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A cross-sectional comparative study of stress and coping among medical undergraduate at a medical college

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ABSTRACT

Background and objectives: To assess and contrast how common stress is among first- and last-year students. To assess how first-year and fourth-year medical students handle stress.

Methods: A comparative cross-sectional study was carried out on 200 participants (100 first-year students and 100 final-year students) after convenience sampling was used to get a signed informed consent.

Result: 20.5%, or 19 of them, reported feeling stressed at some point. Out of the 107 students that were present at school the entire day, 81 (75.7%) had normal stress levels, 11 (10.3%) moderate stress, 13 (12.1%) severe stress, 2 (1.9%), and none had extremely high levels. Overall, stress was a factor for 26 of them (24.3%).

Conclusion: Less maladaptive coping strategies were typically used by first-year students, and as they got closer to their final year, they started to use a mix of problem-focused and emotional coping strategies. Despite this, there was no statistically significant distinction between the two study groups in terms of depression, stress, or anxiety levels.

Keywords: Stress, coping, undergraduate, medical college, course year

INTRODUCTION

Mental health is regarded as an essential component of health by the World Health Organization. Medical education is intended to prepare graduates for a personallyrewarding and socially meaningful career promoting health and caring for the sick. But they are confronted with significant stressors Undergraduate medical education comprises strenuous study and training for 5–6 years. The curricular objectives are dynamic due to expanding knowledge and evolving therapies. During this period, medical students should acquire adequate professional knowledge, skills, and attitudes in order to prepare themselves to deal with life-long professional challenges independently. Decreased study hours and increased demands of the course ranging from dissection hall in first year and clinical bedside classes in the wards from second year followed by theory classes in the post noon session further may affect the academic performance among some students, making way for stress and anxiety especially when exams are closer. As time passes some students feel a sense of lagging behind and start feeling lost and sometimes helpless in their academics. It was observed that the rigorous training during the course might adversely affect the student's physical and mental health. It has been reported that medical students consequently suffer from depression, anxiety, and stress [1,2].

Stress in medical training is a growing concern these days. Many studies have shown that medical students face high rate of psychological morbidity at various stages of their training, especially at the beginning, during the first year Stress, health and emotional problems can lead to mental distress. They can also hampercognitive functioning and learning, leaving a negative impact on it. An optimal level ofstress, earlier known as 'favorable stress' can enhance learning, but excessive stress canlead to physical and mental health problems reducing the self-esteem of the students. This stress when chronic may lead to a feeling of inefficiency and psychological disturbances like depression resulting in poor academics, low interest in academics, social withdrawal due to low academics, deviant attitude towards academics, self-harm, unprofessional attitudes etc. This may also affect the sleep cycle, appetite and health of the individuals [2,3].

Coping is often defined as efforts to prevent or diminish threat, harm, and loss, or to reduce associated distress. Some prefer to limit the concept of coping to voluntary responses. Coping is a very broad concept. Several distinctions have been made within the broad domain; some of the more important ones include Problem-focused coping, Emotion-focused coping, Engagement or approach coping, Disengagement coping. Problem-focused coping addresses the stressor itself like taking steps to remove or to evade it, or to diminish its impact if it cannot be evaded [3,4].

Emotion-focused coping aims to minimize distress triggered by the stressors. There are many ways to reduce distress, ranging from self-soothing (e.g., relaxation, seeking emotional support), to expression of negative emotions (eg : yelling, crying), to focus on negative thoughts (eg : rumination), to attempts to escape stressful situations (e.g: avoidance, denial, wishful thinking). Some behaviors can serve either function, depending on the goal behind their use

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for example, seeking support is emotion focused if the goal is to obtain emotional support and reassurance, but problem focused if the goal is to obtain advice or instrumental help. Problem and emotion-focused coping can also facilitate one another [4,5].

Engagement or approach coping, which is aimed at dealing with the stressor or related emotions, and disengagement or avoidance coping, which is aimed at escaping the threat or related emotions. Engagement coping includes problem-focused coping and some forms of emotion-focused coping: support seeking, emotion regulation, acceptance, and cognitive restructuring. Disengagement coping (maladaptive) includes responses such as avoidance,denial, and wishful thinking. Disengagement coping is often emotion focused, because it involves an attempt to escape feelings of distress. Sometimes disengagement coping is almost literally an effort to act as though the stressor does not exist, so that it does not have to be reacted to, behaviorally or emotionally [5].

MATERIAL AND METHODS

Following the acquisition of a signed informed permission by convenience sampling, a comparative cross-sectional study was conducted on 200 individuals (100 first-year students and 100 final-year students) who met the criteria for selection at Osmania medical college, Hyderabad, Telangana, India from August 2022 to July 2023

INCLUSION CRITERIA

1) Medical students enrolled in their first and last years of medical school.
2) Participants who granted consent and were willing to participate in the study.

EXCLUSION CRITERIA:

1) Students with a history of physical disability, medical or surgical sickness, or psychiatric disease.
2) Participants in the study who did not consent to engage in it

RESULT

TABLE 1: GENDER DISTRIBUTION AMONG FIRST AND FINAL YEAR

COURSE YEAR		GENDER		TOTAL
		MALE	FEMALE	
	FIRST YEAR	47	53	100
	FINAL YEAR	23	77	100
TOTAL		70	130	200

TABLE 2. DOMICILE DISTRIBUTION AMONG FIRST AND FINAL YEAR

DOMICILE		COURSE YEAR	
		FIRST YEAR	FINAL YEAR
	URBAN	80	82
	RURAL	20	18
	TOTAL	100	100

TABLE 3. RELIGION DISTRIBUTION AMONG FIRST AND FINAL YEAR

RELIGION		COURSEYEAR		TOTAL
		FIRST YEAR	FINAL YEAR	
	HINDU	88	77	165
	MUSLIM	8	16	24
	CHRISTIAN	2	4	6
	OTHERS	2	3	5
TOTAL		100	100	200

Table 4. SOCIOECONOMIC STATUS IN FIRST AND FINAL YEARS

SOCIO ECONOMIC STATUS		COURSE YEAR	
		FIRST YEAR	FINAL YEAR
	UPPER	17	37
	UPPER MIDDLE	33	33
	LOWER MIDDLE	29	18
	UPPER LOWER	8	7
	LOWER	13	5
	Total	100	100

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Table 5: MEDIUM OF EDUCATION IN FIRST AND FINAL YEARS

MOE		COURSE YEAR		TOTAL
		FIRST YEAR	FINAL YEAR	
	TELUGU	18	8	26
	ENGLISH	82	92	174
Total		100	100	200

Of the 100 first year students who participated in the study, 76% students had no signs and symptoms of stress, 13% students had mild stress, 11% students had moderate stress, none had severe stress.

And of the 100 final year students who participated 80% students had no signs and symptoms of stress, 3% students had mild stress, 13% students had moderate stress and 4% students had severe stress and none had severe stress

Table 6: STRESS LEVELS IN FIRST AND FINAL YEARS

COURSE YEAR		STRESS				TOTAL
		NORMAL	MILD	MODERATE	SEVERE	
	FIRST YEAR	76	13	11	0	100
	FINAL YEAR	80	3	13	4	100
TOTAL		156	16	24	4	200

Among the 130 female students who participated in the study 104 (80%) of them werenormal, 8 (6.2%) of them had mild stress, 16 (12.3%) of them had moderate stress, 2 (1.5%) of them had severe stress, and none of them had extremely severe stress, over all 26 (20%) had some degree of stress. Of the 70 male students 51(72.9%) of them were normal, 9 (12.9%) of them had mildstress, 8(11.4%) of them had moderate stress, 2 (2.9%) of them had extremely severestress and none of them had severe stress. Overall 19 (27.1%) of them had some degree of stress.

Table 7: SEVERITY OF STRESS VS GENDER

GENDER			STRESS				Total
			NORMAL	MILD	MODERATE	SEVERE	
	MALE	Count	51	9	8	2	70
		% within gender	72.9%	12.9%	11.4%	2.9%	100.0%
	FEMALE	Count	104	8	16	2	130
		% within gender	80.0%	6.2%	12.3%	1.5%	100.0%
TOTAL		Count	155	17	24	4	200

Among the 200 students who participated in the study 26 (13%) of them were from Telugu medium of education, out of which 20 (76.9%) of them were normal, 1(3.9%) of them had mild stress, 3(11.5%) of them had moderate stress, 2(7.7%) of them had severe stress, and none of them had extremely severe stress. Overall 6(23%) of them had stress of some degree. Students from English medium of education constituted 87% of the study sample among whom 135(77.6%) of them were normal, 16(9.2%) of them had mild stress, 21(12.1%) of them had moderate stress, 2 (1.1%) of them had severe stress, none ofthem had extremely severe stress

Table 8: SEVERITY OF STRESS VS MEDIUM OF EDUCATION

MEDIUM OF EDUCATION			STRESS				Total
			NORMAL	MILD	MODERATE	SEVERE	
	TELUGU	Count	20	1	3	2	26
		% within MOE	76.9%	3.8%	11.5%	7.7%	100.0%
	ENGLISH	Count	135	16	21	2	174
		% within MOE	77.6%	9.2%	12.1%	1.1%	100.0%
TOTAL		Count	155	17	24	4	200

Bar Diagram-1

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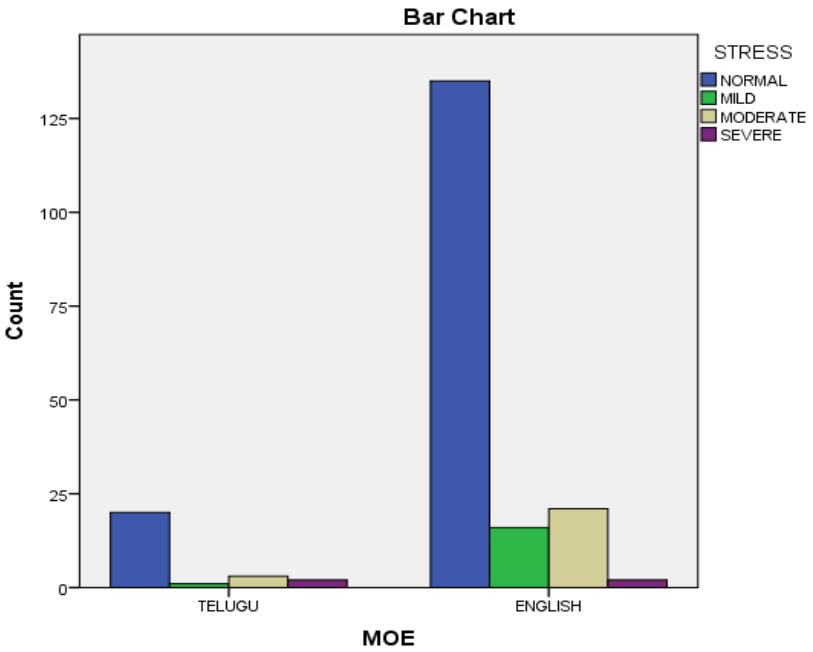
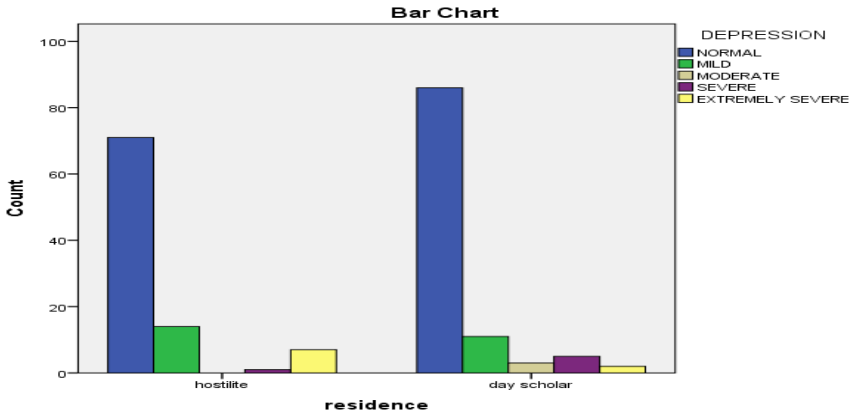


Among the 93 students who were living in a hostel, 74(79.6%) of them were normal, 6(6.5%) of them had mild stress, 11(11.8%) of them had moderate stress, 2(2.2%) of them had severe stress, and none of them had extremely severe stress. Overall 19(20.5%) of them had stress of some degree. Among the 107 students who were day-scholars, 81(75.7%) of them were normal,11(10.3%) of them had mild stress, 13(12.1%) of them had moderate stress, 2(1.9%) of them had severe stress, and none had extremely severe stress. Overall 26(24.3%) of them had stress of some degree.

Table 9: SEVERITY OF STRESS VS RESIDENCE

RESIDENCE			STRESS				Total
			NORMAL	MILD	MODERATE	SEVERE	
	HOSTELITE	Count	74	6	11	2	93
		% within RESIDENCE	79.6%	6.5%	11.8%	2.2%	100.0%
	DAY SCHOLAR	Count	81	11	13	2	107
		% within RESIDENCE	75.7%	10.3%	12.1%	1.9%	100.0%
TOTAL		Count	155	17	24	4	200

Bar Diagram-2



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Stress and coping skills:
Multiple regression analysis was done between stress in first years and the 15 domains of the COPE Inventory and the results are as follows:

The multiple correlation coefficient (R) was .518 and the coefficient of determination R square= .269(Table-10), this prediction was found to be statistically significant by the ANOVA (Table 11) [(F=1.960) p=.029]. The following individual variables were found to be statistically significant (Table- 12) [MD(β)= -.291 & p=.013], [UISS(β)=.433& p=.005].The scatter plots for the variables are depicted in the pictures (Scatter Plots S1-S2).

MD has a negative correlation which implied that in students who had stress used this coping style less often, whereas UISS had a positive correlation which implies that students who had stress used this coping style more often.

TABLE 10: MODEL SUMMARY- STRESS IN FIRST YEAR VS COPING SKILLS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.518a	.269	.132	.636

TABLE 11: ANOVA - STRESS IN FIRST YEAR VS COPING SKILLS

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	11.888	15	.793	1.960	.029[b]
Residual	32.351	80	.404		
Total	44.240	95			

TABLE 12: TABLE DEPICTING COEFFICIENT OF VARIATION OF COPING SKILLS FOR STRESS IN FIRST YEARS

Model	Unstandardized Coefficients β	t	Sig.
1 (Constant)	3.083	3.030	.003
PRAG	-.138	-.580	.564
MD	-.395	-2.541	.013
FOVOF	-.071	-.369	.713
UISS	.588	2.899	.005
AC	-.058	-.314	.754
DENIAL	-.021	-.066	.948
RC	.048	.311	.757
H	.372	1.743	.085
BD	-.542	-1.437	.154
R	.308	1.646	.104
UESS	-.067	-.367	.715
SU	-.608	-1.628	.107
ACC	-.095	-.512	.610
SOCA	-.184	-.945	.347
PLANNING	-.038	-.188	.851

AC: Active coping

ACC: Acceptance

BD: Behavioural Disengagement

D: Denial

FOVOF: Focus on Venting of emotions

H: Humor

MD: Mental Disengagement

PRAG: Positive Reinterpretation and Growth

R: Restraint

RC: Religious Coping

SU: Substance Use

SOCA: Suppression of Competing Activities

UESS: Utilization of Emotional Social Support

UISS: Utilization of Instrumental Social Support

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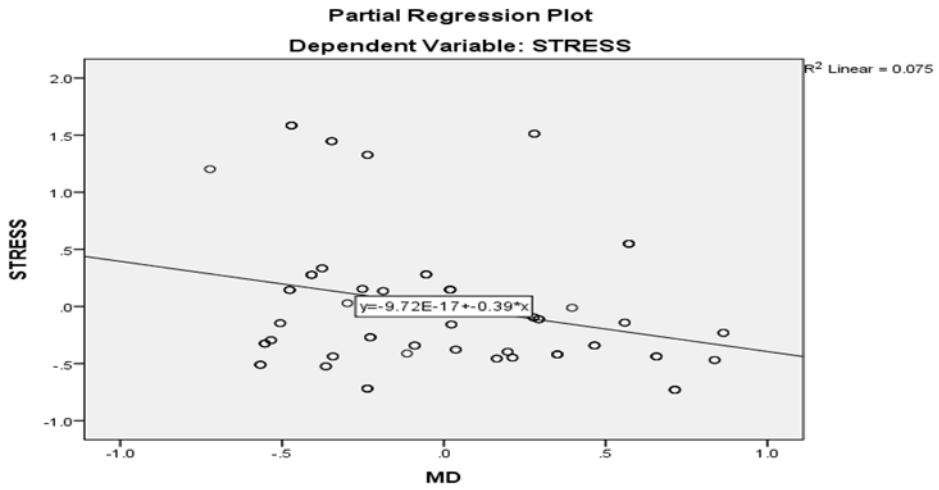
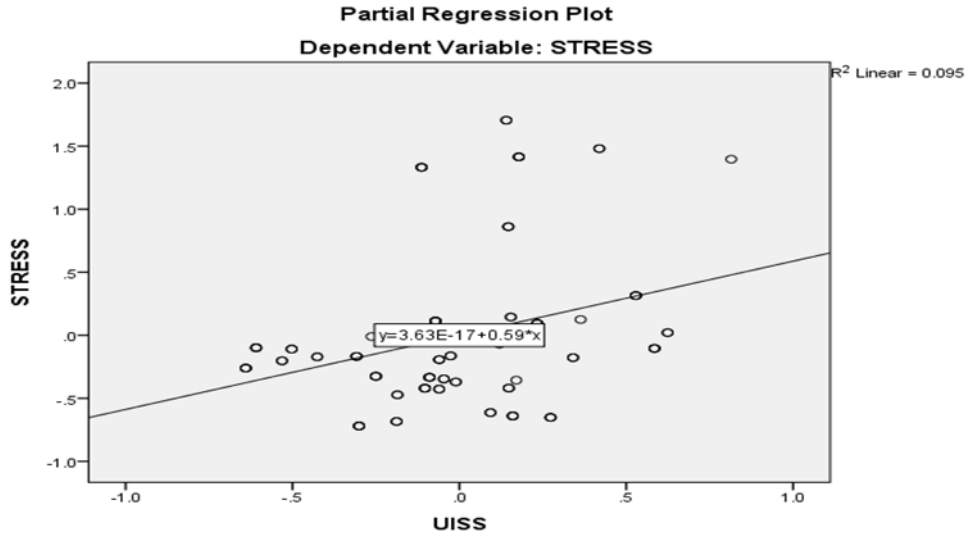
Scatter Plot S1



Scatter Plot- S2



Multiple regression analysis was done between stress in final years and the 15 domains of the COPE Inventory and the results are as follows:

The multiple correlation coefficient (R) was .691 and the coefficient of determination R square=.478 (Table-13), this prediction was found to be statistically significant by the ANOVA (Table-14) [(F=5.121) p<.0001]. The following individual variables were found to be statistically significant (Table-15), [PRAG(β)= .496 & p=.003], [FOVOF(β)=-.440 & p<.0001], [RC(β)= -.347 & p=.001], [H(β)=.381 & p= .001], [R(β)= -.265 & p=.032]. The scatter plots for the variables are depicted in the pictures (Scatter Plots S3-S7)

Focus on and venting of emotions (FOVOF), Restraint (R), Religious coping (RC), and planning had a negative correlation which implies that students who had stress used these coping styles less often, and positive correlation was found with Positive reinterpretation and growth (PRAG) and Humor (H) which implies that students who had stress used these coping styles more often.

TABLE 13: MODEL SUMMARY- STRESS IN FINAL YEAR VS COPING SKILLS

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.691[a]	.478	.384	.680

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TABLE 14: ANOVA - STRESS IN FINAL YEAR VS COPING SKILLS

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	35.519	15	2.368	5.121	.000[b]
	Residual	38.841	84	.462		
	Total	74.360	99			

TABLE 15*:* TABLE DEPICTING COEFFICIENT OF VARIATI VARIATION OF COPING SKILLS FOR STRESS IN FINAL YEARS

Model	Standardized Coefficients β	t	Sig.
(Constant)		1.530	.130
PRAG	.496	3.097	.003
MD	-.084	-.808	.422
FOVOF	-.440	-3.892	.000
UISS	.080	.780	.438
AC	-.067	-.574	.568
DENIAL	-.083	-.756	.452
RC	-.347	-3.648	.000
H	.381	3.372	.001
BD	.181	1.540	.127
R	-.265	-2.177	.032
UESS	-.121	-1.064	.290
SU	-.082	-.933	.353
ACC	-.147	-1.256	.212
SOCA	.250	1.817	.073
PLANNING	-.254	-1.901	.061

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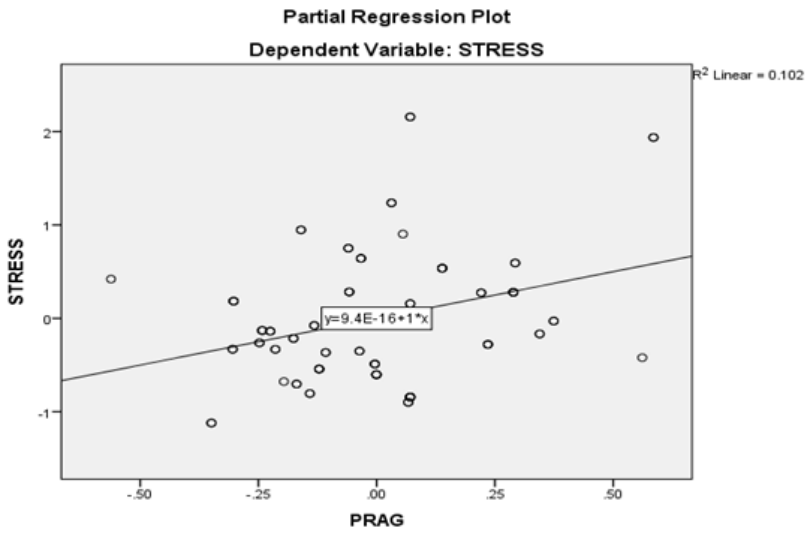
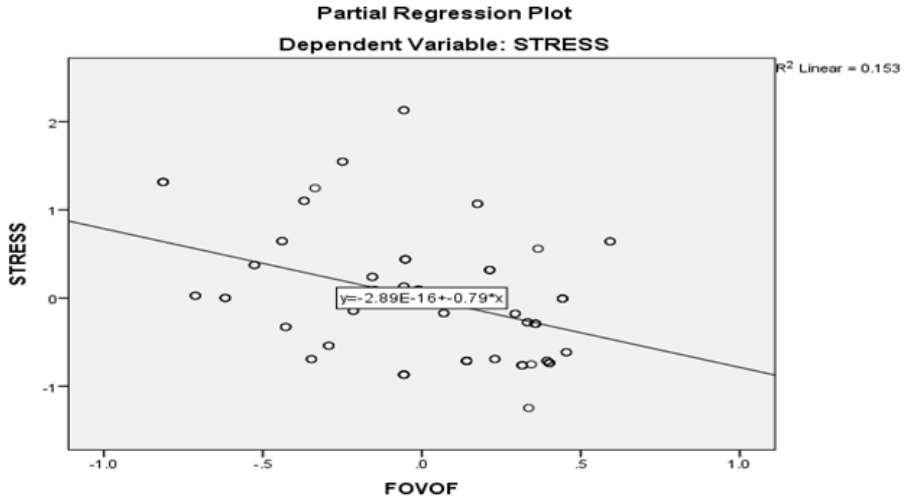
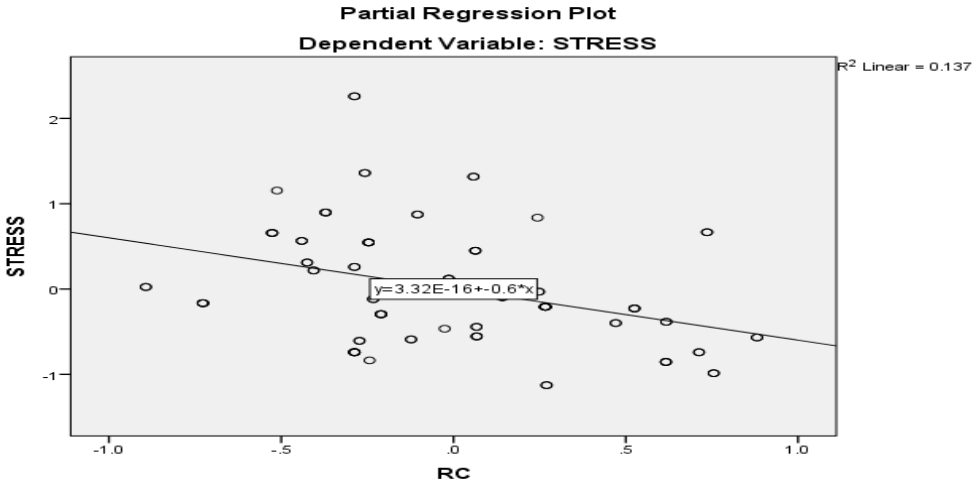
Scatter Plot S3



Scatter Plot S4





Scatter Plot S5

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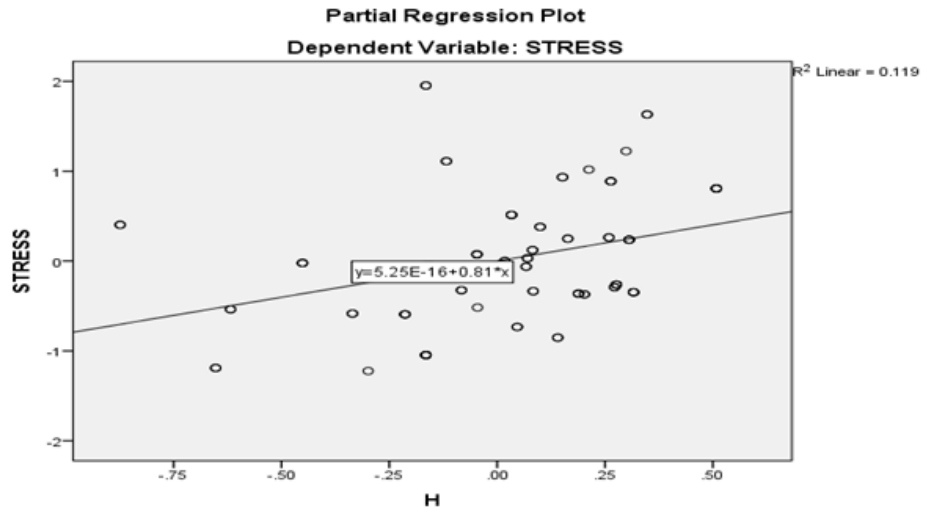
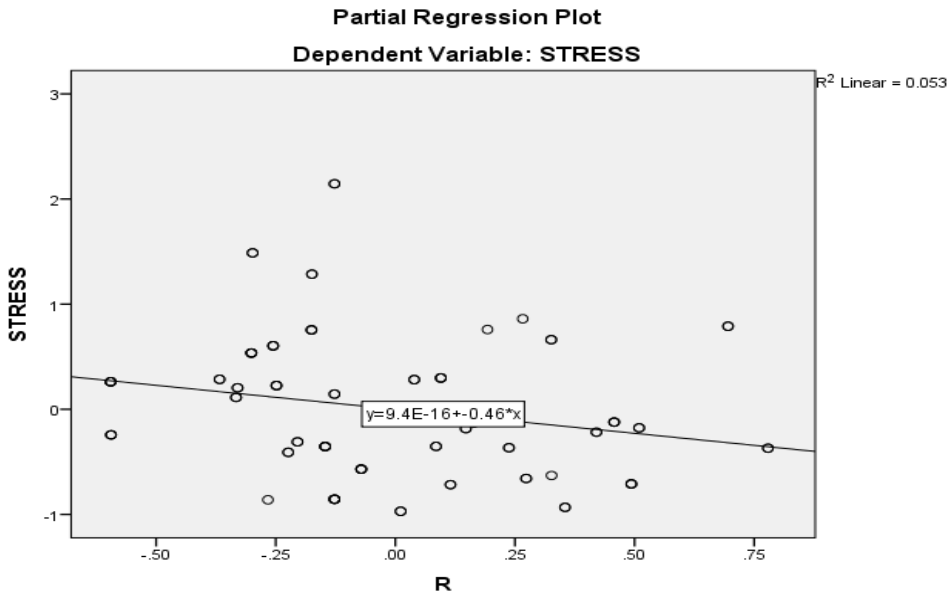
Scatter Plot S6



Scatter Plot S7



DISCUSSION

Multiple regression analysis was done between stress in first years and the 15domains of the COPE Inventory and the results are as follows: The multiple correlation coefficient (R) was .518 and the coefficient of determination R square= .269, this prediction was found to be statistically significant by the ANOVA [(F=1.960) p=.029]. The following individual variables were found to be statistically significant [MD(β)= -.291 & p=.013], [UISS(β)=.433& p=.005]. The scatter plots for the variables are depicted in the pictures (Scatter Plots S1-S2). MD has a negative correlation which implied that in students who had stressused this coping style less often, whereas UISS had a positive correlation which implies that students who had stress used this coping style more often. Multiple regression analysis was done between stress in final years and the 15domains of the COPE Inventory and the results are as follows: The multiple correlation coefficient (R) was .691 and the coefficient of determination R square=.478, this prediction was found to be statistically significant by the ANOVA [(F=5.121) p<.0001]. The following individual variables were found to be statistically significant, [PRAG(β)= .496 & p=.003], [FOVOF(β)=-.440 & p<.0001], [RC(β)= -.347 & p=.001], [H(β)=.381 & p= .001], [R(β)= -.265 & p=.032]. [6,7]

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Focus on and venting of emotions (FOVOF), Restraint (R), Religious coping (RC), and planning had a negative correlation which implies that students whohad stress used these coping styles less often, and positive correlation was found with Positive reinterpretation and growth (PRAG) and Humor (H) which implies that students who had stress used these coping styles more often. In the current study overall stress rate among first years and among final years are 24% and 20% respectively. There was no statistically significant difference between the first and final years in their stress levels but, the firstyear students showed a higher percent of stress compared to the final year students. This could be because of the change in their teaching styles froma spoon-fed system till their 10+2 education. Among those who had stress, those who had moderate stress was higher among both first and final year students. There was no statistically significant difference in the stress levels between male and female students, between telugu medium and english medium students (till their 10+2 education). Students living in hostels showed lower percentage of stress compared to those who were day scholars but this was not statistically significant. Chauhan *et al* observed that the level of stress was higher in students who were from a Gujarathi medium of education till their 12th standard education [8,9].

In a study done by Kunwar *et al* observed 27.7% stress in one medical college and 26.1% in another medical college which is matching with the results of the current study. In a study done by Hamza Mohammad Abdulghani the results showed 21.5% had mild stress, 15.8% had moderate and 19.6% had severe stress levels using the Kessler Psychological Distress Instrument which was widely used for epidemiological purposes to measure current month distress and is available in various languages and also used by the World Mental Health Survey of the World Health Organization as a clinical outcome measure. He also observed that stress was the highest among the first-year students (78.7%), followed by the second year (70.8%), third-year (68%), fourth-year (43.2%), and fifth-year students (48.3%). The results observed are not similar to those observed in the current study. Current study there was no significant difference in stress levels between the firstand final year students. He also observed that the proportion of female studentswho had stress was higher (75.7%) compared to male students (57%). The observations in his study are not in line with those observed in the current study [10,11,12].

Eliza Omar Eva *et al* found that 32% of the medical students felt that they were constantly under stress. This was a comparative study comparing students between public and private medical colleges and included 8 Medical colleges in Bangladesh. A total of 990 students participated in the study. The percentage of females, Muslim students andhostel inmates was were predominantly higher compared to the male students Non-Muslims and day scholars respectively. Bibikulsoom *et al* reported 41% stress in the pre examination period and 30% stress in the post examination period among the students. This was not studied in the current study ,we studied at a neutral period during themid year of the course eliminating the stress related to exams and results [13,14].

Afiong Oboku Oku *et al* in their study observed that 94.2% students felt stressed during their course and 70.3% perceived it as very stressful which is very high compared to our study and other studies however the author mentions that recall bias and over reporting could constitute a limitation to his study. Ratana Saipanish in his study observed that 61.4% of medical students felt stressed, 59% with mild stress, and 2.4% at a high level of stress. These results are higher when compared to our observations. The reason could be that the author used the Thai Stress Test, though not widely usedhe preferred to choose this scale as it takes into account the cultural and language barriers in Thai Medical students. The demographic and living conditions in Thailand may not be similar to our living conditions. These could be the confounding factors. Kiran Mehta *et al* observed that the prevalence of stress is more in female medical students (19.5%) as compared to male medical students (14.9%) these results are not similar to our observations [15,16].

First year students used more of UESS, UISS, and ACC as coping strategies in Depression, Stress and Anxiety [i.e. emotional and Non-cope coping]; MD, AC, SU were less used coping strategies [i.e. maladaptive coping excepting active coping]; whereas final year students used more of PRAG, H, and SOCA, [i.e. adaptive copingstyles] and less of FOVOF, RC, R and Planning [a combination of emotional and problem solving coping styles]. Hence few maladaptive coping styles were used by the first year students and as they progressed towards final year there was a change in their coping strategies from using just emotional strategies to a combination of emotional and problem focused strategies, though there wasn't significant differencein the levels of depression, stress or anxiety between the two groups studied [17,18].

Dr Sandhya C *et al* used Brief COPE to study coping, in the study we used the full version of the COPE Inventory to study coping. Correlation of coping to various stress domains was not possible in our study. Non-cope/negative coping, humor and blame were associated with higher stress levels in her study. In the current study these coping styles were less used by students in stress. T Chandrasekhar *et al* observed that the 5 commonly used coping skills by the

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students to cope with stress were 'positive reframing', 'planning', 'acceptance', 'active coping' and 'self-distraction'. These observations are similar to those observed in the current study. Afiong oboko oku *et al* observed that the coping strategies most students adopted were positive coping strategies like- problem solving, belonging to a peer discussion group (emotional coping) and positive re-interpretation of criticism (adaptive coping). Alcohol/drug use was the least adopted coping strategy and similar findings were observed in the current study. A few studies from United Kingdom have reported that medical students often resort to alcohol, tobacco and drug use as a coping strategy. Such coping strategies were not reported by students in the current study [18].

CONCLUSION

In the current study, no difference in the levels of stress was observed among first and final year students. The stress levels were higher among male students (27.1%) than female students (20%); in day scholars (24.3%) than hostel inmates (20.5%) but those differences are not statistically significant. Students from Telugu medium of education had similar stress levels compared to those from an English medium. First year students used more of UESS, UISS, and ACC as coping strategies in Depression, Stress and Anxiety [i.e. emotional and Non-cope coping]; MD, AC, SU were less used coping strategies [i.e. maladaptive coping excepting active coping]; whereas final year students used more of PRAG, H, and SOCA, [i.e. adaptive coping styles] and less of FOVOF, RC, R and Planning [a combination of emotional and problem solving coping styles]. Hence few maladaptive coping styles were used by the first year students and as they progressed towards final year there was a change in their coping strategies from using just emotional strategies to a combination of emotional and problem focused strategies, though there wasn't significant difference in the levels of depression, stress or anxiety between the two groups studied

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