CHAPTER 5

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This study was designed with the aim of examining psychosocial (coping, social support, resilience and dispositional optimism) and academic specific determinants (perceived academic control and academic motivation) of stress in all the four years of medical education.

This chapter will begin with a discussion on the socio-demographic characteristics of the sample and pattern of stress in medical students.

The discussion of the primary objectives which address differences in psychosocial variables and academic variables among various study years, and the role of these psychosocial variables and academic variables in determining stress of medical students will proceed in an integrated manner as they seem to be interrelated. Though the analyses (stepwise regression) of psychosocial and academic determinants of stress has been carried out separately for each stress category to find out the best predictors, in order to maintain brevity, the discussion will carried forward from determinants’ focus.

In addition, secondary objectives and hypotheses examining the proposed mediational relations between the variables in the study will be discussed. Finally, the implications, limitations and future recommendations will be highlighted.

5.1. Socio-demographic Characteristics

5.1.1. Age

Age was seen to progressively increase from an average of around 18 years in the first year to about an average of 22 years in the final year. This is quite expected, as age naturally increases as one progresses through successive years of education. The sample as a whole (constituting all years) had a mean age of 20.38 (SD=1.67). The age range of the sample was 17 to 26 years. Other Indian studies have reported similar age ranges. Reang and Bhattacharjya (2013) in the cross-sectional study on undergraduate medical students studying at Agartala Government Medical College, India reported the age range of the students to be 18-24 years with a mean of 20.64 (SD=1.26) years. Another study
(Nair, et al., 2013) on first, second and third year medical students studying in Raichur medical college in South India found the mean age of students to be 19.27 (SD=1.00) years.

In a stress study done at a medical college in Nepal where majority of students (49.1%) were Indians, Sreeramareddy et al. (2007) reported the mean age of the respondents to be 20.7 (SD = 1.8) years and the range to be 17-29 years. In another study of stress in medical students carried out at a South Indian medical college on 251 medical students, the mean age of the students was 19.94 (SD=1.29) years, and the range was 17-23 years (Mannapur et al., 2010).

When age was examined to see whether it determined overall stress and stress categories, it was found to be positively related to higher overall stress and higher stress in all stress categories of academic performance related stress, patient and clinical responsibilities related stress, faculty relations related stress, personal issues related stress and professional identity related stress.

In the prediction analysis that followed, higher age was seen to significantly determine higher overall stress, higher patient and clinical responsibilities related stress, higher faculty relations related stress and higher professional identity stress. Many studies have shown that stress is more in higher years of study (Shaikh et al., 2004; Supe, 1998; Yousafzai et al., 2009).

This is further complemented by the finding (which will appear later in discussion) with reference to differences between study years on overall stress and patient and clinical responsibilities related stress. Specifically, third year students had higher overall stress than first year students, while with reference to patient and clinical responsibilities related stress, students in all the years had higher stress than first year students.

5.1.2. Gender

Females formed around 60 to 65 percent of the sample in all years of study except in third year, where males outnumbered female students by seven percent. Existing literature shows gender distribution varies across various studies on stress in medical
students. Similar to this study, Brahmbhatt et al.’s (2013) study of first year and second year students at an Indian medical college found the number of female students to be significantly predominant than male students in both years (32.92% males; 67.08% females). In most of the recent Indian studies done in first year medical students, there was a predominance of female students. (Sharma et al., 2014; Gade et al., 2014; Shah et al., 2014; Pradhan et al., 2014; Abirami et al., 2012) In studies done elsewhere, such as Malaysia, Poland, Pakistan, and Saudi Arabia, where stress in medical students were examined there was a preponderance of female students (Siraj et al., 2014; Masiak et al., 2014; Shah et al., 2010; Soliman, 2014).

However, there are other Indian studies on medical students which have shown a male predominance in the sample. For instance, in Supe’s (1998) study of first three years of medical education, first year had comparable amount of males and females (48 males and 50 females), while second year and third year had higher males than females (second year-42 males and 34 females; third year-38 males and 26 females). In Sreeramareddy et al.’s (2007) study of stress in medical students (where majority of students were Indians), there were 56.3% of males compared to 43.7% of females. In Mandal et al.’s (2012) study of third year medical students, females were comparatively less than males. In another study (Nandi et al., 2012) of medical students in third, sixth and ninth semester of an Indian medical college, 75% of the sample constituted of males. In Reang and Bhattacharjya’s (2013) study of stress in Indian medical students studying in various years of a medical college, majority were males (56.8%) compared to females (43.2%).

The current study had more male students in third year of study than female students and this is similar to some of the above mentioned studies (Mandal et al., 2012; Nandi et al., 2012; Supe, 1998).

Gender as a part of socio-demographic predictors of stress and stress categories was also examined in order to minimize the confounding effects of socio-demographic characteristics on the study outcomes.

Examination of relations by correlation analysis between gender and overall stress and stress categories revealed that female students experienced higher academic performance related stress than males. Gender was found not to be related to other stress
categories of patient and clinical responsibilities related stress, faculty relations, personal issues related stress, and professional identity related stress.

However, in prediction analyses, gender (female students) was seen to predict personal issues related stress, and professional identity stress, despite these variables not having a significant correlation with each other.

Therefore, gender may be acting as a suppressor variable in the regression analysis of personal issues related stress and professional identity stress.

Yet, literature is resplendent with evidence of gender being associated with stress in medical students (Edwards & Zimet, 1975; Toews et al., 1993; Guthrie et al., 1995; Greenfield et al., 2001; Dyrbye et al., 2006; Abdulghani et al., 2011; Shaikh et al., 2004; Shah et al., 2010; Jafari et al., 2012; Grbic & Sondheimer, 2014; Wacholtz & Rogoff, 2013; Paro et al., 2014).

Compared to the overwhelming evidence for stress and burnout being more in female medical students, there are a few studies which have not found gender differences (Murphy et al., 2009; Sunni & Latif, 2014; Siraj et al. 2014; Cook et al., 2014).

In the Indian context, though some of the earlier studies on medical students have failed to establish gender differences (Supe, 1998; Sreeramareddy et al., 2007; Shah et al., 2009), the latest studies have shown evidence for gender differences, particularly for stress being more in females than males (Patil et al., 2014; Nandi et al., 2012; Sharma et al., 2011; Sharma et al., 2014; Gade et al., 2014; Thangaraj & Dsouza, 2014; Brahmbhatt et al., 2013).

5.1.3. Religion

Hindus formed more than three fourth of the sample in each of the year. Christians and Muslims formed less than 10% of the sample in each year. Religions such as Sikhism and Buddhism were followed by seven to nine percent of students in each year. The way in which the major religions are distributed in all study years adequately represents the characteristics of the general population from which the study sample hails. Some Indian studies on medical students that have noted religion have reported religion distribution that is similar to this study’s findings. In Nair et al.’s (2013) study of
stress in students of first three years of medical education enrolled in a south Indian medical college, 72.15% of students were Hindus, 19.75% were Christians and 8.1% were Muslims. Mannapur et al. (2010) in a study of medical students studying in all four years of medical education in a medical college in Karnataka, India reported Hindus (90.84%) as being the predominant religious group. A study of first year medical students at a south Indian medical college (Thangaraj & D’souza, 2014) had 94.8% of Hindus, 3.6% of Muslims, 0.8% of Christians, and another 0.8% of students belonging to other religious groups.

Since, the medical college in which this study was conducted admits students from all over India and some foreign countries, Sikhism and Buddhism were also among the ‘other’ religions that were followed by a small number of students in each year. Analyses revealed that distribution of religions did not vary significantly between different years of medical education.

Among the various religions examined, correlation analyses revealed that students who followed Hinduism experienced lesser academic performance related stress. However, this was not true with regard to overall stress and stress arising from patient and clinical responsibilities stress, faculty relations related stress, personal issues related stress, and professional identity related stress.

Being a Christian or Muslim was not significantly associated with overall stress and all stress categories.

According to the correlational analyses, students belonging to other religion had higher overall stress and higher stress in stress areas of personal issues, and faculty relations. However, other religion group was not significantly associated with stress related to academic performance, patient and clinical responsibilities, and professional identity.

In the prediction analysis, only students hailing from other religions such as Buddhism, Sikhism etc. were likely to experience two units higher stress in the area of personal issues compared to students belonging to Hinduism, Christianity and Islam.
Students hailing from other religions might be experiencing higher personal issues related stress as they may be having lesser opportunities to practice their religion and use it for coping with stress as they live in an area where their religion is a minority group.

5.1.4. Nationality

Majority of the students in each of the year were Indians. The medical college from which the study population was recruited belongs to a University that is well known for offering foreign students admission to its various study programs. Therefore, it is not surprising that nearly a quarter of the whole study population constitutes foreign nationals. Non-resident Indians (NRI) form a major proportion of the foreign students. Apart from NRI students, other students were nationals of countries such as Malaysia, Srilanka, Bangladesh, Iran and Mauritius.

While nationality was examined, in the correlational analyses Indian students had lesser total stress and lesser stress arising from academic performance, and faculty relations. Indian nationality was not related to patient and clinical responsibilities related stress, personal issues related stress, and professional identity stress. Being a Non-resident Indian was not significantly associated with overall stress and all stress categories.

If students belonged to other nations, they experienced higher overall stress and higher academic performance related stress, patient and clinical responsibilities related stress, and faculty relations related stress. However, other nationality status was not significantly related to stress arising from personal issues and professional identity.

But in prediction analysis, students hailing from other nations were likely to experience three units of higher stress from only faculty relations related stress. This finding is particularly important to address as faculty interactions form the core medium through which students learn. Therefore, the barriers and difficulties that international students experience in dealing with faculty needs to be further explored and remedied.

Other studies have shown stress to be high in international medical students. For example in the study of medical students by Yamada et al. (2013) emotional exhaustion related to burnout was 1.6 times higher in international students than local students.
Similarly, ethnic minority or other minority groups are also seen to have higher stress as found in Grbic and Sondheimer’s (2014) survey of 136 medical schools, where in Asian students had higher stress and low social support than white students, while students underrepresented in medicine compared to white students had higher stress and lower quality of life. Themes of free-text responses detailing about stress, attributed stress to reasons such as pressurizing anxiety, negativity, less relaxation and need for a better learning environment.

There is one study conducted in the same campus but different college, where the present study was held, which showed slightly contradictory finding to that of this study. Abraham et al. (2009) among first year Malaysian students enrolled in Melaka Manipal Medical College (MMMC), (Manipal Campus), found only a percentage of students (12.5%) had difficulty in following the teaching language and approaching the teachers indicating the strong student-teacher relationship in MMMC. Since, MMM College is an exclusive college catering to Malaysian students, they have exclusive teachers and therefore they probably get more personal attention and mentoring than international students of this study who are a part of mixed group that majorly contains nationals (Indians) of the country where the college is situated.

Hence, it is important that international students (though they are part of a mixed group) should be considered separately for the special needs and problems they may have.

5.2. Pattern of Stress in Medical Students

In the present study, stress was prevalent in all students in all the years of medical education. Medical students in first year seemed to experience a higher proportion of mild stress (62.9%) than other years of medical education. In addition, proportion of students with moderate stress in first year (35%) appeared to be less than other study years. In literature, studies which report that first year students experience mostly mild or low stress levels are few (Yusoff et al, 2011; Saipanish, 2003; Supe, 1998). On the contrary, evidence for stress being more in first year of study is strong (Nair et al., 2013; Sreeramareddy et al.,2007; Sharma et al., 2014; Gade et al., 2014; Thangaraj & Lilian, 2014; Marjani et al., 2008; Sharif et al., 2007; Abdulghani et al., 2011; Sunni & Latif, 2014; Siraj et al., 2014)
Stress in the first year students of this study may not have amounted to higher levels, owing to the excitement associated with being in a new learning environment. However, any transition can cause mild stress which might be the case with first year students in this sample.

Students in the second year experienced similar amounts of mild stress (49.7%) and moderate stress (46.6%). In comparison to the first year, there was almost a 16 percent shift of proportion of students having mild stress to moderate stress in the second year. As students enter into second year, regular rigors of being a medical student probably raise the stress levels. Some studies have shown stress prevalence in second year medical students to be high, while other studies have shown it to be moderate and comparable to this study’s findings. An Indian study (Mohanty et al., 2011) though showed mild levels of stress (46%) in second year students which is comparable to the current study findings, the moderate stress levels in second year students were found to be lower (17%) than the current study. In Marjani’s et al.’s (2008) study of Iranian medical science students, second year was the second highest in stress prevalence, having a prevalence rate of 55.31%. Similarly, a Saudi Arabian study (Abdulghani et al., 2011) also found stress prevalence to be high in second year followed by first year. Nair et al.’s (2013) study of South Indian medical students also showed that second year had second highest stress prevalence (53.27%). Supe’s (1998) study of Indian medical students found stress prevalence to be comparatively higher in second year (81.5%) than other study years. In an exclusive study of Arabian medical students (Sunni & Latif, 2014) studying in second year, stress prevalence was found to be 71.7%. In another study (Solanky et al., 2012) conducted at a medical college located at Gujarat, India, 68.75% of second year-final phase students had mild to moderate stress, while 56.25% of second year-final phase students had mild to moderate stress.

In the third year, the number of students experiencing moderate stress (52.8%) was highest compared to all other years. In the final year, the sample was divided into almost two equal halves of students, one reporting mild (48.7%) and the other moderate stress (47.9%). This finding of stress being high in higher years is in line with many other studies which have found stress to be more in clinical years such as third year and fourth.
year (Saipanish, 2003; Mosley et al., 1994; Nandi et al., 2012; Solanky et al., 2012; Sreeramareddy et al., 2007; Abdulghani et al., 2011).

High experience of stress in third year of medical education highlights the fact that stress is likely to exacerbate when one enters into clinical training. In addition to the initiation of clinical postings in third year, students have to manage already existing academic pressures.

The stress is seen to stabilize in the final year as observed in the current study, yet a significant number of final year students were seen to experience considerable amount of moderate stress that warrants attention. Other prior studies also have reported final year of medical education as being stressful (Yousafzai et al., 2009; Reang & Bhattacharjya, 2013; Siraj et al., 2014).

5.3. Difference between Four Years of Medical Education on Total Stress and Stress Categories

An overall significant difference was seen on overall stress between the four years of medical education. Post-hoc comparisons revealed only one significant difference, where third year students were observed to have significantly higher overall stress than first year students.

Though no difference on total stress emerged between other study years, it is worthwhile to note that second year, third year, and fourth year students experienced moderate amount of overall stress, while first year students had mild amount of overall stress. Overall stress being more in third year students than first year students is justifiable as clinical postings begin with added responsibilities in third year of study. Managing clinical rotations along with existing academic load may prove stressful to students in third year. This finding supports other existing evidences which show stress levels to be higher in third year of medicine. Saipanish (2003) in a study of Thailand medical students found that the prevalence of stress was highest in the third year.

In another study (Mosley et al., 1994) of stress, coping and depression in third year medical students studying at the University of Mississippi School of Medicine, stress was seen to account for a large percentage of the distress variance (i.e., 29% to
A study done at a Kolkata teaching hospital in India (Nandi et al., 2012) showed stress to be highest in third year of medical education (60%) compared to second year (47.3%) and fourth year (53.47%). In yet another Indian study (Solanky et al., 2012) done at Govt. medical college of Surat, India, third year-final phase students were found to experience more amounts of severe stress than other study years. Sreeramareddy et al. (2007) reported that prevalence of psychological morbidity as measured by GHQ progressively increased in clinical science years of third, fourth and final year (15%, 18.9% and 24% respectively).

The reasons for stress being less in first year students of this study may be many. First year students mostly have didactic lectures that are focused on learning basic science subjects and hence may have lesser work load compared to subsequent years of study, wherein clinical subjects and clinical postings get into the curriculum. Another reason for first year students experiencing less overall stress may be partly attributed to enthusiasm and excitement of getting into a new course in a new learning environment. This study supports other similar findings in the field. For instance, Yusoff et al. (2011) in their study of medical students at Universiti Sains Malaysia medical school found that prevalence of stress was low in first year students (26.3%) compared to second year (36.5%), third year (31.4%) and fourth year (35.35%). However, final year (5th year) students had lower stress (21.9%) than first year students. Even Saipanish’s study (2003) of stress in Thailand medical students also showed similar pattern of stress distribution as observed in Yusoff et al.’s (2011) study. In the Indian context, one study (Supe, 1998) showed stress prevalence of first year students to be lower than second year and third year students.

On the contrary, evidence for stress being more in first year of study is strong. Nair et al. (2013) in their study on first, second and third year medical students of Raichur medical college in South India showed that prevalence of stress was highest in medical students of first year (70.59%) followed by second year (53.27%) and third year (51.48%). In fact, in comparison to third year students, first year students were likely to have 2.62 times more stress, and this likelihood reduced to one time in comparison to students in second year.
Sreeramareddy et al. (2007) in a study of medical students at a medical college in Nepal, where majority of students were Indians noted that first year students (28.45%) had higher psychological morbidity as measured by GHQ than students in second year (16.3%), third year (15%), fourth year (18.9%), and final year (24%). Several recent Indian studies that have focused exclusively on examination of stress in first year of medical students have reported stress to be high (Sharma et al., 2014; Gade et al., 2014; Thangaraj & Lilian, 2014). Some other studies conducted elsewhere in regions such as Iran, Iraq, Saudi Arabia and Malaysia have also reported stress prevalence to be high in first year than other years of medical education (Marjani et al., 2008; Sharif et al., 2007; Abdulghani et al., 2011; Sunni & Latif, 2014; Siraj et al., 2014).

In this study, first year students may have entered medical education with full of curiosity, hope and aspirations looking forward to what medical education offers. Therefore, they may have found their experience as more interesting than stressful. However, beginning any course of study puts forth challenges and demands that students have to confront, which can be perceived as slightly stressful. The experience of mild stress in first year can thus be explained. It could also be possible that first year may be too soon to assess the impact of stressful experiences.

Both third year and fourth year students were found to have similar amounts of moderate overall stress. This could be because, these years are clinical years with more responsibilities, and students are also progressively moving towards completion of studies. Therefore, academic overload, time pressures, and worries about future might set in during this time. This study finding goes in hand with other studies that have found final years of study as highly stressful. A Pakistani (Yousafzai et al., 2009) study on 342 final year medical students from six medical colleges revealed that about 65% of the students found the training period stressful. Reang and Bhattacharjya’s (2013) study on all four years of medical education showed stress to be highest in final year students (97.4%). In another study (Siraj et al., 2014) on final year Malaysian medical students, 53% of students reported high level of stress and 39% of students reported severe level of stress.
On the contrary, some studies have shown that stress progressively decreases as study year increases. In Yusoff et al.’s (2011) study of Malaysian medical students, stress was least in final year. Similar findings were reported by Guthrie et al. (1998). In the study of Iraq medical students (Sharif et al., 2007), stress progressively decreased from third year and in sixth year it was notably less. Though the stress prevalence was high in third year (70.8%) in the earlier mentioned Saudi Arabian study (Abdulghani et al., 2011), stress was seen to decrease in fourth (43.2%) and fifth year (48.3%). The possible reasons for such decrease in stress over progressive years maybe due to adaptation to stress and growing maturity in dealing with stress.

With regard to academic performance related stress, there was no significant difference between students of four years of medical education. However, students of all the study years experienced academic performance stress to a moderate degree indicating that it is a common stressor that pervades throughout medical training. Students experienced stress because of amount and difficulty of assigned academic activities. Examinations and grades, fear of failing a year or course, peer competition, insufficient time to do the assigned college work and fear of failing to keep up with the pace of the workload were also the academic performance related stress equally experienced by all the medical students.

Aspirants of medical education have to plan and prepare long before they actually get into medical training. Once enrolled in medical college, the hard work has to continue for five to six years accommodating to the intensive demands of the college environment. Therefore, it is natural that academic pressures are the most frequently reported stressors in medical training as was also the case in the current study.

It won’t be too far-fetched to state that literature support to the fact of academic performance stress being a major stress in medical education is enormous and unanimous.

Medical students have to encounter academic stressors such as heavy work load (Dahlin, et al., 2005), competition (Coles, 1994), achieving good grades / marks in exams and clinical evaluations, professional training, (Radcliffe & Lester, 2003; Morrison, 2001), fear of failure, and worries about succeeding in exams (Aktekin et al., 2001).
Yusoff et al. (2010) in a study of 761 medical students at a medical college in one of the Universities in Malaysia found top ten stressors to be related to academics. These stressors were tests and examinations, the large quantity of contents to be learned, lack of time to review what has been learned, poor marks, a desire to do well (self-expectation), and insufficient skill in medical practice, falling behind in reading schedule, heavy workload, difficulty understanding the content, and inability to answer teachers’ questions throughout the year of study.

The above was again demonstrated in another subsequent study by Yusoff et al. (2011) which had recruited 387 medical students from four Malaysian public universities. In this study too, the top ten stressors tended to be related to academics. In addition, students perceiving high to severe stress from academic stressors were 16 times at more risk to develop distress in comparison to those who felt academic stressors as causing nil to mild stress.

Studies conducted in various countries such as U.S.A. (Huebner et al., 1981; Toews et al., 1993; Murphy et al., 2009; Lewis et al., 2000), U.K. (Moffat et al., 2004), Honkong (Stewart et al., 1999), Sweden (Dahlin et al., 2005), Turkey (Aktekin et al., 2001), Malaysia (Johari & Hassim, 2009; Yusoff et al., 2010; Yusoff et al., 2011, Siraj et al., 2014), Pakistan (Yousafzai et al., 2009; Shah et al., 2010; Shaik et al., 2004; Sohail, 2013) Iran (Sharif et al., 2007), Vietnam (Quyen & Tasanapradit, 2008), Saudi Arabia (Abdulghani et al., 2011; El-Gilany et al., 2008; Al-Dabal et al., 2010; Soliman, 2014), Thailand (Nuallaong, 2010), and China (Chen et al., 2013) have time and again proved that academic stress is a major concern in medical students and this holds good irrespective of the year of study or mode of study.

Studies in India also have shown academic stress to be a predominant problem in medical students. In Supe’s (1998) study, academic factors such as final exams and information overload were major stressors. Interestingly, students scoring higher than 95% of marks prior to medical school were more stressed than others. High parental and self-expectations caused more academic stress.
Though not measured in this study, parental expectations may enhance academic stress as seen in Supe’s (1998) study. This is because Indian parents are generally more involved in their children’s lives and they also fund education of their wards.

In Sreeramareddy et al.’s (2007) study at a Nepal medical college where majority of students were Indians, academic stressors rated as most severe were 'dissatisfaction with the class lectures', 'vastness of academic curriculum/syllabus', and 'frequency of examinations.'

In a study (Abraham et al., 2009) done among first year Malaysian students enrolled in Manipal campus of Melaka Manipal Medical College (MMMC), India, the same campus in which the current study was done (though current study is done in a different college), it was observed that around 64% of students felt that workload was a lot and 52.5% felt stressed about peer competition for better grades.

Peer rivalry, peer competition and competition for post graduate seats is a common phenomenon and is witnessed in several other Indian studies on medical students (Shah et al., 2009; Vaidya & Mulgaonkar, 2007; Gade et al., 2014; Nandi et al., 2012).

Murphy et al. (2009) in a comparative study of medical and dental undergraduates found that both groups of students felt most stressed about grades and performance on examinations. Murphy et al. (2008) opine that worrying about grades and exam performance is not unusual as students getting into professional courses are expected to be high achievers. Not only they have to put efforts to outperform others while studying in a highly competitive environment, but they are also required to compete with other high achievers in order to get a seat in preferred residency or postdoctoral programs.

Many recent Indian studies specific to first year of medical education (Cherkil et al., 2013; Sharma et al., 2104; Gade et al., 2014; Shah et al., 2014; Patil et al., 2014) and rest of the studies examining students in various years of medicine (Solanky et al., 2012; Nandi et al., 2012; Reang & Bhattacharjya, 2013; Brahmbhatt et al., 2013) have continued to ascertain the dominance of academic stress in medical education.

There are exceptions to the common noted experience of academic stress. In an Indian study (Pai et al., 2014) examining perception of learning environment by medical
students of pre-clinical and clinical stages of medical training, students though noted some problems; they in general had a good perception of learning and perceived course organizers and atmosphere positively.

First year students perceived educational environment more positively than the third, fifth and seventh year students. However, stress progressively decreased with each successive semester. On the positive side, clinical students opined that teaching and learning methods used in pre-clinical phase continued to be useful even in clinical phase. They also felt more confident about succeeding in the course.

All the four years of medical education differed on patient and clinical responsibilities related stress. Post hoc comparisons showed that second year, third year and fourth year medical students had significantly more patient and clinical responsibilities related stress than the first year medical students. All the four years of medical education experienced mild stress in this area. First year students had low mild stress scores when compared to third year and fourth year students whose scores were in the upper end of mild stress range.

The reason why first year students have less stress in this area is probably because they don’t have clinical exposure which is present in other years of study.

This study finding is consistent with the existing literature which states that students in clinical phase generally have more stress than students in lower years or pre-clinical phase of study (Sapanish, 2003; Sreeramareddy et al., 2007; Nandi et al., 2012).

Various stress experiences associated with clinical training have been discussed in literature. Greenfield et al. (2001) studied anxieties experienced by both male and female students in clinical training of two batches of 1992 and 1995. Male and female students both experienced the following situations as highly stressful: getting the diagnosis wrong, presenting cases in tutorials or ward rounds, inadvertently hurting patients, making diagnoses, helping with a cardiac arrest. In addition, males also felt carrying out rectal and vaginal examinations as highly stressful. Dealing with patients sufferings, sickness or dying have also been reported to be as stressful clinical situations (Chang et al., 2012; Wolf, 1994; Frith, 1986; El-Gilany et al., 2008, Sohail, 2013).
In the context of patient care, inability to empathize with patient’s anxiety in dealing with their illnesses is commonly reported by medical students (Radcliffe & Lester, 2003; Spencer, 2004). This distancing may be resulting from repeated exposures to similar experiences, or a part of professional behaviour imparted in medical education, or a result of chronic stress.

Another reason for decline in medical student’s ability to empathize given by Holm and Asperger (1999) is the development of temporary, fragmented relations students have with patients and avoidance of intimacy which medical school atmosphere encourages.

One of the reasons for mild clinical responsibilities related stress in this study could be that students in the college where study was undertaken are not mostly directly involved in patient care, but generally act more like observers being part of a team where faculty and residents (for example, students enrolled in M.D program) are directly involved in day to day patient related care and responsibilities. Therefore, since students don’t have the responsibility of making decisions about comprehensive patient care and have limited patient related interactions, they may not experience high stress. Yet, slight stress could be experienced during higher years as in these years patient contact is initiated and patients are mainly engaged by students for case history taking and related presentations and minor clinical procedures. Hence, certain specific things such as patient not turning up in time for clinical examination, working with patient with poor personal hygiene and difficulty in learning precise skills related to minor clinical procedures may prove slightly stressful.

All the four years of medical education significantly differed on faculty relations stress. Post hoc comparisons revealed one significant difference, where in third year students experienced significantly higher faculty relations stress than first year students. The faculty relations stress in third year medical students was on higher end of mild stress range almost bordering on to moderate range, while students in all other years experienced mild stress in this area.

Third year students’ experience of faculty relations stress being higher than first year students is understandable as student and faculty interactions become frequent and
closer in third year because of clinical postings in the settings where the study took place. Students in small groups begin to accompany faculty in ward rounds and are expected to engage in case discussions and answer questions raised by faculty. Students are also expected to make case presentations in front of faculty, submit clinical assignments to faculty and get faculty signature for ascertaining their attendance. Therefore, certain situations such as inability to answer questions, receiving criticisms in front of peer, inconsistency of feedback from faculty, availability of faculty when required, and enforcement of college regulations by faculty may create frictions in faculty-student interactions resulting in more stress. First year students have more didactic lectures covering basic sciences in huge groups, which do not provide scope for closer interaction with clinical faculty. Also, faculty demanding from students to perform individually is less. In addition, mentoring support from faculty is more mandatory in first year of study. Therefore, first year students may not experience that much of stress arising from faculty relations. Final year students being senior students would have learnt to adapt to stress and their interactions with faculty would have matured.

This study finding is consistent with the paramount evidence that exists with regard to frictions in student faculty relations and harassment from faculty that exacerbates stress in medical students (Firth, 1986; Radcliffe & Lester, 2003; Lempp & Seale, 2004; Wolf, et al.,1998; Dahiln et al., 2011; Shoukat et al.,2010; Gágyor et al., 2012; Supe, 1998; Mohanty et al., 2011; Mane et al., 2011).

Personal issues related stress also did not differ significantly between the four years of medical education. First year and fourth year students experienced mild stress related to personal issues. The scores of third year and fourth year students were in the higher end of mild stress range bordering to moderate range.

Students in all years experienced mild stress with respect to personal life issues such as lack of time for relaxation, absence of home atmosphere in hostel, relationship problems, financial problems and concerns regarding physical health.

However, existing empirical evidence suggests that personal issues related stressors are also among the major concerns reported by medical students.
Insufficient amount of time for relaxation and recreational activities is a glaring problem (Wolf, 1994; Morrsion, 2001; Aketekin et al., 2001; Ball & Bax, 2002; Stewart et al., 1999; Al-Dabal et al., 2010; Shaikh et al., 2004). Several Indian studies also have reported lack of entertainment and relaxation as a stress inducing factor in medical students (Sreeramareddy et al. 2007; Sharma et al., 2014; Reang & Bhattacharjya, 2013; Brahmbhatt et al., 2013; Nandi et al., 2012; Abraham et al., 2009).

Relationship problems such as conflict with friends, parents, roommates are also commonly reported (Huebner et al., 1981; Quyen & Tasanapradit, 2008; Johari & Hassim, 2009; El-Gilany et al; Amr et al., 2008; Siraj et al., 2014).

In the Indian context, Supe (1998) found that emotional and relationship factors such as love affairs, jealousy and fights were more in 1st year students as compared to 2nd and 3rd year students.

In another Indian study (Mohanty et al., 2011) classroom relationship problems in 1st and 2nd MBBS students were found to be significantly higher when compared to the 3rd MBBS.

Interpersonal problems with peer and parents, girlfriend/boyfriends problems, adjusting to roommates, trouble in new friendships have been reported by other Indian studies (Shah et al., 2014; Abraham et al., 2009). Dissatisfaction with living arrangements because of inadequate hostel facilities, lack of home atmosphere and feeling of homesickness and unsatisfactory food arrangements have been reported by several Indian studies (Supe, 1998, Sreeramareddy et al., 2007; Shah et al., 2014; Patil et al., 2014; Brahmbhatt et al., 2013; Nandi et al., 2012, Abraham et al., 2009).

In Reang and Bhattacharjya’s (2013) study of Indian undergraduate medical students, lack of time for recreation and having to be away from home were more so in first year medical students.

Financial stressors are very common in medical education as students have to think paying off debts as they come out of medical training. Many studies have reported medical students having problems in dealing with finances (Firth, 1986; Wolf, 1994;
Ross et al., 2006; Quyen & Tasanapradit, 2008; Sharif et al., 2004; Johari & Hassim, 2003; Amr et al., 2008; Al-Dubai et al., 2011).

Interestingly, in a multi-centre cross-sectional study (Yusoff, et al., 2011) involving four Malaysian public universities where relation between parental income and student distress was examined, it was found that students whose parents had middle-range incomes were at 5 to 13 times higher risk of developing psychological problems than those students whose parents had less income.

The authors explained that lower socio-economic status people are less distressed as they are adapted to life problems. While, people of highest socio economic status were not distressed as they were able to fulfil their needs. But, those in the middle income group seemingly struggled to fulfil their and others expectations.

Review of literature did not find any Indian study that reported financial problems as causing stress. This could be because in Indian culture, parents fund their children’s education and personal expenses accrued during education. Therefore, students are less likely to be stressed about finances.

Many studies have also shown negative physical health outcomes such as reduced health care, poor sleep, decline in physical health irregular eating habits, and inability to concentrate (Al-Dabal et al., 2010; Quyen & Tasanapradit, 2008; Sherina et al., 2004; Shaikh et al., 2004).

Majra (2013) in a study of final year medical students observed overall increase in health-related risk behaviours and decline in health-promoting behaviours among students during their stay in medical college. There was also a significant decline in physical activity and over indulgence in junk food.

Indian studies have revealed physical concerns in medical students such as sleeplessness, health problems, lack of exercise (Kate et al., 2012; Brahmbhatt et al., 2013; Mane et al., 2011; Abraham et al. 2009). In a recent comparative study (Waghachavare et al., 2013) of stress among medical, dental and engineering students, medical students were more affected by health and lifestyle factors as compared to dental and engineering students.
However, an Indian study (Abirami et al., 2012) conducted at a South Indian medical college reported that personal factors such as loneliness, health and financial issues did not cause distress in medical students when compared to academic factors. This suggests that it is quite possible that medical students everywhere need not experience major personal issues related stress as was the case in the current study where personal issues related stress was experienced to a mild degree.

Having a professional demeanour involves acquiring attitudes, values, ethics, behaviours and lifestyles of physicians from the beginning of medical education (Wolf, 1994).

Characteristics of professionalism involves being honest, having integrity, advocating needs of patients, reducing barriers to equitable health care, and conducting oneself ethically (Drybe et al., 2011). The proper acquisition of these behaviours determines the development of a student’s professional identity. Some of concerns that medical students can have with regard to their professional identity are lack of confidence in being a successful professional student, finding professional school reality to be contrary than expected, experiencing insecurities about future and lack of confidence in career decision. In the present study, these professional identity concerns were experienced to a moderate degree by students in second, third, and fourth year of medicine, whilst first year students were only mildly perturbed by these issues. With regard to comparison between study years, third year students only showed a trend towards higher professional identity stress than first year students.

Since students in first year are just beginning the course, they may not be worried about professional identity issues as they have to still get accustomed to training and start forming professional identity. The students in subsequent years have been long enough into the course to be confronted with realities and uncertainties associated with pursuing a career in medicine.

The current study findings are in line with several earlier studies which have shown that professional identity related problems may surface as one enters into higher years or clinical training.
Dahlin et al. (2005) in a study of Swedish medical students found third year and sixth year students as having higher worries about their ability to endure long hours in future and lesser confidence in their ability to competently perform clinical responsibilities in future. In addition, role conflicts and cynicism was seen to increase with progressive study years. Around 25% of students felt that training lacked in adequately preparing them for the profession.

In another subsequent study (Dahlin et al., 2007) of burn out in medical students entering clinical training, worries about long working hours in future and confidence in one’s own competence in future career were observed to increase from first to third year.

Radcliff and Lester (2003) in their study of 21 final year medical students reported that developing and presenting an image of confident competent future professional in interaction with staff colleague and patients to be stressful. Particularly, having to follow a dress code and display presentable persona in clinical training was stressful. In addition, socialization into the role of doctor by teachers through methods such as humiliation and embarrassment was difficult to handle. Concerns about future have been recorded by other studies as well (Aktekin et al., 2001, Sohail, 2013).

Apart from stress, burn out can also compromise patient care and lead to unprofessional conduct. Dyrbye et al. (2010) studied relation between burnout and professionalism among medical students from 7 US medical schools and observed that burned out students were more likely to engage in cheating/ dishonest clinical behaviours such as copying from a crib sheet or from classmates during examination, reporting a physical examination finding as normal when not having conducted it. Burned out students had higher likelihood of committing one or more unprofessional behaviour than students without burnout.

Burned out students were also less likely to hold altruistic views about physician’s responsibility to society. Also, they were not desirous of providing care for the medically underserved patients. In addition, unprofessional behaviours and students attitudes were more related to professional distress than personal mental distress.
The authors of the study opined that that the learning climate of the medical school in some ways may encourage dishonesty as students often commit dishonest behaviours despite being aware that they are wrong.

Empathy is a core professional value, whose development can be hampered by stress and burnout. In a study of burnout, empathy, and professional climate in fourth year medical students, higher burnout scores were related to lower levels of empathy in students and lower professional climate scores as observed in fellow medical students, residents and faculty (Brazeau et al., 2010). In Paro et al.’s (2014) multi-centric study of empathy and its association with burn out and qualities of life in students from 22 medical schools, depersonalizing experiences were related to lower empathy and perspective taking. Whereas, feelings of personal accomplishment were related to lower personal distress and better perspective taking. Similarly, Thomas et al.’s (2007) study showed that burn out in medical students was negatively related to student empathy and positively related to empathy.

In a review of studies (Neumann et al., 2011) on medical students and residents’ change in empathy published from 1990 to 2010, empathy was seen to decline and distress was associated strongly with decline in empathy. Most importantly, hidden curriculum factors such as decline in humane values, idealism when facing clinical reality, being treated immaturesly, media idealization of medical profession, and encouraging unrealistic expectations of how physicians should behave contributed to student distress, which in turn led to decline in empathy.

There is also a lot of emphasis on influence of faculty development of professional identity (Wilkes & Raven, 2002). Owing to the power based influence that faculty may yield, students may emulate professional and sometimes unprofessional behaviours demonstrated by faculty. Learning of unprofessional behaviours such as cynical attitudes, disrespect and lack of empathy towards patients through such ways may pose as a stress to students.

Firth in an early study (1986) also noted that students’ perception of medical profession having failed owing to experiences such as feeling of incompetence, embarrassing or distressing patients often involved a senior faculty and in addition
students opined that mentors were not perfect and feared of repeating such pattern themselves.

Hendelman and Byszewski (2014) in their study noting the professional lapses from the faculty side emphasized the importance of effective positive role modelling of professional behaviours by faculty.

Considering the moderate amount of professional identity stress experienced by students in most of the years of this study, it is imperative that efforts be made to carve a stable professional identity among medical students in the higher years. Faculty in particular should be sensitized about effective role modelling in order to address the concerns related to professional identity.

5.5. Psychosocial Variables of Coping, Dispositional Optimism, Social Support and Resilience

5.5.1. Coping

Examination of the differences between four years of medical education on coping, revealed a significant difference between study years not only on broader dimension of problem based coping but also individual problem based coping styles of active coping, planning, and use of instrumental support seeking.

First year students used the entire problem based coping strategies, more than second year and third year students. However, students in all years used problem based coping (taken together) to a medium extent.

Problem focused coping generally involves problem solving or making efforts to change the source from where stress arises (Carver et al., 1989). Therefore such strategies are considered to be most adaptive ways of dealing with stress and are known to reduce stress and distress in general and clinical populations (Wijndaele et al., 2007; Billings & Moos, 1984; Cronkite et al, 1998). Problem focused coping is also known to be associated with reduced psychological distress and stress not only in general college populations (Penland et al., 2000; Crockett et al., 2007), but also in medical college population (Mosley et al., 1994; Wolfe, 1998; Park & Adler, 2003; An et al., 2012).
The individual problem focused coping style of active coping which involves actively attempting through direct actions in stepful manner to remove or reduce the effects of stress (Carver et al., 1989) was seen to be used more by first year students than second year students. Having successfully completed their pre-medical education, first year students may be endowed with effective active coping methods and confidence that it will work. Other years of study did not differ significantly in the use of active coping.

Planning is another problem focused coping strategy that consists of thinking about how to cope with a stressor. It involves figuring out action strategies and steps on how to effectively deal with a given problem (Carver et al., 1989).

Planning was utilized more by first year and fourth year students in comparison to second year and third year students. First year students may be more likely to have very recently used planning in studying during pre-medical years in their efforts to prepare for medical education. In fact, the Indian system of pre-university education that prepares students for taking entry into medical education is very much tightly packed and tough. Therefore, students have no other way except to plan things in order to sustain. Therefore, this earlier coping method of planning could have been carried over by the students to their first year of medicine. Again, fourth year being the final year of study, students have to strategically plan things to succeed in their exams and pursue their future career. Therefore, fourth year students may use planning more than other years as found in this study.

The use of planning did not differ significantly between first year and fourth year students and between second year and third year students.

First year students were also seen to make higher use of instrumental support seeking than third year students. Instrumental support seeking involves seeking support for instrumental reasons that may actively help in dealing with stress. This involves seeking advice, assistance, or information (Carver et al., 1989).

Instrumental support seeking may be used more by first year students as they are new to the course and may be more in need of practical information in order to get accommodated to the new environment and academic pattern.
Other years of study did not differ in the use of instrumental support seeking.

Students in all the years of medical education were seen to make medium use of active coping, planning and instrumental support seeking. On the whole, it appears that first year students are more likely to make higher use of problem based coping strategies than other study years. This was found to be true, even in the case of broader problem based coping, the use of which was more in first year students as compared to second year and third year students.

This study finding is in line with several studies that have reported that first year students use problem based coping strategies such as active coping (Stewart et al., 1995; 1997, Moffat et al., 2004; Yusoff et al, 2011) planful problem solving (Park & Adler, 2003; Yusoff et al, 2011). In the Indian context, Gade et al.’s (2014) study of first year students studying at an Indian medical college, taking control of possible things which is somewhat alike to active coping was among the often used strategies to reduce stress.

There are certain findings which show that students in higher years have used problem based coping more than students of initial years. In a study (Al-Dubai et al., 2011) of medical and medical science undergraduate students studying at a Malaysian University, planning and active coping was used more by students in higher years than younger students. Al-Dubai et al. (2011) opine that this could be because of older students having better adapted to the college environment and having maintained longer period of contact with mentors than younger students. In Sreeramareddy et al.’s (2007) study also, another problem focused strategy of instrumental support seeking was used more in clinical years rather than initial years as seen in the current study.

However, in the current study, in the prediction analyses, problem based coping taken as whole was observed to be associated with higher overall stress and professional identity stress. When considering the case of individual problem based coping styles, active coping was seen to be associated with academic performance related stress, while planning was associated with higher personal issues related stress. Instrumental support seeking was seen to be associated with higher stress in the area of patient and clinical responsibilities.
Similarly to this study finding, Yusoff et al.’s (2011) study of medical students showed stress to be high, despite using adaptive coping strategies. Even in an Indian study (Supe, 1998) of medical students, students who used planful problem solving had high stress.

The reason for association of the various problem-based coping styles with high stress in certain stress categories as found in this study could be that these problem-based coping strategies were activated and utilized when there was high stress in the respective stress areas. Since this study has a cross-sectional design, it is unclear whether these strategies still persisted to be associated with stress when students would have recovered following stress.

Emotion-based coping as a whole was seen to be used more by first year students when compared to third year and fourth year students.

Though students in all years used emotion-based coping to a medium extent, third year and fourth year students’ score was in the lower end of the medium range, while the first year and second year students’ score was in the middle of the medium range of use.

Emotion-focused coping is mainly directed towards reducing or managing the emotional distress related to the stressful situations (Carver et al., 1989).

In other words, like problem-based coping, emotion-focused strategies may not change the situation directly, but may serve to change the interpretation of how an event is construed. Emotion-focused coping includes a wide range of behaviours, such as blaming, wishful thinking, venting, seeking emotional support, accepting and so on and so forth.

Emotion-focused coping may be both adaptive and maladaptive (Billings & Moos, 1984; Penland et al., 2000; Crockett et al., 2007; Bouteyre et al., 2007). Coping strategies that focus on negative emotions and thoughts are known to enhance psychological distress (e.g. venting of emotions and rumination), while coping strategies that regulate emotion (e.g. seeking social support, and acceptance) are known to reduce distress.
In this study context, emotion focused coping taken as whole may not be adaptive as it was seen to positively predict over all stress. This study is in accordance with other studies that have found emotion focused coping to be associated with psychological distress and stress in medical students (Wolfe, 1998; Park and Adler, 2003). In addition, certain individual emotional coping styles that may act as maladaptive were also seen to be associated with high stress in certain stress categories (as will be evident in later discussion).

Therefore, all medical students, and particularly first year students (since they are seen to use more of all emotion focused strategies than others) should be taught to rely less on maladaptive emotional coping and adopt better coping methods to alleviate stress.

When individual emotional coping styles were examined, differences were observed between the four years of medical education on only three emotional coping styles of venting, use of emotional support and acceptance.

In this study, venting was used significantly more by fourth year students than second year and third year students. No significant difference was seen on venting between other years of study. While first year, second year and third year students made little use of venting, final year students made medium use of venting.

Venting of emotions involves paying attention to one’s emotional distress and a tendency to express or ventilate those feelings. Generally, coping styles such as venting of emotions and rumination are known to be maladaptive as they don’t remediate the negative emotions but rather increase them and prolong the feelings of distress (Windle & Windle, 1996; Knibb & Horton, 2008). Focusing on negative emotions for a long time may impede adjustment and may not help people to adopt active coping methods to deal with stress (Carver et al., Weintraub, 1989). However, sometimes venting may be functional for a short period, like period of mourning (Carver et al., 1989).

There is mixed evidence as to the role of venting in relation to psychological distress. While Bouteyre et al. (2007) demonstrated a positive relation between venting of emotions and depressive symptoms in 233 first year psychology students. Penland et al. (2000) revealed venting to be an adaptive coping strategy because individuals had decreased depressive symptoms when they used venting.
In this study, higher use of venting is probably a maladaptive strategy, since in the prediction analyses, higher use of venting was observed to determine higher overall stress and higher stress in stress areas of academic performance, faculty relations, personal issues and professional identity.

Fourth year students may feel on edge and have anxieties and fears as the pressure to succeed mounts and uncertainties about future increase towards the closure of the study period. Therefore, they may use higher venting than students of other years to express the negative feelings they are experiencing. Nevertheless, it may not serve useful as venting is seen to be associated with higher stress in several stress areas as already observed.

This finding is consistent with findings of other studies on medical students, which have showed that venting was associated with psychological distress and higher academic stress (Sreeramareddy et al., 2007; Yusoff et al., 2011).

Seeking emotional support involves taking support for emotional reasons and includes receiving sympathy, understanding and moral support from others (Carver et al., 1989). Carver et al. (1989) view that emotional support may be useful or not depending on the context. It may serve useful for a person who has experienced a stress, by reassuring him and directing him towards more adaptive ways of coping, whereas, if emotional support is used primarily for getting sympathy and ventilation, then it may not prove useful in long run.

In this study first year students sought higher emotional support than second year and third year students. Being in the first year, students may be slightly stressed and anxious by the adjustments they have to make in the new environment and therefore they may seek more emotional support compared to second year and third year students who would have settled by now. Use of emotional support did not differ significantly between other years of study. However, students of all years used a medium amount of emotional support.

There is evidence to say that emotional support not only reduces anxiety and depression in general population (Wijndaele et al., 2007), but also reduces stress anxiety and depression in college students (Crockett et al., 2007; Penland et al., 2000; Bouteyre et al., 2007).
But, this may not be the case with our study population as the correlational analyses revealed higher use of emotional support to be associated with higher overall stress and higher stress in some stress areas. Though emotional support did not emerge as a significant predictor of stress, a trend of positive relationship between use of emotional support and stress was evident. Therefore, there is a possibility that emotional support may have been maladaptive in this study blocking ways to more effective ways of coping.

Emotional acceptance can be understood as an adaptive coping mechanism where in a person is seen to deal with a situation by accepting the reality of a given situation. Acceptance is salient in situations in which the stressor requires one to accommodate to it, in contrast to situations where the stressor is amenable to change (Carver et al., 1989).

Emotional acceptance was seen to be used significantly more by first year students than second year students in the current study. The higher use of emotional acceptance may have helped first year students to accommodate to stresses of new environment and prepare themselves to familiarize with the same as they have to spend further few more years in the same environment.

Acceptance has been found to be a predominant coping strategy used by first year Indian medical students (Gade et al., 2014). In another study on first year Malaysian medical students, acceptance was among the frequently used adaptive coping strategies (Yusoff et al., 2011). Other studies on medical students also have reported emotional acceptance as a predominant coping strategy to deal with stress (Sreeramareddy et al., 2007; Al-Dubai, et al., 2011).

Students of other years of study did not significantly vary in the use of emotional acceptance and students in all years adopted emotional acceptance to a medium extent.

In general, evidence exists with regard to usefulness of emotional acceptance in reducing depressive symptoms, negative affect and high stress (Shallcross, et al., 2010; Campbell-Sills et al., 2006a; Kashdan et al., 2009).

However, in the current study, on correlational analyses emotional acceptance did not have a significant relationship with overall stress and stress areas.
All the students in four years of study did not significantly differ on the remaining emotion based coping styles of positive reframing, humour, self-blame and religion.

Positive reframing was used to a medium extent by students in all years of medical education. Positive reframing (that is viewing a stressful situation in a positive light) is viewed an adaptive coping method. Some studies done on first year medical students have shown positive reframing/ positive re-interpretation to be used as a predominant coping strategy (Yusoff et al., 2011; Gomathi et al., 2013). In addition, studies have shown use of positive reinterpretation as beneficial in reducing stress, anxiety and depression in medical students (Stewart, Betson, Marshall et al., 1995; Stewart, Betson & Lam et al., 1997; Stewart, Lam, & Betson et al., 1999; Moffat et al., 2004, Gade et al., 2014).

Before concluding that medium use of positive reframing as seen in this study may be beneficial to medical students, it should be noted that in correlational analyses, positive reframing was not significantly related to overall stress or any other stress area. However, in regression analysis use of positive reframing was seen to significantly negatively predict over all stress, indicating the possibility that it would have acted as a suppressor variable.

The coping style of humour (viewing things in a humorous fashion and viewing things lightly) which did not differ in its use among the various study years was seen to be utilized only to a little extent by students in all years of medical education.

Use of humour in medical education is well known as medical teachers think it reduces stress in medical students and aids in many other factors (Zeigler, 1999). Humour intervention has been beneficial in enhancing academic performance (Ziv, 1988). An Indian study proved that humour intervention was beneficial in reducing stress, anxiety and depressive symptoms in medical students (Narula et al., 2011).

Some other studies also note that humour is an important predominant coping strategy adopted by medical students (Gade et al., 2014; Cherkil et al., 2013).
In the current study humour is not necessarily beneficial as correlational analyses showed higher use of humour to be significantly related to higher overall stress and significantly higher stress in only stress areas of faculty relations, personal issues and professional identity. However, humour failed to significantly predict overall stress or any of the stress areas in regression analyses.

In literature there are few studies which have also reported humour to be associated with stress, distress and poor outcomes in medical students (Johari & Hassim, 2009; Stewart, Betson, Marshall et al., 1995; Stewart, Betson & Lam et al., 1997; Stewart, Lam, & Betson et al., 1999). Hence, joking about the stressful situation may not be always useful as it may be a defensive process hindering utilization of other adaptive coping methods.

Self-blame (blaming oneself for the stressful situation) a maladaptive emotional coping strategy though did not differ among the various study years was however seen to be used to a medium extent by first year students. Students in rest of the study years made only little use of self-blame.

Higher use of self-blame by first year students has been reported in other studies of first year medical students (Stern et al., 1993; Chan, 1992, Gomathi et al., 2013). Higher use of self-blame by first year students in this study may require attention and remediation as self-blame is known to be associated with higher psychological distress and stress in medical students (Cherkil et al., 2013; Johari & Hassim, 2009; Mosley et al, 1994: Sreeramreddy et al., 2007). The same was observed in this study too, where in self-blame was seen to positively predict academic performance related stress and professional identity stress. Academic performance and professional identity related issues would need to be dealt with proactive coping strategies. Self-blaming tendency which involves preoccupation with attributing reasons of stress to self could hinder medical students from focusing on practical efforts and actions needed to remediate stress.

The students in all years of medical education did not differ in the use of religion as a coping style and used this style only to a little extent. Religion may have adaptive (Schlebusch, 2000) or maladaptive outcomes (Carver & Scheier, 1994) depending on the religious orientation and context.
Even though, all medical students made little use of religion as a coping strategy in this study, its significant positive correlation with overall stress areas and all other areas of stress, except faculty relations calls for attention. Specifically, religious coping emerged as a significant predictor only in the area of personal issues related stress, hence pointing towards the detrimental consequences religious coping may have with regard to stress pertaining to personal lives of medical students.

Religious coping may have proved maladaptive in this study as it may have fostered a passive way of dealing with stress in personal areas instead of using better strategies such as communication or planning to resolve personal issues. This study finding is consistent with other studies in general literature that have found religious coping to be associated with high stress and negative outcomes (Paragament, Smith, Koenig, & Perez, 1998; Ano & Vasconcelles, 2005; Carpenter, Laney, & Mezulis, 2011).

However, these studies distinguish between positive religious coping and negative religious coping and indicate negative religious coping involving fear of punishment of God, spiritual discontent etc., to be related to negative outcomes, while positive religious coping strategies having benevolent religious reappraisals of stress, aimed at seeking spiritual connection, lead to positive outcomes (Paragament et al., 1998; Ano & Vasconcelles, 2005; Carpenter et al., 2011).

It is unclear whether students in the present study used positive or negative religious coping. Therefore, it would be interesting to explore this aspect in future, using extended measures of religiosity.

In contrast to this study finding, higher use of religious coping has been reported by medical students in other studies and most of these studies assume it as an adaptive coping strategy, since it is frequently used by medical students (Cherkil et al., 2013; Gomathi et al., 2013; Al-Dubai et al., 2011; Yusoff et al., 2011). There are only few studies which have actually demonstrated religion to be negatively correlated with stress symptoms (e.g., Johari & Hassim, 2009).

None of the individual avoidant coping styles of self-distraction, denial, substance use and behavioural disengagement differed significantly between four years of medical education. However, when avoidance based coping as a whole was examined, second
year students were seen to make higher use of it as compared to students in all the other years. The second year students may adopt avoidance as a coping mechanism as the workload may increase from first to second year. Further, in prediction analysis avoidance based coping as a whole was seen to determine high over all stress and high stress in stress areas of academic performance, patient and clinical responsibilities and professional identity.

Avoidant coping is known to be associated with higher depression in clinical populations (Billings & Moos, 1984; Holahan et al., 2005) and also with stress, anxiety and depressive symptoms in university samples (Dwyer & Cummings, 2001; Crockett et al., 2007).

This study finding supports findings from other studies on medical students, which have proven avoidance coping to be associated with lower psychological well-being (Park & Adler, 2003), negative affect (Ko et al., 2007), curriculum related stress and lower personal competence (An et al., 2012). Specific avoidant coping styles are also associated with negative outcomes as is evident in the discussion of individual avoidant coping styles.

Therefore, avoidance coping which involves denying or ignoring a stressor needs to be addressed as it may distract medical students from engaging in adaptive coping method, and in the long run allow the stressors to accumulate and eventually lead to more problems.

Among the individual avoidant coping styles, self-distraction as a coping strategy was used to a medium amount by students of all study years. High use of self-distraction has been reported by other studies on medical students (Shah et al., 2009; Gomathi et al., 2013).

Self-distraction being a maladaptive coping strategy involves cognitively disengaging from a stressful situation through methods such as day dreaming and sleep. Though, there is medium use of this strategy in this population, measures need to be taken to not allow it to exceed to severe levels, as it is known to be more in distressed students and positively related to stress in medical students (Johari and Hassim, 2009).
Behavioural disengagement was used only a little by students in all years. In the correlation analysis, though this coping strategy had significant higher correlation with overall and all stress areas except patient and clinical responsibilities, it failed to predict any of the stress areas in prediction analysis. This could be because of multicollinearity with other predictor variables.

Behavioural disengagement is known to be used more in distressed medical students (Johari & Hassim, 2009) and is associated with stress symptoms and psychosocial stress (Johari and Hassim, 2009; Sreeramreddy et al., 2007).

Students in all years did not differ in the use of denial and hardly used it to cope with stress. According to Carver et al. (1989), denial coping occurs when people deny the reality of the existence of a stressor.

Denial initially may reduce distress, but allowing the stress to exist without acknowledging it may hinder coping later on (Mullen & Suls, 1982; Suls & Fletcher, 1985).

This study finding is similar to findings of certain other studies which have shown denial to be reportedly less in medical students (Sreeramareddy et al., 2007; Al-Dubai et al., 2011).

Nevertheless, denial is known to be more in distressed medical students and to be associated with high stress in medical students (Johari & Hassim, 2009; Sreeramreddy et al., 2007). In this study, though denial was seen to positively correlate with overall stress and all stress areas (except patient and clinical responsibilities), it failed to emerge as a salient predictor of any of the stress areas.

Similar to denial, use of substance as a coping style did not vary among the study years, and it was hardly used by the students to cope with stress. This finding corroborates with findings of one study done at Nepal medical college and another study done at Malaysian medical college (Sreeramareddy et al., 2007; Al-Dubai et al., 2011), which showed substance use to be notably less among medical students.

Particularly, alcohol/drug use was least reported. The authors of both studies speculate whether this could be because of under reporting. The Malaysian study also attributes this to students’ religious background that prohibits alcohol use. In the Indian
settings also, there are studies which reveal that substance use was least adopted by first year (Gade et al., 2014) and second year students (Gade et al., 2014; Kate et al., 2010).

In the current study also, less use of substance may be the result of denial or social desirability. Despite, the little use of substance as a coping strategy, it was found to be positively correlated with total stress and stress areas of patient and clinical responsibilities, faculty relations and personal issues. In the prediction analyses, higher substance use was seen to exacerbate stress arising from faculty relations.

There are studies that have reported use of substance as a coping method. Tyssen et al. (1998) in their study of Norwegian nationwide sample of medical students, found use of alcohol to cope was associated with tension and mental distress. Some other studies also have reported use of alcohol as a coping strategy (Guthrie et al., 1995, 1997, 1998, Yousafzai et al, 2009). In addition to alcohol, use of other substances such as tobacco and drugs among medical students have also been reported (Miller & Surtees, 1991; Ashton & Kamali, 1995). In the Indian context, Cherkil et al.’s (2013) study of medical students showed substance use as a coping method to be adopted by 60% of students when faced with stressors related to living conditions which is the most stressful domain experienced by these students. In the same study, a substantial 26% of students continued to favour substance use as a coping style to deal with the stress domain of health and value conflict.

Therefore, whether medical students admit their substance use or not, intervention should be in place to increase awareness of harmful effects of substance on physical and psychological health.

5.5.2. Social Support

The presence of support doesn’t mean that it is helpful and rendered as one requires. Therefore, College Social Support Scale was used to comprehensively measure support in terms of availability, helpfulness and reception of it from both family and friends.

The four years of medical education did not differ on availability, helpfulness and reception of support from both friends and family as measured by college social support survey.
Availability of support, helpfulness of support and reception of support from both friends and family were perceived to be high by students in all four years of medical education.

Higher amounts of family and friends social support may be considered as a good asset possessed by medical students as it helps combat stress effectively. Many studies have indicated that high social support in medical students is associated with positive outcomes such as higher social well-being (Strayhorn, 1989), high quality of life (Kim & Cho, 2012), less stress and burn out (Chang et al., 2012), and low social support with negative outcomes such as high stress (Kim & Cho, 2012), mental health problems (Jeong et al., 2008; Jeong et al., 2010), and higher dropout rates (Maher et al., 2013).

In correlational analyses, higher availability, and received support from friends was related to higher academic performance related stress and lower personal issues related stress. In addition, higher received support from friends was significantly correlated with higher overall stress and higher stress in stress categories of academic performance and professional identity.

However in the regression analyses, only two significant predictions emerged, where availability of support received from friends predicted lower stress in the area of personal issues related stress and received support from friends predicted higher stress in the area of academic performance stress.

The finding that support from friends relieves personal issues related stress supports the existing literature on medical students which indicates peer support to be a preferred strategy and useful way of dealing with stress in medical students (Kate et al., 2010; Nandi et al., 2012; Chan, 1992; Sohail, 2013; Shah et al., 2009; Gade et al., 2014; Patil et al., 2014, Mane et al., 2011).

Interestingly, received support from peer increased academic performance stress. This could be either because of academic competition where in peer support may be considered as an interfering factor rather than a facilitative factor. In addition, time spent with friends may compromise time scheduled for studying. There are few evidences in literature where support had undesirable consequence for medical students. For instance, in a study of third year medical students studying at a medical college of Chicago, US, college
support from outside the college was seen to be associated with lower academic performance (Rospenda, et al., 1994). The authors reasoned that time spent on social support outside the school may have jeopardized the time spent towards academic goals.

As earlier mentioned no difference emerged between the study years with regard to support from friends. Similar to this study, Supe’s (1998) study on Indian medical students didn’t reveal differences on social support between study years.

In correlation analyses, only one significant correlation emerged where in higher helpfulness of support received from family was associated with lower patient and clinical responsibilities related stress. However, this did not emerge as a significant predictor.

Availability of support from family though did not correlate with faculty relations stress was seen to emerge as a significant predictor of the same. Therefore, it could be acting as a suppressor variable.

Though this study did not find robust evidence for role of family support, there are many studies which have shown that medical students, specifically Indian students avail family support in times of stress and find it to be helpful (Kate et al., 2010; Nandi et al., 2012; Soliman, 2014; Mane et al., 2013).

Faculty support as measured by the three item scale developed by the researcher was found to significantly differ between four years of medical education. First year students experienced significantly higher faculty support than second year, third year and fourth year medical students.

Faculty support also had a significant negative correlation with overall stress and all stress categories of patient and clinical responsibilities, faculty relations, personal issues and professional identity except academic performance. However in the regression analyses, higher faculty support lowered stress only in one stress area of professional identity.

The reason why first year students may have experienced higher faculty support in this study could be that college from which this study sample hails has faculty mentorship program and during first year of study, mentorship support by faculty is
strictly adhered to. All students are assigned mentors and students have to regularly 
interact with their respective mentors about the problems they face in academics and 
other areas. However, as students get into successive years of study, students may not 
avail mentorship support, either because of lack of time, or non-availability of faculty. In 
addition, there may be some attitudinal barriers to engage in support seeking.

It could also be possible that students may learn to seek advice from seniors as 
they progress into successive years of education as compared to beginning of the course, 
when students would still be in in the process of familiarizing with the new college 
environment and getting acquainted with people. Hence, making use of already available 
support system (faculty support) would be logically preferred by first year students.

The finding in this study is consistent with other studies, which have shown 
faculty support to protect against medical student burnout and stress (e.g., Chang et al., 
2012). Faculty is an important part of any support program offered to students. For 
instance, the high success of a social support scheme introduced for medical students 
studying at the University of Dundee was attributed to faculty being genuinely interested 
in their students’ welfare and participating in students’ social and academic activities 
(Malik, 2000).

Faculty’s role in providing developmental support to medical students in order to 
widens the reception of support by all students than only “at risk” students has been 
emphasized by Sandar et al. (2014). Sander’s et al. (2014) also opine that medical schools 
should foster the development of an organizational culture where everyone is responsible 
for supporting students and additional support needs to be provided by identified tutors. 
also underscores the importance of mentoring to enhance student well-being.

It could be opined that the faculty in this study may be providing adequate 
mentoring support to students as faculty support was seen to be negatively related to 
overall stress and most of the stress areas. Specifically, the strength of this relation being 
strongest in the stress area of professional identity indicates that support to resolve 
professional uncertainties and dilemmas from faculty may be most helpful as they are 
experienced professionals.
On correlational analyses, other parameters such as total availability of support from both family and friends were related to personal issues related stress. Both total helpfulness of support and total received support from both family and friends were also related to academic performance related stress. Finally, total support (considering all the scores on various dimensions of family and friends support) also significantly correlated with academic performance related stress. However, in the prediction analyses none of these correlations emerged significant.

5.5.3. Resilience

The four years of medical education did not differ significantly on resilience. Students in all study years had high resilience suggesting that on the whole medical students were a resilient group. Resilience is a salient attribute which enable students at higher levels of education to manage their ongoing academic demands along with other stressors they are confronted with in their attempt to balance study and other life activities.

In further analyses, resilience was seen to be negatively correlated with overall stress and stress areas of academic performance, patient and clinical responsibilities, faculty relations and professional identity. However, only in the area of patient and clinical responsibilities, higher resilience was seen to predict lesser stress.

Several studies in the college population have revealed that higher resilience is associated with lesser psychiatric symptoms in college students in the presence of stressful life events (Hjemdal et al., 2006), lesser alcohol consumption in college students (Johnson et al., 2011), better coping with college transition related stressors (Derosier et al., 2013), lesser academic stress (Wilks, 2008), systematic and intuitive styles of thinking (Ahangar, 2010) and better college adaptation (Park & Lee, 2011).

It could be speculated that high level of resilience of medical students in this study could have exerted a protective role and kept the stress experience of medical students in mild to moderate range and not allowed it to worsen. Particularly, resilience would have helped in mitigating the negative effects of stress arising from patient and clinical responsibilities.
Resilience is recognized to be such an important factor in medical education that it is recommended to be listed as a major personal competence to be considered while admitting students into medical education (Koenig et al., 2013).

This study finding is consistent with many studies on medical students that have shown resilience to yield great benefits such as fostering sooner recovery from burnout, ensuring lesser stress, better quality of life, higher psychological well-being, better academic performance and higher life satisfaction (Dyrbye et al., 2010; Elizondo-Omaña, et al., 2010; Kim & Cho, 2012; Peng et al., 2012; Souri & Hasanirad, 2011; Kjeldstadli, et al., 2006).

Authors such as Howe et al. (2012) and, Elly and Stallman (2014) discuss on how to extend the benefits of fostering resilience beyond general well-being in medical students to be practically useful. Howe et al. (2012) recognize medical career as a challenging one, besotted with ethical and moral dilemmas and uncertainties for which the students need to be prepared. Therefore, medical colleges should expose students to such clinical uncertainties and train them to overcome difficulties so that students become resilient and are better prepared to face such situations in future.

Eley and Stallman (2014) opine that of late medical education has become too flexible offering most things to students on a platter which actually may not make them resilient. Eley and Stallman (2014) state that nurturing resilience in students is possible only by allowing them to strive for their goals repeatedly, teaching them to accept failures as a normal phenomenon and enhancing their self-management skills.

### 5.5.4. Total optimism, Dispositional Optimism and Pessimism

Students in four years of medical education did not differ on total optimism. Students in all years had high and similar levels of total optimism.

Difference between four years of medical education on dispositional optimism barely reached significance \((p=.055)\) and on further analysis first year students showed a trend towards higher dispositional optimisms than second year students. Though there were no group differences, dispositional optimism was high in students of all years.
Students in four years of medical education did not significantly differ on pessimism and all of them scored neutral on pessimism indicating neither denial nor agreement on having pessimism.

The fact that all medical students had high levels of optimism and were neutral on pessimism suggests that optimism serves as a positive adaptation factor which could have kept the stress in mild and moderate levels in this study.

This is further supported by the fact that in prediction analysis, higher dispositional optimism was seen to be associated with lesser overall stress, lesser academic performance and lesser professional identity related stress. Similar to these findings, research evidence exists with regard to the benefits of optimism in college students in general. In a group of college students who were grouped as low, moderate and high in optimism, high optimists had highest quality of life and better coping skills than low optimists (Harju & Bolen, 1998).

Many other studies also have proven that optimism has benefits in protecting students against stress and psychological distress (Scheier & Carver, 1985; Scheier & Carver, 1992; Chang, 1998; Brissette et al. 2002; Baldwin et al., 2003; Aspinwall & Taylor; 2002; Singh & Mansi, 2009). Optimism is also associated with higher academic performance (Chemers et al., 2001; Nes et al., 2009), higher college retention (Nes, et al., 2009) and higher life satisfaction in students (Şafak Ünüvar et al., 2012).

This finding of benefits of optimism for student wellbeing is consistent with other studies’ findings which have showed optimism to be associated with higher psychological well-being and better physical health in medical students (Souri & HasaniRad, 2011; Pritchard et al., 2007).

An Indian study examining differences between medical and engineering students showed that generally optimism was associated positively with psychological well-being (Singh & Jha 2013). However, the same study showed medical students having lesser optimism than engineering students. This is in contrast to the current study where in medical students were found to be high on optimism.
In this study, as earlier observed, students had neutral levels of pessimism. Further, pessimism was seen to have a significant (yet weak) negative relation with overall stress, and academic performance and personal issues related stress. However, this relation between pessimism and stress did not persist in regression analysis. Though students in this study have neutral levels of optimism, lower levels of pessimism are desirable as pessimism is associated with poor well-being outcomes, higher stress and lesser satisfaction in general population (Chang, 1992). Few studies have examined pessimism in medical students. A study by Banihashemian, et al. (2009) comparing medical and non-medical students found pessimism to be higher in medical students and to be negatively related to general health in medical students.

5.6. Academic Variables of Perceived Academic Control and Academic Motivation

5.6.1. Perceived Academic Control

Locus of control in academic settings is an important construct as it determines the extent to which individual feels he/she can gear the academic outcomes and manage the related stresses. Perceived academic control which is similar to locus of control specifically refers to the level of influence students believe that they have on their academic outcomes and responsibility they assume for their academic outcomes (Perry, 1991). Low perceived academic control may make students prone to failure and high academic control will lead them to academic success and other positive outcomes.

In this study, second year students had comparatively lesser perceived academic control than first year, third year and fourth year students. The reasons behind second year students having lesser perceived academic control than rest of the years could be speculated. Medical education is a tough program and most students who enter medicine generally have high prior academic success, but may face some unexpected and unaccustomed academic difficulties and failures as they initiate medical education. If at all such failures would have occurred in the first year, it may reduce students’ level of perceived control over their academic outcomes as they enter into second year of study. Later on, as years progress, the students may get adapted to such ups and downs in the course of their study and revert back of earlier levels of perceived control. However, it should be borne in mind that this is just a speculation and needs to be validated by further study.
In this context, it is important to note that students in all years had high levels of perceived academic control which is a positive sign as it may help them navigate successfully through academic challenges and help them manage the stresses in various areas of medical education. Further, though perceived academic control in the regression analyses, did not predict any stress area, it did have a negative correlation with overall stress and stress areas, suggesting at least a trend (even though weak) where in perceived academic control could protect against stress.

High levels of perceived academic control can be equated to high internal locus of control, while low levels of perceived academic control may align more with external locus of control. Many studies have documented evidence that internal locus of control is positively related to academic achievement (Bar-Tal & Bar-Zohar, 1977; Findley & Cooper, 1983; Kalechstein & Nowicki, 1997), less stress (Abouserie, 1994), better focus on work during stressors (Wolk & Bloom, 1978), academic efficiency, and high self-esteem (Sagone & Decaroli, 2013). An Indian study also showed that college students experienced less stress when they experienced more control (Dasgupta, 1992). External locus of control leads to decline in academic performance in face of stressors (Wolk & Bloom, 1978), high stress (Abouserie, 1994), and low self-esteem (Sagone & Decaroli, 2013).

This finding is in accordance with other studies’ findings that have found perceived academic control in higher levels to be associated with lesser course related anxiety and boredom (Perry et al., 2003), better college adjustment (Hladkyj et al., 1998; Hladkyj et al., 2003), better academic outcomes such as higher academic performance (Perry et al., 2001), and higher academic persistence (Ruthig et al, 2002; Perry, et al., 2005).

The presence of higher perceived academic control in medical students of this study is a notable contribution as the few studies conducted on locus of control in medical education have focused mostly on health locus of control (e.g., Wolf et al., 1991; Shamseddeen et al., 2006).
5.6.2. Academic Motivation

Academic motivation was examined in terms of intrinsic motivation, its subtypes, extrinsic motivation, its subtypes and amotivation as assessed by Academic Motivation Scale.

Intrinsic motivation is a positive attribute that indicates that a person pursues an activity such as learning out of inherent enjoyment and satisfaction and will, rather than any external pressures or rewards (Deci & Ryan, 1985, 2000). Therefore, intrinsic motivation is naturally expected to be associated with good academic and psychological outcomes.

High intrinsic motivation is a positive attribute to possess as it is positively associated with good academic outcomes such as higher course persistence (Vallerland & Bissonette, 1992), better course performance (Amabile et al., 1994: Moneta, & Siu, 2002), positive psychological health and parameters of well-being, such as good affect and self-actualization, and negatively related to ill being, depressive and anxiety symptoms (Kasser & Ryan, 1986; Niemiec et al., 2009).

Therefore, high levels of all types of intrinsic motivation in all medical students of this study can be considered as an asset. The different types of intrinsic motivation have been examined in this study. Intrinsic motivation to know which refers to performing an activity for the pleasure and the satisfaction that one experiences while attempting to learn, explore and understand something new (Vallerand et al., 1992) was higher in first year students compared to second year and third year students. This could be because as fresh entrants of medical education, students are likely to hold high aspirations and a penchant to learn new things as compared to students of other years whose initial enthusiasm to learn new things would have been stabilized after being familiarized with the course. However, all medical students in general had high intrinsic motivation to know.

With respect to determination of stress by intrinsic motivation to know, higher intrinsic motivation to know negatively correlated with lower overall stress and lower stress in all stress categories except academic performance. In the regression analyses, however, intrinsic motivation to know was seen to predict lower overall stress and lower professional identity stress in medical students, indicating that desire to explore and learn
new things would reduce not only their overall stress, but also their future concerns bringing in more clarity to resolve professional uncertainties and dilemmas.

Intrinsic motivation to know was also seen to predict academic performance related stress, though it did not significantly correlate with academic performance related stress, hence it may acting as a suppressor variable.

Intrinsic motivation towards accomplishment which could be understood as engagement in an activity for the pleasure and satisfaction derived when one attempts to accomplish or create something (Vallerand et al.,1992) was also higher in first year students than second year students. First year students may possess higher intrinsic motive to accomplish like they possess high intrinsic motive to know, since they would have chosen a medical career and would be excited to begin with a goal of accomplishing what they want to.

Though all students scored high on intrinsic motivation towards accomplishment, first year students were in the upper end of the high score range, while, students of all other years scored on the lower end of the high score range.

In the analysis of relationships, intrinsic motivation towards accomplishment though was significantly correlated with professional identity, it failed to emerge as a significant predictor of professional identity in regression analysis.

Intrinsic motivation to experience stimulation which can be understood as engaging in an activity in order to have stimulating sensations such as sensory pleasure, aesthetic experiences, or fun and excitement, while engaging in an activity (Vallerand et al.,1992) though did not differ among various study years was nevertheless, found to be in the moderate to high range of scores. Specifically, first year and third year students had slightly high amounts, while second year and fourth year students scored in lower end of moderate range. Fun filled and excitement infused learning may keep away boredom that is likely to deter academic engagement.

Intrinsic motivation as a whole, though significantly differed among four years in the initial analysis, these differences did not emerge to be significant in post hoc analyses. However, students in all years experienced high levels of intrinsic motivation as a whole.
In the correlational analyses, total intrinsic motivation had a significant negative correlation with overall stress and stress areas of patient and clinical responsibilities, faculty relations, and professional identity. In the subsequent prediction analyses however, intrinsic motivation as a whole was seen to reduce stress in only two stress areas of faculty relations and professional identity.

Having higher academic intrinsic motivation probably makes students seek faculty help to enable their learning, hence easing out any frictions present in the faculty student interactions. Also, higher levels of intrinsic motivation may make students work towards researching about their professional future and building a strong professional identity so that they can face lesser professional uncertainties.

It is evident from this study that different types of intrinsic motivation and intrinsic motivation as a whole help students to deal effectively with certain areas of professional stress. As a consequence, students may also be able to enhance their academic performance.

This study finding adds to existing literature which contains studies that have shown intrinsic motivation to be beneficial to medical students. Park et al. (2012) in a study of medical students using the AMS scale found that intrinsic motivation to know and intrinsic motivation to accomplish things were negatively related to stress. Firouznia et al. (2009) in another study found higher motivation to be associated with high marks in clinical and pre-clinical exams. Masaki et al. (2009) found traits of self-directedness, persistence and self-transcendence to be related to intrinsic motivation suggesting that intrinsic motivation could foster self-directedness and persistence in students to achieve academic success.

Extrinsic motivation on the other hand involves engaging in an activity owing to external reasons such as getting a reward, or avoiding a loss or punishment (Deci & Ryan, 1985; 2000).

In this study, three types of extrinsic motivation of external regulation, introjected regulation and identified regulation were examined along with extrinsic motivation taken as a whole.
According to Deci and Ryan (1985, 1991) extrinsic motivation subtype of external regulation refers to behaviour that is regulated by external rewards or constraints. In introjected regulation, reasons for motivation to begin with are external but later on become internalized and maintained by internal pressures such as anxiety and guilt (Ryan & Connell, 1989). Identified regulation involves those behaviours which are valued and important to self and the individual identifies self with motives. Though, this appears internalized, it is still extrinsic as behaviours are carried out, not out of a sense of purpose or satisfaction, but because the goal needs to be realized (Koestner et al., 1996).

In this study though there were no differences among study years on extrinsic motivation taken as a whole, the entire student sample had higher levels of extrinsic motivation. Extrinsic motivation as a whole was also observed to predict higher stress in stress areas of academic performance and faculty relations. This may not be considered as a good thing, given the existing literature on extrinsic motivation that suggests that pursuing extrinsically motivated goals generally affects learning and well-being negatively (Vansteenkiste et al., 2008; Timmermans et al., 2004; Niemiec et al., 2009). However, all types of extrinsic motivation do not have negative outcomes.

Motivational profiles have been further classified into autonomous and controlled types and studied. Autonomous motivation contains intrinsic motivation and identified regulation while controlled motivation consists of introjected and external regulation (Ryan & Connell, 1989; Sheldon & Elliot, 1998; Vansteenkiste et al., 2009). Controlled motivation is associated with positive outcomes while autonomous motivation is associated with negative outcomes.

In this study, among the three sub types of extrinsic motivation, the students in four years of medical education differed only on introjected regulation. First year students had higher introjected regulation than fourth year students. Introjected regulation is a part of controlled motivation and controlled motivation is associated with negative outcomes such as higher procrastination (Sene´cal et al., 2003), poor achievement (Soenens & Vansteenkiste, 2005), and higher drop out (Vallerand et al., 1997).
Therefore, high levels of introjected regulation in the beginning of the course is not a good sign as it may continue to grow through progressive study years and hamper academic performance and cause more stress. In this study also, it was observed that introjected regulation continued to be at high levels, except in fourth year, where it amounted to moderate levels.

In addition, correlational analyses showed that higher introjected regulation was significantly associated with higher overall stress and higher stress in two stress areas of academic performance and faculty relations, validating the fact that introjected regulation may enhance stress. However, these relations did not emerge to be significant in prediction analysis.

The negative effects of introjected regulation has also been demonstrated by Kemp et al. (2014) who found that introjected regulation is related to alienation, disengagement and poor learning outcomes in a study of biomedical doctoral students.

Though no difference between study years emerged on external regulation, external regulation was high in all study years. Similar to introjected regulation, in the correlation analyses that was conducted, external regulation showed a trend of being associated with higher overall stress and higher stress in two stress areas of academic performance and faculty relations. However, these relations did not emerge as significant in prediction analyses. External regulation, like introjected regulation being a part of controlled motivation is associated with negative outcomes as is evident in the studies quoted earlier in the context of introjected regulation. Kemp et al. (2014) also found that external regulation is related to alienation, disengagement and poor learning outcomes in a study of biomedical doctoral students.

Identified regulation is a part of autonomous motivation and autonomous motivation is associated with academic persistence (e.g., Vansteenkiste et al., 2004), in depth teaching (Vansteenkiste et al., 2009), lesser procrastination (Sene´cal et al., 2003) and lower stress (Ryan & Deci, 2000). Though the study years did not differ on identified regulation, all the years of medical education had high levels of identified regulation, which could serve as protective factor directing them to achieve better academic outcomes and keep stress in check.
In the correlational analyses, identified regulation had non-significant minute negative correlations with overall stress and all stress categories. However, in the regression analyses, higher levels of identified regulation were seen to enhance stress in the stress areas of academic performance and professional identity. Hence, identified regulation may be acting as a suppressor in the regression analyses of academic performance and professional identity.

Interestingly, as is evident from the study findings, both extrinsic motivation and intrinsic motivation were generally high in all medical students suggesting that both extrinsic and intrinsic motivation can coexist. The coexistence of both extrinsic and intrinsic motivation has been examined by Kursurkar et al. (2013) who in their study tested whether Relative Autonomous Motivation (RAM, an index of the balance between AM and CM) affects academic performance through good study strategy and higher study effort in medical students. Using Structural Equation Modelling it was found that high RAM positively affected good Study Strategy (GSS) and study effort, which in turn positively affected academic performance represented by grade point averages.

Therefore, efforts at medical college should be made to foster a balance between extrinsic and intrinsic motivation to ensure positive academic outcomes.

Amotivation is a least self-determined motivational state where in individuals fail to understand relationship between their actions and outcome of their actions (Deci & Ryan, 1985). They don’t possess any will to pursue any activity and lack both extrinsic and intrinsic motivation. Therefore, such a state may foster feelings of incompetence. With reference to amotivation, only one difference between the four study years occurred in which, second year students were seen to have higher amotivation than first year and fourth year students.

Since amotivation is associated with negative outcomes such as poor academic persistence (Vallerand & Bissonnette, 1992; Vallerand et al., 1989), stress at college (Baker, 2004), high boredom and poor concentration (Vallerand et al., 1993), attention should be paid to second year students whose amotivation levels were higher than first year and fourth year students. It could be possible that in first year, students venture into a chosen field desired by them and hence are likely to be more motivated. While, students
in final year are reaching the end of their course, where success and meeting of desired 
goals seem more likely, and therefore they may not or cannot afford to experience 
amotivation. Second year students probably feel the initial excitement of first year 
waning off and the piling amount of academic work which is likely to continue in 
successive years may make them a little amotivated. Yet, it should be noted that students 
in all four years had little amount of amotivation. Particularly, students of first year and 
fourth year were on lower end of the range of scores qualifying as little amotivation.

Amotivation in medical students was also seen to be associated with overall stress 
and all stress categories. In the regression analyses that followed, amotivation was found to 
predict higher overall stress and higher stress in stress areas of academic performance, faculty 
relations, personal issues and professional identity. Similar findings has been reported by one 
earlier study of Park et al. (2012), where in amotivation was found to be negatively related 
to stress in medical students. In fact, Park et al. (2012) constructed a path analysis showing 
motivation, academic performance and stress to form a triangular feedback loop where in 
stress could be associated with motivation, and motivation may be indirectly related to stress 
through academic performance. This indicated that students with higher amotivation may 
face difficulty to sustain good academic performance, which in turn may result in experience 
of high stress. Therefore, attempts to enhance motivation may be benefitted from stress 
management interventions as they may enhance motivation.

5.7. Mediational Outcomes

5.7.1. Mediational Effect of Optimism on the Relation between Coping and Stress

In literature, the evidence indicates that optimism fosters active or adaptive 
coping while lesser optimism or pessimism fosters avoidant coping (Taylor & Aspinwall, 
1996). Optimism is known to positively correlate with problem solving, positive 
reframing and acceptance, planning, and seeking instrumental support (Carver et al., 
1989; Scheier et al., 1986; Solberg, Nes, & Segerstrom, 2006). While, it has also been 
negatively correlated with avoidance coping, specifically, denial, distancing, suppression 
and behavioural disengagement (Scheier et al., 1986 : Scheier et al., 1989; Hjemdal et 
al., 2006).
Further, there have been many studies that have found the mediating effects of coping in the relation between optimism and distress (Billingsley et al., 1993; Carver, et al., 1989).

In a specific study of breast cancer patients undergoing surgery, coping strategies of acceptance and humour predicted lower distress while avoidant strategies of denial and disengagement predicted higher distress. Many coping styles were observed to mediate the effects of optimism on distress. Specifically, acceptance and denial mediated the effects of optimism on pre-surgical distress among these women (David et al., 2006).

However, the reverse possibility of optimism mediating the effects of coping on distress is also present, but the evidence for it is less (David et al., 2006).

Considering the less evidence present for coping effects being mediated by optimism, this research proposed to examine whether optimism mediated the relationship between different broader types of coping and total stress and stress categories.

Both total optimism and dispositional optimism were seen to partially mediate the effects of avoidance based coping on total stress and professional identity stress. Nearly 8% and 6% of the effects of avoidance based coping on total stress was mediated by total optimism and dispositional optimism respectively. While, 8% and 5% of the effects of avoidance based coping on professional identity related stress was mediated by total optimism and dispositional optimism respectively. Total optimism alone partially mediated the effects of avoidance based coping on patient and clinical responsibilities related stress (by a magnitude of .02) by 18 percent. Dispositional optimism alone was seen to significantly and partially mediate the effects of avoidance based coping on academic performance related stress and faculty relations stress by 8% and 6% respectively. The magnitude of the mediating effects was .02 for academic performance related stress and .01 for faculty relations stress.

When total optimism operated (partly), avoidance based coping reduced overall stress and stress in areas of patient and clinical responsibilities and professional identity. Therefore, when medical students had higher avoidance based coping, they experienced lesser total optimism and higher overall stress and higher patient and clinical responsibilities stress. The presence of dispositional optimism partly helped to lessen the
effects of avoidance based coping on overall stress and stress arising from academic performance, faculty relations and professional identity. In other words, higher utilization of avoidance based coping led to lesser dispositional optimism which in turn enhanced overall stress and stress related to academic performance, faculty relations, and professional identity.

This finding is consistent with study (David et al., 2006) of pre-surgery breast cancer patients that examined whether optimism, pessimism, and coping mediate with each other in predicting distress levels. This study revealed optimism to mediate the effects of avoidance based coping strategy of denial on distress.

Therefore, targeting optimism in intervention may partly help in reducing the deterring effects of avoidance based coping on overall stress and stress areas of academic performance, patient and clinical responsibilities, faculty relations and professional identity.

However, it’s to be taken into account that effects of avoidance based coping on overall stress and stress areas of academic performance, patient and clinical responsibilities, faculty relations and professional identity remained significant even when both total optimism and dispositional optimism mediated some of these relations, or when total optimism or dispositional optimism alone mediated in some cases. The proportion of mediating effects of both total optimism and dispositional optimism in all relations amounted to less than 20 percent. Hence, avoidance based coping still largely affected or increased over all stress and higher stress in areas of academic performance, patient and clinical responsibilities, faculty relations and professional identity.

Therefore, addressing coping skills should be a larger focus of whatever intervention that is designed to remediate stress in medical students. In addition, there could be other factors such as appraisals, resilience etc., which could be potential mediators affecting these relations that need to be tested.

Total optimism was seen to partially mediate the relation between avoidance based coping and academic performance related stress but the mediation was non-significant as per Sobel test. In the case of relation between avoidance based coping and faculty relations related stress, total optimism did not show a mediating effect in the
regression analyses. Further, both optimism and dispositional optimism did not mediate the relation between avoidance based coping and personal issues related stress. Dispositional optimism though partially mediated the relation between avoidance based coping and patient and clinical responsibilities related stress, but the mediation was non-significant as per Sobel test.

In the mediational analyses done to examine the mediating role of dispositional optimism in the relations between emotion based coping and overall stress and stress categories, it was observed that emotion based coping enhanced total stress and stress in all stress areas while controlling for dispositional optimism. It could be speculated that some unmeasured variable might be suppressing the mediator dispositional optimism, which in turn may be inflating the relation between emotion based coping and overall stress and stress categories.

Mediational analyses examining the mediating role of total optimism in the relations between emotion based coping and overall stress and stress categories were not done as emotion based coping did not predict the mediator total optimism.

In the mediational analyses conducted to investigate the mediating role of total optimism and dispositional optimism in the relations between problem based coping, and overall stress and stress categories of academic performance related stress and professional identity stress, it was observed that problem based coping enhanced total stress and stress in all stress areas while controlling for dispositional optimism. Therefore, it is possible that some unmeasured variable might be suppressing the mediators total optimism and dispositional optimism, which in turn may be inflating the relation between problem based coping and overall stress and stress categories of academic performance related stress and professional identity stress.

The mediational analyses examining the mediating effects of optimism and dispositional optimism in the relations between independent variable of problem based coping and outcome variables of stress categories namely, patient and clinical responsibilities related stress, faculty relations related stress and personal issues related stress were not carried out as the independent variable failed to predict the outcome variables.
5.7.2. Mediational Effect of Perceived Academic Control on the Relation between Optimism and Stress

Ruthig et al. (2009) examined PAC as a mediating factor in the relation between optimism and stress in students, in order to know if enhancing PAC would be a beneficial factor rather than targeting stable psychological factors such as optimism which may take longer to change in context of students who may not have that much time to change. Going in this line, this study also examined whether perceived academic control will mediate the relation between optimism and stress.

Accordingly, this study found perceived academic control to partially mediate the effects of total optimism on total stress and professional identity related stress by a small magnitude of -.02 in each case. Perceived academic control mediated 10% and 16% of effects of total optimism on total stress and professional identity related stress respectively.

In the presence of perceived academic control, total optimism was seen to reduce the total stress and stress related to professional identity. In other words, when medical students had higher dispositional optimism, it led to higher perceived academic control, which in turn led to lesser overall stress and lesser professional identity stress.

Higher optimism in medical students led to lesser over all stress and professional identity stress, partly because dispositional optimism was associated with higher perceived academic control, which in turn predicted lesser overall stress and professional identity stress. This finding is consistent with Ruthig et al.’s (2009) findings where in perceived academic control mediated the effects of optimism on psychological health and depression.

Hence, intervention targeting to enhance perceived academic control may better contribute to enhance dispositional optimism’s buffering effects on overall stress and professional identity stress in academic contexts. The role of perceived academic control is more so important in educational settings, as sheer presence of optimism may not be enough to deal with academic stress but the level of one’s perceived control on academic situations may also yield an influence on the stress experience. Further, factors such as
optimism are more stable traits which may take longer to change unlike PAC which is more amenable to change in shorter duration (Ruthig et al., 2009).

Yet, it needs to be noted that effects of dispositional optimism on overall stress and professional identity stress still remained significant while, perceived academic control partially mediated these relations. Therefore, perceived academic control cannot fully explain the association between dispositional optimism and overall stress and professional identity stress. This could mean that dispositional optimism is still an important factor in determining over all stress and professional identity stress and also there could be other untested potential mediators whose role need to be explored.

Perceived academic control though was seen to partially mediate the effects of total optimism and dispositional optimism on stress categories of academic performance, patient and clinical responsibilities, faculty relations and personal issues, none of these mediations was significant, either as seen in regression analyses, or as further examined by Sobel test.

5.7.3. Mediational Effect of Resilience on the Relation between Academic Motivation and Stress

Motivation, though is an important factor in determining academic success, the achievements and gains students make may be lost if students don’t develop resilience to deal with stress, pressures and setbacks in the academic settings (Martin 2002). Along with motivation, it is equally important to make students academically resilient to ensure their academic success. In view of this, Martin (2002) has proposed a model of motivation including academic resilience for student enhancement. Though, Martin (2002) has emphasized construct of academic resilience in enabling motivation, this research would like to first test whether resilience in general would have a beneficial role in the relation between motivation and stress. If it does, then future research could focus on testing the specific role of academic resilience.

Therefore, this study examined the mediating role of resilience in the relation between motivation, its subtypes and amotivation on the one hand, and stress and stress categories on the other hand.
Resilience was seen to partially mediate the effects of intrinsic motivation to know on overall stress and fully mediate the effects of intrinsic motivation to know on professional identity related stress by a magnitude of -.04 in each case. Resilience mediated 25% and 27% of the effects of intrinsic motivation to know on overall stress and professional identity related stress respectively.

The mediation of resilience between intrinsic motivation to know and overall stress was partial. Therefore students with higher intrinsic motivation have lesser overall stress, (partly) as higher intrinsic motivation to know is related to higher resilience which in turn predicts lesser overall stress. However, intrinsic motivation still yielded a significant effect on overall stress, over and above the effects of resilience. Hence, enhancing resilience together with intrinsic motivation may help to mitigate the bad effects of overall stress. However, in view of resilience being a partial mediator, the role of other potential mediators in the relation between intrinsic motivation to know and overall stress may be explored.

Resilience fully mediated the relation between intrinsic motivation to know and professional identity related stress. Higher intrinsic motivation in medical students was associated with higher resilience in medical students, which in turn decreased professional identity related stress. Resilience had a large considerable large effect in enabling intrinsic motivation to know, to buffer the effects of stress leaving little room for any other mediators. Therefore, in order to ensure that intrinsic motivation to know alleviates professional identity stress, interventions have to largely focus on strengthening resilience in medical students.

Resilience did not yield a significant mediating effect on the relations between intrinsic motivation to know and stress categories of academic performance related stress, patient and clinical responsibilities related stress, faculty relations related stress and personal issues related stress.

Resilience fully mediated the effects of intrinsic motivation towards accomplishment on professional identity related stress by a magnitude of -.07. Nearly, 63% of the effects of intrinsic motivation towards accomplishment on professional identity related stress was mediated by resilience.
Intrinsic motivation towards accomplishment more than decreasing professional identity stress directly, exerts an effect on the amount of resilience medical students have, which in turn affects the professional identity related stress.

Thus, intrinsic motivation towards accomplishment affects professional identity stress only through resilience. Therefore, strengthening resilience along with intrinsic motivation towards accomplishment may reduce professional identity related stress, as against focusing alone on strengthening intrinsic motivation towards accomplishment.

The mediational analyses examining the mediating effects of resilience in the relations between independent variable of intrinsic motivation towards accomplishment and outcome variables of overall stress and stress categories of academic performance, patient and clinical responsibilities related stress, faculty relations related stress and personal issues related stress was not carried out as the independent variable failed to predict the outcome variables.

Resilience fully mediated the effects of intrinsic motivation to experience stimulation on total stress, patient and clinical responsibilities related stress, and professional identity related stress. The magnitude of mediating effect was -.05, -.04 and -.07 respectively for these stress areas. Resilience mediated 46%, 37% and 36% of the effects of intrinsic motivation to know on overall stress, patient and clinical responsibilities related stress and professional identity related stress respectively.

Intrinsic motivation to experience stimulation yielded less overall stress, and lesser stress in stress areas of patient and clinical responsibilities and professional identity only in the presence of resilience. In other words, intrinsic motivation to experience stimulation did not directly reduce total stress and stress related to patient and clinical responsibilities and professional identity, but it was associated with higher resilience which in turn predicted less total stress and less stress in stress areas of patient and clinical responsibilities and professional identity. Hence, encouraging intrinsic motivation to experience stimulation alone may not adequately reduce stress, but fostering resilience along with intrinsic motivation to experience stimulation would be of crucial significance in order to reduce total stress and stress related to patient and clinical responsibilities and professional identity.
Resilience also fully mediated the effects of total intrinsic motivation on total stress, patient and clinical responsibilities related stress, and professional identity related stress. The magnitude of mediating effect was -.05, -.04 and -.07 respectively. Resilience mediated 36%, 37% and 49% of the effects of intrinsic motivation to know on overall stress, patient and clinical responsibilities related stress and professional identity related stress respectively.

Intrinsic motivation as a whole reduced over all stress and reduced patient and clinical responsibilities related stress, and professional identity related stress only when resilience operated. Higher total intrinsic motivation was related to higher resilience, which in turn predicted less overall stress, and less stress in stress areas of patient and clinical responsibilities and professional identity. As total intrinsic motivation is sum of all subtypes of intrinsic motivation, the same logic that resilience should be fostered to enable intrinsic motivation subtypes to effectively reduce stress also applies here.

Resilience did not yield a significant mediating effect on the relation between total intrinsic motivation and faculty relations related stress. The mediational analyses examining the mediating effects of resilience in the relation between total intrinsic motivation and stress categories of academic performance and personal issues related stress were not done as total intrinsic motivation did not predict these stress areas.

The mediational analyses examining the mediating effects of resilience in the relation between independent variable of extrinsic motivation subtype of identified regulation and outcome variables of total stress and all stress categories stress was not carried out as the independent variable failed to predict overall stress and stress categories.

In the mediational analyses conducted to investigate the mediating role of resilience in the relations between extrinsic motivation of introjected regulation and overall stress, it was observed that introjected regulation enhanced total stress while controlling for resilience. Therefore, it is possible that some unmeasured variable might be suppressing the mediator resilience, which in turn may be inflating the relation between introjected regulation and overall stress.
The mediational analyses examining the mediating effects of resilience in the relations between independent variable of extrinsic motivation subtype of introjected regulation and outcome variables of stress categories of patient and clinical responsibilities related stress, personal issues related stress and professional identity related stress was not carried out as the independent variable failed to predict the outcome variables.

The mediating role of resilience on the relations between extrinsic motivation subtype of external regulation and total stress and stress categories were not examined as the independent variable external regulation did not predict the mediator resilience.

Mediational analyses conducted to examine the mediating role of resilience in the relation between total extrinsic motivation and academic performance related stress showed that total extrinsic motivation enhanced total stress while controlling for resilience. Therefore, it is possible that some unmeasured variable might be suppressing the mediator resilience, which in turn may be inflating the relation between total extrinsic motivation and academic performance related stress.

The mediational analyses examining the mediating effects of resilience in the relation between independent variables total extrinsic motivation and outcome variables of total stress and stress categories of patient and clinical responsibilities related stress, faculty relations stress, personal issues related stress and professional identity related stress were not carried out as the independent variable failed to predict the outcome variables.

Resilience was observed to partially mediate the relations between amotivation on one hand and overall stress, patient and clinical responsibilities related stress, and professional identity related stress on the other hand by small magnitudes (-.02 for overall stress, patient and clinical responsibilities related stress; -.03 for professional identity stress). Resilience mediated around 7%, 12% and 8% of the effects of amotivation on overall stress, patient and clinical responsibilities related stress, and professional identity related stress respectively.
Higher amotivated students experienced higher overall stress and higher patient and clinical responsibilities related stress, and professional identity related partly because of lower resilience.

This means that amotivation in medical students led to higher overall stress and higher patient and clinical responsibilities related stress, and professional identity related partly because amotivation was associated with lower resilience, which in turn resulted in higher overall stress, higher patient and clinical responsibilities related stress, and professional identity related stress. However, amotivation continued to yield a significant effect on overall stress, and on patient and clinical responsibilities related stress, and professional identity stress over and above the effects of resilience. Therefore, along with reducing amotivation, resilience also should be enhanced by interventions in order to reduce overall stress and stress in relevant stress areas mentioned above.

Resilience did not significantly mediate the relations between amotivation and stress categories of academic performance related stress, faculty relations stress and personal issues related stress.

The above findings in support of the mediating role of resilience prove that intrinsic academic motivation alone may not be enough to reduce stress in academic settings. Along with motivation, it is equally important to increase resilience to enable students to cope effectively with setbacks and stressors in various areas of medical education. In addition, with regard to amotivation, it would not suffice to target it alone in order to reduce stress, but resilience also should be enhanced in order to overcome the deterring effects of amotivation on stress.
5.8. Examination of Achievement of Study Objectives and Testing Tenacity of Study Hypotheses

In the following section, the extent to which study objectives were achieved and tenacity of the proposed hypotheses will be discussed in light of the study findings.

5.8.1. Primary Objectives and Related Hypotheses

First objective and hypothesis.

1) First objective of the study intended 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.

Accordingly, the following hypothesis was formulated:

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

With regard to the first objective, on total stress, only third year students had significantly higher scores than first year students, while there was no significant difference between other years of study. In academic performance related stress, students in four years of medical education did not differ significantly. However, students in all years experienced stress to a moderate degree in this area.

In the area of patient and clinical responsibilities related stress, second year, third year and fourth year students had higher patient and clinical responsibilities related stress than first year students. With respect to faculty relations stress, only one significant difference was seen between students of third year and first year students, where in third year students were seen to experience faculty relations stress more than first year students.

There was no significant difference between the four years of medical education on personal issues related stress. Though initially, there emerged a significant difference between four years of medical education on professional identity stress, post hoc comparisons revealed that these differences did not continue to remain significant.

In view of these findings, the null hypothesis stating that that there will be no difference between 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} year medical students on total stress and various areas of stress is rejected.
Second objective and hypothesis.

2) The second objective was to compare the differences between 1st, 2nd, 3rd and 4th year medical students on psychosocial variables such as coping strategies, dispositional optimism, social support and resilience.

Accordingly, the second hypothesis stated:

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

With regard to the second objective, the following were the findings: among the individual problem based coping styles, active coping was seen to significantly differ between first year and second year students, wherein first year students used active coping more than second year students. With regard to planning, first year students used it more than second year and third year students. Fourth year students also made higher use of planning than second year and third year students. Instrumental support seeking was high only in first year students as compared to third year students and other years of study did not differ significantly on this variable.

With regard to use of individual emotion based coping styles, students in all years of medical education differed only in the use of venting, emotional support and acceptance. Fourth year students used venting significantly more than second year and third year students and significant differences did not emerge between other years of study.

Emotional support was used significantly more by first year students than second year students and there was no difference between the other years of study in the use of emotional support. Emotional acceptance was also used more by first year students when compared to second year students. Use of other emotional coping styles of positive reframing, humour, self-blame and religion did not differ significantly between the four years of medical education.

The avoidant coping styles of self-distraction, denial, substance use and behavioural disengagement did not differ significantly between the students in all four years of medical education.
Students in all four years of medical education differed significantly in the broader coping types of problem based coping, emotion based coping, and avoidance based coping.

Problem based coping as a whole was used more by first year students than second year and third year students. Emotion based coping styles taken together found higher use by first year students when compared to third year and fourth year students. Avoidance based coping as a whole was utilized more by second year students in comparison to students in all other years.

When support was examined, it was found that students in four years of medical education did not differ on availability, helpfulness and reception of support from both friends and family.

However, faculty support was seen to differ significantly between the students of four years of medical education. Only one difference emerged, where in first year students perceived higher faculty support than second year, third year and fourth year medical students.

There was 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. Pessimism also did not differ significantly between four years of medical education.

On resilience, there was no significant difference between the students of four years of medical education.

In view of the above findings, the second hypothesis stating that there will be no difference between 1st, 2nd, 3rd and 4th year medical students on psychosocial variables such as coping strategies, dispositional optimism, social support and resilience is rejected.

**Third objective and hypothesis**

3) The third objective of the study was to compare the differences between 1st, 2nd, 3rd and 4th year medical students on academic specific determinants such as perceived academic control and academic motivation.
Accordingly, the null hypothesis stated was:

\( c) \) There will be no difference between 1\(^{st}\), 2\(^{nd}\), 3\(^{rd}\) and 4\(^{th}\) year medical students on academic specific determinants of perceived academic control and academic motivation.

The examination of third objective revealed that academic specific determinant of perceived academic control was seen to be significantly lesser in second year students as compared to first year, third year and fourth year students. There was no difference between other study years on perceived academic control.

Among the motivational variables, intrinsic motivation to know was significantly more in first year students than second year and third year students. No other differences were observed between other study years on intrinsic motivation to know.

Intrinsic motivation towards accomplishment differed significantly only between first year and second year students; where in first year students experienced more intrinsic motivation toward accomplishment than second year students.

Students in all the four years of medical education did not significantly differ on intrinsic motivation to experience stimulation. Intrinsic motivation as a whole significantly differed between all study years in the initial analysis, but the significance did not show up in post hoc comparisons.

Extrinsic motivation subtype of introjected regulation differed only between first year and fourth year students where first year students were seen to have higher introjected regulation than fourth year students. Students in all four years of medical education did not differ significantly on both extrinsic motivation subtypes of identified regulation and external regulation. The students in all four years of medical education did not significantly differ on total extrinsic motivation.

When amotivation was examined, second year students had higher amotivation than first year and fourth year students. Amotivation did not significantly differ between other study years.
Keeping the above findings in mind, the null hypothesis which stated that there will be no difference between 1st, 2nd, 3rd and 4th year medical students on academic specific determinants of perceived academic control and academic motivation is rejected.

**Fourth objective and related alternate hypotheses**

4) The fourth objective of the study was to examine the degree to which psychosocial variables such as coping strategies, dispositional optimism, social support, and resilience determine stress in medical students.

Some of the alternate hypotheses proposed in relation to the psychosocial determinants of stress and stress categories were:

- 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

The analyses examining determination of stress by coping showed that broader dimension of problem based coping was seen to predict higher overall stress and professional identity stress. Among the individual types of problem based coping, seeking instrumental support was seen to predict higher academic performance related stress. Problem focused coping style of planning predicted higher personal issues related stress.

In view of these findings of problem based coping predicting higher stress in many areas, the alternate hypothesis stating that problem based coping will predict lower stress is rejected.

Analyses conducted to see whether emotion based coping predicts higher stress, showed that emotion based coping as whole predicted higher overall stress. Among the individual emotion based coping strategies, ventilation was seen to predict higher overall stress and higher stress in stress areas of academic performance, faculty relations, personal issues and professional identity. Another emotion based coping style of self-blame was seen to predict higher stress in areas of academic performance and
professional identity. Another emotional based coping style of religion was seen to predict high personal issues related stress.

In view of emotional based coping as a whole predicting high over all stress and several individual emotion based coping styles predicting higher stress in many stress areas, alternate hypothesis stating that emotional based coping will predict higher stress is accepted.

Examination of determination of stress by avoidance based coping revealed that avoidance based coping as a whole predicted higher overall stress and higher stress in stress areas of academic performance, patient and clinical responsibilities, personal issues and professional identity. The individual avoidance based coping style of substance predicted higher stress arising from faculty relations.

In view of avoidance based coping as a whole predicting high over all stress and high stress in many stress areas, and one of the avoidance based coping style predicting higher stress in one stress area, the alternate hypothesis stating that avoidance based coping will predict higher stress is partially accepted.

Analyses of determination of stress by social support showed that higher received support from friends was seen to predict higher academic performance related stress. Only availability of support from friends was seen to predict lower stress in the stress areas of personal issues. Faculty support predicted lower stress only in the stress area of professional identity.

In view of the findings related to social support, the alternate hypothesis stating that higher social support predicts lower stress stays partially accepted.

With respect to analyses showing determination of stress by resilience, it was seen that higher resilience predicted lower stress only in the stress area of patient and clinical responsibilities.

Therefore, the alternate hypothesis stating that resilience will predict lower stress stays partially accepted.
Analyses examining the determination of stress by dispositional optimism showed that higher dispositional optimism predicted lower overall stress and lower stress in stress areas of academic performance and professional identity.

Therefore, the alternate hypothesis stating that dispositional optimism will predict lowers stress is partially accepted.

**Fifth objective and related alternate hypotheses**

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

Some of the alternate hypotheses proposed in relation to the academic specific determinants of stress and stress categories were:

- 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

The analyses conducted to examine whether stress was predicted by perceived academic control revealed that in correlational analyses, higher perceived academic control was significantly associated with lower overall stress and lower stress in all stress areas. However, in regression analyses, perceived academic control did not predict overall stress and any of the stress areas.

In view of these findings, the alternate hypothesis stating that perceived academic control will predict lower stress stays rejected.

Analyses run to examine to what extent academic motivation will determine stress showed that higher levels of intrinsic motivation to know predicted lower overall stress. Higher levels of total intrinsic motivation were seen to predict lower stress in stress areas of faculty relations and professional identity.

Therefore, the alternate hypothesis stating that higher intrinsic motivation will predict lower stress is partially accepted.
With regard to extrinsic motivation, total extrinsic motivation was seen to enhance faculty related stress.

As a result, the alternate hypothesis stating that higher extrinsic motivation will predict higher stress is partially accepted.

Regression analyses showed that higher amotivation predicted higher overall stress and higher stress in stress areas of academic performance, faculty relations, personal issues and professional identity.

Therefore, the alternate hypothesis stating that higher amotivation will predict higher stress is partially accepted.

5.8.2. Secondary Objectives and Related Supplementary Alternate Hypotheses

Sixth objective and related supplementary alternate hypothesis

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

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

The analyses run to examine whether optimism mediates the relationship between different broader types of coping and total stress and stress categories showed that both total optimism and dispositional optimism partially mediated the effects of avoidance coping on total stress and professionally identity stress. Total optimism alone partially mediated the effects of avoidance based coping on patient and clinical responsibilities related stress. Further, dispositional optimism alone was seen to significantly and partially mediate the effects of avoidance based coping on academic performance related stress and faculty relations stress.

Optimism and dispositional optimism did not mediate in the expected way, the relations between broader coping dimensions of emotion focused coping and problem based coping on one hand and total stress and all stress areas on the other hand.

Optimism and dispositional optimism mediated the relation between avoidance based coping and only few stress areas, and optimism and dispositional optimism did not
mediate the effects of both emotion focused and problem based coping, the hypothesis stating that optimism will mediate the relationship between different types of coping and stress is partially accepted.

**Seventh objective and related supplementary alternate hypothesis**

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

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

Mediological analyses conducted to examine the mediating role of perceived academic control in the relation between optimism and stress showed that perceived academic control partially mediated the effects of total optimism on total stress and professional identity related stress.

Since perceived academic control mediated effects of optimism on only two stress areas, the hypothesis stating that perceived academic control will mediate the relationship between optimism and stress is partially accepted.

**Eighth objective and related supplementary alternate hypothesis**

8) To study whether higher academic motivation will mediate the relationship between academic motivation and stress.

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

Resilience was seen to partially mediate the effects of intrinsic motivation to know on overall stress and fully mediate the effects of intrinsic motivation to know on professional identity related stress. Resilience also fully mediated the effects of intrinsic motivation towards accomplishment on professional identity related stress. Again, resilience fully mediated the effects of intrinsic motivation to experience stimulation on total stress, patient and clinical responsibilities related stress, and professional identity related stress. Further, resilience also 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 expected way, the relations between extrinsic motivation and its subtypes on one hand and total stress and all stress areas on the other hand.

Since resilience mediated only the relations between some of the types of intrinsic motivation and some of the stress areas and as it failed to mediate the relations between extrinsic motivation and its subtypes and overall stress and all stress areas, the hypothesis stating that resilience will mediate the relationship between academic motivation and stress is partially accepted.