CHAPTER 6

SUMMARY CONCLUSION
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6.1. Aim

The aim of the study was to determine psychosocial and academic specific determinants of stress in medical students.

6.2. Sample

The study was a cross-sectional survey of students enrolled in a medical college. The sample consisted of medical students studying in 1st, 2nd, 3rd and 4th year of MBBS studying at Kasturba Medical College, Manipal, and Manipal University. Final sample had 143 students in first year, 161 students in second year, 127 in third year, and 117 in fourth year. All the students who consented were taken into the study and age of the whole sample ranged between 17 to 26 years.

6.3. Tools

The following tools were employed in the study:

1) Socio-demographic proforma designed for the study.
2) Professional Student Environmental Stress Survey (Murphy et al., 2008)
3) The Coping Orientation of Problem Experience Invitatory (Brief COPE; Carver, 1997).
4) College Student Social support Scale (CSSSS) (Mcgrath et al., 2002.)
5) The 14-Item Resilience Scale (RS-14) (Wagnild, 2010).
6) Life Orientation Test-Revised (LOT-R) (Scheier et al., 1994).
7) Perceived Academic Control (PAC) (Perry et al., 2002).

6.4. Variables

Overall stress and various areas of stress such as academic performance, patient and clinical responsibilities, faculty relations, personal issues and professional identity were the main dependent variables. Psychosocial factors such as coping, social support, optimism, resilience, and academic factors such as perceived academic control and
academic motivation were the main independent variables. The various years of study served as independent variables, while first few objectives were examined.

6.5. Objectives of the Study

6.5.1. Primary Objectives

1) To compare the differences between 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} year medical students in overall stress and various areas of stress.

2) To compare the differences between 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} year medical students on psychosocial variables such as coping strategies, social support, resilience and dispositional optimism.

3) To compare the differences between 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} year medical students on academic specific determinants such as perceived academic control and academic motivation.

4) To examine the degree to which psychosocial variables such as coping, social support, resilience and dispositional optimism determine stress in medical students.

5) To examine the degree to which academic specific determinants such as perceived academic control and academic motivation determine stress in medical students.

6.5.2. Secondary Objectives

6) To study whether dispositional optimism will mediate the relationship between coping and stress.

7) To study whether perceived academic control will mediate the relationship between dispositional optimism and stress.

8) To study whether resilience will mediate the relationship between academic motivation and stress.
6.6. Hypotheses

6.6.1. Null Hypotheses

For the present study the following null hypotheses have been formulated.

a) There will be no difference between 1st, 2nd, 3rd and 4th year medical students on total stress and various areas of stress.

b) There will be no difference between 1st, 2nd, 3rd and 4th year medical students on psychosocial variables, such as coping, social support, resilience and dispositional optimism.

c) There will be no differences between 1st, 2nd, 3rd and 4th year medical students on academic specific determinants, such as perceived academic control and academic motivation.

6.6.2. Alternate Hypotheses

Following are the alternate hypotheses formulated for the study:

d) Utilization of problem focused strategies will predict lower stress.

e) Utilization of emotional coping strategies will predict higher stress.

f) Utilization of avoidant coping strategies will predict higher stress.

g) Higher level of social support will predict lower stress.

h) Greater amount of resilience will predict lower stress.

i) Higher dispositional optimism will predict lower stress.

j) Greater perceived academic control will predict lower stress.

k) Higher intrinsic motivation will predict lower stress.

l) Higher extrinsic motivation will predict higher stress.

m) Higher amotivation will predict higher stress.

6.6.3. Supplementary Alternate Hypotheses

n) Optimism will mediate the relationship between different types of coping and stress.

o) Perceived academic control will mediate the relationship between optimism and stress.

p) Resilience will mediate the relationship between academic motivation and stress.
6.8. Statistical Analysis

The data was analysed with SPSS version 15. Chi square test, One-way ANOVA, Kruskal-Wallis test, Mann–Whitney U test, Pearson’s correlational analyses, Stepwise Multiple Regression Analyses were the tests used for data analyses. Mediational analyses were done by following Baron and Kenny’s procedure (1986).

6.9. Results

The major findings of the study will be presented here.

1) There was a 100 percent of prevalence of stress in all years of study. Medical students in first year had a higher proportion of mild stress (62.9%). Students in the second year had similar amounts of mild stress (49.7%) and moderate stress (46.6%). A 16 percent shift of proportion of students having mild stress to moderate stress from first year to second year was noticed. Third year had the highest number of students experiencing moderate stress (52.8%) compared to students in all other years. The final year had somewhat two equal groups of students, one reporting mild (48.7%) and the other moderate stress (47.9%). The number of students reporting severe stress in each year was noticeably less.

2) The age range of the whole sample was between 17 to 26 years. Higher age was seen to predict higher overall stress, higher patient and clinical responsibilities related stress, higher faculty relations related stress, and higher professional identity stress.

3) With regard to gender, around 60 to 65 of the sample in all years consisted of female students with the exception of third year where males were more than females. Gender was not seen to predict any stress area.

4) Majority of the students in all years were Hindus. Students hailing from other religions such as Buddhism and Sikhism were seen to experience two units of higher personal issues related stress than students from other common religions.
5) Majority of the students in all years were Indians. Students belonging to other nations such as Nepal and Sri Lanka experienced three units of higher stress from faculty relations.

6) Examination of differences between the study years on overall stress and stress categories showed that third year students had higher overall stress than first year students. However, students in all years had moderate overall stress.

With regard to stress category of academic performance, there was no difference between students of four years of medical education. Yet, students of all years experienced moderate amount of academic performance indicating that it is a common stressor that pervades throughout medical training.

In the stress category of patient and clinical responsibilities stress, second year, third year, and fourth year students had higher stress than first year students. However, students of all years experienced only mild stress in this area.

Third year students experienced higher stress in faculty relations as compared to first year students. Third year medical students had faculty relations stress scores that was on higher end of mild stress range, bordering on to moderate range, while students in rest of the years had mild levels of faculty relations stress.

There was no difference between the four years of medical education on personal issues related stress and all students had mild stress scores in this area.

Comparison between study years on professional identity revealed that third year students only showed a trend towards higher professional identity stress than first year students. Students of all years had moderate professional identity stress, except first year that had mild levels of professional identity stress.
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7) Examination of differences between four study years on broader dimension of problem based coping revealed that first year students used higher problem based coping than second year and third year students. However, students in all years used problem based coping to a medium amount.

With regard to the individual problem based coping styles, active coping was higher in first year students than second year students. First year students used planning more than second year and third year students. Fourth year students also used planning more than second year and third year students. First year students used more instrumental support seeking than third year students.

8) Emotion based coping styles taken together was used more by first year students as compared to third year and fourth year students. Among the individual emotion based coping styles, fourth year students used venting more than second year and third year students. Two emotional coping styles of emotional support and emotional acceptance was used more by first year students than second year students. There were no differences between the study years on use of other emotional coping styles of positive reframing, humour, self-blame and religion.

Students in all years used positive reframing to a medium extent. First year students made medium use of self-blame, while students in all other years used self-blame to a mild extent. Humour and religion was used only to a little extent by students of all years.

9) Avoidance based coping as a whole found higher use in students of second year when compared to students in all other years. Students in all four years did not differ on individual coping strategies of self-distraction, denial, substance use and behavioural disengagement.

Students in all years used self-distraction to a medium extent. Behavioural disengagement was used to a little extent by students in all years. All students hardly made use of denial and substance use as coping mechanisms.
10) Students in all study years did not differ on college social support scale dimensions of availability, helpfulness and reception of support from both friends and family. However, levels of social support were mostly high in all dimensions. With regard to faculty support, first year students perceived higher faculty support than second year, third year and fourth year students.

11) Total optimism did not differ among students of all study years and students in all years had high levels of total optimism. With reference to dispositional optimism, first year students showed a trend towards higher dispositional optimism than second year students. Dispositional optimism was also found to be high in students of all years. Pessimism also did not differ between the students in all study years and students in all years had neutral scores on pessimism. Therefore, medical students taken together were optimistic.

12) Students in all years did not differ on resilience and students in all years had high resilience suggesting that this medical students’ group was a resilient group.

13) With regard to perceived academic control second year students had lesser perceived academic control as compared to first year, third year and fourth year students.

14) When differences on motivation and its subtypes were examined, intrinsic motivation to know was higher in first year students compared to second year and third year students. However intrinsic motivation was found to be high in all study years. Intrinsic motivation towards accomplishment was also higher in first year students than second year students. However, students in all years scored high on intrinsic motivation towards accomplishment. Intrinsic motivation to experience stimulation did not differ significantly between all the four years; however, students in all years had moderate levels of intrinsic motivation to experience stimulation. Students in all four years also did not differ on total intrinsic motivation, but all students in all years had high levels of total intrinsic motivation.
Among the subtypes of extrinsic motivation, first year students had higher levels of introjected regulation than fourth year students. Students in all years had high levels of introjected regulation, except fourth year that had moderate levels. Students in all four years of medical education did not differ significantly on other two extrinsic motivation subtypes of identified regulation and external regulation. The students in all four years also did not differ on total extrinsic motivation. Students in all years had high levels of identified regulation, external regulation and total extrinsic motivation.

With regard to amotivation, second year students had higher amotivation than first year and fourth year students. However, students in all years had little amount of amotivation.

15) Findings related to determination of stress by coping revealed that higher use of problem based coping predicted higher overall stress and professional identity stress. The individual problem based coping style of seeking instrumental support predicted higher academic performance stress. Higher use of planning predicted higher personal issues related stress.

16) Higher use of emotion focused coping as a whole predicted higher overall stress. With regard to individual emotion focused strategies, higher use of ventilation predicted higher overall stress and higher stress in stress categories of academic performance, faculty relations, personal issues and professional identity. Higher use of self-blame predicted higher academic performance and professional identity related stress. Higher use of religion was also seen to predict higher personal issues related stress.

17) Higher use of avoidance based coping as a whole predicted higher overall stress and higher stress in stress categories of academic performance, patient and clinical responsibilities, personal issues and professional identity. Among the individual avoidant coping styles, higher use of substance predicted higher stress from faculty relations.
18) Among the social support dimensions, higher received support from friends predicted higher academic performance related stress. Availability of support from friends predicted lower personal issues related stress. Higher levels of faculty support predicted lower stress in the stress category of professional identity.


20) Higher levels of dispositional optimism predicted lower overall stress, and lower academic performance and professional identity related stress. Perceived academic control did not predict any of the stress areas.

21) With regard to determination of stress by academic motivation, among the subtypes of intrinsic motivation, higher levels of intrinsic motivation to know predicted lower overall stress. Higher levels of total intrinsic motivation predicted lower stress in stress categories of faculty relations and professional identity. None of the extrinsic motivation subtypes predicted any of the stress areas, while total extrinsic motivation, predicted higher stress in the area of faculty relations related stress. Amotivation predicted higher overall stress and higher stress in stress categories of academic performance, faculty relations, personal issues and professional identity.

22) In the analyses conducted to test whether total optimism and dispositional optimism mediated the relationship between different broader types of coping on one hand and total stress and stress categories on the other hand, it was observed that both total optimism and dispositional optimism partially mediated the effects of avoidance based coping on total stress and professionally identity stress. Total optimism partially mediated the effects of avoidance based coping on patient and clinical responsibilities related stress. Lastly, dispositional optimism alone partially mediated the effects of avoidance based coping on academic performance related stress and faculty relations stress.
23) With regard to the examination of mediation by perceived academic control of the relationship between optimism and stress, it was found that perceived academic control partially mediated the effects of total optimism on total stress and professional identity related stress.

24) Analyses examining the mediating effect of resilience on the relation between academic motivation and stress revealed that resilience partially mediated the effects of intrinsic motivation to know on overall stress and fully mediated the effects of intrinsic motivation to know on professional identity related stress. Further, resilience also fully mediated the effects of intrinsic motivation towards accomplishment on professional identity related stress. Next, resilience also fully mediated the effects of intrinsic motivation to experience stimulation on total stress, patient and clinical responsibilities related stress, and professional identity related stress. Finally, resilience fully mediated the effects of total intrinsic motivation on total stress, patient and clinical responsibilities related stress, and professional identity related stress. Resilience did not mediate in the desired way, the relations between extrinsic motivation and its subtypes on one hand and total stress and all stress areas on the other hand.

6.10. Tenability of Hypotheses

Null hypotheses

a) There will be no difference between 1st, 2nd, 3rd and 4th year medical students on total stress and various areas of stress.

All the study years differed on overall stress and two stress areas namely patient and clinical responsibilities and faculty relations. Therefore, this null hypothesis is rejected.

b) There will be no difference between 1st, 2nd, 3rd and 4th year medical students on psychosocial variables such as coping, social support, resilience and dispositional optimism.
With regard to coping the four study years differed on all broader dimensions of problem focused, emotion focused and avoidance focused coping. The four study years were also seen to differ on all individual problem based coping styles and three individual emotional coping styles of venting, emotional support and emotional acceptance. However, the study years did not differ on any of the individual avoidance coping styles.

With reference to social support, students of all years did not differ on availability, helpfulness and reception of support from both friends and family. The study years differed only in the perception of faculty support.

There was also no significant difference between the students in four years of medical education on total optimism. The difference between four years of medical education barely reached significance on dispositional optimism. The four study years did not differ on pessimism.

The study years did not significantly differ on resilience.

In view of the groups having differed on coping, the null hypothesis is rejected.

c) There will be no differences between 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} year medical students on academic specific determinants such as perceived academic control and academic motivation.

There was one difference among the four years of medical education on perceived academic control.

With reference to intrinsic component of academic motivation, the four study years differed on intrinsic motivation to know, intrinsic motivation towards accomplishment and total intrinsic motivation. Among the extrinsic motivation subtypes, the four study years differed only on introjected regulation. With reference to amotivation, one difference was observed between the four study years.

In view of the study groups differing on some of the academic variables, the null hypothesis is rejected.
Alternate Hypotheses

Following are the alternate hypotheses formulated for the study:

d) Utilization of problem focused coping strategies will predict lower stress.
   This hypothesis is rejected as problem focused strategies predicted higher stress.

e) Utilization of emotional coping strategies will predict higher stress.
   This hypothesis is partially accepted as some of the emotional coping strategies were seen to predict higher stress in some of the stress areas.

f) Utilization of avoidant coping strategies will predict higher stress.
   This hypothesis is partially accepted as avoidant coping as a whole predicted high stress in some stress areas and also an individual avoidant coping strategy predicted stress in one stress area.

g) Higher level of social support will predict lower stress.
   This hypothesis is partially accepted as only two dimensions of support predicted lower stress: received support from friends predicted lower personal issues related stress and faculty support predicted lower professional identity related stress.

h) Greater amount of resilience will predict lower stress.
   This hypothesis is partially accepted as resilience predicted lower stress only in the stress area of patient and clinical responsibilities.

i) Higher dispositional optimism will predict lower stress.
   This hypothesis is partially accepted as higher dispositional optimism predicted lower overall stress and lower stress in two stress areas.

j) Greater perceived academic control will predict lower stress.
   This hypothesis is rejected as perceived academic control did not predict overall stress and any of the stress areas.

k) Higher intrinsic motivation will predict lower stress.
This hypothesis is partially accepted as intrinsic motivation to know predicted overall stress and total intrinsic motivation predicted lower stress in two stress areas.

l) Higher extrinsic motivation will predict higher stress.

This hypothesis is partially accepted as total extrinsic motivation predicted higher stress in only one stress area.

m) Higher amotivation will predict higher stress.

This hypothesis is partially accepted as amotivation predicted higher overall stress and higher stress in some of the stress areas.

**Supplementary alternate hypotheses**

n) Optimism will mediate the relationship between different types of coping and stress.

This hypothesis is partially accepted as both total optimism and dispositional optimism was seen to partially mediate only some of the relations between avoidance coping and stress areas.

o) Perceived academic control will mediate the relationship between optimism and stress.

This hypothesis is partially accepted as perceived academic control partially mediated the effects of total optimism on overall stress and one stress area.

p) Resilience will mediate the relationship between academic motivation and stress.

This hypothesis is partially accepted as resilience mediated some of the relations between some types of intrinsic motivation and certain types of stress areas.
6.11. Implications

Stress as an undeniable part of medical education is restated by this study findings. However, overall stress in this medical student population remained in moderate levels rather than severe levels. Considering that stress is higher in progressive years of medical education, attention needs to be paid to students in higher years.

The finding that students in all years had moderate academic performance stress again is a common finding reported across many studies and point towards the fact that academic pressures run throughout the medical education and all students irrespective of the study years need help to resolve stress in this area. It would be interesting to explore whether structure of the curriculum contributes to stress in academics. Special attention needs to be paid to remediate stress in third year students as they not only experienced higher overall stress, but also had higher faculty relations stress, and showed a trend towards higher professional identity stress as compared to first year students. Professional identity stress was also in moderate levels in all higher years of study indicating that these students had worries about being successful professionally and experienced insecurities about future course of their career. Probably, in the medical curriculum, more attention needs to be given to development of professional, performance, clinical and communication skills that could make students more confident about bridging the gap between acquired knowledge and practical skills and thereby boost their professional identity.

Maladaptive emotion focused coping and avoidance coping are known to enhance stress in medical students (Wolfe, 1998; Park & Adler, 2003; Ko et al., 2007; An et al., 2012).

In this study, venting and emotional support was used more in fourth year students and second year students respectively, and avoidance coping as a whole was predominantly used by second year students. Therefore, coping skills training should be tailor made to modify the maladaptive coping strategies that are found in each year of study.

Also, in view of both emotion focused coping and avoidance based coping (as a whole and some of individual strategies) determining stress in several stress areas,
remediation measures to modify maladaptive coping and training in adaptive coping strategies to the whole medical students population should be in place in order to alleviate stress in several stress areas.

It is to be noted that medical students had positive assets such as high resilience, higher social support, higher optimism and higher intrinsic motivation that would have offset some of the negative effects of stress and prevented the stress from not increasing to severe proportions. In addition, all of these factors also were associated with reduction in stress in one stress area or the other. Therefore, these protective factors could be included in the intervention framework to deal with stress in medical education.

Though, most of the above factors showed positive effects, there are some negative effects associated with these factors such as reception of social support from friends enhanced academic performance stress. It should be explored whether excessive competition leads to such exacerbation of stress and if found so, efforts should be made to enhance academic co-operation between students.

Motivation is generally discussed in terms of its influence on academic performance, but this study clearly shows that higher levels of intrinsic motivation can affect stress by reducing professional students’ stress, while, amotivation intensifies stress in several areas of a medical student’s life, and thereby impedes academic success. Hence, enhancing motivation along with reducing amotivation should also be considered as an important goal, not only for facilitating immediate stress alleviation but also for enabling long term academic success.

Further, the results of the mediational analyses in this study show that psychosocial and academic factors don’t have isolated effects but rather are interrelated in the way they influence stress in medical students. For instance, with regard to effects of coping on stress, it was seen that optimism mediates effects of avoidance based coping and therefore enhancing optimism may help to an extent to reduce the negative effects of avoidance based coping on several stress areas. Similarly, it would be beneficial to build on perceived academic control (which is more amenable to change) along with optimism rather than focusing only on optimism in order to reduce stress of medical students. In addition, enhancing resilience is also crucial to enable certain types of intrinsic
motivation to be more effective in reducing stress. In fact, in some of the relations between intrinsic motivation and stress areas, resilience had full mediation effects. Further, resilience also demonstrated a protective effect against the negative impact of amotivation on stress areas, hence, again pointing the need to target resilience also, rather than focusing on reducing amotivation alone.

There were two salient findings with regard to the socio-demographic factors. First finding is the revelation that students belonging to other nations such as Nepal, Malaysia and Srilanka had three times higher stress than others in the stress area of faculty relations. Whether these students experienced communication or interpersonal barriers and misunderstandings in their interactions with faculty needs to be further explored. Faculty need to be more approachable and put efforts to make these students comfortable.

The second finding is that students practising other religions such as Buddhism and Sikhism were likely to experience two times higher stress related to personal issues as compared to students from other religions. Lacking avenues to practice their religion may be proving stressful. Further interviewing these students for causes of their stress may throw more light on this issue.

A search to find out the guidelines regarding welfare of medical students from regulatory bodies revealed that Medical Council of India (MCI) has come out with specific guidelines to revamp the Indian medical education outlined in a document named Vision 2015 (MCI, 2011). These guidelines suggest improvisations such as emphasis on competency based learning, early clinical exposure, continuous training in professional and ethical values, self-directing learning etc. Subsequently, these guidelines have been inculcated in the regulation on graduate medical education (MCI, 2012). One of the guidelines includes a foundation course to be taught in the beginning of the first year which includes topics such as stress management, time management, communication, interpersonal skills etc. that need to be taught to the medical students.

The strict adherence to these guidelines, specifically time devoted to teaching stress management may empower students to deal with stress. However, it is not enough to teach these skills as a part of preparatory module, it is equally important to carry out
the same throughout all the years of medical education as medical students in all study years, experience stress as revealed by this study.

Stress management or health promotion interventions have been found to be generally useful in medical students (see reviews by Shapiro, Shapiro, & Schwartz, 2000; Shiralkar, Harris, Eddins-Folensbee, & Coverdale, 2013). However, most of the studies conducted in India have focused only on coping in the stress context and made suggestions for interventions accordingly (Supe, 1998; Shah et al., 2009; Gade et al., 2014; Cherkil, et al., 2013; Patil et al., 2014; Kate et al., 2010; Mane et al., 2011). But, it is also important to include in the interventional plan, the additional varied psychosocial and academic factors such as resilience, social support, optimism, perceived academic control and motivation which have been found to have bearing on medical students’ stress as found in this study.

The college in which the study was conducted has student mentoring programs and student cell that caters to needs of the students. However, such services have high chances of being availed by students who have identified problems that may be causing somewhat serious disruptions in their studies or life. Whereas, majority of the student population may not have problems that can be identified as serious, yet they may experience daily stress that may have cumulative negative effects on their health and performance. Therefore, probably it is necessary to take stress management / health promotion programs to the classroom to get a wider audience and externalize the benefits of such programs to all students. Further, these programs may integrate various psychosocial and academic factors that have been found to influence stress processes as observed in this study.

Special attention has to be paid to the needs of minority groups as they are likely to face more stress in certain stress areas.

Till date, the prevalent method of selection of students into MBBS course in India is mostly based on academic merit and knowledge based entrance test. However, it would be more useful to consider findings of psychometric assessment including personal competencies, personality, and aptitude along with academic merit, as psychological makeup of an individual is also important in determining future psychosocial adjustment.
and success of a medical student (Koenig et al., 2013; Yusoff et al., 2013). Therefore, factors such as coping, resilience, optimism and academic motivation that were found to affect stress in this medical students’ population could be used as aids for selecting medical students to the medical course. To facilitate this process, psychologists may be included as a part of the selection committee.

6.12. Strengths of the Study

1) It is a fact that there are innumerable studies on stress in medical students. However, most of the studies have examined factors influencing stress in isolation (the most popular being coping), unlike this study which included several psychosocial and academic factors under a single framework (some of which have not been examined earlier) in order to find out the best predictors of stress in medical students.

2) The study also used outcome measures such as Professional Student Environmental Stress Survey which has several stress areas specific to the medical education, contrary to general measures such as GHQ (which is most widely used by other researchers) which assesses general psychological morbidity rather than stress. Some of the other measures used (e.g., Academic Motivation Scale) assessed various dimensions of the construct in question in determining their relation to stress rather than focusing on a single dimension.

3) This study instead of limiting to preliminary analyses used better methods such as prediction analyses and mediational analyses to determine the best predictors of various areas of stress and the interrelations among these factors in determining stress.

4) The findings of the study could help in planning stress remediation to address stress areas that are specific to each study year. In addition, the study indicates salient factors determining stress that could be included in interventions targeting stress related issues in medical students of this college.
6.13. Limitations

1) Cross-sectional study design limits the possibility of making causal inferences based on the study findings.

2) Some of the limitations may be related to the nature of the tools used:
   a) Though the common mode of measuring stress and factors determining stress is self-report, it is often associated with response biases such as social desirability which may make people answer in ways that show them in positive light. This could partly be the reason why students were seen to score high on most positive factors.
   b) The length of the questionnaires could have fatigued the students and contributed to some haphazard responding due to which some questionnaires had to be left out of analyses.
   c) Despite assuring confidentiality of students’ responses, there could be a possibility of underreporting because of fear of stigmatization. Students were requested to write their names and year of study in the socio-demographic proforma in order to facilitate their identification and test scores, in case they requested for intervention which was offered if required.

3) The study used only subjective measures, and the lack of objective parameters to complement the subjective findings may limit the external validity of these study findings.

4) The findings of this study has limited generalizability as it was conducted at a single private medical college and also findings may not reflect the problems faced by all medical students across the country enrolled in different types of colleges (Government or Private). Students in this college have strong financial support from family and generally they would have been brought up in a protective environment where most of their needs are met. Therefore, it is quite possible that they may have different problems than the ones a student in a Government medical college may face.

1) Future studies may examine stress and factors influencing stress using a longitudinal design to determine the change in these factors across time and to make causal inferences.

2) Studies in future should focus on conducting multi-site studies across various regions including both private and government and medical colleges, so that the study findings can be better generalized.

3) It would be interesting to explore whether changes in curriculum such as reducing the excess content and making it more need based in structure would reduce academic performance stress.

4) Enough studies have focused on examining stress and coping in Indian medical students, but there are hardly studies examining effects of stress intervention in Indian medical students. Therefore, future studies should develop intervention models and focus on conducting intervention studies on medical students.

5) Future studies could design intervention studies taking into account the psychosocial and academic factors found to have an impact in this study and see if these factors change following intervention.

6) Future studies may include objective measurement of stress such as measurement of heart rate, respiratory rate, systolic and diastolic blood pressure and skin temperature.

7) International students in this student population were found to have high stress in certain areas. These findings could be followed up by qualitative interviews to find more details about the problems faced by international students, so that necessary measures can be taken to remediate them.
6.15. Conclusion

The primary aim of this investigation was to examine difference in stress among medical students of various years of medical education and also to examine psychosocial and academic determinants of stress in medical students. The study also investigated the interrelations among some of these variables in influencing stress outcome.

There are few studies that have examined a combination of variables in relation to stress in medical education. This study made an attempt to investigate stress in medical students employing a multi-factorial framework examining several psychosocial and academic factors independently, and their interrelations to determine their negative or positive effects on stress. The findings revealed that stress was prevalent in all students and majority of the students experienced moderate stress. Students of higher study years, specifically, third year students experienced more stress in certain stress areas as compared to lower study years indicating that students of higher study years are in greater need of intervention to address stress related issues.

The study revealed that it is not only important to study stress, but simultaneously equal importance should be given to study of psychosocial and academic variables, such as coping strategies, social support, resilience, optimism, academic motivation and certain socio-demographic characteristics, as all of them yield either positive or negative impact on stress in medical students of the sample in this study. Among the psychosocial factors, most notably, maladaptive emotion focused strategies of ventilation and self-blame, and avoidant coping taken as a whole were seen to predict higher stress in several stress areas, while optimism was seen to be associated with lower stress in some stress areas. Higher levels of social support and resilience were seen in this sample, and some dimensions of these variables were related to few of the stress areas. With regard to academic variables, strong evidence was present in the case of intrinsic motivation to know which led to lower stress in several stress areas and amotivation which was related to higher stress in several stress areas.
The mediational analyses conducted among the study variables point that psychosocial and academic factors, such as coping, optimism and motivation associate with others variables of optimism, perceived academic control and resilience respectively, in exerting positive or negative effects on stress.

It is hoped that this study has thrown some light in the area of stress and factors that determine stress in undergraduate medical education. This may help educationalists and professionals associated with stress management to envisage a framework of variables to focus on, while addressing stress in medical students. It is also hoped that this study revelations would stimulate future research aimed at developing interventions (the lacunae of which is markedly evident in India) to address the factors of significance, and see whether the modifications of these factors by suitable interventions serve as pathways to stress reduction in medical students.