

# Assessment of Stress and its Determinants among Indian Medical Undergraduate Students of North India

Shiv Kumar Yadav<sup>1</sup>, Dheeraj Gupta<sup>2</sup>, A.R. Piyush<sup>3</sup>, Bhola Nath<sup>4</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Community Medicine, <sup>3</sup>Assistant Professor, Pathology, Govt. Doon Medical College, Dehradun, <sup>4</sup>Additional Professor, Department of Community and Family Medicine, AIIMS Bathinda

## Abstract

**Background:** Medical Education curriculum is considered to be one of the toughest across the world. The long duration of course along with frequent assessments done make it stressful journey for medical students. Assessment of stress and its determinants among medical students is of utmost importance so that correctable actions can be taken.

**Objective:** Assessment of stress and its underlying causes among Indian Medical Undergraduate Students.

**Material and Method:** A descriptive cross-sectional study carried among 380 MBBS (Undergraduate) students of Government Medical College of North India to explore various stress determinants (Stressors) which were categorized into 6 domains viz. Academic Related Stressors (ARS), Intrapersonal and Interpersonal Related Stressors (IRS), Teaching and Learning-Related Stressors (TLRS), Social Related Stressors (SRS), Drive and Desire Related Stressors (DRS) and Group Activities Related Stressors (GARS). Data collection was carried out for a period of 3 month and self-administrated validated MSSQ questionnaire was used as a Data tool. Data entered and analyzed with SPSS software.

**Result:** 31% medical students suffers from Severe and 56% medical students suffers from moderate Academic Stress. 40% medical students have documented that Teaching and Learning Method as a source of Moderate stress. Academic related stress and Social related Stress has significant association among both gender when compared with 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> Semester curriculum. Father's Education status of a Female Student and their Residence has significant association with Academic related stress. Mother occupation and 1<sup>st</sup>, 3<sup>rd</sup> and 5<sup>th</sup> Semester Curriculum has significant association with Teaching Related stress.

**Conclusion:** Stress exists in various domains and with variable intensity during whole MBBS course.

**Keyword:** Stress, Medical Students, Determinants.

## Introduction

Medical education training period is considered to be a highly stressful period for the students all over the world.<sup>[1,2]</sup> Various Studies have shown prevalence of stress among medical students ranging from 30%

to 50%.<sup>[3,4]</sup> Two studies conducted among Malaysian government university students reported presence of emotional stress ranging from 29.1 % to 41.9% among medical students<sup>[2,3]</sup> and another study conducted among Malaysian private medical school reported it to be 46.2%<sup>[1]</sup> as measured by General Health Questionnaire (GHQ-12).<sup>[5]</sup> 57% medical students have emotional disorders as measured by GHQ compared with law students who were having 47.3% emotional disorders.<sup>[6]</sup>

These studies elicit presence of elevated psychological pressure on medical students. Stressful conditions adversely affect emotional, mental and

---

### Corresponding Author:

**Dr. Dheeraj Gupta**

Associate Professor, Community Medicine, Govt. Doon Medical College, Dehradun

e-mail: itsdheeraj@gmail.com

physical well-being of students. Various studies have shown that persistent stressful conditions were associated with mental and physical health problems in medical students at various stages of their training.<sup>[1,2,3,4,8,9]</sup> Studies have also documented that excessive stress level leads to lowered self-esteem<sup>[10,11]</sup>, anxiety and depression<sup>[12,13]</sup> difficulties in solving interpersonal conflicts<sup>[14]</sup>, sleeping disorders<sup>[15,16]</sup>, increased alcohol and drug consumption<sup>[17-19]</sup>, cynicism, decreased attention, reduced concentration and academic dishonesty<sup>20</sup> among medical students and when stress becomes unbearable among medical student it leads to suicide.<sup>21</sup> Thus It is very important to work for early diagnosis as well as effective intervention programmes to prevent possible future mental illnesses among medical students.<sup>[1,7]</sup>

A Stressor is a personal or environmental event that causes stress.<sup>[22,23]</sup> Various studies have grouped stress among medical students into six categories; Academic Related Stressors (ARS), Intrapersonal and Interpersonal Related Stressors (IRS), Teaching and Learning-Related Stressors (TLRS), Social Related Stressors (SRS), Drive and Desire Related Stressors (DRS), and Group Activities Related Stressors (GARS).<sup>[24]</sup> Various Studies have documented that Medical training, especially Academic matters are most common stressors affecting medical students' well-being<sup>[2,7,24-27]</sup>. Students Personal problems and its relation with student psychological morbidity and academic success is still unclear.<sup>[2,20]</sup> So this study is planned to assess the presence of stress and its various determinants among Indian Medical Undergraduate Students so that intervention can be planned to reduce the stress among Medical Undergraduates.

**Aims and Objective:**

1. Assessment of Presence of Stress among Indian Medical Undergraduate Students.
2. Exploration of underlying causes (Stressors) responsible for stress among Indian Medical Undergraduate Students.

**Methodology**

A Descriptive Cross-Sectional study was carried out among 380 Indian Medical Undergraduate Students of a Government Medical College of North India. Before enrolment, written informed consent was obtained from all study participants. Study participants were enrolled by using convenient sampling method. The

study was conducted for a period of 3 months and Self-administered validated MSSQ<sup>28</sup> Questionnaire was used as data collection tool. Data was entered in MS Excel and analysed with SPSS Software. Means (±SD) were computed for Continuous Variables and Percentages were estimated for Categorical Variables. Chi square test, Student T test and Pearson Correlation were applied to look for any association between variables.

**Data Tool:** The Medical Student Stress Questionnaire (MSSQ) was developed to identify various stressors responsible for causing stress among medical students as well as measure the intensity of stress caused by the stressors. The six domains of stress measured by the MSSQ were developed based on various researches. 40 questions in MSSQ were answered on Likert scale from 0(No stress), 1(mild stress), 2 (moderate stress), 3 (severe stress) to 4 (very severe unbearable stress). The MSSQ grouped stressors into six domains, each based on a common underlying themes, I. Academic Related Stressors (ARS), II. Intrapersonal and Interpersonal Related Stressors (IRS), III. Teaching and Learning-Related Stressors (TLRS) IV. Social Related Stressors (SRS) V. Drive and Desire Related Stressors (DRS) VI. Group Activities Related Stressors (GARS). Each Question is categorised into one of 6 domains as mentioned in stress domain column in questionnaire attached so there are 13 question of domain I, 7 questions of domain II, and so on as mentioned below:

	I	II	III	IV	V	VI
<b>Total</b>						
Divided by Score	13	7	7	6	3	4

Responses given by participants were categorised in number as mentioned above from 0 to 4. Then added and divided by Denominator assigned to each domain for example there are 13 question which are related to academic related stressor so responses given by participants for these 13 question were added and divided by 13 and then whatever be score were assessed based on stress score criteria. 0 – 1.00 (mild stress), 1.01 – 2.00 (moderate stress), 2.01 – 4.00 (high stress). This way we calculated role of Different domains of stressor in causing stress among students.

**Result**

Among Study Participants, Male to Female ratio was approximately equal. Majority (68%) of students

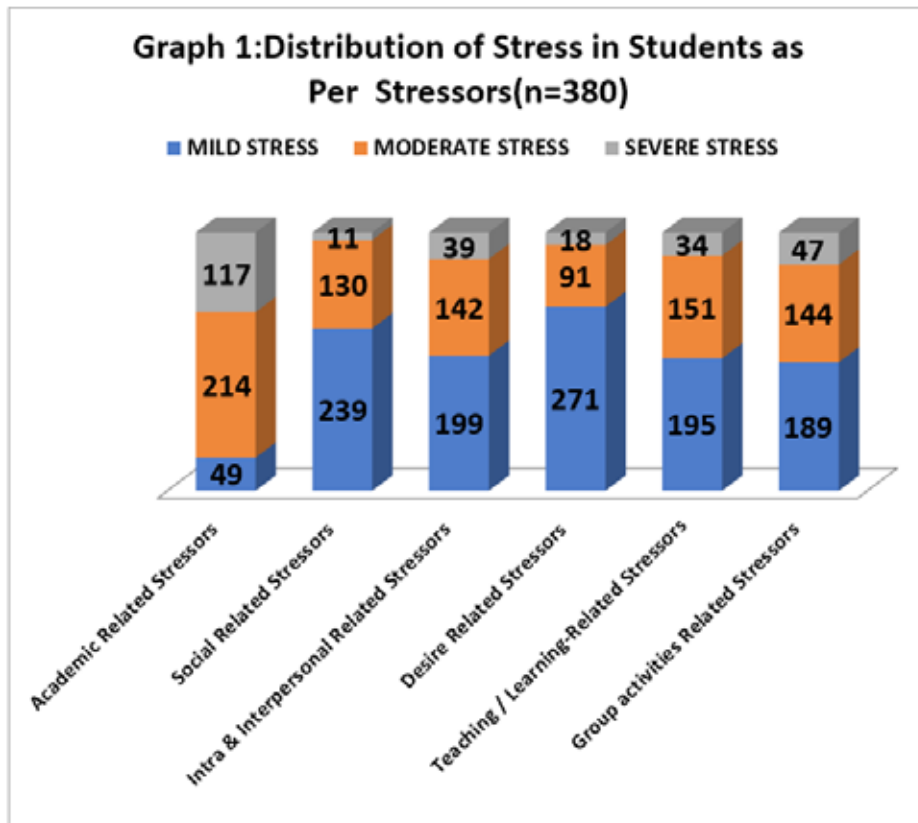
were of age group 18-20 years. Approximately 74.5% schooling from urban school while rest completed their were from urban background and 84.5% have done studies from rural schools as shown in table 1.

**Table 1: Profile of Study Participants**

Sr No	Variables		Frequency (%) (n=380)
1	Gender	Male	186(48.9%)
		Female	194(51.1%)
2	Age Group	< 18 year	7(1.8%)
		18-20 years	260(68.4%)
		21-24 years	113(29.8%)
3	Residence	Rural	97(25.5%)
		Urban	283(74.5%)
4	Schooling	Rural	59(15.5%)
		Urban	321(84.5%)
6	Semester MBBS	1st	146(38.4%)
		3rd	103(27.1%)
		5th	131(34.5%)
7	Father Education	Upto Middle School	11(2.9%)
		High School	25(6.6%)
		Intermediate/Diploma	65(17.1%)
		Graduate	146(38.4%)
		Profession/Honours	133(35%)
8	Mother Education	Upto Middle School	38(10%)
		High School	37(9.7%)
		Intermediate/Diploma	76(20%)
		Graduate	118(31.1%)
		Profession/Honours	111(29.2%)
9	Decision to join Medical field	Self	313(82.4%)
		Parents	61(16.1%)
		Others	6(1.5%)
10	Father Occupation	Unskilled worker	13(3.4%)
		Skilled Worker	261(68.7%)
		Professional	106(27.9%)
11	Mother Occupation	Housewife	288(75.8%)
		Skilled Worker	25(6.6%)
		Professional	67(17.6%)

**Distribution of Stress in Students as Per Stressors:** Students experiences variable level of stress during the medical training period. Severe Stress is caused by 30.8% Academic Related Stressor, 12.4% Group Activities Related Stressors, 10.3% Intra & Interpersonal related Stressors and 8.9% Teaching and

Learning Related Stress. Moderate Stress is caused by 56.3% Academic Related Stressor, 39.7% by Teaching and Learning Related Stressor, 37.9% Group Activities Related Stressors, 37.4% Intra & Interpersonal related Stressors, 34.2% by Social related Stressors as shown in graph 1.



**Academic Related Stressors (ARS):** Academic Related Stressors like Syllabus, Test & Examination, Self-Expectation, Heavy Workload, failing behind in reading schedule, lack of skills, difficult understating, Less Time, Grading process etc. were used to assess the impact of these stressors in causation of stress

among medical students. Both Male and Female Students showed significant association of ARS with different Semester and Female students have significant association of their place of residence in causation of Academic Related Stress as shown in Table 2.

**Table 2: Relations of Academic Related Stressors with Gender**

Sr.No.	Gender	Stress	Semester			Chi- Square (P Value)
			1st	3rd	5th	
1	Male	Mild	4	7	14	12.093 (0.0170)
		Moderate	43	27	37	
		Severe	30	8	16	
	Female	Mild	8	7	9	10.597 (0.031)
		Moderate	32	31	44	
		Severe	29	23	11	
			Residence			
			Rural	Urban		
2	Male	Mild	7	18	0.691 (0.708)	
		Moderate	29	78		
		Severe	18	36		
	Female	Mild	10	14	0.6496 (0.039)	
		Moderate	19	88		
		Severe	14	49		

**Social Related Stressors (SRS):** Different Semesters contributes towards significant social related stress in both male and female students. Education status of Mother of male students was found to be significantly

associated with Social related stress and whether decision to join medical profession was taken by self, parents, siblings was found to be significant Stressor among both male and Female students as shown in table 3.

**Table 3: Relation of Social Related Stressors with Gender**

Sr.No	Gender	Stress	Semester				Chi- Square (P value)	
			1 <sup>st</sup>	3 <sup>rd</sup>	5 <sup>th</sup>			
1	Male	Mild	52	16	39	12.987 (0.011)		
		Moderate	25	24	24			
		Severe	0	2	4			
	Female	Mild	54	34	44	11.016 (0.026)		
		Moderate	15	23	19			
		Severe	0	4	1			
2			Mother Education				Yate's CS 18.005 (0.0211)	
			Upto Middle School	High School	Intermediate	Graduate		Post-Graduation
	Male	Mild	13	14	26	35		19
		Moderate	12	7	19	7		28
		Severe	0	2	0	3		1
	Female	Mild	11	9	21	50		41
		Moderate	2	4	8	21		22
		Severe	0	1	2	2		0
	3			Decision to Join Medical field				Yate's CS 12.872 (0.011)
		Self	Parents	Siblings Relatives				
Male		Mild	90	14	3			
		Moderate	60	13	0			
		Severe	4	0	2			
Female		Mild	112	19	1			
		Moderate	43	14	0			
		Severe	4	1	0			

**Group Activity Related Stressors (GARS):** Group activity stressor like participation in classroom, feeling of incompetence, peer pressure of performance was assessed to document their role in stress among students. Students when asked to work or prepare a project

in group, this itself act as a stressor for them. Mother Education of male student and place of residence of male student showed significant effect of group activity related stressor on them as shown in Table 4.

**Table 4: Relation of Group Activity Related Stressors with Gender**

Sr.No	Gender	Stress	Mother Education					Chi- Square (P-value)
			Middle School	High School	Intermediate	Graduate	Post-Graduation	
1	Male	Mild	7	11	23	30	19	17.873 (0.02)
		Moderate	14	6	14	13	23	
		Severe	4	6	8	2	6	
	Female	Mild	5	6	19	36	33	7.94 (0.439)
		Moderate	7	4	9	29	25	
		Severe	1	4	3	8	5	
2			Residence					
			Rural		Urban			
	Male	Mild	17		73		8.708 (0.013)	
		Moderate	27		43			
		Severe	10		16			
	Female	Mild	21		78		3.593 (0.166)	
		Moderate	14		60			
		Severe	8		13			

**Desire Related Stressor:** Presence of desire related stressor among students were assessed like parental pressure to study well, Family Responsibility and unwillingness to study medicine among student and it

was found that female student have more significant effect of desire related stress in relation with their semester, place of schooling and place of residence as shown in table 5.

**Table 5: Relation of Desire Related Stressor with Gender**

Sr.No	Gender	Stress	Semester			Chi- Sqaure (P value)
			1 <sup>st</sup>	3 <sup>rd</sup>	5 <sup>th</sup>	
1	Male	Mild	59	29	45	2.787 (0.594)
		Moderate	15	11	16	
		Severe	3	2	6	
	Female	Mild	52	34	52	11.166 (0.025)
		Moderate	15	23	11	
		Severe	2	4	1	
2			Place of Residence			
			Rural		Urban	
	Male	Mild	33		100	4.264 (0.119)
		Moderate	16		26	
		Severe	5		6	
	Female	Mild	24		114	6.68 (0.035)
		Moderate	16		33	
		Severe	3		4	

			Place of Schooling		
			Rural	Urban	
3	Male	Mild	23	110	5.338 (0.069)
		Moderate	10	32	
		Severe	5	6	
	Female	Mild	11	127	9.213 (0.010)
		Moderate	7	42	
		Severe	3	4	

## Discussion

This study provide significant information regarding existence of stress in various domains among medical students of India which is supported by various studies and showed the prevalence of stress among medical students ranging from 30% to 50%.<sup>[3,4]</sup> Two studies conducted previously showed presence of emotional stress ranging from 29.1 % to 41.9% among medical students<sup>[2,3]</sup> and another study conducted among Malaysian private medical school reported it to be 46.2%<sup>[1]</sup> as measured by General Health Questionnaire (GHQ-12).<sup>[5]</sup> 57% medical students have emotional disorders as measured by GHQ compared with law students who were having 47.3% emotional disorders.<sup>[6]</sup> Academic Related Stressor (ARS) contributes to significant stress among medical students. In this study Both Male and Female Students showed significant association of ARS with different Semester and Female students showed significant association of Residence with ARS. Academic Related Stress are responsible for causing 30.8% Severe Stress and 56.3% Moderate Stress among medical students which is similar to findings of various studies which have documented that medical training, especially academic matters are most common stressors affecting medical students well-being.<sup>[2,7,24-27]</sup> Academic Learning Related stress domain has maximum Correlation with Group activity which involves Student participation which suggest that student academic learning in group predisposes them to stress. Social Life Related Stressors (SRS) like interaction with patients, lack of time for family and friends, unable to answer patients doubts, facing death of patients, frequent interruption of work by others if not solved on time causes stressful student life. Different Semester contributes towards significant social related stress in both male and female students. Education status of Mother of male students was found to be significantly associated with Social related stress and

whether decision to join medical profession was taken by self, parents, siblings was found to be significant Stressor among both male and Female students. Social life Stressors are responsible for 2.9% Severe Stress and 46.4% Moderate Stress among medical students. Social Related Stress have maximum correlation with Intra and Inter personal relation stress which suggest conflicts in relationship are source of major stress.

Students when asked to work or prepare a project in group, this itself act as a stressor for them. Mother Education of male student and place of residence of male student showed significant effect of group activity related stressor on them. Group Activity related stressors are responsible for causing 12.4% severe Stress and 37.9% moderate stress. Presence of desire related stressor among students were assessed like parental pressure to study well, Family Responsibility and unwillingness to study medicine among student and it was found that female student have more significant effect of desire related stress in relation with their semester, place of schooling and place of residence. Desire related stressor is responsible for causing 4.7% severe stress and 23.9% moderate stress. Desire related stress showed maximum correlation with Group Activity related stress .Students were assessed on whether lack of enough study material, lack of guidance from Teacher, incompetent Teachers, inappropriate Assignments, absence of feedback from teachers and lack of recognition from teachers contributes towards Teaching and learning related stressor among them it was found that female students showed significant association of TLRS with different semester . Teaching and learning stressors are responsible for causing 8.9% severe stress and 39.7% moderate stress. Intra and Interpersonal related stressor are responsible for causing 10.3% Severe stress and 37.4% Moderate Stress. however various other studies have been done so far but Students Personal problems

and its relation with student psychological morbidity and academic success is still unclear<sup>[2,20]</sup> Inter and Intra Personal relationship showed maximum correlation with Teaching and Learning Stress which emphasizes the impact of emotional health on student's learning.

### Conclusion

Medical Students of India are under lots of stress and there are various stressor as shown in this study apart from academics related stress in their life. Timely intervention dedicated on particular stressors will prove to be very significant in reducing their stress level.

**Ethical Clearance:** Taken from Institutional Ethics Committee of the Medical College.

**Source of Funding:** Self

**Conflict of Interest** -Nil

### References

- Sherina MS, Lekhraj R, Nadarajan K . Prevalence of emotional disorder among medical students in a Malaysian university. *Asia Pacific Family Medicine Journal* 2003;2:213-217.
- Saipanish, R. Stress among medical students in a Thai medical school. *Med Teach.* 2003;25(5):502-506.
- Muhamad S.B.Y, Ahmad F.A.R and Yaacob MJ. Prevalence and sources of stress among medical students in Universiti Sains Malaysia [dissertation]. *Medical Education: Universiti Sains Malaysia (USM) Mei* 2009.
- Miller, P. M. & Surtees, P. G. Psychological symptoms and their course in first-year medical students as assessed by the Interval General Health Questionnaire (I-GHQ). *Br J Psychiatry.* 1991; 159:199-207.
- Ali Montazeri\*, Amir Mahmood Harirchi, Mohammad Shariati, Gholamreza Garmaroudi, Mehdi Ebadi and Abolfazl Fateh . The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version *Health and Quality of Life Outcomes* 2003;1. Available online: <http://www.hqlo.com/content/1/1/66>.
- Ko SM, Kua EH, Fones CSL. Stress and the undergraduate. *Singapore Med. J.* 1999;40: 627-630.
- Aktekin M., Karaman T., Senol Y.Y., Erdem S., Erengin H. & Akaydin M. Anxiety, depression and stressful life events among medical students: a prospective study in Antalya, Turkey. *Medical Education.* 2001;35(1):12-17.
- Muhamad S.B.Y, Ahmad F.A.R and Yaacob M.J. The development and validity of the Medical Student Stressor Questionnaire (MSSQ). *ASEAN Journal of Psychiatry, Jan-June* 2010;11 (1). Available online: <http://www.aseanjournalofpsychiatry.org/oe11105.htm>
- Zaid, Z. A., Chan, S. C. & Ho, J. J. Emotional disorders among medical students in a Malaysian private medical school. *Singapore Med J.* 2007;48(10):895-899.
- Linn, B. S. & Zeppa, R. Stress in junior medical students: relationship to personality and performance. *J Med Educ.* 1984; 59(1):7-12.
- Siegrist J. Adverse health effects of high-effort/low-reward conditions, *Journal of Occupational Health Psychology.* 1996;1:27-41.
- Rosal, M. C., Ockene, I. S., Ockene, J. K., Barrett, S. V., Ma, Y. & Hebert, J. R. A longitudinal study of students' depression at one medical school. *Acad Med.* 1997; 72(6):542-546.
- Shapiro, S. L., Shapiro, D. E. & Schwartz, G. E. Stress management in medical education: a review of the literature. *Acad Med.* 2000;75(7):748-759.
- Clark, E. J. & Rieker, P. P. Gender differences in relationships and stress of medical and law students. *J Med Edu.,*1986; 61(1):32-40.
- Niemi, P. M. & Vainiomaki, P. T.. Medical students' distress - quality, continuity and gender differences during a six-year medical programme. *Med Teach.* 2006;28(2):136-141.
- Niemi, P. M. & Vainiomaki, P. T. Medical students' academic distress, coping and achievement strategies during the pre-clinical years. *Teaching & Learning in Medicine.* 1999;11(3):125-134.
- Pickard, M., Bates, L., Dorian, M., Greig, H. & Saint, D. Alcohol and drug use in second-year medical students at the University of Leeds. *Med Educ.* 2000;34(2):148-150.
- Newbury-Birch, D., White, M. & Kamali, F. Factors influencing alcohol and illicit drug use amongst medical students. *Drug Alcohol Depend.* 2000;59(2):125-130.

19. Flaherty, J. A. & Richman, J. A. Substance use and addiction among medical students, residents, and physicians. *Psychiatric Clin North Am.* 1993; 16(1):189-197.
20. Liselotte N. Dyrbye, Matthew R. Thomas and Tait D. Shanafelt. Medical students distress: causes, consequences, and proposed solutions, *Mayo Clin Proc*, 2005;80(12):1613-1622.
21. Hays, L. R., Cheever, T. & Patel. P. Medical student suicide, 1989-1994. *Am J Psychiatry*, 1996;11153(4):553-555.
22. Lazarus R.S. Theory-Based Stress Measurement. *Psychology Inquiry*.1990;1 (1):3-13.
23. Lazarus, R. S., & Folkman, S. *Stress, appraisal, and coping*. New York: Springer.1984.
24. Muhamad S.B.Y, Ahmad F.A.R and Yaacob M.J. The development and validity of the Medical Student Stressor Questionnaire (MSSQ), *ASEAN Journal of Psychiatry*, Jan-June 2010;11 (1). Available online: <http://www.aseanjournalofpsychiatry.org/oe11105>.
- 25.. Guthrie E.A., Black D., Shaw C.M., Hamilton J., Creed F.H. & Tomenson B. Embarking upon a medical career: psychological morbidity in first year medical students. *Med Educ*, 1995;29(5):337-341.
26. Kaufman D.M, Day V. & Mensink D. Stressors in 1st-year medical school: comparison of a conventional and problem-based curriculum. *Teaching and Learning in Medicine.* 1996; 8(4):188-194.
27. Kaufman D.M, Day V. & Mensink D. Stressors in Medical School: Relation to curriculum format and year of study. *Teaching and Learning in Medicine* 1998;10(3):188-194.
28. Muhamad Saiful Bahri Yusoff & Ahmad Fuad Abdul Rahim. *The Medical Student Stressor Questionnaire (MSSQ) KKMED*. Manua Publications Medical Education Department, School of Medical Sciences, USM, Kubang Kerian, 16150 Kota Bharu Kelantan, Malaysia February 2010.