Risk Factors of Stress and an Intervention Plan to Reduce Stress among Final Year MBBS Students in Kerala

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ABSTRACT

Introduction: Repeated evidence showed that medical students are subjected to considerable stress has been published over the past decades. The present study looked into the identified risk factors and an intervention training plan was developed to be tested and used in the medical student population.

Material and methods: This is a case control study which included final year MBBS students of Government Medical Colleges in Kerala. All the students were screened for stress and randomly selected them as cases (stressed) and controls(nonstressed) after getting Informed Written Consent and institutional ethical clearence.

Results: The Age, Religion and Monthly Family Income are comparable among Cases and Controls as p-values were Non-Significant. In Univariate Analysis, 17 variables became Significant. The Logistic Model showed strong association of all these 3 Risk Factors with stress. According to the determinants identified in the present study, an appropriate Intervention Training Plan for stress reduction among these students.

Conclusion: Inability to manage the available time due to Poor Time Management Skills of the students (OR 14.8) and public humiliation by Faculty (OR 6.1) increase the risk of stress among the final year MBBS students in Kerala. The Intervention Training Plan developed can be used to reduce stress among these students in future.

Keywords: Stress, Determinants, Intervention Training Plan, Time management.

INTRODUCTION

Stress refers to the non-specific response of the body to any demand made on it. Currently the term typically refers to both physiological and psychological responses to increased demands on the organism.[1] Up to a certain extent stress proves to be accelerating the magnitude and quality of efforts in achieving the desired goal. But prolonged stress is likely to reduce the efficiency of a person.

Stress is believed to result from experienced overload with further emphasis on experienced unpredictability and uncontrollability of events. This implies that the existence of stress in a person is partly inferred from information on the person's experience of lack of control. Final year is the period just before they qualify to become doctors and is reported to be highly stressful compared to first MBBS and second MBBS. Intense stress predicted clinical depression and somatic distress in third year medical students. Mosley et al reported that, 57% of somatic distress and 23% of clinical levels of depression in their study on stress, coping

and well-being among third year medical students.[2]

The population under study is the privileged medical student community who are future doctors. In order to be competent enough to serve the public with empathy, they need to train in a healthy and stress free environment. Otherwise the consequences of chronic stress perceived during the whole training period will reduce their work efficiency and indirectly it will become a public health problem.

Repeated evidence showed that medical students are subjected to considerable stress has been published over the past decades. There is evidence that mental distress during medical school predicts later problems in physicians, which in addition to the personal suffering of the individual doctor might negatively affect patient care.[3] It is known that physicians do not seek the kind of professional help for themselves as they would provide for their patients. Medical students seem to adopt a similar behaviour.[4]

So far, there were no specific stress management programs focused to the medical student population. Early intervention will benefit the students and faculty to solve the problem of stress to certain extent, so that their performance could be enhanced. Prevention of stress related illness is currently the subject of a vast amount of empirical research. Two interventions that used meditation-type practice did seem to improve mood disturbance in both junior doctors and medical students.[5,6] Timely and appropriate interventions if incorporate into the curriculum can prevent the effects of chronic stress experience during the whole training period of Medicine. The present study looked into the identified risk factors and an intervention training plan was developed to be tested and used in the medical student population.

MATERIAL AND METHODS

It is a Case Control Study conducted at Government Medical Colleges southern, central and northern parts of Kerala. The cases and controls were selected proportionately from the whole study population in the three Medical Colleges. Random Sampling of Cases and Controls was done from the Perceived Stress Scale(PSS) Screened separate lists for

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the Cases (PSS score ≥ 20, 20-40) and Controls (PSS score 0-19) of the above mentioned 3 colleges, in Phase 2. For Phases 1 and 3, convenient sampling technique was adopted for qualitative methods. Stress was measured as dependent variable. Sixteen different independent variables were measured.

Phases 1 and 3 - Final year MBBS students of the Government Medical Colleges mentioned above and Clinical Teachers and Parents of these students. Phase 2 – Final year MBBS students who satisfy the definition of Cases and Controls were recruited. Rationale for selecting Cases and Controls was to identify multiple risk factors for the single outcome. Who did not give consent were excluded.The whole study was undertaken in 3 consecutive phases.

The training need analysis consists of 4 principal stages of activity which includes Identifying Training Needs, Plan, Design and Develop Training, Implement Training and Assess Results and Evaluate Training Outcomes. Planning training involved Deciding who needs to be trained, Establishing the number of people for whom training is needed, Specifying the aim of the training they would undertake, Utilizing the available resources and Recognizing important constraints which might limit what can be achieved.

Designing Training involved Number of people who need to be trained, grouping of these people into areas of common training need, their location, their availability for training, Timescale within which training should be implemented, Funding support available for both development and implementation, Availability of suitable trainers and Institutional resources available.

The data was collected using pre-tested proforma with the all identified variables, PSS, GHQ, FGD Guide, In-Depth Interview Schedule and Key Informant Interview Schedule.

STATISTICAL ANALYSIS

For continuous variables means were calculated and compared by 't' test. Chi square test was used for determination of association between categorical independent variables with dependent variable stress. Crude Odds Ratios and their Confidence Intervals were also calculated for these associations. Mann Whitney U test was done to test the significance of Monthly Family Income since it was a skewed distribution. P value less than 0.05 was considered significant.

RESULTS

The age ranged from 22 to 31 for cases and 21 to 25 for controls. The 16 significant variables and Female Gender were more represented among Cases. All the associations were statistically significant given Chi-Square Test, p value, Odds Ratios and their Confidence Intervals (table-1). The findings on Emotional and Social Support from Peers, Friends, Family Teachers and Others was shown in table-2.

Mantel – Haenszel Chi Square was done as the test of significance for variables like Competitive Environment and Academic Pressure showed both Confounding and Interaction. Psychiatric Morbidity, Examination, Facing Unfamiliar Situations, Taking Responsibilities, Favouritism or Denied Opportunities by Faculty, and High Parental Expectations showed Interactions. In Multivariate Analysis using Logistic Regression, all statistically significant variables and interaction terms were entered in a stepwise manner noting the change in the effect estimate of stress. The variables Poor Time Management Skills, Publicly Humiliated by Faculty, Examination, Academic Pressure, and Female Gender became significant and rest of the variables were exited from the Logistic Model. The Logistic Regression was then repeated with these 5 variables and the Gender by Academic Pressure Interaction Term along with scientifically important variables coping and social support to provide complete control over confounding. Finally,three variables became Significant in Logistic Regression. The model with 3 Risk Factors Poor Time Management Skills, Female Gender and Publicly Humiliated by Faculty is predicting 79% of overall accuracy rate. The interaction term and other variables became insignificant. The reduced model is as good as the full model which was predicting 81.7% with 5 variables (table-3).

Female Gender, Poor Time Management skills and Publicly Humiliated by Faculty were turned out with strong association to stress. The Final Model was assessed using Hosmer and Lemeshow Test. The significance was 0.07, meaning reasonable Fit. Even though Examination was significant in univariate analysis, it became non-significant in final logistic regression (table-4).

DISCUSSION

In the present study, the Univariate Analysis of Competitive Environment was perceived as significant factor by 74.7% of cases as compared to 32.8% of controls. In many medical schools, the environment itself is an all prevailing pressure situation, providing an authoritarian and rigid system, one that encourages competition rather than cooperation between learners.[8] The importance of learning environment for achievement was reported to have profound impact on student's burnout.[7]

ThePsychiatric Morbidity was seen in 80.6% of cases vs. 33.9% of controls. This finding is disturbing and require urgent response. Erica Frank (2006) also reported that poor mental health is significantly associated with belittlement or harassment by faculty and these students had frequent histories of depression and suicide attempts.[8] In the study of determinants of mental well-being in medical students, the researchers observed that one-fifth of the students scored above the threshold on GHQ indicating notable psychiatric morbidity.[9] Both the developed and the developing world reported psychiatric morbidity in medical students comparable to our findings.[10] The pressure from studies, Peer Conflict, Vast Syllabus, Examination and Information Overload were found to be significant as stress factors.[11] Facing Unfamiliar Situations, Taking Responsibilities, Outstanding Performance was also found to be stressful. Similar finding was also observed by.[12]

Faculty mistreatment in the form of Favouritism or Denied

Variable	Cases Number (%)	Controls Number (%)	Total Number (%)	p value	Odds Ratio 95% CI
Psychiatric Morbidity (≥3)	150 (80.6)	63 (33.9)	213 (57.3)	p=0.000	8.14
No (<3)	36 (19.4)	123 (66.1)	157 (42.7)		(5.01-3.07)
Peer Conflict	87 (46.8)	55 (29.6)	142 (38.2)	p= 0.001	2.09
No	99 (53.2)	131 (70.4)	230 (61.8)		(1.37-3.21)
Vast Syllabus	160 (86)	128 (68.8)	288 (77.4)	p= 0.000	2.79
No	26 (14)	58 (31.2)	84 (22.6)		(1.66-4.68)
Examination	170 (91.4)	152 (81.7)	322 (86.6)	p=0.006	2.38
No	16 (8.6)	34 (18.3)	50 (13.4)		(1.26-4.48)
Practical Exam	152 (81.7)	121 (65.1)	273 (73.4)	p=0.000	2.4
No	34 (18.3)	65 (34.9)	99 (26.6)		(1.49-3.88)
Information Overload	114 (61.3)	71 (38.2)	185 (49.7)	p=0.000	2.57
No	72 (38.7)	115 (61.8)	187 (50.3)		(1.69-3.89)
Competitive Environment	139 (74.7)	61 (32.8)	200 (53.8)	p=0.000	6.06
No	47 (25.3)	125 (67.2)	172 (46.2)		(3.86-9.51)
Facing Unfamiliar Situations	93 (50)	56 (30.1)	149 (40.1)	p=0.000	2.32
No	93 (50)	130 (69.9)	223 (59.9)		(1.52-3.55)
Responsibilities	118 (63.4)	78 (41.9)	196 (52.7)	p= 0.000	2.40
No	68 (36.6)	108 (58.1)	176 (47.3)		(1.58-3.65)
Academic Pressure	151 (81.2)	107 (57.5)	258 (69.4)	p=0.000	3.19
No	35 (18.8)	79 (42.5)	114 (30.6)		(1.99-5.09)
Expectations about Outstanding Performance	99 (53.2)	54 (29)	153 (41.1)	p= 0.000	2.78
No	87 (46.8)	132 (71)	219 (58.9)		(1.81-4.27)
Poor Time management skills	174 (93.5)	93 (50)	267 (71.8)	p= 0.000	14.5
No	12 (6.5)	93 (50)	105 (28.2)		(7.56-7.83)
No Time for Personal Activities	94 (50.5)	57 (30.6)	151 (40.6)	p= 0.000	2.31
No	92 (49.5)	129 (69.4)	221 (59.4)		(1.51-3.53)
Publicly Humiliated by Faculty	150 (80.6)	74 (39.8)	224 (60.2)	p= 0.000	6.31
No	36 (19.4)	112 (60.2)	148 (39.8)		(3.95-0.07)
Favoritism or Denied Opportunities	117 (62.9)	85 (45.7)	202 (54.3)	p= 0.001	2.02
No	69 (37.1)	101 (54.3)	170 (45.7)		(1.33-3.05)
High Parental Expectation	66 (35.5)	39 (21)	105 (28.2)	p= 0.002	2.07
No	120 (64.5)	147 (79)	267 (71.8)		(1.30-3.29)
Table-1: Univariate Analysis of Significant Variables with Odds Ratio >2					

Variable	Cases Number (%)	Controls Number (%)	Total Number (%)	p value	Odds Ratio 95% CI
No support in the form of Advice and Information	6(3.2)	3 (1.6)	9 (2.4)	p= 0.311	2.03
Got Support	180 (96.8)	183 (98.4)	363 (97.6)		(0.50-8.25)
No support in the form of Assistance and Reassurance	11 (5.9)	7 (3.8)	18 (4.8)	p= 0.33	1.61
Got Support	175 (94.1)	179 (96.2)	354 (95.2)		(0.61-4.24)
No Support in the form of Encouragement to enhance Self Esteem	17 (9.1)	18 (9.7)	35 (9.4)	p= 0.86	0.94
Got Support	169 (90.9)	168 (90.3)	337 (90.6)		(0.47-1.89)
Table-2: Univariate Analysis of Emotional and Social Support					

opportunities, High parental Expectations, Romantic Relations, Inadequacy of Learning Resources, Inadequate Training by Faculty, Inadequate Entertainments and Recreational Facilities, Poor Communication Skills, Change in Sleeping Habits, Change in Eating Habits etc. was not found to be a risk factor for stress as we got a non-significant association in our study.

In the present study students used different types of coping strategies and the most prevalent were Problem Solving (91.4%), Positive Thinking (90.4%), Acceptance (89.8%) and Avoidance (80.1%). Alcohol and substance use was prevalent in 9.9% of the study population. 59% reported Self Blame as one of the coping styles they adopted to deal with

stress which is a negative coping strategy and will never resolve the problems. Al-Haqwi in 2010 had reported that the reason for alcohol and substance in medical students is stress and recommended the need for training them stress coping strategies.[13]

A training Plan was developed according to TNA conducted in Phase 3. One-day Workshop on Time Management Skills to improve their time management skills is proposed for each Phase of MBBS students. To improve the Mental Health status of students to manage stress effectively, 2 days' workshop on Stress management, Coping Strategies, Motivation, Communication and Conflict Management Skills is planned to conduct in the 1st Semester of 1st MBBS,

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Variable	Cases N (%)	Controls N (%)	Total N (%)	Stratum Specific OR	MH OR	95% CI of MH OR	p value
Poor Time management				10.33 & 0.49	16.69	8.27-33.7	p= 0.000
Female (F)	127 (91.4)	47 (51.1)	174 (75.3)				
Male(M)	47 (100)	46 (48.9)	93 (66)				
Publicly Humiliated				6.5 & 5.7	6.2	3.8-9.9	p= 0.000
F	113 (81.3)	37 (40.2)	150 (64.9)				
M	37 (78.7)	37 (39.4)	74 (52.5)				
Competitive Environment				4.3 & 7.1	5.2	3.3-8.2	p= 0.000
F	108 (77.7)	41 (44.6)	149 (64.5)				
M	31 (66)	20 (21.3)	51 (36.2)				
Psychiatric Morbidity				6.5 & 9.7	7.5	4.6-12.1	p= 0.000
F	113 (81.3)	37 (40.2)	150 (64.9)				
M	37 (78.7)	26 (27.7)	63 (44.7)				
Peer Conflict				2.1 & 1.6	1.95	1.3-3.0	p= 0.003
F	69 (49.6)	29 (31.5)	98 (42.4)				
M	18 (38.3)	26 (27.7)	44 (31.2)				
Vast Syllabus				2.3 & 2.6	2.4	1.4-4.1	p= 0.001
F	122 (87.8)	70 (76.1)	192 (83.1)				
M	38 (80.9)	58 (61.7)	96 (68.1)				
Examination				1.6 & 4.2	2.3	1.2-4.4	p= 0.016
F	126 (90.6)	79 (85.9)	205 (88.7)				
M	44 (93.6)	73 (77.7)	117 (83)				
Practical Exam				2.2 & 2.3	2.2	1.4-3.7	p= 0.001
F	115 (82.7)	63 (68.5)	178 (77.1)				
M	37 (78.7)	58 (61.7)	95 (67.4)				
Information Overload				2.3 & 2.4	2.4	1.5-3.6	p= 0.000
F	88 (63.3)	39 (42.4)	127 (55)				
M	26 (55.3)	32 (34)	58 (41.1)				
Facing Unfamiliar Situations				2.3 & 1.9	2.2	1.4-3.4	p= 0.001
F	73 (52.5)	30 (32.6)	103 (44.6)				
M	20 (42.6)	26 (27.7)	46 (32.6)				
Taking Responsibilities				2.5 & 1.9	2.3	1.5-3.5	p= 0.000
F	91 (65.5)	40 (43.5)	131 (56.7)				
M	27 (57.4)	38 (40.4)	65 (46.1)				
Academic Pressure				3.9 & 1.6	2.6	1.6-4.2	p= 0.000
F	121 (87.1)	58 (63)	179 (77.5)				
M	30 (63.8)	49 (52.1)	79 (56)				
Outstanding Performance				2.7 & 2.1	2.5	1.6-3.8	p= 0.000
F	80 (57.6)	31 (33.7)	111 (48.1)				
M	19 (40.4)	23 (24.5)	42 (29.8)				
No Time for Personal matters				2.1 & 2.5	2.2	1.4-3.4	p= 0.000
F	71 (51.1)	31 (33.7)	102 (44.2)				
M	23 (48.9)	26 (27.7)	49 (34.8)				
Favoritism or Denied Opportunities	86 (61.9)	45 (48.9)	131 (56.7)	1.7 & 2.6	1.98	1.3-3.0	p= 0.002
F	31 (66)	40 (42.6)	71 (50.4)				
M							
High Parental Expectations				1.4 & 3.6	1.95	1.2-3.1	p= 0.005
F	47 (33.8)	24 (26.1)	71 (30.7)				
M	19 (40.4)	15 (16)	34 (24.1)				
Table-3: Mantel – Haenszel Chi Square test results for Gender Association							

6th Semester of 2nd MBBS and 8th Semester of 3rd MBBS. Training Modules were developed separately for Students and Faculty which give details regarding the Objectives of training, duration and methodology of sessions which included Lectures, Discussions, Case Studies, and Role Plays. It was reported that, medical schools in the United States and Canada have initiated health-promotion programs and have reported positive results in reducing the negative effects of stress upon health and academic performance of medical students.[14]

CONCLUSION

Inability to manage the available time due to Poor Time Management Skills of the students and public humiliation by Faculty increase the risk of stress among the final year MBBS students in Kerala. Female Gender as such causes

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Variable	Crude Odds Ratio	Wald Statistic	Significance	Adjusted OR	95% CI
Gender – Female Male	3.02	4.5	p= 0.03	6.17 1.00	1.15-33.12
Examination – Yes No	2.38	0.82	p= 0.36	0.64 1.00	0.25-1.67
Poor Time Management Skills - Y No	14.5	51.9	p= 0.000	14.79 1.00	7.12-30.79
Academic Pressure – Yes No	3.19	2.2	p= 0.14	4.31 1.00	0.61-30.41
Publicly Humiliated by Faculty - Yes No	6.31	41.7	p= 0.000	6.14 1.00	3.5-10.7
Coping – Ineffective Effective	1.09	0.99	p= 0.32	1.32 1.00	0.77-2.26
Social Support – No Yes	2.03	0.34	p= 0.56	1.62 1.00	0.32-8.1
Gender by Academic Pressure	2.6 (MH)	0.89	p= 0.34	0.56	0.16-1.88

Table-4: The relationship between the Risk Factors with Stress after controlling for all extraneous variables (Final Model of Logistic Regression)

a 6.2 times more odds for developing stress among them. The findings of this study indicated the need for stress management intervention programs in medical colleges. Initiatives need to be taken to reduce the stress in them. Evidence based intervention programs will help to reduce stress and psychiatric morbidity. The intervention training plan will improve scientific technique for the wealth of information, thereby translating research evidence into safer care of our medical student population.

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