub-scale (6), 9.Psychotism (10) 10. Additional symptoms sub-scale (7).

The items included in each subscale were listed in the scoring key. Each item had maximum score of four, depending upon the severity of symptom. The score one was given when student complained of a little bit of symptom, score four for extremely severe. The severity of symptom in each sub-scale in was divided into: (Absent, Mild, Moderate, Severe) depending upon the total score obtained by a given subject in the said sub-scale. For this purpose, maximum score obtained by any given was taken into consideration. If a subject scored between 25-50% of a maximum score, he/she was placed in the category of the mild, between 50-75%, was placed in category of moderate, between 75-100%, and placed in category of severe. If the score was between 0-25% it's considered as normal/absent.

Statistical Analysis

Data were entered in Microsoft Excel (Microsoft office excel standard edition 2003 Microsoft Corporation) and analyzed using SPSS (Statistical Package for Social Sciences) release 13.0.2004 version 13.0 statistical software. Descriptive analysis was computed in terms of mean and standard deviation for continuous variables and frequency with percentage for ordinal and nominal variables. Prevalence of outcome variables along with 95% confidence interval was

calculated. Pearson's chi^2 test used to observe and quantify an association between the categorical outcome and different study variables. Student's t-test for independent samples was used to compare the mean values. P value of less than 0.05 was considered to be statistically significant. The outcome variables (different categories of psychiatric morbidities) were categorized into dichotomous as present/absent.

RESULTS

Of 110 students eligible to participate in study, response rate was 95.45% with dropout of 5 students. 79.05% (n=83) were male and 20.95% (n=22) were females. Mean age of males was 21.37 years ± 0.57 and 21.40 years ± 0.66 in females. 89.52% of study group belonged to urban area and 10.48% to rural. However, both sexes were comparable in respect to domicile, marital status and category (p>0.05). A non-significant p value (>0.05) was obtained on comparing socio-demographic attributes, income and educational qualification of parents of male and female students. On analyzing academic records, 87.17% females scored more than 70% marks in class 10+1 and 86.36% in class 10+2 as compared to 61.43% (p<0.001) and 81.91% (p<0.01) in male students, respectively. The results were significant and the difference widened in later years of academics. Time spent in academic activities like self-study, practical training, reading academic journals, non-academic daily activities i.e., sleeping, bathing, eating etc., and recreational activities of watching television, playing games, going for cinema were comparable among both sexes (p >0.05).

Table 1 shows neurotic trait as assessed on PGI-HQ-N1 scale. Overall, 56.2% (59 out of 105) students showed neurotic traits with a mean score of 11.02 ± 5.58. Out of them 60.24% were males with mean score of 11.08 ± 5.45 and 40.9% were females with mean score of 10.81 ± 6.21. However, among gender results were clinically non-significant (p>0.05).

Table 1 Scores on PGI-HQ-N1

PGI-HQ-N1 score	Engineering Students				Level of Significance
	Male (N=83)	**%age**	**Female** (N=22)	**%age**	
<10 non-neurotic	33	39.75	13	59.1	X^2 =2.64; p > 0.05, NS
>10 Neurotic	50	60.24	9	40.9	
Range	0-25		0-21		t = 0.19; p > 0.05, NS
Mean ± SD	11.08 ± 5.45		10.81 ± 6.21		
Overall Mean ± SD	11.02 ± 5.58				

Scores obtained on SCL-90 scale in Table-2, used to screen psychiatric morbidity, were comparable in both sexes (p>0.05). Considering the cut off value of > 60 as a clinical case more than half of the study population was found to be having some sort of psychiatric affection accounting to overall psychiatric morbidity of 51.42% (n= 54) with male preponderance of six times (43.80% versus 7.6% in females). Global Severity Index (GSI) with mean raw score and T-score of >60 was 0.68 and 51.1; Positive Symptom Total was 19.37 and 46.6; Positive Symptom Distress Index was 1.69 and 49.6, respectively.

Table 2 Score on SCL-90

SCL-score	Engineering Students			
	Male (N=83)	**%age**	**Female** (N=22)	**%age**
< 20	5	6.02	8	36.36
21 – 40	14	16.86	2	9.10
41 – 60	21	25.30	4	18.18
61 – 80	17	20.48	4	18.18
81 – 100	14	16.86	2	9.10
101 – 120	9	10.84	1	4.54
121 – 140	1	1.20	1	4.54
141 – 160	3	3.61	0	0.0
161 – 180	1	1.20	0	0.0
181 – 200	0	0.00	0	0.0
201 – 220	1	1.20	0	0.0
Range (m)	15-212	-	0-172	-
Mean ± SD	67.41 ± 36.71	-	55.22 ±43.69	-
Overall mean score ± SD	64.86 ± 38.38			
t	1.32			
P value	P > 0.05			
S	NS			

t Students t-test
P value Level of significance >0.05,
NS Non-significance

Psychiatric symptoms on SCL-90 scale ranged from minimum of 11.42% (Somatization and Phobia) to maximum of 72.38% (Anger hostility). 42.85% students were having OCN, 32.38% were Depressive and Anxiety was found in 23.80% of study population whereas 20.95% students were paranoid. There was no clinical case of psychotism in the entire study group.

Analyzing individual parameters of SCL-90 revealed that 28.9% males had higher anxiety score as compared to 4.54% females which was statistically significant (p<0.05). Similarly, significant difference was observed, with male preponderance, in other sub-scales like paranoid (24.1% versus 9.09%; p<0.05) and interpersonal sensitivity (42.1% versus 27.27%; p<0.05). However, both sexes were comparable in regards to Somatization, Depression, Phobia, OCN and Anger-hostility (p>0.05).(Table 3)

Table 4 revealed that the overall mean score of SCL-90 for the entire study group was 64.86 ± 38.38, whereas it was 67.41 ± 36.71 for males and 67.41 ± 36.71 in females with a non-significant p value of >0.05. Mean score of individual parameters was highest for depression (11.61 ± 7.37) followed by OCN (11.40 ± 6.79) and least for phobic anxiety (2.94 ± 3.70). Statistically significant (p<0.05) difference was seen in mean score for individual psychiatric symptoms of interpersonal sensitivity in males (9.38 ± 6.01) than females. (6.31 ± 7.13) Mean score of anxiety and OCN also displayed statistically significant results in both sexes with value of 7.90 ± 5.95 versus 5.31 ± 4.71 and 11.97 ± 6.79 versus 9.22 ± 6.50 respectively.

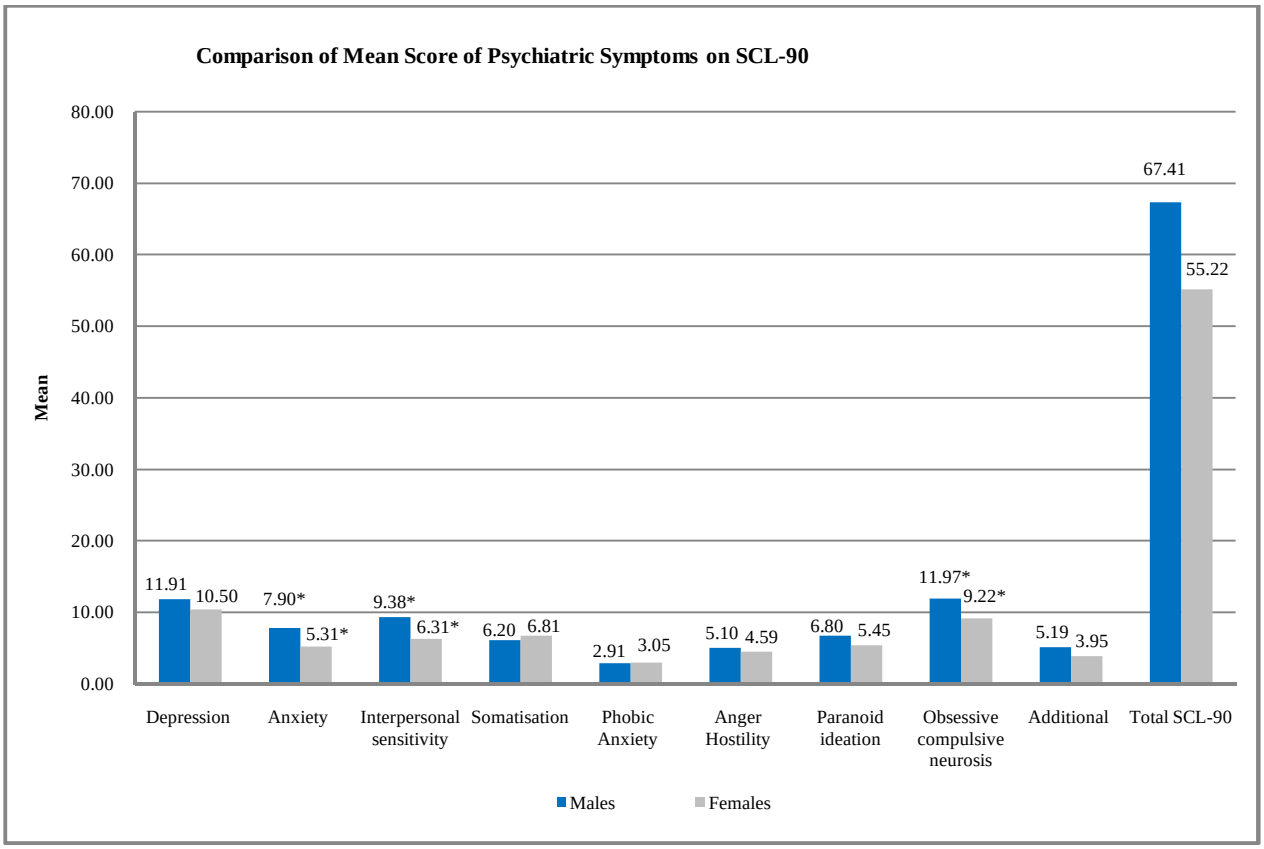
Table 3 Categorization of SCL -90 Into Sub-Scales

SCL-90 Sub-scales			Engineering Students				Level of Significance
			Male (N=83)	%age	Female (N=22)	%age	
Somatization	Absent	0-12	74	89.1	19	86.36	X^2=0.134 p>0.05 NS
	Present	13-48	9	10.83	3	13.63	
	Mild	13-24	8	9.63	3	13.63	
	Moderate	25-36	1	1.20	0	0.0	
	Severe	37-48	0	0.0	0	0.0	
Depression	Absent	0-13	55	66.26	16	72.72	X^2=0.331 p>0.05 NS
	Present	14-52	28	33.72	6	27.27	
	Mild	14-26	24	28.9	6	27.27	
	Moderate	27-39	4	4.82	0	0.0	
	Severe	40-52	0	0.0	0	0.0	
Paranoid	Absent	0-6	63	75.9	20	90.9	X^2=2.364 p<0.05 S
	Present	7-24	20	24.1	2	9.09	
	Mild	7-12	18	21.69	2	9.09	
	Moderate	13-18	2	2.41	0	0.0	
	Severe	19-24	0	0.0	0	0.0	
Interpersonal sensitivity	Absent	0-9	48	57.83	16	72.72	X^2=1.621 p<0.05 S
	Present	10-36	35	42.16	6	27.27	
	Mild	10-18	27	32.53	6	27.27	
	Moderate	19-27	7	8.43	0	0.0	
	Severe	28-36	1	1.2	0	0.0	
Phobia	Absent	0-7	73	87.95	20	90.90	X^2=0.150 p>0.05 NS
	Present	8-28	10	12.03	2	9.08	
	Mild	8-14	8	9.63	1	4.54	
	Moderate	15-21	2	2.4	1	4.54	
	Severe	22-28	0	0.0	0	0.0	
Anxiety	Absent	0-10	59	71.1	21	95.45	X^2=5.693 p<0.05 S
	Present	11-40	24	28.9	1	4.54	
	Mild	11-20	20	24.1	1	4.54	
	Moderate	21-30	3	3.6	0	0	
	Severe	31-40	1	1.2	0	0	
OCN	Absent	0-10	47	56.62	13	59.0	X^2=0.043 p>0.05 NS
	Present	11-40	36	43.36	9	40.9	
	Mild	11-20	24	28.91	8	36.36	
	Moderate	21-30	11	13.25	1	4.54	
	Severe	31-40	1	1.20	0	0.0	
Anger Hostility	Absent	0-6	59	71.08	17	77.27	X^2=0.333 p>0.05 NS
	Present	7-24	24	28.91	5	22.72	
	Mild	7-12	20	24.1	4	18.18	
	Moderate	13-18	3	3.61	1	4.54	
	Severe	18-24	1	1.2	0	0.0	
Additional	Absent	0-7	64	77.10	19	86.36	X^2=0.899 p>0.05 NS
	Present	8-28	19	22.88	3	13.63	
	Mild	8-14	15	18.07	2	9.09	
	Moderate	15-21	3	3.61	1	4.54	
	Severe	22-28	1	1.20	0	0.0	

Table 4 Comparison of Mean Score of Psychiatric Symptoms on SCL-90

Psychiatric symptoms	Group	Mean ± SD	Overall mean ± SD	t	P	S
Depression	Males	11.91 ± 7.10	11.61 ± 7.37	0.79	>0.05	NS
	Females	10.5 ± 8.40				
Anxiety	Males	7.90 ± 5.95	7.36 ± 5.79	1.88	<0.05	S
	Females	5.31 ± 4.71				
Interpersonal sensitivity	Males	9.38 ± 6.01	8.74 ± 6.35	2.04	<0.05	S
	Females	6.31 ± 7.13				
Somatisation	Males	6.20 ± 5.59	6.33 ± 5.95	0.42	>0.05	NS
	Females	6.81 ± 7.28				
Phobic Anxiety	Males	2.91 ± 3.37	2.94 ± 3.70	0.14	>0.05	NS
	Females	3.05 ± 4.85				
Anger Hostility	Males	5.10 ± 3.61	5.0 ± 4.04	0.53	>0.05	NS
	Females	4.59 ± 5.47				
Paranoid ideation	Males	6.80 ± 4.32	6.52 ± 4.34	1.30	>0.05	NS
	Females	5.45 ± 4.33				
Obsessive compulsive neurosis	Males	11.97 ± 6.79	11.40 ± 6.79	1.70	<0.05	S
	Females	9.22 ± 6.50				
Additional	Males	5.19 ± 4.45	4.93 ± 4.27	1.20	>0.05	NS
	Females	3.95 ± 3.42				
Total SCL-90	Males	67.41 ± 36.71	64.86 ± 38.38	1.32	>0.05	NS
	Females	55.22 ± 43.69				

t Students t-test P value Level of significance < 0.05 S Significance



Level of significance at p value <0.05 *

DISCUSSION

Stress can be defined as an event that involves a major change in person's ongoing life pattern (Holmes & Rahe 1967).[10] Costello *et al*., (2006) on reviewing epidemiology of psychiatric disorders opined that "onset before adulthood may be characteristic of the majority of adult mental disorders".[11] This also indicates that with timely psychiatric intervention, students can be helped to achieve better academic and other achievements.

The prevalence of psychiatric morbidity in our study was 51.42% which was similar to the study conducted by Kiran *et al*., (2017) in Telangana and Makhal *et al*., (2015) in West Bengal on recent nationwide survey for burden of diseases and found GHQ-12 scores above the cut-off (≥4) point among 56.8% and 52.8% university students respectively.[12,13] Study carried out by Kessler *et al*., (2005) and Phippen *et al*., (1995) have documented nearly similar prevalence among students i.e., 64%, 71.25% respectively.[14,15] Seventy-two percentage of medical students perceived moderate and high level of stress compared to 56.7% of engineering students as reported by Chenganakkattil *et al*. (2017).[16]

To assess the psychological health of undergraduate students during their initial entry in the university GHQ scale was used with traditional cut-off point score of ≥4, which revealed 57% of stress in Medical students as compared to 47.3% of Law students.[17] Guthrie *et al*., (1986) studied psychological morbidity and burnout experience in medical students during their undergraduate training, which were assessed on GHQ-12 and Maslach Burnout inventory and reported that repeated experience of psychological stress was the best predictor for psychiatric morbidity.[18]

Tamoda *et al*., (2000) studied 1-year prevalence and incidence among 116 first year university students of Japan and found that 26.7% met Diagnostic and Statistics Manual for Mental Disorders- IV criteria for Major depressive disorder (MDD).[19] In our study, relatively higher levels of psychiatric morbidity are likely to be complex and cannot be attributed to single issue or rationalized as the perceived stress of educational system. Personal characteristics of students and priori psychiatric diagnosis could be important predictors for mental health. Stress if perceived as negative or becomes excessive, students experience physical and psychological impairment.[20] In our study, plausible explanation for higher level of psychiatric morbidity was due to examination stress, which might have added to the existing anxiety thus, resulting in disruption of homeostasis.

In our study, male students had significantly more psychiatric morbidity than female students (43.80% versus 7.6%). Males were more likely to suffer from anxiety (28.9% versus 4.54%), depression (33.7% versus27.27%), paranoid behavior (24.1% versus 9.09%) and OCD (43.3% versus 40.95%) which was in accord to study conducted by Ali *et al*., (2014).[21] Ramteke *et al*., (2016) reported female engineering students (Mean stress score = 6.6344) were more anxious than male engineering students (Mean stress score = 6.2336) but statistically non-significant.[22] However, Lashiram *et al*., (2016) found that the medical students are more depressed and have more anxiety as compared to the engineering students. The most likely explanation for sex differences was attributed to be multi-factorial i.e., including biological, socio-cultural or combination.[23] Whereas Amr *et al*., (2008) showed that there is no significant difference of perceived stress between the male and female medical students. Furthermore, female students reported less relationship

problems with teachers and substance abuse but scored significantly higher than males on depression and neuroticism scales.[24]

CONCLUSION

There is a rising trend of psychiatric illness in professional students that cannot be overlooked, which have multi-factorial etiological causes. It's an attempt to understand the relationship between academic stress of exam and psychiatric morbidity. Males were more prone to morbidity than females on various parameters. Therefore, an early recognition and timely specialist care under aegis of Integrated Health Care Delivery System should be a norm rather than necessity to prevent distress, which if left unabated, may have deleterious effect on health.

Limitations of study

The study does not take into account faculty characteristics or teaching styles, which could have an effect on the student's perceived stress levels.

The study took place at one point of time that was just before the final semester exams, which limits its ability to generalize these findings and in establishing temporal relationship.

Furthermore, it's a self-assessment proforma that was filled by engineering students with a possible reporting bias in interpretation of questions or desire to report their emotions in a certain way.

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