CHAPTER 2

REVIEW OF LITERATURE

Conceptualizing Stress, Coping, Social Support, Resilience, Optimism, Perceived Academic Control and Academic Motivation in Undergraduate Medical Students

Stress experience can affect an individual during any part of the life span. Some amount of stress is good as it allows one to thrive and helps in learning life skills. But excess amount of stress can have adverse consequences on physical and mental well-being.

2.1. Stress

2.1.1. Definitions

No single acceptable definition of stress exists. Many authors have viewed it in various ways according to their theoretical orientations. One of the pioneers in stress study, Hans Seyle (1956) defines stress as “nonspecific response of the body to noxious stimuli”

Lazarus (1966) offers this definition of stress: "stress occurs when an individual perceives that the demands of an external situation are beyond his or her perceived ability to cope with them".

Lazarus in his review (1993) discussed various ways of conceptualizing stress and suggested that four concepts are essential to describe the stress process: firstly, an external or internal causal agent which may be called as stress or a stressor. Secondly, an evaluation or an appraisal by the mind or body of what is threatening and what is not. Thirdly, a coping mechanism adapted by the mind or body to manage the stressful demands. Finally, a complex pattern of effects on mind and body, which is known as the stress reaction.

Various models have been out forth to describe the stress process. The three main theoretical orientations proposed to explain stress are: response based model, stimulus based model, and transactional based model.
2.1.2. Models of Stress

2.1.2.1. **Response based model of stress.** Hans Selye (1956) was a pioneer in stress research and he viewed stress from a medical and physiological perspective. Selye’s key concepts were highly influenced by Cannon’s (1932) view that changes related to sympatho-adrenal system are “emergency functions.” According to Selye, stress is a response to negative stimuli or unwanted stressors in the environment. Hence, he conceptualized stress as a response. He proposed general adaptation syndrome (GAS), which is the body’s response pattern to stress.

2.1.2.1.1. **General adaptation syndrome.** GAS consists of three phases of responses. During the occurrence of a stressor, resistance of the body, initially goes down and then rises up. This high resistance persists throughout the second phase of the response, but finally reduces and leads to exhaustion. If an additional stressor joins in, resistance is lower throughout and exhaustion occurs sooner.

2.1.2.1.1.1. **Stage 1: alarm.** As the threat or stress begins, the body initiates its ‘fight or flight’ response. The hypothalamus sends messages to the sympathetic system, which in turn enhances heart rate, respiration rate and blood pressure, dilates pupils, releases glycogen, and leads to GSR (galvanic skin response) changes through sweating. In addition, the hypothalamus sends impulses to the endocrine system, through pituitary gland. Pituitary gland releases ACTH (adrenocorticotrophic hormone). ACTH goes to the adrenal glands, which in turn produce adrenaline and noradrenaline, thus continuing the responses brought about by the sympathetic system. Corticosteroids (cortisone and hydrocortisol) which are also produced by adrenal glands during this time are part of the stress response and work to maintain the body's responses.

2.1.2.1.1.2. **Stage 2: resistance.** On the occasion of stressor not resolving, certain responses initiated in stage one decrease in their strength. Though, the activity of the sympathetic system subsides, it still continues to be vigilant and ready to act. Levels of adrenaline remain high, though behavioural responses such as running away which are part of the body’s ‘fight or flight’ response have not occurred. Generally, the phase of resistance makes way to homeostasis, or adaptation, making the symptoms disappear and not leading to the third stage of exhaustion. But, if resistance persists it may affect
immunity badly. Usually, persistent and chronic stress results in decrease of the body's resources and makes the immune system ineffective.

Health problems that have been associated with stress include cancer, hypertension (high blood pressure), ulcers, heart attacks, rheumatoid arthritis, colitis, and asthma. In addition, a weak immune system makes the body vulnerable to bacterial and viral attacks, which in turn may cause diseases.

2.1.2.1.1.3. Stage 3: exhaustion. The body's resources are worn off, and all the energy conserves are used up. When the immune system deteriorates, it can lead to development of diseases and in rare cases, death. The sequence can be interrupted. In most of the cases, stressors are resolved during Stage 1 or during early phase of Stage 2, and body functions return to homeostasis.

Seyle’s stress theory has a number of criticisms. First of all, the way stress is defined as a non-specific response is general in nature. A number of physiological reactions may be initiated following stress. Secondly, Selye uses the term ‘stressor’ to refer to the aversive state that starts the body’s response to stress and the term ‘stress’ to indicate both the impact or the alarm reaction that immediately follows after a stressor which affect the tissues and the subsequent adaptive responses that result as reactions to the stressor. Also, adding to further confusion is that Selye sometimes referred to stress as damage, or diseases that result out of GAS responses that have been persistent for a long time. Thirdly, no importance was given to cognitive variables such as appraisal and meaning which commonly occurs during stress and fourthly, the uniform nonspecific physiological response pattern indicated in GAS does not account for differences in how individuals differ in the way they perceive a stimulus or how people differ in the ways they cope with a stressful situation.

2.1.2.2. Stimulus based model of stress. Holmes and Rahe (1967) proposed the stimulus based theory of stress. This theory examines what happens to individuals when they undergo major changes in life situations. In this context, life changes or life events are considered as stressors which elicit responses from individuals. Therefore, in contrast to response-based model, stress is the stimulus and not response.
Holmes and Rahe (1967) defined stress as the adjustment required as a result of certain major life changes or events. The primary argument of this theory is that many life changes in a considerably short duration hugely enhance an individual’s susceptibility to illness. The major tenets of this theory are (a) Life poses same readjustment requirements to all individuals, (b) Change leads to stress, irrespective of the fact whether the stressful life event is desired by the individual or not. (c) All individuals have a common threshold of readjustment demands, going beyond which will lead to illness (Rahe & Arthur, 1978). There are measures to assess life events such as the Social Readjustment Rating Scale (SRRS) and Schedule of Recent Experiences (Holmes & Rahe, 1967). The SRRS contains forty-two life events, such as pregnancy, retirement, loss of loved one, marriage retirement etc. These life events are given a priori weights which are calculated based on the approximate estimated amount of adjustment required by life events (Holmes & Rahe, 1967).

Though this approach stimulated lot of research in this line, the studies put together do not account more than 4% to 6% of illness occurrences and the correlations in these studies are generally low falling in the range of .20 to .30 (Johnson & Sarason, 1979a).

The drawback of this approach is that life events are assigned a priori weights. It is not necessary that a life event will definitely cause stress. Also, other factors such as desirability of a life event, personality traits such as hardiness and sense of coherence which may modify the effect of life events have been side-lined by these theorists.

2.1.2.3. Stress as a transaction. Lazarus (Lazarus, 1966; Lazarus & Folkman, 1984) developed the transactional theory of stress and coping. According to the transactional theory (Lazarus & Folkman, 1984), stress is conceptualized as a dynamic process or “transaction” between the individual and various facets of the environment that are perceived to tax, threaten, or to exceed a person’s resources and coping capabilities and pose endangerment to the individual’s well-being. Lazarus (1966) opined that stress did not solely rely on the ‘event’ but, rather is a consequence of a transaction between an individual and his or her environment. Therefore, stress embraces a number of cognitive, affective, and coping factors.
The theoretical framework that Lazarus proposed to explain the stress process was quite unlike of stimulus or response based models. Lazarus (1966) and Lazarus and Folkman (1984) laid emphasis on role of ‘appraisal’ or self-evaluation in how individuals, feel, and behave in stressful situations.

On encountering a stressor, a person assesses the potential threat (this is known as primary appraisal). Primary appraisal means how a person judges the significance of an event, whether it is stressful, positive, controllable, challenging or irrelevant. Specifically, an individual evaluates whether the situation represents (a) a possible case for harm or loss (threat) that may occur or (b) actual harm in the way of psychological damage has already taken place or (c) the condition is representative of challenge coming out of complex situation which may pose harm but can be successfully resolved by efficient resource mobilization and adaptive coping. Subsequent to this, the secondary appraisal follows, and it is the process of evaluating what coping methods or behaviours may be availed in order to resolve a problem and how effective these may be (Cohen, 1984). ‘Coping efforts’ focused on resolving or regulating the problem result in ‘outcomes’ of the coping process.

Reappraisal also occurs and this is the continuous process of evaluating, changing, or relabelling the prior primary or secondary appraisals as the situation progresses or takes different dimension. The event that was perceived to be threatening in the beginning may now be seen as challenging or insignificant. Usually, reappraisal changes the way the threat is perceived.

A number of factors bear influence on appraisals of threat, such as number and complexity level of threats; individual’s values, goals and commitments; uniqueness of the situation; availability of resources; social support; coping skills; self-esteem; situational limitations; degree of uncertainty and vagueness; closeness (time and space), severity and time duration of the threat; and how much the threat can be controlled (Lazarus, 1966; Lazarus & Folkman, 1984).

Conceptualizing of coping and emotions are the other important components of Lazarus’s transactional framework. Coping is conceptualized as “constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands.
that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p. 141).

Lazarus and Folkman (1984) gave two forms of coping namely problem-focused coping and emotion-focused coping. Problem-focused coping strategies are aimed directly at the problem in an attempt to generate solutions by which the problem can either be solved changed or managed. Most problem solving methods fall under reappraisals-for instance, giving a different meaning to the situation or event, or acknowledging personal resources or strengths that are present.

Emotion-focused coping methods aim to reduce emotional distress resulting out of problematic event, and are usually used when a situation cannot be altered. These include strategies such as blaming self, venting of emotions, using religion, seeking emotional support, etc.

Adaptive coping with stress should lead to positive outcomes, such as lower stress, better life satisfaction, fewer psychosomatic symptoms, and decreased anxiety. On the contrary, if the stress is not effectively handled it will result in a variety of physical and mental ailments such as anxiety, depression, chronic respiratory ailments, cardiovascular disease, infectious disease, and cancer (e.g., Penley, Tomaka, & Wiebe, 2002; Zeidner, 1998).

Another important part of Lazarus’s (1966, 1991) transactional model is emotion, to be specific, emotions which are known as stress emotions that have important cognitive effects. These emotions are sadness, anxiety, anger, fear, and guilt (Lazarus, 1966, 1991; Lazarus & Folkman, 1984). Though, thoughts were seen to precede emotions, the primary appraisal of threat and the meaning assigned to the stressful situation sets off a particular stress emotion that matches with its meaning.

All of the constructs put together in transactional model may result in any of the three health related adaptational outcomes: (a) functioning at work place and social domain of living, (b) morale or life satisfaction, and (c) health. This model views health from a broader perspective and includes physical, psychological and social facets (Lazarus, 1966; Lazarus & Folkman, 1984).
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2.1.3. Stress in the College Environment

College is a transition period which is beneficial, yet, filled with many stressors a student has to confront. Academic pressures, financial constraints, time management, faculty relations, and lack of social support networks are some important stressors in the college environment. These stressful factors may cause negative impact on academic performance, physical and mental health.

A lot of research evidence exists with reference to academic factors as the main source of stress (Kohn & Frazer, 1986; Mallinckrodt, Leong, & Kralj, 1989; Clark & Rieker, 1986; Struthers, Perry, & Menec, 2000; Olpin, 1997).

Pressure of studying, test anxiety, writing term papers, fear of not keeping up with course work, receiving low grades, lot of homework, vague assignments, uncomfortable classrooms, pressure to graduate, and time management are some of the commonly reported academic stressors (Schafer, 1996; Fisher, 1994; Tyrrell, 1992; Kohn & Frazer, 1986; Hirsch & Ellis, 1996; Mallinckrodt et al., 1989; Kariv & Heiman, 2005; Misra & Mckean, 2000). Apart from academic requirements, faculty relations can also be a source of stress (Sgan-Cohen & Lowental, 1988; Hurst, Baranik, & Daniel, 2013).

The negative outcomes associated with stress related to academic activities make it important to take necessary steps to prevent it. Academic stress has been reported to be associated with poor physical health (Lesko & Summerfield, 1989; Greenberg, 1981; Von Ah, Ebert, Ngamvitroj, Park, & Kang, 2004). Zaleski, Levey-Thors, and Schiaffino (1998) in a study observed that as the number of stressful life events rose for college students, their physical symptoms also rose. Lesko and Summerfield (1989) observed a significant positive relation between the illness incidence and the number of exams and assignments students had.

Not only physical health, even mental health is compromised as a result of academic stress. Anxiety and depression are the often reported negative mental health outcomes (Aldwin & Greenberger, 1987; Felsten &Wilcox, 1992; Cotton, Dollard, & De Jonge, 2002; Chambel & Curral, 2005).
Students not only suffer negative physical and mental consequences, but as result they may face decline in academic performance (Haines, Norris, & Kashy, 1996; Felsten & Wilcox, 1992; DeMeuse, 1985).

Felsten and Wilcox (1992) found that stress was directly related to decrease in grade point average in first year University students. Furthermore, DeMeuse (1985) has reported that life stress was inversely related to academic performance. Struthers, Perry, and Menec (2000) also found that higher academic stress was associated with lower course grades.

Academic stress may not only have direct effects on student well-being, but may also predict chronic stress in university students. A study (Pozos-radillo, Preciado-Serrano, Acosts-Fernandez, Aguilera-Velasco, & Delgado-Garcia, 2014) examined how academic stress predicted chronic stress in 527 students of a public University and their associations with age and gender. Academic Stress Inventory (ASI) and the Stress Symptom Inventory (SSI) were given to the students. A multiple regression analysis revealed that academic stress situations related to classroom intervention, taking an exam and mandatory work predicted high chronic stress. Also, female gender and ages 18, 23 and 25 were also associated with stress.

In addition to academic factors, intrapersonal, familial, social, interpersonal and financial factors also contribute to stress in a college environment (Ross, Niebling, & Heckert, 1999; Darling, McWey, Howrad, & Olmstead, 2007).

For example, Ross et al. (1999) did a study to examine the major sources of stress faced by 100 college students of an American University by using the Student Stress Survey, which assessed interpersonal, intrapersonal, academic and environmental sources of stress. Daily life hassles occurred more often than life events, and interpersonal sources of stress were the common sources of stress. Among the top five sources of stress were, changed eating routines, academic overload, new responsibilities, change in sleeping habits and vacations.

A recent review (Hurst, Baranik & Daniel, 2013) was conducted including 40 qualitative studies on college stressors with themes of lack of resources, academics, relations, environment, diversity, expectations, transitions and other stressors. Among all
the themes, relationship stressors was the most common theme and it included stress related to family, romantic, peer and faculty relations. This review found relations, diversity and other stressors to be new categories compared to quantitative reviews on college stressors.

There is evidence which confirms that financial concerns could also be a stress factor (Joo, Durband & Grable, 2008; Heckman, Lim, & Montalto, 2014; Wilson, & Pritchard, 2005). Having to work towards paying fees may leave students with less time to study and make them worried about finances and getting good grades.

2.1.4. Stress in Medical Students

Medical training is associated with considerable stress. Academic over load, examinations, time pressures, fear of failure, doubts about clinical competence, relations with faculty, and economic constraints are some of the varied stressors a medical student has to confront with. The negative impact stress can have on academic performance and the associated psychological morbidity such as depression, anxiety and substance use underscores the importance of studying stress in this group. In addition, today’s medical students are tomorrow’s physicians caring for the general population. Therefore, it is imperative to ensure their health before they effectively take care of other’s health. The following section will cover prevalence of stress and common areas of stress and psychological morbidity associated with medical student stress.

Prevalence of stress can vary depending on the region and institutions of study, year of study and measures used. In one of the earliest studies conducted in three universities at Britain, stress prevalence was reported to be 31.2 percent (Firth, 1986). Other studies in the U.S have also reported prevalence of considerable amount of stress. For example, a systematic review (Dyrbye, Thomas, & Shanafelt, 2006) of 40 studies done on stress, burnout, depression, anxiety, and related mental health problems in US and Canadian Medical students between 1980 and 2005, reported that overall psychological distress was consistently and comparatively higher than the general population. A number of studies done in the Arab countries on medical students have also noted prevalence of stress.
Elzubeir, Elzubeir, and Magzoub (2010) in their review of eight studies on stress among Arab medical students found that prevalence of stress widely ranged between 19.6 percent and 95 percent. A subsequent study done by Abdulghani, AlKanhal, Mahmoud, Ponnampерuma, and Alfaris (2011) on all medical students from first to five years, studying at a Saudi Arabian medical college found a 63% of total stress prevalence and a 25% prevalence of severe stress.

A cross-sectional study comparing female pre-clinical medical undergraduate and female nonmedical undergraduate students at an University belonging to Saudi Arabia (Al-Dabal, Koura, Rasheed, Al-Sowielem, & Makki, 2010) revealed that higher number of medical students (48.6%) reported being more stressed due to studies than non-medical students (38.7%).

Malaysian studies have also underscored the role of stress in medical students. Sherina, Rampal, and Kaneson (2004) measured stress in Malaysian medical students using GHQ-12 and found the prevalence of stress to be 41.9 percent. Another study (Johari, & Hassim, 2009) aiming to find stress prevalence and coping strategies in medical students of three Malaysian universities reported the prevalence of stress to be 44.1 percent. Al-Dubai, Al-Naggar, Alshagga, and Rampal (2011) in a cross-sectional study of stress and coping in 376 medical and medical sciences’ students revealed that 46 per cent of students felt stressed. Yet, another study carried out at Universiti Sains Malaysia in 2010 (Yusoff, Rahim, & Yaacob) administering General Health Questionnaire (GHQ-12; Goldberg, 1978) and Medical Student Stressor Questionnaire (MSSQ) found stress prevalence among medical students to be 29.6 percent. A multi-centre cross-sectional study (Yusoff, et al., 2011) involving 387 first year medical students from four Malaysian public universities reported the prevalence of stress to be 50 percent at the end of the year.

In a study of 129 basic science medical students in a university in Iran (Marjani, Gharavi, Jahanshahi, Vahidirad, & Alizadeh, 2008), the prevalence of stress of all types was found to be about 61.47 percent.
An another cross-sectional study involving (Sharif, Al-kamil, & Attiya, 2007) 300 medical students conducted at Basrah university, Iraq, showed an overall stress prevalence of 44.6 percent.

Studies from Pakistan also have revealed high prevalence of stress in medical students. A cross-sectional survey conducted in six medical colleges of Pakistan on 342 final year medical students found that 65 percent of the students felt the training period stressful (Yousafzai et al., 2009).

Shaikh et al. (2004) in their study of a Pakistani medical school which had a total of 264 students from all classes revealed that more than 90 % of students experienced stress at one time or another.

In a cross-sectional study (Shah, Hasan, Malik, & Sreeramareddy, 2010) of undergraduate medical students of CMH Lahore Medical College, Pakistan, where perceived stress scale was utilized, the overall mean of perceived stress was found to be 30.84 percent.

In the Indian context, some studies have shown stress to be prevalent among medical students. Supe (1998) attempted to determine incidence of stress and stress controlling factors in 238 first, second, and third year medical students. It was seen that 73% of students perceived stress.

In a Nepal medical college, where majority of students (49.1%) were Indians, Sreeramareddy et al. (2007) conducted a cross-sectional questionnaire based study on a total of 407 basic science and clinical science medical students. An overall prevalence of 20.9% of psychological morbidity was established by the use of GHQ-12 (Goldberg, 1978). Also, psychological morbidity was more prevalent in Indian students.

Abraham et al. (2009) conducted a study on stress among first year Malaysian students enrolled in Melaka Manipal Medical College (MMMC), (Manipal Campus), India. The campus in which study was carried out is similar to the current study, except that the present study studied students from Kasturba Medical College, of which, majority were Indians. Among the 125 students studied, prevalence of emotional problems was 37.3% as measured by GHQ-12 (Goldberg, 1978).
In another study (Mannapur et al., 2010) carried out at a South Indian medical college on 251 medical students where stress was measured by Presumptive Stressful Life Events Scale (PSLES), the overall stress prevalence was 89.64 percent. Less/moderate stress was seen in 42.63% of students and severe stress was observed in 47.01% of students. Two other Indian studies (Mohanty, Mohanty, Balasubramanium, Joseph & Deshmukh 2011) reported a stress prevalence of 54% and (Vaidya & Mulgaonkar, 2007) 51.37% respectively.

Since 2013, there has been a rise in Indian studies on stress related to medical students. A study (Nair, Ramesh, Hiremath, Chethana, & Raghunath, 2013) examined stress in 245 medical students studying at Raichur medical college in South India and found the prevalence of stress in the whole group (as measured by Kessler-10 questionnaire, Kessler et al., 2002) to be 58.88 percent. Reang and Bhattacharjya’s (2013) study on 146 medical students by use of GHQ-12 (Goldberg, 1978) showed a stress prevalence of 94.52 percent.

In a relatively recent cross-sectional study (Brahmbhatt, Nadeera, Prasanna, & Jayram, 2013) of medical students in one of the colleges at coastal Karnataka, India, prevalence of stress and sources of stress were examined. Among the 200 first and second year medical students who participated, overall stress prevalence (as measured by Perceived Stress Scale) was found to be 42.5 percent.

2.1.5. Pattern of Stress in Various Study Years

Distribution of stress can vary across the phases of study as per the demands put forth by the stages of medical training. Guthrie et al. (1998) in a study of U.K medical school found that prevalence of stress to be 36.6%, 30.6% and 21.9% for 1st, 4th and 5th year students respectively. Stress was seen to progressively decrease as the year of study increased.

Marjani et al. (2008) in a study of 129 Iranian medical science students also found prevalence of stress to decrease as study years increased. The prevalence of stress was highest (73.33%) in first year of study followed by second year (55.31%) and third year (53.33%).
There are other studies that have showed the prevalence of stress to be markedly less in the final years of study. For instance, Yusoff et al. (2011) examined medical students of Universiti Sains Malaysia school of medicine and found that prevalence of stress was least in final year (21.9%) as compared to other years of study (1st, 2nd, 3rd, 4th, and 5th years had stress prevalence of 26.3%, 36.5%, 31.4%, and 35.3% respectively).

In another cross-sectional study of 271 medical students in Iraq, it was seen that (Sharif et al., 2007), the prevalence of stress was highest in first year (62.8%), followed by the 3rd year (55.6%) and 5th year students (47.7%). The 6th year students had a notable least stress prevalence (27.3%).

Abdulghani, AlKanhal, Mahmoud, Ponnamperuma, and Alfaris (2011) in their cross sectional study of medical students in all years studying at a Saudi Arabian medical college reported stress to be comparatively less in final years of study. The fourth and fifth year students had stress prevalence of 43.2% and 48.3% as compared to first year, second year and third year students, who had stress prevalence of 78.7%, 70.8% and 68% respectively. This progressive decrease in stress as year of study progresses could be because of growing maturity and experience that enables adaptation to stress.

Jafari, Loghmani, and Monatzeri (2012) conducted a cross-sectional study to examine psychological morbidity in basic science, clinical clerkship, internship, and residency medical students enrolled in an Iranian medical college. On logistic regression analysis, basic science students were six times more likely to be at higher risk for scoring above threshold on the GHQ-12 (Goldberg, 1978).

There are also studies which have documented progressive increase in stress as the years of study increases. This is more applicable when students enter into clinical phase of training.

In a study (Shaikh et al., 2004) of 264 students from all classes of a Pakistani Medical college, it was found that senior students of fourth and final year had highest stress prevalence (95% and 98% respectively).
Sreeramareddy et al. (2007) in a study of medical students at a medical college in Nepal noted that psychological morbidity as measured by GHQ-12 (Goldberg, 1978) rose with progressive study years in clinical science years of third (15%), fourth (18.9%) and final year students (24%). But, it was lesser than first year which had a 28.45% prevalence of psychological morbidity. The prevalence of psychological morbidity was 16.3% in second year students. However, the number of GHQ-cases did not differ according to study years or broader categories of basic science and clinical science.

In a study of Thailand medical students, Saipanish (2003) found the prevalence of stress to be highest in the third year (1st, 2nd, 3rd, 4th, 5th and 6th year stress prevalence were 52.3%, 62%, 73.5%, 65.5%, 56.1% and 44.3% respectively). This highlights the fact that stress is likely to exacerbate when one enters into clinical training.

In Mosley et al.’s (1994) study of stress coping and depression in third year medical students studying at Mississippi School of Medicine stress was seen to contribute a large percentage to variation in distress (i.e., 29% to 50%).

In an Indian study done almost one and half decade ago (Supe, 1998) on 238 medical students belonging to first year, second year and third year of study, stress was found to be significantly more in second (81.5%) and third year (76.5%) students when compared to first year (65.3%) students.

Other studies have focused on stress in particular year of study. A cross-sectional questionnaire-based survey (Yousafzai et al., 2009) done on 342 students in final year of medicine belonging to six medical colleges of Pakistan revealed that about 65% of them found the training period stressful.

Suni & Latif (2014) studied perceived stress in students studying in second year medicine at a medical college in Saudi Arabia. An Arabic version of perceived stress scale was given to 40 males and 40 female students. The prevalence of stress was 71.7%. and the mean perceived stress was 17.31. Around 28.3% of students reported nil stress. Mild, moderate, and severe stress was found to be 21.7%, 31.7%, and 18.30%, respectively.
Siraj et al. (2014) examined relation between varied stressors and academic performance in 234 fourth year medical students studying at Universiti Kebangsaan Malaysia. Out of 234 students, 179 students (response rate being 76.49%) were included in the study. Around 8% of students had moderate amount of stress, while 53% had high level of stress and 39% had severe levels of stress.

Many recent studies (specifically, Indian) have focused on stress experience in first year of medical education.

Sharma et al. (2014) studied stress and coping strategies in 75 (44% males and 56% females) first year medical students studying in an Indian medical college at Jaipur and found that 96% of students experienced stress.

In another recent cross sectional Indian study (Gade, Chari, & Gupta, 2014) which examined stress and coping in 131 first year medical students, on a questionnaire developed by the study researchers where a median of three or greater was indicative of higher stress, 29% of students obtained a median of three or greater.

In yet another recent Indian study (Thangaraj & Lilian, 2014), 250 first year medical students belonging to the age group of 17 -20 years were assessed on Cohen’s perceived stress scale. On arbitrary categorizing into different stress groups, 14.8% had low perceived stress, 68.4 % had moderate perceived stress and 16.8 % students had high perceived stress.

A research conducted in neighbouring country of Pakistan (Sohail, 2013) studied stress in medical students belonging to first year of medicine. High stress levels were reported by 20.83 % of students, 71.67% of students reported moderate level of stress and low levels of stress was present in 7.5% of students and low levels of stress was present in 7.5% of students. Other recent Indian studies have either focused on various years or semesters of study or studied medical students of all years together.

Mohanty et al. (2011) conducted a study on first year, second year, third year students and medical interns studying at MGM college, Mumbai showed that first year, second year and third year students experienced 35%, 46% and 41% of mild stress respectively. Moderate stress was found to be 22%, 17% and 48% in first year, second
year and third year students respectively. Severe stress was experienced by 14.3%, 28.6% and 28.6% of first year, second year and third year medical students. Both first year and second year students had 14% of very severe stress, while second year students did not report of experiencing very severe stress.

Another Indian study (Solanky, Desai, Kavishwar, & Kantharia, 2012) examined stress experience in students studying in various years of Government medical college of Surat. A total of 160 students took part in the study, and equal number of students were selected from various years (1st, 2nd-phase I, 2nd-final phase, 3rd-1st and 3rd-final). On the whole, 55.6% of students had mild to moderate stress, while 41.2% reported of severe stress. In the first year, 53% of students had mild to moderate stress, while 47% had severe stress. In the second year-I phase, 6.25% of students had no stress, 68.75% had mild to moderate stress and 25% had severe stress. In the second year-final phase, 56.25% of students had mild to moderate stress, while 43.75% had severe stress. In the third year-Phase I, 9.37% of students had no stress, 59.38% had mild to moderate stress and 31.25% had severe stress. In the third year-final phase, 40.63% of students had mild to moderate stress and 59.37% had severe stress. Final year students had the highest severe stress students and students in second year 1 had the lowest amounts of severe stress.

A study (Nandi et al., 2012) done at a Kolkata teaching hospital examined prevalence of stress and stressors in 215 medical students studying in third, sixth and ninth semester of medical education. To assess the stress, specifically, the 28 item General Health Questionnaire (GHQ) was used. A total of 52.56% of students reported being stressed i.e. these students scored above 5 or more on the GHQ 28, in third semester, 47.3%, 60% in the sixth semester and 53.47% in the ninth semester scored in the positive range of stress scores as measured by GHQ 28.

Reang and Bhattacharjya (2013) conducted a cross-sectional study on undergraduate medical students by administering GHQ-12 (Goldberg, 1978) and a stress questionnaire was administered to 146 medical students studying in various semesters of all four years of medical education. Participants who had a GHQ score of 4 were categorized as have significant stress and considered to be a ‘case’ in the study. Although caseness was high in all years of medical education, stress was highest in 8th
semester or final year students (97.4%). Based on GHQ score categories, 51.4% had mild stress, 32.2% had moderate stress and 11% had severe stress.

Nair et al. (2013) in the study on first year, second year and third year medical students studying in Raichur medical college in South India found that prevalence of stress was highest (70.59%) in first year followed by second year (53.27%) and third year (51.48%). The stress was seen to decrease as students progressed through successive academic years. Compared to third year, first year students were likely to have 2.62 times more stress and this likelihood reduced to one time in second year of study.

2.1.6. Gender Differences in Stress.

There is evidence for gender differences in stress with most studies pointing towards female students as having more stress. Yet, there are few studies that have not found any gender differences.

As early as 1975, Edwards and Zimet (1976) in a study of medical students from University of Colorado school of Medicine found that females reported of being more lonely, feeling out of place and feeling of inability to achieve academic goals. This highlighted that females received different treatment in medical school.

Toews, Lockyer, Dobson, and Brownell (1993) in a study of stress levels and stressors in medical students, residents and graduate science students (M.Sc., PhD), at a medical institute in U.S.A, found that women had more scores on all measures in all groups. On SRRS, they got a score indicating moderate risk of illness as compared to men who had mild risk. Women also had higher stress ratings for self-expectations. This finding of high stress levels in female students is also supported by findings of another study of medical students, residents and graduate science students enrolled in four medical colleges across four universities in Canada (Toews, et al., 1997) where in women reported over all higher levels of stress. They had increased concerns about amount and complexity of subject, examination, evaluation, stress resulting out of self-expectations and feelings of lack of competence. On SRRS, females scored higher than men indicating that they had much higher risk of developing some form of illness in the following year. As opposed to men, women drew more support from extended group of friends, classmates and others such as counsellors.
Guthrie et al. (1995) also found that more women (61.5%) experienced stress than men (50%). In a study of first year medical students, Lloyd and Gartrell (1981) found that to begin with, there was no difference between male and females in their adjustment. However, by the middle of the year female students had more psychiatric symptoms, more depression and anxiety, were more troubled, were more interpersonally insensitive and had less life satisfaction. Women students had also more stress as they experienced role conflict and less family support for pursuing their academic goals.

Greenfield, Parle, and Holder (2001) examined gender differences in anxieties of students entering into clinical training in two batches of 1992 and 1995 at a medical college of U.K. An analysis of 1995 data revealed that females had higher scores than males for sixteen situations out of thirty one situations. These situations were grouped into 3 main categories.

The largest category had self-esteem related threats which involved situations posing threat in relation to professionals and in relation to lay people. The specific situations where women students felt more stressed were: presenting cases in ward rounds or tutorials, admitting to consultants about lack of knowledge about something, making diagnoses, making wrong diagnoses, interacting with other professionals and admitting to patients that one doesn’t know something.

Ranking of situations involving interaction with teachers as more stressful than clinical and intimate situations by female students made authors speculate whether this was related to persistent dominance of male teachers in teaching hospitals that impacted the relation between male consultants and female students.

The next larger category where females were more stressed was concerning technical procedures such as examining patients, drawing blood, injecting a patient etc. The third category where women felt more stressed in situations that posed a threat to personal safety such as examining drunk or abusive patients, examining psychiatric patients and situations where possibility of being infected was present.

The three situations where males had higher scores than females consisted of intimate contact with patients, such as undressing the patients of opposite gender and undressing old people. The authors opine few male students are used to intimate care of
others than female students who would have been placed in a caring role in the family at some point or the other. Hence, there is a greater likelihood of male students associating undressing predominantly with sexual situations, which could make them anxious in clinical situations.

In a systematic review of 40 studies done on US and Canadian Medical students between 1980 and 2005 in the areas of stress, burnout, depression, anxiety, and related mental health problems, Dyrbye et al. (2006) reported that on the whole, studies indicated that females had higher psychological distress. Studies conducted in Arab countries also have examined gender difference in stress among medical students.

In a study conducted at a Saudi Arabian Medical college (Abdulghani et al., 2011), which examined stress prevalence in medical students, stress levels was found to be higher in female students (75.7%) than male students. Also, being a female was found to be an independent significant risk factor for stress outcome.

Amr, El-Gilany, and El-Hawary (2008) in a study examined influence of gender on perceived sources of stress, anxiety, depression, physical symptomatology and personality in Egyptian medical students. Though, the perceived stress did not vary according to gender, female students scored higher than male students on scales indicating depression and neuroticism. On the other hand, males reported stressors such as relationship problems with teachers (such as bad treatment, unfairness, over-criticism) and substance abuse than females.

Also, studies conducted in Pakistani medical colleges have shown stress related symptoms (Shaikh et al., 2004; Shah et al., 2010) to be more prevalent in female medical students. Shah et al. (2010) opine that a plausible reason for the higher stress levels in women may be because of Pakistan’s conservative environment which limits freedom of women, thereby reducing their opportunities to participate in extra-curricular activities.

Sohail (2013) in a study of 120 medical students at a Pakistani medical college found sources of stress to vary among male and female students. Predominant sources of stress among males (85%) and females (97%) were law and order situation and security. The corruption in the country was perceived as stressor by 90% of male and female students. Teachers’ discouraging attitude led to distress in 48 % of male students. Other
sources of stress among females were lack of well-paying job and health facilities (85%), and patients’ sufferings (80%).

In the Malaysian context, Sherina et al. (2004) in a study examining stress prevalence in medical students found very slight preponderance of stress levels in females, though not significant. Similarly, in another study of medical students from three universities in Malaysia (Johari & Hassim, 2009), though stress was higher in females than males, the difference failed to reach statistical significance.

In a recent study (Backovic, Zivojinovic, Maksimovic, & Maksimovic, 2012) of 755 medical students studying in the two final years at School of Medicine in Belgrade, Serbia, female students reported physical health and stress levels to be worse than males. Examination which was a high stress factor in the whole population was also significantly higher in female students, and came out as an independent stress factor in female population.

Female students also experienced more stress in communicating with the faculty and found contacts with patients to be more stressful than male students. In addition, conducting autopsy was two times more stressful for female students and it also turned out to be an independent predictor of stress in women.

In a web-based survey carried out on 500 medical students and 500 business students in Sweden (Dahlin, Nilsson, Stotzer, & Runeson, 2011) female students scored higher than men on worries about future endurance at both universities.

Jafari, Loghmani, and Monatzeri (2012) in their study of psychological morbidity in basic science, clinical clerkship, internship, and residency medical students enrolled in an Iranian medical college found that female students were at three times higher risk for scoring above threshold on the GHQ-12.

Grbic and Sondheimer (2014) conducted a pilot survey examining the well-being of medical students and exploring the vulnerability of certain student populations to distress. The data was based on Medical Student Life Survey (MSLS), a pilot survey conducted on second-year medical students of 136 U.S. Medical schools accredited by the Liaison Committee on Medical Education (as of 2013). Among the 3,305
respondents, females experienced significantly more stress than males as observed on perceived stress scale.

Some studies that have examined burn out in medical students have shown gender differences.

A study (Cecil, Mchale, Hart, & Laidlaw, 2014) investigated health behaviors that predicted burnout in medical students. Pertaining to the subscales of burn out measure, higher depersonalization and lower depersonalization was significantly predicted by male gender.

Wachholtz and Rogoff (2013) in a study of spirituality, burn out experience, and well-being in 259 medical students at a North-eastern medical school found women to be more burned out and anxious.

In a study (Paro et al., 2014), among many other things, empathy in medical students and its relation with quality of life and burn out was examined. The study was multi centric involving 22 medical schools and students’ population of thousand three fifty. Empathic concern and personal distress was higher in females than males. Physical and psychological quality of life was also low in female students than male students. On the burn out scale, females had more emotional exhaustion than males and lesser depersonalization than males. Although the already discussed studies have established evidence for higher stress in female medical students, there are also studies that have found no evidence for gender differences in stress.

Suni and Latif (2014) studied perceived stress in second year medical students studying at University of Dammam medical college in Saudi Arabia. An Arabic version of perceived stress scale was given to 40 males and 40 female students. However, there was no gender difference in stress experience.

Siraj et al. (2014) examined relation between varied stressors and academic performance in 234 fourth year medical students studying at Universiti Kebangsaan, Malaysia. There was no significant difference between genders in stress experience.

Cook, Arora, Rasinski, Curlin, and Yoon (2014) in 2011 investigated the prevalence of mistreatment in medical students and its relation to burnout in a sample of
605 third year medical students studying in 24 different medical schools. Gender was not associated with burnout.

Murphy, Gray, Sterling, Reeves and DuCette, (2009) in their comparative study of stress in medical and dental students found no evidence for gender differences. They opine that the recent trend of larger representation of female faculties at medical and dental schools has considerably reduced the pressures earlier experienced by women to prove themselves equal or perform better than men in the previously male-dominated fields.

Some of the earlier studies that have examined gender differences in Indian medical student population have failed to establish gender differences in stress (Supe, 1998; Sreeramareddy et al., 2007; Shah et al., 2009). However, of late there is evidence pointing towards nature of stress being different in males and females. Also, stress is seen to be more in female medical students.

Patil, Madhura and Khadar (2014) examined stress and coping strategies of first year male and female medical students studying at medical college in Tamilnadu, India. The often reported stress symptoms in male students were difficulty in taking decisions, changed sleep habit and trouble in communication. The common stress symptoms in females were difficulty in making decisions, disruptive sleep habit, loneliness and difficulties in concentration. Stress symptom of fatigue was more in male students than female students. Stress factor of homesickness was more in females than males.

Another Indian study (Nandi et al., 2012) was done at a Kolkata teaching hospital to examine prevalence of stress and stressors in 215 medical students studying in third, sixth and ninth semester of medical education. Among the measures used were 28-item General Health Questionnaire and Warwick-Edinburgh mental well-being scale. Stress was higher in females than males. Gender differences were not apparent in the impact of stressors, except for financial problems where in male students (32.5%) reported of finances affecting their academic performance more than their female counter parts (16.36%).
In 2013, Reang and Bhattacharjya conducted a cross-sectional study on undergraduate medical students by administering GHQ-12 (Goldberg, 1978) to 146 medical students studying in various semesters.

Based on GHQ score, stress was not significantly associated with gender. However, academic stressors were experienced more by males while non-academic stressors were felt more by females.

Sharma, Wavare, Deshpande, Nigam and Chandorkar (2011) examined the effect of stress on vital parameters of 68 final year medical students during their academic examination. Among the 68 students participating, a highly significant difference in pulse rate, systolic and diastolic blood pressure was observed during exams. Stress as measured by Zung scale was higher in girls than boys.

In a recent study, Sharma et al. (2014) studied stress and coping strategies in 75 (44% males and 56% females) first year medical students studying at an Indian medical college at Jaipur and reported of stress being more in female students. In yet another recent Indian study (Gade et al., 2014) on stress in first year medical students, females experienced slightly more stress than males. Thangaraj and Dsouza (2014) among first year medical students found a higher stress mean scores for females on Cohen’s perceived stress scale (21.18) than males (19.60).

A cross-sectional study (Brahmbhatt et al., 2013) of medical students in one of the colleges at coastal Karnataka, which studied stress and sources of stress in two hundred first year and second year medical students showed female students to be experiencing more stress than male students.

Gender difference in medical students has been most often reported in the context of abuse. In a study of sexual harassment of students, White (2000) found that 80% of the sexual harassment occurrences were reported by female medical students.

In a study (Rautio, Sunnari, Nuutinen, & Laitala, 2005) on student mistreatment comparing medical students with students from other courses, females perceived more mistreatment than males and they were more disturbed by it than males. Females also reported being mistreated by staff including professors and lecturers when compared to...
male students. Nagata-Kobayashi et al., (2006) in a study of medical student abuse in 304 fifth and final year clinical clerkship medical students hailing from six Japanese medical schools doing their clinical clerkships, female students reported of greater sexual harassment than male students. Females, specifically reported of higher sexual harassment than male students.

2.1.7. Comparison of Medical Students with Other Students

Medical students’ stress has been compared with other professional and university students. Some studies have reported of medical students of being more stressed than non-medical students.

Ko, Kua, and Fones (1999) in their study of medical and law students found that 57% of medical students as compared to 47.3% of law students scored above cut-off points on the General Health Questionnaire (GHQ).

In a comparative study (Omigbodun et al., 2006) of psychological morbidity and stress in medical, physiotherapy, dental and nursing students at a medical college in Nigeria, medical and dental students scored higher on GHQ when compared to nursing students and physiotherapy students. Medical and dental students were more likely to cite overcrowding, high work load, few holidays, and strikes as stressors, while physiotherapy and nursing students found noises in environment, security issues and conveyance as major stressors.

One of the studies (Al-Dabal et al., 2010) that compared female undergraduate medical and non-medical students at a Saudi Arabian university found that medical students were significantly stressed due to studies than non-medical students. Unsuitable teaching methods, unsatisfactory study environment, and fear of failure in examinations were frequently reported by medical than non-medical students. In comparison to non-medical students, medical students had more social problems and reported worsening of physical and mental status, anxiety and depression and negative life-style changes since initiation to the college programme.
In a comparative study of medical, economics and physical education students in Turkey (Aktekin et al., 2001), it was seen that GHQ, BDI and STAI scores rose significantly from first to second year. Students in medical stream had higher GHQ scores as compared to economics and physical education stream. With use of differing cut off scores for GHQ, percentage of students scoring above the threshold were higher in medical stream as compared to economics and physical education stream.

Multiple regression analyses showed dissatisfaction with social activities and worries about future significantly accounted for the variance in GHQ-12, BDI and STAI scores. Stress stemming out of relations with the other sex significantly predicted change in scores on GHQ -12 and STAI.

Few studies exist in the literature that report stress levels of medical students as being comparable to, or even less than non- medical students.

A study (Heins, Fahey, & Henderson, 1983) of American law and medical students though did not reveal any differences in overall stress, it showed that law students had higher academics related stress and higher fear of failures as compared to medical students. Also, a British study showed that medical students had no higher levels of health-anxiety and worry than students of English and Law (Singh, Hankins, & Weinman, 2004).

El-Gilany, Amr, Awadalla, and El-Khawaga, (2008) in a comparative study of law and medical students in Egypt found that law students reported higher stress level and anxiety than medical students. Law students cited more of personal, environmental and relationship categories as stressors. Medical students identified troubles with the instructors, excessive workload, problems with course mates, close contact with serious illness and personal injury or illness as their major stressors.

In another comparative study of medical law and graduate students, Helmer et al. (1997) found that medical students did not have higher stress than other groups and their stress was only slightly greater than the norms of the general population.
Yet, another study of stress, burnout and mental distress in business and medical students (Dahlin, Nilsson, Stotzer, & Runeson, 2011) found medical students not to be as stressed as business students.

Mane et al. (2011) compared stress levels between students of various professional courses of dental, medicine, physiotherapy, engineering and nursing students of an educational trust in Raichur, India. The prevalence of perceived stress as measured by perceived stress scale was 50% among all students. Perceived stress scale score was highest in dental students (29.5) followed by medical student (27), physiotherapy students (26.6), engineering students (26.6) nursing students (26.16) and finally pharmacy students had lowest mean score of 23.2.

In a recent Indian study, Waghachavare, Dhumale, Kadam, and Gore (2013) studied stress in various professional colleges of medicine, dental and engineering at Maharashtra, India. A pre-tested scale was given to 1,224 students and among them, 24.4% experienced stress. Out of students who experienced stress, highest stress was experienced by dental students (38.5%) followed by medical students (34.1%) and finally by engineering students (27.45%).

Stress experienced by medical students can be categorized into various areas. The literature pertaining to relevant stress categories is outlined below.

2.1.8. Various Stress Areas
2.1.8.1. Academic pressures: The medical student stress literature points towards academics related pressures as a constant occurring stressor throughout medical education. The varied number of stressors a medical students is posed with are 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 (Aktekik et al., 2001).

As early as 1981, a study in the U.S medical students, reported overload of information and inadequate time to be bothersome stressors (Huebner et al., 1981).
In a prospective longitudinal study (Stewart, Lam, Betson, Wong, & Wong, 1999) of 121 medical students, the relation between stress and academic performance was examined during the first two years of medical college. Students were assessed both before the classes began and later during the course. Pre-medical academic performance score was also recorded. It was observed that high stress levels were associated with poor academic performance before and during medical course. Another earlier study (Grover, & Smith, 1991) also showed similar results, wherein academic anxiety was not only significantly related to academic performance in first year medical students but when combined with prior academic achievement increased prediction in academic performance.

Toews, Lockyer, Dobson, and Brownell (1993) in a study of stress levels and stressors in medical students, residents and graduate science students at an University in US. found that medical students felt highly stressed about examination and evaluation, volume of work, time pressures and self-expectation.

In a comparative study of medical and dental undergraduates (Murphy, Gray, Sterling, Reeves, & DuCette, 2009), it was seen that both groups of students felt most stressed about grades and performance on examinations. Another high cause of stress was fear of failing a course or licensing exam. Murphy et al. (2008) offered explanation that worrying about grades and exam performance is typical as students entering such professional courses are expected to be high performers. They must not only make efforts to outperform others while studying in a highly competitive environment but also should compete to be high achievers in order to enter into preferred residency or postdoctoral programs.

The kind of learning mode (problem or non-problem based) followed by the medical school also determines the academic pressures students face. There are mainly two types of learning modes of medical curriculum; problem based and non-problem based.

Non-problem based learning approach is the traditional mode of teaching and learning that follows didactic lecture based teaching methods. Whereas, problem based learning (PBL) approach students determine their own learning objectives and research on the subject matter to be learned. The information thus obtained is discussed in groups for further refinement of knowledge.
Moffat, Connachie, and Ross (2004) studied stress among first year medical students enrolled in a PBL based curriculum in a medical college at Glasgow. They found that the major stressors arose from medical training, specifically, they were related to uncertainties about study behaviour, progress of study and aptitude rather than problems related to personal life.

Another comparative study (Lewis et al., 2009) examined course-related stressors in undergraduate problem-based learning and non-problem based learning medical courses. It was seen that large numbers of students enrolled in both programmes reported of having significant stress because of the medical course, particularly, gathering adequate and entire medical knowledge was the most frequently felt stressor by students in both courses.

The PBL students felt more than non PBL students that they did not have knowledge of what faculty expected of them and too many group discussions managed by students alone resulted in an unclear curriculum. Also, PBL students felt absence of opportunity to pursue those academic areas which they were interested in.

The non PBL students felt that the medical course fostered a sense of anonymity and made them feel more isolated. The authors opine that this could be because students in PBL programme had lesser number of small group teaching sessions and mostly they had to spend their time being part of a large group. Therefore, this reduced attention may lead to feelings of anonymity and isolation among students.

In one of the earlier studies to examine stress and coping among 450 Malaysian medical students studying at three universities, Johari and Hassim (2009) found that students appearing for exams shortly had higher stress than those who were not.

In a study (Yusoff, Abdul Rahim, & Yaacob, 2010) of 761 medical students that examined stress and sources of stress at medical colleges in one of the Universities in Malaysia, it was found that top ten stressors were related to academics. The top ten academic 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), 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.
Another subsequent study by Yusoff et al. (2011) (which had one of the authors involved in the earlier study) that extended to four Malaysian public universities involving 387 medical students found the top ten stressors to be academic related, same as the academic stressors rated as top ten stressors in the earlier study of Yusoff et al. in 2010. In addition, it was seen that those students who perceived academic stressors as causing high to severe stress were 16 times at more risk to develop distress in comparison to those who felt it as causing nil to mild stress.

A study (Yousafzai et al., 2009) conducted in final year medical students of six medical colleges in Pakistan revealed that one of the main factors contributing to stress was heavy workload (47.4%).

Another cross sectional study (Shah et al., 2010) examining stress in medical students of CMH Lahore Medical College, Pakistan using logistic regression analysis revealed that stressed cases were associated with academic related stressors. The most common kinds of academic stresses were frequency of examinations, vastness of academic curriculum, and performance in periodic examinations. Similar concerns related to academics and exams in Pakistani medical students were also found by Shaik et al. (2004). In a recent study (Sohail, 2013) of first year medical students in Pakistan, the academic stressors experienced (as appearing in depth interviews) were over memorization, lack of adequate study room facilities or seat arrangements in library. Majority of students wanted breaks after tests and they further opined that special guidance should be offered to required students.

An Iranian study (Sharif et al., 2007) of 300 medical students from all classes also found that major concerns were related to academics. Majority of the students experienced difficulties in examination (79.3%), lack of time to revise and prepare (74.2%), difficulties in understanding lectures (57.0%), and concentration difficulties (48.8%).

A study (DinhDo & Tasanapradit, 2008) of stress and depression in 351 Vietnamese medical students revealed that 88% and 82% of students experienced heavy workload and lower grades than expected, respectively as major academic concerns. Other academic stressors were missing many classes (55%) and apprehension about graduation (47.3%).
Studies conducted in Arabian medical students also confirm, course of study, heavy workload as most commonly reported sources of stress (Abdulghani et al., 2011; El-Gilany et al., 2008). Another study (Al-Dabal et al., 2010) that exclusively studied prevalence and causes of academic stress in pre-clinical female medical students as compared to non-medical female students in Saudi Arabia found that medical students reported unsuitable teaching methods, an unsatisfactory study environment, and fear of failure in examinations more frequently than non-medical students.

In Soliman’s (2014) cross-sectional study that intended to examine stress and coping strategies in 319 first year medical students studying at King Saud University College of Medicine, Riyadh, Kingdom of Saudi Arabia, the highest stress factors were related to academics such as learning all course content (43.3% strongly agreed), having heavy demands of themselves to study (46.9% agreed), lack of time to cover topics for exams (33.8% strongly agreed) and having to study at night (31.0% strongly agreed).

Siraj et al. (2014) in a study of relation between stressors and academic performance in fourth year medical students of a Malaysian medical college found that majority of students (84%) reported academics as highly stressful.

In a study of (Nuallaong, 2010) clinical level medical students studying at Thaammsat University, Thailand, among the major stressors reported were exams (35.70%) and exam grades (20.90%).

Chen et al. (2013) in their study of impact of academic stress in students attending a medical college in Inner Mongolia Area of China found that students with academic stress were 1.5 times more likely to have psychological distress with distress levels rising with academic stress, suggesting a dose-response relation between academic stress and distress.

Studies carried out in India also have emphasized that academic stress is the most often reported stress in medical students.

In a study (Supe, 1998) of medical students of first three years at Seth G S medical college, India, among all other factors, academic factors were greater perceived causes of stress. The most important causes of stress were final examinations and large amount of information to be learned. Students who had scores more than 95% of marks at
12th standard, just prior to admission to medical college were most stressed than others suggesting that high achievers could be more stressed. High parental expectations, peer and self-expectations about high academic performance could be contributing stress factors (Supe, 1998).

Sreeramareddy et al. (2007) in a study of medical students (where majority were Indians) in a Nepal medical college examined stress, psychological morbidity and coping in basic science and clinical science students. Being dissatisfied with lectures, vast syllabus and frequency of exams were the academic stressors that were frequently reported by students. Logistic regression analysis showed that being case as per GHQ was related to incidence of stressors in academics and health. Academic stressors that were rated as most severe were: not being satisfied with lectures, vast syllabus, and frequent exams.

A study (Vaidya & Mulgaonkar, 2007) conducted on 109 first year Indian medical students examining their stress, depression and anxiety in relation to academic performance revealed that factors related to academics were perceived more stressful than other stress factors. Around 19.40% of students felt considerable amount of stress owing to competition for post graduate seats, alteration in the way exams were conducted, unpredictable nature of exams and better performance by other students. However, stress anxiety and depression were not related to academic performance.

Another Indian study (Abraham et al., 2009) conducted on stress among first year Malaysian students enrolled in Melaka Manipal Medical College (MMMC), (Manipal Campus), India, has similar settings to the current study, which was conducted in the same campus. In this study, around 64% of students opined that workload was a lot and 52.5% felt peer competition for better grades was also stressful. A small number (12.55%) of the students reported difficulty to follow language in which teaching is done.

Again, in a subsequent Indian study (Shah et al., 2009) of 126 medical students studying at Shri M.P Shah Medical College, the five most frequently reported stressors were found to be academic in nature. The stressors were: length of course material, overload of work, competition in exams, understanding information and peer competition.
Many other subsequent Indian studies have proven academic pressures as a main source of stress.

A study (Abirami, Jana, Sobana, Bharathi, & Parthasarathy, 2012) done at a South Indian medical college, assessing anxiety and depression and the related curricular factors in 142 first year medical students showed that anxiety related to study demands and time pressures were the common factors of stress in all three groups of students having anxiety alone, students with depression alone and students with anxiety and comorbidity of depression.

Students with depression alone felt that the most stress causing factors were transition to university study or medical education followed by time pressures. Students with anxiety alone felt the main stress causing factors were study demands and attaining grades. Students with both anxiety and depression felt study demands and anxiety regarding grades as main concerns.

A recent Indian study (Cherkil, Gardens, & Soman, 2013) examined the association between coping styles and stress in medical students studying at a medical college in Kerala. Stress was assessed by Severity of Stress Scale (S3S)-Medical Students’ Version which has various domains such as academics, self-expectations, relationships, living conditions, and health and value conflicts. Academic stress and self-expectations were observed to be among the high stress domains.

In Sharma et al.’s study (2014) of stress and coping in first year medical students studying at a medical college in Jaipur, the most commonly reported stressor by 89% of students was vast syllabus followed by frequent exams and tough topics. Stress was also reported to be high during exams by 91% of the students.

In another Indian study of (Gade et al., 2014) stress and coping in 131 first year medical students, among the 41 stress inducing factors, the highest stressful factors were competition for post-graduation seats followed by academic competition with classmates, examination and grades, fear of failure in exams and inadequate time to do assigned work. Females experienced higher academic competition, and higher stress about grades.
A cross-sectional study (Shah, Purohit, Shah, & Shah, 2014) was done to examine stress in 140 first-year medical students (64.28% females, 35.7% males) at an Indian medical college where in academic factors such as vast syllabus (92.8%), language (70%), tough topics (57.1%), duration of first year (61.7%), and difficulty in memorizing topics (61.7%) were reported to be the main sources of stress.

Patil et al.’s (2014) study on stress and coping strategies of first-year male and female medical students studying at medical college in Tamilnadu, India, showed that predominant stress causing factors to be academics and exams.

Yet, another Indian study (Solanky et al., 2012) conducted at Government medical college of Surat examined stress in medical students of various study years revealed that major factors contributing towards stress were enhanced load for exam (80.62%), vast syllabus (70%), less than expected marks (68.2%), less time for rehearsal (63.2%), procrastinating tendencies (67.7%) and fear of exam failures (59.3%).

Severe stress was highest in final year students and lowest among the second year 1 phase students. Vast syllabus was felt as a major stressor by 87.5% of first-year and 61% of first-year students. Trouble to cover daily study portion was reported as a stressor by 71.8% of final-year and 62.5% of second-year phase 1 students. Tough study topics were perceived as a stressor by 75% of final-year and 60% of first-year students. Fear of exam failures was reported as a stressor by 53% of first-year and 75% of final-year students. Poor time management was highly reported by third year phase 1 students. Tiring class schedule was highly felt by students in first year (56%). Procrastination was reportedly high in second-year students (53.45%). Thoughts of skipping exams were high in final-year students (25%).

Reang and Bhattacharjya’s (2013) study on Indian undergraduate medical students of various years also revealed that major stressors were competition for grades and frequent number of exams, and these were felt more by first-year medical students compared to students in other years.

Academic stressors were experienced more by males while non-academic stressors were felt more by females. The students who were positive GHQ cases and had difficulty following the language in which teaching was conducted were seen to have 81.59% higher chance of developing stress.
In a relatively recent cross-sectional study (Brahmbhatt et al., 2013) of first and second year medical students in one of the colleges at coastal Karnataka, important academic stressors reported were frequency of examination, exam performance, and vast academic curriculum. In regression analysis peer competition was seen to determine stress.

In a study (Mane et al., 2011) of students of various professional courses of dental, medicine, physiotherapy, engineering and nursing students, in all the courses, main sources arose from academic domains. Multivariate logistic regression analysis revealed that among the major predictors of stress were academic related stressors and schooling in non-english medium. The academic stressors specific to medical students were frequent exams, and more academic assignments.

Pai, Menezes, Srikanth, Subramanian, and Shenoy (2014) examined perception of learning environment by medical students of pre-clinical and clinical stages of training studying at an Indian medical college. Undergraduate medical students of first, third, fifth and seventh semesters of medical education participated.

Contrary to many study reports, in general, students in all semesters had a good perception of learning, perceived course organizers positively, perceived atmosphere positively. It was observed that first year students perceived education environment in a positive light than the third, fifth and seventh year students. The scores 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.

However, the first years students though perceived positive learning environment, they nevertheless felt that medical education emphasized more on factual learning. About other drawbacks of learning environment, students in general felt that they were fatigued to enjoy the study, unable to memorize what they needed to study and were stressed most of the time during the course. All these were felt more by clinical batches.

An Indian study (Nandi et al., 2012) done at a Kolkata teaching hospital examining stress and stressors in medical students revealed that around 70% of students reported of tight exam schedules as being stressful, while 60% of students reported of peer rivalry and unhealthy competition.
In the stress, burn out and support resources study of medical students conducted by Chang et al. (2012) academic stress was observed in the form of having to make decisions regarding electives and clerkships based on students advise rather than faculty advise and uncertainty about mastering the vast medical knowledge.

Basnet, Jaiswal, Adhikar, and Shyangwa (2012) in a study of depression and stressors in Nepalese medical students among the main stress inducing factors were academic stressors.

Academic performance as a stressful time is not evident only in subjective measures but also seen in objective measures related to physical health. Sharma et al. (2011) examined the effect of stress on vital parameters of final year medical students studying at an Indian medical college during their academic examination. Among the 68 students participating, a highly significant difference in pulse rate, systolic and diastolic blood pressure was observed during exams. Stress as measured by Zung scale was high during exams. Girls were more stressed than boys.

In another study, Pradhan, Mendinca, and Kar (2014) studied the autonomic parameters of pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP) of stress along with stress questionnaire to determine the effects of stress on cognitive functions as recorded by auditory reaction time (ART) and visual reaction time (VRT) in first year medical students studying at an Indian medical college. A total of 49 males and female students took part. The assessments and recording were done prior to exam and three months post exams. Study results indicated that autonomic parameters of PR, SBP, DBP, ART, VRT and stress scores were increased in pre-examination setting in both males and females. Female learners had higher PR while, stress score and SBP were higher in males in pre-examination phase. ART and VRT were higher in males both before and post exams.

2.1.8.2. Patient and clinical responsibilities: The medical training brings about a host of patient and clinical responsibilities that can be stressful for the student. The point of initiation of contact with patients depends on the kind of curriculum each medical institution follows. Generally, the first two years is known as the pre-clinical phase and mainly involves lectures and lab based work. At the beginning of third year, students are
initiated into taking up patient and clinical responsibilities in a hospital setting. Already existing heavy coursework, plus the additional duties involving direct contact and care taking responsibilities may make students very anxious and stressful.

In a study, students just entering into clinical training of two batches of 1992 and 1995 were examined for gender differences in their anxieties (Greenfield et al., 2001).

The top five clinical situations that were ranked as stressful by both males and females significantly correlated with each other in the 1992 batch. Also, in the 1995 batch, three clinical situations that gained rank in the top five stressful situations were similar to the ones that figured among the top five clinically stressful situations rated by females.

The five most stressful clinical situations rated as stressful by females in 1992 were: presenting cases on ward rounds, getting diagnoses wrong, helping with a cardiac arrest, inadvertently hurting patients and telling consultants that one does not know something.

The five most stressful clinical situations rated as stressful by males in 1992 were: presenting cases on ward rounds, getting diagnoses wrong, helping with a cardiac arrest, inadvertently hurting patients, telling consultants that one does not know something and carrying out vaginal examinations.

In 1995, females ranked the following five 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.

Males in 1995, ranked 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, carrying out vaginal examinations and carrying out rectal examinations.

On comparing rankings done by females in 1992 and 1995, it was seen that four of the situations that came in the top five stressful situations also appeared in the top five situations in 1995. Similarly, males, both in 1992 and 1995 batches ranked first three situations as identically stressful.
Firth (1986) examined stress and psychological morbidity in 318 final year medical students from three British universities who were entering clinical postings in psychiatry. Among the commonly reported stressors were clinical situations that involved talking to patients, anxieties precipitated by being asked to play an active role in ward rounds and dealing with suffering and death. With regard to conversing with patients, 56 of the 61 situations reported involved talking to psychiatric patients. The author reports that most of the situations involved failure to engage in a conversation with psychiatric patient. The author states that any posting may produce its typical stress and students here may have felt more stressed as they did not perceive getting any help or being welcomed.

In a study (Sohail, 2013) of Pakistani first year medical female students, around 80% of females feared facing patients’ sufferings.

With reference to clinical responsibilities related stressors, Nuallong (2010) in a study of clinical level medical students found that among the major stressors reported were transition from pre-clinical to clinical year (31.30%), and preparing patients’ reports (22.50%).

Chang et al.’s study (2012) on burnout and stress in medical students revealed that students were stressed about inability to endure long hours of clinical training, practice and associated responsibilities. The difficulties students experienced with regard to death and dying involved talking to the dying person, dealing with a grieving relative and having to be present during an unanticipated death.

Other studies have reported that caring for sick and dying patients (Wolf, 1994) and being in close contact with seriously ill patients as highly stressful (El-Gilany et al., 2008).

Inability to empathize with patients’ anxiety in coping with their illnesses is often reported by students (Radcliffe & Lester, 2003; Spencer, 2004). This kind of distancing may be a result of professional conduct that medical training teaches, or numbness resulting out of repeated similar exposures, or a result of chronic stress one goes through the whole of medical training.
According to Holm and Aspergen (1999), decline in medical student’s ability to empathize is because of the temporary, fragmented relations they have with patients and also the avoidance of intimacy which medical school environment fosters.

Sometimes not being assigned patient care in itself can be stressful. Students in Radcliffe and Lester’s (2003) study reported that transition to clinical training was stressful. Students mostly felt useless, unable to engage in active patient care because of inadequate knowledge or skills and spending most of the time in year three in waiting for something to occur in ward rather than doing something active

2.1.8.3. Relationship with faculty. Relationship with faculty can be one of the salient factors determining student adjustment in medical school. Strained faculty-teacher relationship in the form of interpersonal conflict, verbal and sexual mistreatment can be stress inducing to the medical students. Harassment in medical education has come to be established as an undeniable fact.

Firth (1986) in her study of stress and psychological morbidity in 318 final year medical students from three British universities found that the category that was felt as most stressful by a large portion of students, and leading to strong feelings in students was "relationship with consultants," Under this, students described instances where they were humiliated in front of their peer.

The strength of feeling expressed in this category along with the category “feeling that medical profession had failed” seemed to suggest that students felt that their teachers were less than perfect and the possibility that they may emulate them and repeat the pattern in future.

In one of the surveys (Nora et al., 2002) of 14 medical schools in the United States, it was seen that gender discrimination and sexual harassment were reported by both male and female students posted in all specialties. Female students reported significantly higher gender discrimination and sexual harassment than males. Other studies also have reported of medical students admitting of very negative experiences during clinical postings, specifically in certain departments (For e.g., Field & Lennox 1996).
Faculties are known to arouse negative reaction in students by subjecting them to situations such as humiliating them in front of other students, shouting at them, expecting them to have knowledge of things they have not been taught (Radcliffe & Lester, 2003; Lempp & Seale, 2004). Such experiences can result in students feeling in what Kay (1990) termed as "traumatic de-idealization", where in students feel their self-esteem is damaged and this lowers their ideals about teachers and the medical profession as a career.

A longitudinal study (Frank, Carrera, Stratton, Bickel, & Nora, 2006) set forth to examine experiences of harassment and belittlement in medical students from 16 US medical schools. There were 2,884 students who were assessed at freshman orientation, ward entry and in senior year of study. In total, 2316 students responded. In senior students, 42% had felt harassed and 84% felt belittled. Harassment and belittlement was caused by residents, pre-clinical and clinical professors, and patients. Students who felt harassed and belittled were more stressed depressed and suicidal. They also were more likely to consume alcohol and indulge in binge drinking. Perception of negative attitudes from faculty such as not being cared by them led to higher reporting of harassment and belittlement. Confidence in career decisions was negatively related with harassment and belittlement. Lower sense of control and lesser life satisfaction was associated with higher harassment and belittlement. Good mentorship was negatively associated with experiences of harassment and belittlement.

In one of the studies that examined (Wolf, Scurria, & Webster, 1998) anxiety, depression, loneliness, social support and perceived mistreatment over the four years of undergraduate medical education, perceived mistreatment of psychological nature was persistent throughout the four years of study. Also, higher mistreatment was associated with higher depression and anxiety at freshman orientation and end of first year of study.

Another study examined the relation between verbal abuse and confidence in clinical skills by analysing the data (13,168 respondents) from the Association of American medical colleges Medical School Graduation Questionnaire in 1996 (Schuchert, 1998).
It was observed that 38.3% of the medical students admitted of having experienced verbal abuse during their study period. Verbal abuse was seen to be associated with low levels of clinical confidence. This relationship existed regardless of the age, sex, race and ability.

Nagata-Kobayashi et al. (2006) studied prevalence of medical student abuse in 304 fifth and final year medical students hailing from six Japanese medical schools doing their clinical clerkships. Nearly 68.5% of these students reported abuse. Verbal abuse was the commonly reported abuse. Female students reported of greater sexual harassment than male students. In around 45% of the students, abuse occurred by faculty. Abuse was frequent during surgery postings, followed by internal medicine and anesthesia postings. Only 8.5% of students reported about their abuse to higher authorities. Around 27.1% of students had anger in response to mistreatment.

An open ended survey question elicited most common comments about gender discrimination. Other comments were about suggestions to improve clerkship experience. Thirteen students wrote qualitative comments about disregard from teaching physicians that extremely negatively affected students’ motivation to study.

Regardless of whether the medical training followed a PBL approach or non-PBL approach, the students are likely to perceive lack of encouragement and feedback from teachers as frequently encountered stressor as revealed by a study that compared stressors of medical students enrolled in PBL and non-PBL medical programmes (Lewis et al., 2009).

Similar reports of insufficient feedback from faculty as a highly rated stress also came about from a study in Sweden that compared medical and business students (Dahiln et al., 2011).

Rautio, Sunnari, Nuutinen, and Laitala (2005) conducted a study on student mistreatment comparing medical students with students from four other subject streams. A total of 665 students took part in the study. Around 50% of the students reported of being mistreated. Common sources of mistreatment were humiliation and contempt (40%) followed by negative remarks (34%), verbal abuse (23%), sexual harassment and other gender based mistreatment (17%), and finally task given as punishment (13%).
Medical students reported all forms of mistreatment more than students of Humanities, Education, Science and Technology. Females reported more mistreatment than males and mistreatment disturbed them more than males. Staffs including professors and lecturers were seen to mistreat females more than males.

Another comparative study (El-Gilany et al., 2008) that examined stress, anxiety and depression in medical and law students at Egypt, found that inconsiderate and insensitive faculty (4% respectively) were the most commonly cited stressors among medical students.

Studies elsewhere also reported of stressors of poor student and faculty relationship, problems of bad treatment, unfairness, criticism and a need for improvement in this relationship (Johari & Hassim, 2009; Shaikh et al., 2004).

Considering the lacunae of studies on mistreatment of medical students in Pakistan, Shoukat et al. in 2010 designed a study to examine the prevalence of mistreatment in its various forms and psychological morbidity at a Pakistani medical school.

Out of the 232 students, a considerable proportion of students reported of mistreatment (62.5%). Males reported significantly more mistreatment than females. Mistreatment was significantly associated with stress, gender, year of study and substance use. Around 67.5% of students admitted to have been subjected to mistreatment by clinical faculty. The most common kinds of mistreatment from clinical faculty were: discrimination based on race or religion, belittlement or humiliation, being shouted or yelled at, being given extra work as punishment, being threatened to be failed or graded unfairly, sexual harassment, discrimination based on gender and hostile or shocking comments about career in future. On the other hand, ill treatment from the residents’ side was to take credit for student’s work. Also, higher the year of study, more was the mistreatment felt. The reason the authors cite for the high rate of mistreatment clinical faculty indulge in is because of the high authority that is assigned to them with little check that increases their chances of misusing their authority.

The evidence for faculty as a source of mistreatment and other stresses in the lives of medical students still continues to mount in the present day context, despite the growing awareness of its effects on student well-being.
A meta-analysis and systematic review (Fnais et al., 2014) conducted on harassment and belittlement experiences included 57 cross-sectional studies and 2 cohort studies. The findings revealed that around 59.4% of medical students had reported at least one form of harassment and discrimination in their training period. Verbal abuse (63%) was the most common form of mistreatment. Faculty were the most common source of harassment and discrimination (71.2%) followed by patients (34.4%) and patients’ families (21.9%).

Oser et al. (2014) examined frequency and negative effect of medical student mistreatment based on specialty choice using a longitudinal design. Authors assessed medical students from one medical college at the end of third year during 2003 to 2010. Among the 807 students who participated, mistreatment based on specialty choice was a common experience. The common types of mistreatment were direct negative comments or overhearing negative comments about choice of specialty and being made to feel that they had to be less honest about specialty choice to be treated fairly. Frequency of mistreatment and the resulting negative impact strongly correlated with each other. Mistreatment was seen in specific clerkships than in primary care. Mistreatment occurred most often in surgery postings, followed by gynaecology and internal medicine. Major source of mistreatment was from resident physicians. Specialty choice seemed to negatively affect their evaluations and limit their teaching opportunities. Students were likely to reconsider their specialty choice when the theme of mistreatment was related to respect. Strangely, patterns of mistreatment remained consistent over the study period in spite of several new professional policies and actions.

A study in Germany (Gágyor et al., 2012) investigated frequency of negative experiences and its perceived negative effect in an online survey of medical students in one of the medical Universities of Germany. Among the 391 students who took part in the study, 56% reported of inadequate appreciation, while 51% reported of experience of rivalry and 34% had undergone verbal abuse. Verbal abuse was felt severely negative by 59% of students, while rivalry was perceived as severe in negative impact by 46% of students. Lack of appreciation was felt as severe negative experience by 32% of students. Female students were more aggrieved by negative experiences as compared to male students.
Mavis, Lipscomb, and Rappley (2014) in an article reviewed national mistreatment data collected from Association of American Medical Colleges’ Graduate Questionnaire (GQ) collected from 2000 to 2012. From 2000 to 2011, percentage of students reporting mistreatment ranged from 12% to 20%. Between the same periods, when the screening question asking about mistreatment was included, 82% to 91% of students being mistreated reported of having been publicly belittled or humiliated. When the exclusive screening question about mistreatment was removed in 2012, around 34% of students reported being publicly humiliated.

Irrespective of the screening question used, the most common form of mistreatment experienced was public humiliation. Other often experienced mistreatments between 2000 and 2011 were sexist remarks, having to perform personal services, lower grades or evaluations owing to gender. In 2012 also, same experiences in same order were reported except for an additional experience of racially or ethnically offensive remarks.

In 2012 GQ, the frequent sources of mistreatment were clinical faculty, residents or interns followed by nurses. The same groups were reported to be the frequent sources of mistreatment between 2000 and 2011, though the magnitude of reporting differed because of the use of screening question. Nearly, one third of students experiencing mistreatment reported these incidents to higher authority. Among the students who did not report, most either felt that incident was not serious enough to be reported or felt reporting could turn things against them. Among the 2012 respondents, 37% felt that reporting incidents of mistreatment would lead to any effective measures and 22% reported of having resolved the issue by themselves.

Al-Kadri et al. (2014) explored the impact of clinical supervision and assessment characteristics on study strategies used during clinical rotations by medical students studying at a medical college in Saudi Arabia. Semi-structured focus groups interviews and individual interviews were conducted on clinical supervisors. Among the themes identified was the role of clinical supervision which when constructive, positively affected students’ learning strategies.
Disorganized clinical supervision made students frustrated and lose interest in clinical training, which in turn had a negative effect on studies. Supervisors were perceived as a source of anxiety in instance such as when they over-estimated students’ clinical abilities and asked them to do tasks that were beyond curriculum. This led to more stress when it occurred in front of patients or peer. Another source of stress was unavailability of supervisors at work place and students had to depend on them for their final grades. Students felt frustrated being assessed by faculty who were not familiar with their performance. Disorganized reading of students was partly an outcome of trying to rehearse tasks and questions on speculation in order to avoid stress if at all supervisors asked them to perform on these things.

Around 48% of males in Sohail’s (2013) study on Pakistani first year medical students reported that they were distressed due to faculty’s discouraging attitude and in depth interviews revealed expectations from faculty figured as a daily stressor. Further, in depth interviews, all students wanted teachers to be flexible in their teaching and wanted them to spend more time on difficult concepts.

Though faculty support in medical education is over emphasized in literature, in Nuallaong’s study 2010) of clinical level medical students, 41.9% wouldn’t want to consult a faculty for help and 12.12% believed that consulting a faculty would affect their future career life.

Medical students in Huebner, Royer, and Moore’s study (1981) found inadequate feedback regarding performance from faculty to be stressful.

Relationship problems with teachers have been reported to be stress inducing factors in two Indian studies (Supe, 1998; Mohanty et al., 2011). Interpersonal problems with faculty were also reported by medical students in another study of Indian medical students (Mane et al., 2011).

Pai et al.’s (2014) study about perception of learning environment of medical students in a south Indian medical college showed that in general students felt faculty were knowledgeable, focused and quick in giving student feedback. However, students in first year opined that faculty attitude was authoritarian and traditional and teacher centered. Authors opine that this opinion could be because students in first year have more directed learning in didactic set up rather than independent learning.
In Abraham et al.’s study (2009) of stress among first year Malaysian students enrolled in Melaka Manipal Medical College, India, a small number of students reported difficulty in approaching the faculty. The authors opine that considering that only a small number of students felt difficulty in following the teaching language and difficulty in approaching the faculty, demonstrated a strong faculty-student bonding at this college.

Kate, Kulkarni, Shetty, Deshmukh, and Moghe’s (2010) study on stress and coping strategies of first year Indian medical students revealed that a majority of students from first year and second year felt the need for guidance from teachers to plan about their future career.

2.1.8.4. Personal life issues. Medical students often report of having to compromise with personal and social aspects of their lives. It has been reported that, on an average medical students expend 29% more time studying than students enrolled in other courses (Helmers et al., 1997). Insufficient amount of time for relaxation and recreational activities is a glaring problem (Wolf, 1994; Morrison, 2001; Aketekin et al., 2001; Ball & Bax, 2002).

Stewart, Lam, Betson et al. in 1999 revealed that among second year medical students, inadequate opportunities for social and recreational activities accounted for higher stress levels, less academic success and increased depressive symptoms.

Firth (1986) in her study of stress and psychological morbidity in 318 final year medical students from three British universities found that one of the categories felt as frequently stressful by students was concerned with the effects of medical training on important personal aspects of their life such as relationship and finances. Poor interpersonal relationships as a stressor were also reported by medical students in another study (Huebner et al., 1981).

A study (Abdulghani, 2008) that examined stress and depression among male medical students in a Saudi Arabian medical school found that non conducive home environment was among the highly rated stressors.
A number of interpersonal and intrapersonal sources of stress were reported by a cross-sectional study (Dinh Do & Tasanapradit, 2008) of stress in Vietnamese medical students. The interpersonal sources of stress experienced were, having to work with not so familiar people (62.7%), followed by change in social activities (51.3%), troubles in finding new friends (36.8%), problems with parents (26.5%) and conflict with roommates. The intrapersonal sources of stress were having to take up new responsibilities (88.6%), changing sleep pattern (76.1%), eating habits (70.7%), and decline in physical health (60.1%). Also, majority of students (64.1%) found difficulty in speaking in public and 47.9% of students admitted that they violated minor laws such as the traffic rules.

Sherina et al. (2004) in a study of Malaysian medical students found that some of the psychological stress symptoms they experienced were related to their personal lives. Majority of students did not feel reasonably happy (78.8%) and had sleeping problems when they were worried (71.0%). Other concerns were feeling constantly under strain (38.9%), inability to concentrate (27.5%), inability to enjoy normal activities (27.3%) and loss of self-confidence (27.0%).

In another study (Johari & Hassim, 2009) of Malaysian medical students from three universities impaired relationship with parents, friends, siblings, partner and teachers were seen to be associated with stress. Relationship of stress was stronger with problems with parents and peers.

Problems with peers also figured as one of the common stressors in other studies as well (For e.g., El-Gilany et al; Amr et al., 2008).

A comparative study (Al-Dabal et al., 2010) of female medical students and female non-medical students in Saudi Arabia, reported of medical students as having more social problems than non-medical students. Medical students also reported more of negative changes in life-style such as less social interactions with family and friends, lack of sleep, reduced health care, less time for hobbies and recreational activities, and lack of physical exercise.

In a cross-sectional study of medical undergraduates in Pakistan, it was seen that stressed cases were associated with occurrence of psychosocial concerns. The most common sources of psychosocial concerns were high parental expectations, loneliness and
sleeping difficulties. In another Pakistani study, students demanded better recreational facilities. Sreeramareddy et al. (2007) in a study of medical students at Nepal (where majority of the students were Indians), found that the frequent sources of personal stress were, concerns about food in the mess, high expectations from parents, poor avenues of entertainment, and lack of time for leisure.

Among them, the stresses that were rated as most stressful were, concerns about food in the mess, high expectations from parents, and poor avenues of entertainment.

The study had also hypothesized that if parents of students were medical doctors, the students can avail good parental advice on managing the stresses in the course. However, in contrast to the expected, higher levels of psychological morbidity was observed in students of parents who were doctors. Authors opine that this is probably because of the high expectations from parents that appeared as a severe and significant source of personal stress. In Asian cultures like that of India, not only parents still exercise some control on their children’s choice of career but also in most cases financially support their wards’ education. Hence, it is natural they set high expectations with respect to their children’s career which may enhance stress of the students.

Financial problems also are reported to be of a major concern for medical students as they have to think about paying off the loans once they pass out (Wolf, 1994). Ross et al. (2006) conducted a study on medical undergraduates to determine relationships between student debt, mental health and academic performance. It was seen that students from lower socio-economic status and postgraduate students had greater debts. Though there was no direct relationship between debt, socio-economic status or psychological morbidity as measured by GHQ, a section of students (37.7%) had higher debt, performed poor in their class and reported that worrying about debt affected their studies.

A multi-centre cross-sectional study (Yusoff, et al., 2011) involving four Malaysian public universities which studied stress and coping strategies in medical students also examined whether parental income was related to student distress. It was observed that students whose parents had income between RM 5001 to RM 20000 were significantly at 5 to 13 times higher risk of developing psychological distress compared to those medical students whose parents had income less than RM 700. Those students
whose parents had an income less than RM 700, RM 701 to RM 5000 and more than RM 20000 were at an equal risk of developing psychological distress.

The authors explained reasons for the same opining that lower socio-economic status people are used to life difficulties and hence were less distressed. While people of highest socio-economic status were not distressed as they were able to fulfil their needs. However, those in the middle income group (RM 5001 to RM 2000) were struggling to fulfil their and others expectations.

There are a host of other studies which have also documented financial problems to be a stressor for medical students (Quyen & Tasanapradit, 2008; Sharif et al., 2004; Johari & Hassim, 2003; Amr et al., 2008; Al-Dubai et al., 2011).

Few studies have examined personal stresses in Indian medical students. In a study done at Seth G.S. Medical College, (Supe, 1998) India, problems related to structural factors such as hostel and canteen facilities, environmental situations, noise in classroom and library were more in students of 2nd and 3rd year students as compared to 1st year students. Emotional or relation 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) of 1st 2nd and 3rd year medical students, it was seen that the social and emotional stressors such as self-expectations, parental expectations, classroom relationships with peers and teachers in 1st and 2nd MBBS students were significantly higher when compared to the 3rd MBBS.

In Shah et al.’s (2009) study of Indian medical students studying at a medical college in Jamnagar, India, stress was more in students who resided at hostels than at home. Stress was more in students coming from higher socio-economic status than lower socio-economic status. Also, students from higher socio-economic status had more stress because of class mates, teachers and course material. Interestingly, local students had more stress and difficulty in office relationships that involved getting certificates and scholarships than students residing at hostels.
Reduced social interactions and leisure time were among the common stressors reported by first year medical students in a study done by Sharma et al. (2014) at a medical college in Jaipur, India.

Considering the professional responsibility that students are likely to have in future in educating patients about healthy life style, Majra (2013) was interested to know whether the medical students were likely to practice what they would preach and hence examined whether educational culture in medical schools enhanced the health promoting behaviours of students during their stay in medical college.

Behavioural risk factors were tested among final year medical students in two South Indian medical colleges. An overall increase in health-related risk behaviours and decline in health-promoting behaviours were observed among students during their stay in medical college. Apart from the rise in the numbers of students who smoked and consumed alcohol, a significant decline could be noted in percentage of students (from 43.2% to 24.4%) with regard to physical activity and exercise.

Compared to males, less number of females were doing physical activity when they started medical college. Only 5% had started any exercise while in medical college, 59% had stopped physical activity and around 35% had a decline in their physical activity. The reason given for stopping physical activity were long working hours resulting in lack of time for other activities. It was interesting to note that, all students were indulging in junk food. Frequency of eating junk food was more and food habits turned irregular since students initiated medical college. Poor food quality, less food choices and inconvenient mess timings were cited as reasons for adapting unhealthy eating habits.

This study clearly showed that medical students hardly followed health life style during their education and hence there is a need to make them adhere to healthy habits so that it not only enhances their health but also adds to their professional accountability.

In Shah, Purohit, Shah, and Shah’s (2014) study on first year medical students studying at an Indian medical college, the main personal issues related stress were staying alone at hostel, adjusting to new place, roommates, ragging, initiating new friendships and enhanced responsibility.
Feeling homesick was one of the major stress causing factors reported by first year medical students in Patil et al.’s (2014) study.

In a study (Abirami et al., 2012) done at a South Indian medical college personal factors such as loneliness, health and financial issues did not contribute to distress in medical students as compared to academic factors.

Apart from academic stressors, Reang and Bhattacharjya’s (2013) study on Indian undergraduate medical students of various years revealed other stressors such as lack of time for recreation and having to be away from home and these were more so in first year medical students.

In a cross-sectional study (Brahmbhatt et al., 2013) of first and second year medical students in one of the colleges at coastal Karnataka, the predominant personal issue stressors reported were high parental expectations, inadequate entertainment resources in college and quality of food in mess. Logistic regression analysis revealed less time for recreation, and loneliness as predictors of stress. Also, exercise was seen to be negatively related to stress.

In an Indian study (Mane et al., 2011) of various professional courses, the personal issues stress specific to medical students were interpersonal problems with peer, parents, environmental factors and insomnia.

In Nandi et al.’s (2012) study of medical students studying in various semesters at a teaching hospital of Kolkata, students politics as a disturbing factor was reported by a majority of students (80%). Around 30% students reported of financial constraints. Dissatisfaction with social and recreational activities was reported by 60% of students. Majority of students were also unhappy with hostel canteen and library facilities. Perceptions of these stressors were in somewhat same range in all semesters.

Hectic life style figured as a measure stressor in the study conducted by Basnet et al. (2012) on depression and stressors in Nepalese medical students.

Abraham et al.’s study (2009) on first year Malaysian students enrolled in Melaka Manipal Medical College, India reported that among the non-academic sources of stress, around 56.6% of students reported of having no time for recreation, while 26.6% suffered
from home-sickness. Around 25.8% of students felt that they had relationship problems (girlfriend/boyfriend issues) and 22.5% reported of having health problems. The rest of the prominent problems reported were accommodation (20.8%), room-mates (15.8%), financial issues (14.16%) and making friends (11.6%).

With reference to personal care, Kate et al.’s (2010) study on stress and coping strategies of first year Indian medical students revealed that students commonly reported about lack of time and insufficient sleep and complained about food in mess. In a comparative study (Waghachavare et al., 2013) of stress among medical dental and engineering students a higher number of medical students were affected by health and lifestyle factors in comparison to the dental and engineering students.

A Pakistani study (Sohail, 2013) of first year medical students showed quite a different pattern of sources of stress, where in 85% males and 97% females reported law and order situation and security as predominant source of stress, while corruption in the country was perceived as stressor by 90% of male and female students. However, students appreciated the low fees in their government medical colleges which reduced their economic burden.

Final year Malaysian medical students in a study (Siraj et al., 2014) reported certain major stressors to be arising from group activity (57%), intrapersonal and interpersonal stress (56%), and social domain related stress (49%).

2.1.8.5. Professional identity. Developing a professional demeanour involves acquiring attitudes, values, ethics, behaviours and lifestyles of physicians from the beginning of medical education (Wolf, 1994). Professionalism includes being honest, acting with integrity, advocating for the needs of patients, reducing barriers to equitable health care, and adhering to an ethical code of conduct (Drybe et al., 2011). How well these behaviours are learned determines the development of a student’s professional identity. Some of the concerns that medical students can have with regard to their professional identity are confidence in one’s competence to be a good professional student, worries, lack of confidence about one’s future and doubts about one’s career decision.
Dahlin et al. (2005) in their study of Swedish medical students found that students in third and sixth year had greater worries about their ability to endure long hours in future and had less confidence in their strength to competently perform clinical responsibilities in future. Also, this stress related to future endurance was more in female students. In the same study, it was seen that role conflicts and an increasing degree of cynicism was seen to develop throughout first, third and sixth year of the medical course. Even if not significant, around a quarter of students felt that their training was not adequately preparing them for the profession, highlighting the growing concerns of professional identity towards the end of the course.

In a subsequent study, Dahlin, Joneberg, and Runeson (2007) of psychological morbidity and burnout in medical students entering into clinical training, it was seen that worries about long working hours in future and confidence in one’s own competence in future career was seen to increase from first to third year.

Both the above findings indicate that as students enter and go through clinical training the concerns regarding their professional identity seems to increase. Development of a cynical attitude and dissatisfaction with way medical school prepares one for future career can enhance professional identity stress.

Radcliffe and Lester (2003) conducted an interview based study on 21 final year medical students, where they focused on eliciting causes of stress as perceived by medical students. Students found that developing and presenting an image of confident and competent future professional, interaction with staff, colleague and patients were stressful.

Following the dress code and having a presentable persona in clinical training were also stressful. A considerable few felt that learning to think and behave like a doctor through role modelling was difficult. Particularly, socialization by teacher through humiliation and embarrassment made relations with senior teachers stressful.

In a study of medical students at Turkey (Aktekin et al., 2001) significant rise in worry about future was seen in students from 1st year to 2nd year. Regression analysis also showed that worrying about future was strongly associated with psychological morbidity, depression and trait anxiety.
In Sohail’s (2013) study of Pakistani first year medical students, 85% of females felt that future held lack of well-paying job and health facilities (85%).

In view of the lack of studies examining relationship between professionalism and burnout, Drybe et al. (2010) carried out a cross-sectional study of 268 medical students studying in seven U.S. Medical colleges. The Maslach Burnout Inventory (MBI), the PRIME-MD depression screening instrument, and the SF-8 quality of life (QOL) assessment tool and items inquiring about professional conduct and attitudes representative of professionalism were administered.

The most commonly reported unprofessional behaviour was stating a physical examination finding as normal when it was actually not carried out.

Given the findings of the study, the authors are of the opinion that the learning climate of the medical school in some ways may be encouraging dishonesty as students frequently commits dishonest behaviours, despite knowing that they are wrong. In the context of the burned out students having less altruistic views regarding physicians’ responsibility to society, the authors speculate the possibility of this indifference found in medical student population as having important implications for physicians in actual practice. If this view of students continues to sustain as physicians, then physicians initiative to promote public health, and advocate for underserved patients will be questionable. However, the authors are careful to conclude that this can be only ascertained by extending the research to include practicing physicians.

Ability to empathize is an important aspect of professional conduct and is known to be associated with indices of well-being. Thomas et al. (2007) in a multicenter study of 1098 U.S medical students examined whether lower levels of empathy are associated with personal and professional distress and higher level of well-being related to higher levels of empathy. Instruments measuring empathy, burnout, depressive symptoms and quality of life were administered to the students. Burnout domain of depersonalization was seen to be negatively correlated with empathy, regardless of gender, and emotional exhaustion was negatively related to empathy in men. Depressive symptoms were seen to be associated with lower levels of empathy in women. Irrespective of gender, sense of personal accomplishment was positively related to empathy. Also, higher quality of life in certain domains was seen to be related to higher empathy. Multivariate analyses
examining measures of distress and well-being simultaneously revealed that both burn out (negatively) and well-being (positively) independently correlated with student empathy. Authors opine that empathy being part of professionalism may be enhanced by efforts to reduce student distress and promote student well-being.

Neumann et al. (2011) reviewed studies on medical students and residents change in empathy published from 1990 to 2010. Out of the 18 studies meeting the inclusion criteria, 11 studies were on medical students. Most of the studies on medical students showed a decline in empathy.

Some studies indicated that students getting into patient oriented specialty had higher empathy than those getting into patient remote specialty. Ten out of eleven studies on medical students revealed that student empathy decreased during third year of study, which is clinical phase of training. Distress factors of burnout, low well-being, poor quality of life and depression had significant influence on medical students’ empathy. Since distress seemed to be the main factor reported by many studies for decline in empathy, studies explored reasons behind such distress. The hidden curriculum seemed to be the common factor running through many studies discussing medical students’ distress.

The factors part of hidden curriculum were mistreatment by faculty and mentors, decline in humane values, idealism that were present at beginning of the medical course when facing clinical reality, reduced support from family and peers. High workload with reduced time for relaxation and sleep, less stay of patients leading to fragmented patient-clinician contact reducing opportunity to learn from patients, unstructured learning atmosphere, few bedside interactions, being treated as immature persons and media idealization of medical profession fostering unrealistic expectations of how physicians should behave were other hidden curriculum factors that contributed to student distress, which in turn led to decline in empathy.

The way the faculty influence students has an important impact in the development of their professional identity. Wilkes and Raven’s (2002) theorize that faculty socially influence students in their day to day interaction through the use of different power based strategies. Since, students are at the lower end of the power hierarchy, they are susceptible to social influences which, if used properly can lead to
development of compassion, but if used improperly can deter their professional development. They opine that because of their uncertainty, inexperience, and fear of poor evaluation, or out of respect and desire to develop a good relationship with faculty students may emulate professional and sometimes unprofessional behaviours demonstrated by faculty. These factors that motivate students to learn certain unprofessional behaviours such as cynical attitudes, disrespect and lack of empathy towards patients with or without desire may pose to be stressful to students.

Considering the importance of professionalism in medical students and the even more important role of effective faculty role modelling of professional behaviours, Hendelman and Byszewski (2014) examined lapses of professionalism as seen by medical students in four year MD curriculum. Around 64% of students reported that they had witnessed a professional lapse. In the pre-clerkship phase, the lapses were committed mostly by students involving arrogance, impairment and lack of cultural or religious sensitivity. At the clerkship phase involving clinical situations, students reported of lapses occurring primarily by faculty involving behaviours such as arrogance, confidentiality breach, and lack of cultural or religious sensitivity. They also reported of impairment mostly occurring from the students’ side. Authors emphasize the importance of faculty development and effective role modelling from the faculty in order to shape medical students’ professional identity in the right direction.

Firth in her study (1986) found that student feelings of medical profession having failed because of experiences such as feeling of incompetence, embarrassing or distressing patients often involved a senior faculty. This coupled with strong negative feelings aroused in relationships with faculty suggested that students felt that their teachers were not perfect beings and they may emulate the same pattern themselves in future.

Effective positive role modelling of professional behaviours by faculty is the need of the hour. This need is also echoed as a major requirement by the medical students (Byszewski, Hendelman, McGuinty, & Moineau, 2012). Therefore, faculty need to be sensitized about overcoming their personal deficits and concentrating on efforts towards imparting good professional behaviours.
2.1.9. Burnout in Medical Students

Burnout is the extreme stress experience pertaining to workplace situations. Maslach and Jackson (1981) conceptualize burnout as a syndrome of emotional exhaustion and cynicism that occurs frequently among individuals who do ‘people-work’ of some kind. It involves emotional exhaustion, depersonalization or cynical attitudes, and impaired personal accomplishment. Burnout, syndrome has been observed among residents and physicians. Lately, this concept has been applied to the medical student context as well, because medical students have to involve themselves in clinical work as they progress through training. A surge of interest in studying burnout in undergraduate medical students began after a systematic review of 40 studies (Dyrbye et al., 2006) done on depression, anxiety and burn out in US and Canadian medical students between 1980 and 2005 reported lack of burn out studies in undergraduate medical students.

Subsequent to this, one of the first studies on burnout in medical students was carried out by Dyrbye et al. in 2006. They studied the prevalence of burnout and the effects of personal life events on burnout in 545 medical students studying in three medical schools.

Burnout was seen in 45% of medical students. The study found that prevalence of burnout rose as students progressed through study years despite, students having higher personal accomplishment. Among final year medical students, burnout stood out as the salient measure of distress compared to depression and at-risk alcohol use. Negative personal life events experienced by students in the past 12 months were strongly related to burnout. Specifically, experiencing a major illness in the past 12 months was strongly related to burnout.

Oliva Costa, Santos, Abreu Santos, Melo and Andrade (2012) using a cross sectional design assessed the prevalence of burnout (by administering Maslach Burnout Inventory) and its associated factors among Brazilian medical students. A 10.3% prevalence of burnout was observed. Burnout was higher in those students who lacked confidence in their clinical skills, who felt uncomfortable with course activities, derived no pleasure from their studies, those who had thoughts of dropping out of the course and were dissatisfied with teaching strategies. Though, burnout did not vary much according to the course years, it was found to
be higher when students entered clinical training. With regard to personal factors burnout was associated with low expectations of the future.

Burnout is an important concern to take note of, as it can lead to unprofessional conduct and compromised patient care. A study (Dyrbye et al., 2010) examined relation between burnout and professionalism among medical students from seven US medical schools. Findings revealed that burned out students were more likely to engage in dishonesty and cheating such as copying from a hospital sheet or from a classmate in a closed examination, and stating a physical examination finding as normal when not having conducted it. The likelihood of committing one or more unprofessional behaviour was more in students with burnout than students without burnout. Burned out students held lesser altruistic views with regard to physician’s responsibility to society. Also, they were undesirous of providing care for the medically underserved.

Items of professional conduct and physician’s responsibility to society were more associated with burnout than items of depression and mental/physical quality of life. This indicates that unprofessional behaviours and students attitudes were particularly related to professional distress than personal mental distress.

Burn out is also found to be related to frequent thoughts of quitting medical school (Dyrbye et al., 2010).

Brazeau, Schroeder, Rovi, and Boyd, (2010) examined the relation between burnout, empathy and professional climate in fourth year medical students. Higher burnout scores were associated with lesser empathy in students and lower professional climate scores as observed in fellow medical students, resident and faculty.

In a study (Paro et al., 2014), among many other things, medical students’ empathy and its relation to quality of life and burn out was examined.

The study was multi centric involving 22 medical schools and students’ population of thousand three fifty. Empathic concern and personal distress was higher in females than males. Both physical and psychological quality was lower in females than males. On the burn out scale, females experienced higher emotional exhaustion and lower depersonalization than male students. Final year medial students experienced higher
emotional exhaustion, depersonalization and personal accomplishment. Depersonalizing experiences were related to lower empathy and perspective taking. Feelings of personal accomplishment were associated with lower personal distress and better perspective taking.

Chang et al. (2012) set out to examine stress prevalence, depression and burnout and support resources used by 336 medical students in reducing the psychological distress. Among the questionnaires used were modified Maslach Burnout Inventory Human Services Survey (MBI-HSS), PRIMEMD depression screening survey, and Perceived Medical School Stress Scale. Around 55% of students scored in the high burnout range in all the three subscales of inventory measuring burnout.

A study (Cecil et al., 2014) investigated health behaviours that predicted burnout in medical students. Pertaining to the subscales of burnout measure, around 55% of students had high emotional exhaustion, while 34% of students reported high levels of depersonalization and 46.6% of students had low levels of personal accomplishment. Regression analysis revealed that lower emotional expression occurred more in students in third year. Less physical activity, being an ex-smoker (compared to having not smoked) significantly predicted higher emotional expression. Higher depersonalization was significantly predicted by male gender, final study year and institution. Lower personal accomplishment was significantly predicted by male gender and low physical activity. Being in third, fourth or fifth year of study, lower physical activity and higher alcohol binge drinking predicted higher personal accomplishment.

Student mistreatment is also associated with burnout. Cook, Arora, Rasinski, Curlin, and Yoon (2014) in 2011 examined the prevalence of mistreatment in medical students and relation to burnout in a sample of 605 third year medical students studying in 24 different medical schools. Among the students studied, around 64% reported of having experienced at least one instance of being mistreated by faculty and 76% of students reported such at least one mistreatment event involving residents. A small number of students reported recurrent mistreatment, 10% by faculty and 13% by residents. Recurrent mistreatment by both faculty and residents was associated with higher burnout compared to no or infrequent mistreatment.
Experience of burnout can be offset by psychosocial assets such as spirituality. Wachholtz and Rogoff (2013) examined the protective role spirituality may have in the burnout experience of 259 medical students at a Northeastern Medical school in The U.S. The students were administered scales measuring spirituality, burnout, psychological distress, coping, and general happiness. Correlation analyses showed that spirituality was negatively related to psychological distress maladaptive coping and burnout, whereas life satisfaction was positively related to spirituality.

Burnout was seen to be significant and have larger positive correlations with anxiety ($r = .696; p<.01$), depression, ($r = .676; p<.01$), and maladaptive coping ($r = .666; p<.01$). Burnout was seen to be negatively related to life satisfaction ($r = -.600; p<.01$), spiritual life ($r = -.621; p<.01$), and daily spiritual experiences ($r = -.144; p<.05$).

However, the four years of study did not differ on anxiety, depression, life satisfaction, most of coping methods and spiritual parameters. Students during their clinical phase (year 3 and 4) had more burnout than students in non-clinical years (year 1 and 2). Women were more likely to be burned out and anxious.

Regression analyses revealed that spirituality was associated with less burnout irrespective of demographics, mental health status, life satisfaction and maladaptive coping. Overall, the study demonstrated that spirituality was associated with better life satisfaction and less burnout and psychological distress.

Burnout can also begin prior to students taking on active clinical responsibilities as they enter into clinical phase of training. In a cross-sectional study (Mazurkiewicz, Korenstein, Fallar, & Ripp, 2012) of 86 pre-clinical medical students, 71% were found have burnout. Burnout students were significantly more likely to have less sleep, feel less control over daily routine and feel clinically less competent to become an intern.

Researchers have also speculated whether burnout has its origin prior to medical school. In a study (Fang, Young, Shah, Moutier, & Zisook, 2012) of burnout and depression in premedical and non-premedical students, it was observed that premedical students had greater depression burnout related emotional exhaustion than non-premedical students. Burnout tended to be significant in premedical students even after controlling for depression. Findings like this point out towards need to look for and remediate burnout even before students enter medical training.
2.1.10. Mental Distress

In addition to stress, many studies have documented other indicators of distress ranging from psychological morbidity to depressive, anxiety symptoms and substance abuse in medical students.

One of the earliest studies on medical students’ distress was the Johns Hopkins Precursors Study (Thomas, 1976) where in 1337 medical students were followed from 1947 to 1963. It was seen that 49 students of the subjects died prematurely and 17 committed suicide. The number of people suffering from mental illness was 54. These finding indicate how stress of medical school culminated in mental morbidity and end of life for some students.

Another earlier study (Firth, 1986) on stress and psychological disturbances in fourth year medical students from three universities reported a 31.2% prevalence of emotional disturbance (as assessed by 12 item GHQ), and this prevalence was higher than other groups in the general population.

A study (Dickstein, Stephenson, & Hinz, 1990) conducted on 217 medical students, specifically requesting psychiatric consultation over a period of eight years, revealed that as per DSM III diagnostic criteria, 32% had Adjustment Disorder, 23% had Mood Disorders and 13% had Anxiety Disorders.

Toews, Lockyer, Dobson and Brownell (1993) in a study of stress in medical students, resident and graduate science students at US medical institute reported that these students had higher scores on Symptom Check List 90 Revised as compared to scores of average non-psychiatric population.

In a study (Guthrie et al., 1995) of 9 medical schools in the U.S, 47% of students were found to have mental health or substance related problems. A 5 year longitudinal study (Guthrie et al., 1998) that aimed to examine psychological morbidity and burnout in U.K medical students assessed medical students in their first, fourth and final year of study. The prevalence of psychological morbidity was 36.6%, 30.6% and 21.9% in first, fourth and final year respectively. On GHQ- 12, 18 students were above threshold on all three occasions, 25, on two occasions and 43, on one occasion. Students who were GHQ cases on two or more occasions were more likely to find the medical course stressful.
during the first year. There were no gender differences on GHQ in all years of study. Psychological morbidity in the final year of the course was best predicted by the GHQ-12 score in first year of study. The authors concluded that a small portion of students repeatedly experience psychological distress during their medical training.

Depression and anxiety have been found to be mostly commonly reported in medical student population.

Clark and Zeldow (1998) studied medical students at six times throughout the four years of medical education and reported an overall prevalence of 12% of mild to moderate depression at some time point during medical school. Depression scores as measured by BDI peaked at the end of the second year and were found to remain higher than baseline scores throughout the course of the study. At the peak, nearly 25% students reported of mild to moderate depression. Zoccolillo, Murphy, and Wetzel (1986) also have reported a similar prevalence of depression in the first two years of medical training.

Aketkin et al. (2001) in a study of Turkish medical students found that psychological morbidity (as measured by GHQ) depression and anxiety rose significantly in medical students between the first and second years.

In a cross-sectional study, Dahlin et al. (2005) examined stress and depression in Swedish medical students studying in first, third and six years and found a 12.9% prevalence of depression which was significantly higher than general population. Female students had 16.1% prevalence and male students had 8.1% prevalence. Around 3% of students had a history of suicide attempts.

In a subsequent study done by the same authors (Dahlin et al., 2007), Swedish medical students were examined at first year and followed up to third year of study. At third year, diagnostic interviews were conducted for assessing psychological morbidity. Around 27% of the sample was found to have psychiatric morbidity. In the adjusted analyses depression at first year predicted psychiatric morbidity at third year.

Studies conducted at Arabian countries also have reported prevalence of depression in medical students. One of the studies (Ahmadi, Kamel, Ahmed, Bayoumi, & Moneenum, 2008) conducted at Dubai Medical College for girls, at United Arab Emirates
reported that nearly 23% had scored in moderate range on BDI while 4% had scored in the moderate to severe depression.

Yet, another study (Ahmed, Banu, Al-Fageer, & Al-Suwadi, 2009) conducted on second year medical college students of Dubai Medical College for girls investigated presence of depression and anxiety in students of medicine posted at three primary care centres and hospitals associated with the college. Depression was reported by 28.6% of students and anxiety was reported by 28.7% of students. Depression and anxiety significantly correlated with each other. Second year medical students had higher rates of depression and anxiety than students from other years of study.

In a Malaysian study (Sherina et al., 2004) where in psychological stress symptoms and depression in medical students were measured by GHQ-12 (Goldberg, 1978) and BDI, depression was found to associated with most of the psychological symptoms. Also, students reporting of these symptoms were almost 2 to 3 times more likely to have depression.

Wolf, Faucett, Randall, and Balson (1988) in their study of medical undergraduates of all four years found that depression and anxiety were highest at the end of the first year and lowest at the end of the fourth year. Perceived mistreatment was significantly positively correlated with depression and anxiety at freshman orientation and at the end of the first year.

In a comparative study of medical, economics and physical education students in Turkey (Aktekin et al., 2001) it was found that GHQ, BDI and STAI scores rose significantly from first to second year. With use of differing cut off scores for GHQ, percentage of students scoring above the thresholds were higher in medical stream as compared to economics and physical education stream.

In a multi-site study (Goebert et al., 2009) of depression and suicidal ideation in 2,193 medical students and residents from six colleges in the U.S it was found that based on Centre for Epidemiologic Studies-Depression scale (CES-D) 12% had major depression and 9.2% had mild/moderate depression. Medical students as compared to residents had a higher rate of depression and female students had higher depression. Around 6% had suicidal ideation and this was reported more by medical students.
A study (Givens & Tija, 2002) examined depression and use of mental health services by depressed medical students and barriers to utilization of these services in 194 medical students of first and second year studying in a US Medical College. Twenty-four percent of the medical students were found to be moderately to severely depressed as per BDI criteria. Among the 46 depressed students only ten had used mental health services. Also, of the 46 depressed students, 12 had contemplated suicide during their study period. However, only five of them were undergoing treatment for depression.

Another subsequent study (Tija, Givens, & Shea, 2005), examined factors associated with under treatment of depression in medical students. Among the 322 medical students studied, 15.2% were depressed and 20.4% had suicidal ideation during medical school. However, only 26.5% of the depressed students underwent treatment. Being treated for depression did not vary according to the year of study, completion of psychiatric requirement, race, or depression severity.

In a systematic review of stress studies done on US and Canadian Medical students between 1980 and 2005, stress, depression, anxiety, burnout, and related mental health problems, Dyrbye et al. (2006) reported a high prevalence of depression and anxiety among medical students. The psychological distress was reported to be consistently higher than in the general population and age-matched population.

A Pakistani study (Inam, Saqib, & Alam, 2003) of medical students, found prevalence of anxiety and depression to be 60%. Anxiety and depression was higher in 1st and 2nd year as compared to 3rd and 4th year.

A longitudinal study on prevalence of depression (Quince, Wood, Parker, & Benson, 2012) was carried out in students enrolled in medical course at U.K. A total of 1112 students enrolled in core science group (year 1) and 543 students beginning clinical component (year 4) were followed up annually between 2007 and 2011 and were assessed by depression subscale of Hospital Anxiety and Depression Scale (HADS-D).

In total, 725 core science and 364 clinical students participated in the study. Among core science students prevalence of depression ranged between 5.7% and 10.6%, while, among clinical students prevalence of depression ranged between 2.7% and 8.2%. A small minority of students (18.2% of core science students, and 10.6% of clinical
students) reported of depression at some point, however, majority of them did only on one such occasion. In men approaching the end of clinical studies, depression scores slightly increased. Prevalence of depression did not increase over time.

An interesting (Rosen et al., 2010) study examined the gene-environment interaction in predicting depression and anxiety in 141 first year medical students. Subjects responded to measures of anxiety, depression, hope, and spiritual meaning at three time points in the first year. Buccal samples were taken to genotype each subject at the s/l variant in the promoter region of the serotonin transporter gene (5-HTTLPR). Among the students, 91 were given a measure of recent stressors. It was observed that depression scores increased as student progressed through their first year of medical education. Presence of s/s genotype in promoter region of the 5-HTT gene was related to greater increases in depression, but this was true only in presence of higher number of recent stressors. However, this did not hold good for general stress. In the s/s genotype group, spiritual meaning and hope buffered the genetic susceptibility to stress-related depressive symptoms.

A Chinese study (Sobowale et al., 2014) intended to explore depression and suicidal ideation and examine available mental health services in medical students studying at a medical school in mainland China. A total of 348 second and third year medical students were administered Patient Health questionnaire-9 (PHQ-9). The mean PHQ-9 score was 6.02. Around 13.5% of students experienced moderate depression. Nearly, seven and half percent reported of suicidal ideation. Third year and second year students did not differ on depression and suicidal ideation. Around 30% of students with depression had suicidal ideations. A focus group discussion with selected students revealed a need for wellness curricula in addition to the counselling service already being offered at the medical college.

A nationwide South-Korean study (Roh, Jeon, Kim, Han, & Hahm, 2010) examined depression and related factors in students enrolled in 41 medical schools across South Korea in the year 2006. Among the 14,095 registered students, 7,357 (52.2%) participated in the study. Depression was assessed by the patient-rated version of the Mini International Neuropsychiatric Interview (MINI-PR). Academic functioning, details
and socio-demographic characteristics were also collected. The present, one year and lifetime prevalence of major depressive disorder (MDD) were found to be 2.9%, 6.5%, and 10.3%, respectively. Female gender, lower study years, admission track with exemption from entrance exam, living alone at a lodging facility or a rented room, and financial problems were the major risk factors associated with one year MDD. Academic performance of depressed students was significantly lower than non-depressed students.

In a study in Vanderbilt medical school (Ghodasara, Davidson, Reich, Savoie, & Rodgers, 2011) researchers wanted to examine the prevalence of four predominant kinds of mental disorders in medical students enrolled in first year, second year and third year of medical education. Among 330 invited students, 301 participated. Results indicated that depression and anxiety was higher in Vanderbilt medical students than nonmedical students. The whole population had a mean BDI-II score of 8.74. About 11.6% of students had mild depression, while 9% had severe depression. Female students were more depressed than male students. In comparison to college students and working adults, around 21.4% - 22.7% of male medical students and about 38.7% - 40.5% of female students had clinically significant state anxiety. Around 18.2% - 25.3% of male medical students and about 40.1% - 45.6% of female medical students had clinically significant trait anxiety. Females had higher anxiety scores than males.

With regard to substance abuse, 12% of students reached borderline scores for possible alcohol abuse and very few students (1% or less than 1%) had problem drinking and a possible drug abuse disorder. Also, very few students (1%) were likely to have eating disorders. Doing exercise three times during the week was associated with lesser depression and anxiety, and having mental illness in the family was related to higher scores in anxiety and eating disorder.

Saravanan & Wilks (2014) set out to examine prevalence of depression and anxiety in 358 Malaysian medical students and differences in experiences of and reactions to stressors between depressed and non-depressed students and anxious and non-anxious students. Also, the study aimed to examine how variables differed according to gender, year of training and phase of training (preclinical and clinical). Students were administered, the Student Life Stress Inventory and other scales measuring depression, anxiety and stress.
Results showed that 44% of students had anxiety and 34.9% of students were depressed. Female students had higher anxiety than male students. Anxious students had significantly more frustrations (arising out of failure to accomplish work, daily hassles, and delays in achievement of goals), pressures (owing to deadlines, overwork, and conflicts in interpersonal relations), and changes (rapid and too many changes happening simultaneously) than non-anxious students. Anxious students physiologically experienced higher stuttering, trembling, rapid movements, fear, anxiety, worry, and sadness as compared to non-anxious students.

Depressed medical students when compared to non-depressed medical students were seen to experience significantly higher number of stressors due to frustration and many changes happening simultaneously. Depressed and non-depressed medical students were not seen to significantly differ on conflict, pressure, self-imposed stressors, physiological, behavioural and cognitive reactions to stressors.

Considering the lack of studies on mental health of medical students in Nepal, a Nepalese study (Basnet et al., 2012) was designed to examine the prevalence of depression and stressors in students studying in 50 first and 50 third year of medical education at B.P. Koirala Institute of Health Sciences, Nepal. A stress questionnaire and Zung depression scale was administered to 50 students each in first and third year of medical education.

Depression was seen to be prevalent in 29.78% of students. First year students had a depression prevalence of 36.74%, while 22.22% of third year students were seen to have depression. Depression was higher in females as compared to males.

Jeong et al. (2010) in 2008 studied relations between social support health-related behaviours, socioeconomic status and depression in 120 South Korean female medical students. Around 37.1% of students had depression and the mean score on Center for Epidemiology Studies Depression Scale (CES-D) CES-D score was 14.1±8.6. Low levels of perceived interpersonal support increased the risk of depression by 10 times.

Jafari, Loghmani, and Monatzeri (2012) conducted a cross-sectional study to examine psychological morbidity in medical students enrolled in an Iranian medical college. A sample of fifty-five students each from basic science, clinical clerkship,
internship, and residency stage were invited to participate in the study. Among the 220 medical students invited to take part in the study, 192 students participated in the study. Students were administered the 12-item General Health Questionnaire (GHQ-12). Also, socio-demographic details were obtained. Mean age of participants was 25.4 and 53% of the students were females. On the whole, 49.5% of students scored above the threshold on the GHQ-12. Logistic regression analysis showed that female students were three times and basic science students were six times more likely to be at higher risk for scoring above threshold on the GHQ-12.

Strous et al. (2012) set out to examine subjective report of subsyndromal and syndromal mental conditions among preclinical and clinical phase medical students. A total of 110 students took part in the study. There were 50.9% males and 48.1% females. The students’ age ranged between 18-30 years with a mean age of twenty seven. Around 50% of the students were in the first year and 44.5% of the students were in fifth year and 5.5% of the students were missing data. The students were administered an earlier used 24 item rating scale to assess mental health conditions across Axis I (13 items) and Axis II (11 items) of the DSM-IV.

Nearly 55% of the students admitted of having experienced Axis I and Axis II disorders, predominantly mood disorders (38% in first year and 35% in fifth year) and obsessive-compulsive traits (41% in first year and 46% in fifth year). The least reported disorders in both first and fifth year were psychotic and schizotypal. Fifth year students had more Axis I disorders than first year students. Females reported higher Axis I disorders than male students. Though students experienced these mental health conditions with minimum severity, this reveals the need for ongoing support programs to address the mental health issues of medical students.

Few Indian studies have examined psychological morbidity depression and anxiety in medical students.

Vaidya and Mulgaonkar (2007) examined depression anxiety and stress in first year Indian undergraduate medical students. Incidence of anxiety and depression was 66.05% and 39.4% respectively.
In a Nepal medical college where majority of students (49.1%) were Indians, Sreeramareddy et al. (2007) conducted a cross-sectional questionnaire based study on a total of 407 basic science and clinical science medical students. An overall prevalence of 20.9% of psychological morbidity was established by the use of General Health Questionnaire. Also, prevalence of psychological morbidity was higher in basic science students, students from India and students with parents who were medical doctors.

Another Indian study carried out by Supe (1998) did use Zung depression inventory. However, scores on depression was not reported separately.

A cross-sectional study (Aarif & Mishra, 2009) was conducted to examine psychiatric morbidity in 400 medical students studying at a rural medical college in India. General Health questionnaire-28 and Rosenberg Self Esteem Scale were administered. The overall prevalence of psychiatric morbidity as per GHQ was 29.75%. First year students had highest psychiatric morbidity (37%) followed by 3rd year part-1 students (27%). Social dysfunction was seen in 56% of students, while 31% of students had anxiety and insomnia. Around 30% of students had somatic symptoms, while 20% had severe depression. Around 18% of students had low self-esteem, and low self-esteem had negative correlation with psychiatric morbidity. Males had higher depression than females. First year students were seen to experience higher somatic symptoms (38%) and anxiety (34%). Final year students (third year-part 2) had higher prevalence of social dysfunction (67%) and depression (26%).

Sidana et al. (2012) in a study conducted at New Delhi on 337 medical students examined depression by giving Patient Health Questionnaire (PHQ-9). Prevalence of provisionally diagnosed depression was 21.5% and prevalence of major depression was 7.6%. Depression was significantly associated with study year and academic performance. First year students had the highest prevalence of depression followed by second year students. Previous episodes of depression were also reported by 14.7% of students. Only, 4.7% of students sought help.

A recent Indian study (Vankar, Prabhakaran, & Sharma, 2014) examined prevalence of depression and the associated stigma experienced by medical students in a sample of 331 medical students studying at a medical college in Gujarat. Patient Health
Questionnaire (PHQ-9) and a 22-item semi-structured questionnaire were administered to measure personal, perceived, and help-seeking stigma. The prevalence of depression was sixty four percent. First year students had higher levels of depression. Among 26.6% of students, moderate to severe depression was observed. Majority of students experienced various kinds of stigma related to having depression.

Gupta and Basak (2013) examined relation between type D personality and depression among 150 medical students at a medical college at India. There was a 45% prevalence rate of depression and 70% of cases had type D personality.

Kumar, Jain, and Hegde (2012) examined prevalence of depression and its associated factors in 400 medical students studying at a south Indian medical college. Depression was found to be prevalent in 71.25% of the population. Among the depressed sample, nearly 80% could be categorized as having mild and moderate levels of depression. Using the cut-off scores on Beck Depression Inventory, 27.8% had mild depression, 29.3% had moderate depression, 7.5% had severe depression and 6.7% had very severe depression. The rest 29.8% of students scored in normal range. Males (53.7%) were found to be slightly more depressed than females (46.3%). Depression was less in first year and second year medical students when compared to other study years. During the first two years of study, moderate degree of depression was found in 26% of the students. While, students in third and fourth year had 55% and 36% moderate depression respectively. Interestingly, degree of severe and very severe depression increased from 9% in the first year to 19% in fourth year of study.

Depression was significantly prevalent in students who had family problems and family history of depression. This study underscored the importance of detailed screening of students for possible psychiatric problems and needed intervention.

Apart from depression, anxiety also has been specifically reported in medical students. In one of the earliest studies, Vontver et al. (1978) examined anxiety in second year medical students using State Trait Anxiety Inventory (STAI) and found that mean trait anxiety scores were much higher than the mean scores in the general population.
In a study of first year medical students, Lloyd and Gartrell (1981) found that anxiety significantly rose over the year for female students. In a subsequent study, Lloyd and Gartrell (1984) found that medical students in all four years had anxiety scores higher than the general population. Another study by Hendrie et al. (1990) also found high rates of anxiety and depression in male (27%) and female (41%) students. Yet, another study on first year medical students (Vitaliano et al., 1984) found that anxiety levels fell above the median for psychiatric patients and one standard deviation above the mean of non-patient population.

A study (Abirami et al., 2012) done at a South Indian medical college assessed anxiety and depression and the related curricular factors in 142 first year medical students (68 males, 74 females). Participants were administered Zung’s Self Rating Anxiety and Depression Questionnaires, and Revised Effects of University study on Life style Questionnaire (R-EUSLQ) to measure about life style. Around 16.2% of the first year students had anxiety only, while 14.8% of them had depression alone. The percentage of students who had both depressive and anxiety symptoms was 33.1%. Anxiety related to study demands and time pressures was the common factor of stress in all three groups.

Suicide in medical students is also an important concern that needs attention. As early as 1976, Thomas (1976) reported that suicide was the most common cause of death in medical students (34.7%). Tyssen et al. (2001) studied medical students and doctors and reported the prevalence of suicidal ideation to be 14%. The life time prevalence of suicidal ideation was 43%, the proportion of planned suicide was 8% and 1.4% had attempted suicide. Dahlin et al.’s (2005) study on depression and stress in Swedish medical students revealed that around three percent of the students had a history of suicide attempts.

In one of the studies (Dyrbye et al., 2008) which aimed at examining frequency of suicidal ideation and its relation to burnout in medical students hailing from seven medical schools, it was found that 11.2% reported suicidal relation and 9.6% experienced burnout in previous year. In the longitudinal cohort, depressive symptoms, quality of life and burn out measured at baseline predicted suicidal ideation in the next year. Burn out and poor mental quality of life at baseline independently predicted suicidal ideation in the next year. Recovery from burnout was seen to be associated with decreased suicide risk.
In yet another study (Dyrbye et al., 2011) the prevalence of different types of distress such as burnout, depression, stress, poor mental quality of life, poor physical quality of life and fatigue in medical students and their relation to suicidal ideation and thoughts of quitting medical school were examined. Almost all students (82%) experienced at least one form of distress with 58% of students having more than 3 forms of distress. Interestingly, a dose-response relationship was evident between the number of manifestations of distress and suicidal ideation and thought of quitting the study. Students with 2, 4, and 6 forms of distress were 5, 15 and 24 times respectively more likely to have suicidal ideation than students with no types of distress assessed. Also, all kinds of distress were seen to be independently associated with suicidal ideation or thoughts of quitting the medical school.

In a recent study conducted at a Taiwan based medical University Fan et al. (2012) found that students in second year of medicine had higher frequency of suicidal ideation than first year students. Students hailing from lower socioeconomic status, with higher physical symptoms and having depression experienced higher suicidal ideations.

Gold, Sen, and Schwenk (2014) in a study of physician suicide in the US found that among the 31,636 suicides reported in the general population, 203 were that of physicians. On multiple logistic regression analyses, mental disorders and job related problems leading to suicide significantly predicted being a physician. Post-mortem reports showed less likelihood of being under medical treatment. It is quite possible that such suicides are not a sudden development and might have precursors in earlier life of physicians as medical students. This directs towards need to focus on remediating vulnerability to mental illness and stress in medical education as preventive measure.

Another common mental affliction in medical students is the use of and dependence on various substances. Firth in 1986 in her study of final year medical students from three British universities found that 4% of students had higher alcohol use and nearly 50% of the students had increased their alcohol use in the past two years. Students falling at or above the threshold of four on the general health questionnaire admitted of consuming alcohol significantly more than those scoring below four. This indicates that psychological distress was associated with higher substance use.
Clark, Eckenfels, Daugherty, and Fawcett (1987) in a longitudinal study examined the drinking patterns of medical students belonging to a class from the beginning of medical school till the end of graduation. During the entire duration of medical school, 11% of students engaged in excessive drinking for a minimum of one six-month period. Another 18% of students were identified as alcohol abusers. Male students drank more than females in pre-clinical years. However, during clinical years men reduced their alcohol intake to almost a similar rate showed by female class mates.

In a survey of eight US medical schools (Mangus, Hawkins, & Miller, 1998) it was found that 20% of students had engaged in binge-drinking at least once in the past 30 days and around 28% of students reported an increase in alcohol consumption during medical school.

Pickard, Bates, Dorian, Greig, and Saint (2000) in a study of alcohol and illicit drug use in second year U.K medical students found that 86% of the students consumed alcohol. Among the students who took alcohol, a high proportion of both men (52.6%) and women (50.6%) exceeded the recommended units of alcohol consumption. Illicit drug use was admitted by 33.1% of students and the most commonly used drug was Cannabis.

Da Silveira et al. in 2008 studied use of psychoactive substances among 456 Brazilian medical students of six years of study. They found that male students most frequently used substances such as alcohol (80.5%), cannabis (25.3%), solvents (25.2%), and tobacco (25.2%). The most frequently used drugs among female students were alcohol (72.6%), tobacco (14.6%), solvents (10.5%), and tranquillizers (7.5%).

Baldwin, Hughes, Conard, Storr, and Sheehan (1991) examined substance use in 2046 senior medical students of 23 US medical schools. Substance use in the past 30 days included alcohol (87.5%), marijuana (10.0%), cigarettes, (10.0%), cocaine (2.8%), tranquilizers (2.3%), opiates other than heroin (1.1%), psychedelics other than LSD (lysergic acid diethylamide) (0.6%), amphetamines (0.3%), barbiturates (0.2%) and LSD (0.1). Tranquilizers usage increased after entry into medical school. Thirty-three students (1.6%) believed that they currently needed help for substance abuse. However, only 25.7% students were aware of any policy on substance abuse at their own medical school.
In a study of two nation-wide Norwegian samples of medical students (Tyssen, Vaglum, Aasland, Grønvold, & Ekeberg, 1998) reported that alcohol as a method to cope was used by 10.5% of the students. Nearly, 14% of students engaged in hazardous drinking ('binge drinking' at least 2-3 times per month). Among men, 24% and six percent among the women engaged in hazardous drinking. Increasing age, mental distress and lack of religious activity was related to use of alcohol to cope.

Park and Levenson (2002) examined prevalence of drinking to cope among 275 medical students in a Midwestern U.S University. Drinking to cope was associated with higher levels of alcohol consumption, episodes of heavy drinking, and both negative and positive alcohol-related consequences. On regression analyses, positive alcohol expectancies were strongly related to alcohol use. Specifically, situational drinking to cope was a strong predictor among many other alcohol-use indicators. Men used drinking to cope more than women.

A South African study by Marais, Calitz, Rataemane, and Joubert (2002) reported that 28.3% of sixth year medical students used alcohol in a harmful way, most often in social settings and also involving friends. A number of students were seen to use alcohol to cope with stressful situations.

Newbury-Birch, White, and Kamali (2000) examined alcohol and illicit drug use among other variables in 194 students in first year of medicine. Around 45% of the students consumed alcohol above the UK threshold set for alcohol intake. Cannabis was the most often used illicit drug. Alcohol intake was related to experiences, such as reduced study behaviours, higher sexual contacts and frequent arguments and physical altercations. Psychoticism was associated with alcohol and illicit drug use.

A study (Spyridi et al., 2011) conducted at Medical school of Aristotle University of Thessaloniki on 410 students of first to fifth year of the medical study revealed that 27.8% had used at least once one or more illicit drugs. Among the illicit drug consumers, cannabis was used by 19.5% of the students, amphetamines was taken by 9.75% of students, LSD was consumed by 9.75% of students, inhalants was adapted by 5.85% of students, benzodiazepines was used by 5.8% of students, 3.65% of students had taken syrups, cocaine was taken by 2.7% of students, ecstasy was taken by 1.2% of students and 0.7% had used heroin. Men were seen to use illicit drugs more than females.
26% were smokers and smokers were more in men than women. Students who used at least one illicit drug and tobacco had more family problems, especially relationship problems with parents.

In an Iranian study of 971 medical students (Sahraian, Sharifian, Omidvar, & Javadpour, 2009), 22% male and 8% female students reported having engaged in substance abuse at least once. Substance abuse was more in males than females. The two frequent substances used were cigarette followed by water pipe.

In the Indian context, one study (Mannapur et al., 2010) on stress in medical students revealed that 9.16% and 11.55% of the students had a habit of smoking and alcohol consumption, respectively. Stress was seen to be significantly associated with alcohol intake and smoking. Around 78.26% of the students who smoked and 68.7% of the students who consumed alcohol had severe stress.

Majra (2013) examined health related risk behaviours among final year medical students studying in two South Indian medical colleges. Findings revealed that the number of students who smoked almost doubled from 13.6% to 26.1% and number of students who consumed alcohol also rose significantly from 19.3% to 43.8%, since the students started their medical education. Though, there were more male smokers, the number of females taking up smoking after joining medical college outnumbered males. Peer pressure was the leading reason for both males and females to initiate smoking, followed by stress, desire to do new things and freedom. Among females, stress was also a predominant reason to take up smoking. With regard to alcohol consumption, majority of males accounted for peer pressure as a reason to start alcohol consumption, followed by stress, desire to experiment and lastly to enjoy freedom. Among women, peer pressure figured as the main reason to initiate alcohol consumption, followed by freedom, need to experiment and lastly stress.

2.1.11. Issues Related to Special Populations in Medical Education.

Certain populations such as international students, and lesbian, gay, bisexual, and transgender (LGBT) community may have unique problems that may lead to stress which need to be addressed.
Research on problems which sexual minority faces in medical education is beginning to emerge. A recent research (Lapinski & Sexton, 2014) examined the concerns in relatively unexplored population of lesbian, gay, bisexual, and transgender among medical students of six osteopathic medical schools of US. Specifically, relations between sexual orientation and gender identity and levels of depression, perceived social support, comfort with disclosure of orientation and campus climate of LGBT were examined.

Around 15% of students reported to be lesbian, gay and bisexual. There were no transgenders. LGB students had higher depression and slightly low perceived social support. Most of the LGB students felt the campus climate to be non-inclusive. Authors opine that medical school campuses should facilitate by providing a positive and inclusive atmosphere for all medical students.

International students studying in a foreign college in a foreign language may face more stress. Yamada et al. (2013) conducted a study to examine whether well-being differed in medical students enrolled in English program for international students (n=235) compared to students enrolled in the local program (n=1043) at the Palacky University in the Czech Republic.

The Medical Student Well-Being Index (MSWBI) was used to assess students’ psychological distress. Around 44% of students in English program had psychological distress and 53% of local students had psychological distress. Though, international students did not differ from local program students in psychological distress, the prevalence of distress in them was notable. Among the domains of psychological distress, emotional exhaustion related to burn out was 1.6 times higher in international students compared to local students.

Grbic and Sondheimer (2014) conducted a pilot survey examining the well-being of medical students and exploring the vulnerability of certain student populations to distress. The data was based on Medical Student Life Survey (MSLS), a pilot survey conducted on second-year medical students to measure well-being, perceptions of the learning climate, and empathy. The survey was sent to 136 U.S. Medical schools accredited by the Liaison Committee on Medical Education (as of 2013). Only 3,466
students out of 19,555 responded constituting 18% response rate. Only 3,305 respondents had correctly completed the survey. Short version of perceived stress scale and a condensed version of Linear Analogue Self-Assessment to assess quality of life were used. Free-text responses were also analysed. Various socio-demographic characteristics were also analysed.

Various differences emerged across the socio-demographic variables studied. Females experienced significantly more stress than males as seen on perceived stress scale. High stress was observed in first generation college students, female, students of lesbian gay and bisexual (LGB) orientation, Asian and students underrepresented in medicine [URiM] (compared to white) students. Students belonging to first generation of college had higher stress, fatigue, financial problems, lower QOL and social support than others. LGB students had higher stress, fatigue financial concerns and low social support compared to heterosexual students. In comparison to males, females experienced higher stress, and fatigue but had higher social support.

Asian students had higher stress and low social support but low financial problems compared to white students. URiM students had higher stress and lower quality of life. Themes of free-text responses ranged from pressurizing anxiety, negativity, less relaxation and need for a better learning environment. This research contributed to the importance of checking wellness in vulnerable medical student sub groups.

The review of literature demonstrated the kinds of stress and psychological distress medical students undergo. Yet, the students’ use of mental health services offered at their respective institution is limited. Guthrie et al. (1995) in their study of mental health problems in nine US medical schools found that despite, a high prevalence of psychological distress, around 70% of students worried about confidentiality matters and feared their problems being documented. This could possibly have a bearing on their hesitance in seeking help from mental health services at their colleges.

In a study of depression and utilization of mental health services by first and second year studying in a US Medical College (Givens, & Tjia, 2002), very few depressed students were observed to be undergoing treatment. The most frequently cited barriers to using mental health services were lack of time (48%), lack of confidentiality
(37%), stigma associated with using mental health services (30%), cost (28%), fear of documentation on academic record (24%), and fear of unwanted intervention (26%). Students who were suicidal were 2.8 times more likely than other depressed students to admit a “fear of unwanted intervention” as a major barrier for seeking treatment.

In another subsequent study, Tija, Givens and Shea (2005) studied factors associated with under treatment of depression in medical students. When barriers to treatment were examined among untreated depressed students, 53.8% reported lack of time, 27% reported insufficient number of sessions available from university-based services and 23.1% reported stigma of using mental health services. A similar percentage (23.1% each) of students reported fear of negative impact on career and fear that diagnosis would be registered in the academic record. A few students also reported their fear of being recognized by a colleague associated with the institution’s mental health centre and their belief that treatment would not be beneficial. The authors report that the institution provides adequate standard treatment based on confidentiality. Yet, depressed medical students remained untreated though they have an opportunity to avail needed treatment. The authors conclude that an educative approach is essential to target students to recognize the importance of taking treatment for depression.

Sidana et al. (2012) examined depression in 337 medical students studying at a medical college at New Delhi, India, found that in spite of a 21.5% prevalence of depression, only 4.7% sought help and a reluctance to seek help for depression was observed.

In a study (Vankar et al., 2014) that investigated depression and associated stigma in 331 medical students studying at a medical college of Gujarat, majority of students (73%) opined that depression would negatively affect their education, while nearly half of the students (52.3%) felt depression was a sign of weakness. Females compared to males felt that other students would not want to associate with a depressed student and that they would not be able to finish their medical college responsibilities. Higher the year of study, greater was perceived stigma about disclosing depression to friends and stigma about others not wanting to work with a depressed student was also higher.
2.1.12. Stress Management

Innumerable studies have been conducted on the effects of stress on medical student well-being. Almost, all of the studies have made suggestions to develop adequate intervention and support systems to address stress related issues. There have also been studies that have evaluated intervention or support programs that intend to remediate stress in medical students. However, these studies do not match up to the extent of research conducted on effects of stress. Some evidence regarding stress remediation intervention and programs is examined below.

Some guides and write ups (For example, Vogan, McKimm, Da Silva, & Grant, 2014) have appeared on how best support can be provided to medical students to help them deal with stress and adapt to medical school.

Sometimes, people who suffer stress when involved in brainstorming in groups come up with effective strategies to cope up with stress. Pereira & Barbosa (2013) at a Brazilian medical college using qualitative research evolved coping strategies in an elective class dealing with professional stress of medical students. A focal group discussion consisting of nine students from an elective class was carried out wherein students identified stress factors and coping methods used by them. A class evaluation questionnaire was also given at the end of the elective program. The identified stress factors were inadequate time, academic overload, tests, self-demands, overload of extracurricular activities, competitiveness and problems related to family. Coping methods that came up in the group discussion were: respecting one’s limits, prioritizing things, not comparing with others, leisure activities (such as movies, engaging in literature and sports), and meeting friends and family.

The popular coping methods were relaxation, listening to music, engaging in community work, having simulated jury, short texts and discussions. The class on professional stress was meaningful in terms of giving opportunities to ask questions and reinforcing known coping methods, providing means to self-assess and self-respect. The professional stress class was termed worthwhile as it developed new interest, improved quality of life and gave opportunity to students to express.

An intervention study (Finkelstein, Brownstein, Scott, & Lan, 2007) investigated the effectiveness of a new mind body stress reduction elective on the anxiety and stress
of second year medical students. Students were assessed with anxiety, stress and mood states measures on the first day, last day of the elective and again three months later. There was also a control group of students who had not enrolled in the course, but were assessed using same measures and at same points like the intervention group. Students in the intervention group had higher baseline anxiety than peer who were not in the program. The anxiety of the enrolled students steadily declined and this treatment gain was maintained even three months after the course ended.

Shapiro, Shapiro, and Schwartz (2000) conducted a review of articles (from 1966 to 1999) on stress management programs in medical students. Authors in total found 34 studies that had intervention programs, and out of them, only six used rigorous scientific method. Results showed that stress management led to better immunity, lower depression and anxiety, higher awareness of alternative therapies, higher empathy and spirituality, increases knowledge of stress effects, use of adaptive coping strategies and ability to resolve role conflicts. Authors opined that there is still lot of scope to overcome limitations and made few recommendations for future research such as strict study design, assessment of moderator variables to know which treatment works the best for whom, validity of outcome measures and follow-up assessment.

Motz et al. (2012) assessed the impact of Mind Body Medicine Skills (MBS) course on medical students’ perceived stress, mindfulness and elements of emotional intelligence. Mind Body Medicine Skills (MBS) program included a variety of mind-body related techniques such as mindfulness meditation, guided imagery, movement and group sharing involving listening without judgment. A total of 72 medical students (47 females and 25 males) were administered certain scales before and after undergoing the course. Stress was seen to significantly reduce after the course, and mindfulness became higher after the course. Positive affect rose in students of both gender, while negative affect dropped only in females. Females felt that their capacity to attend to feelings and perspective taking had increased, while their personal distress in response to distress in others decreased. Males had no change in negative affect. Both males and females felt higher empathic concern.
Dobkin and Hutchinson (2013) in order to examine how teaching mindfulness prevents decline in compassion and burnout in medical professionals reviewed the literature to know the extent to which teaching of mindfulness has occurred in medical schools. It was found that around 14 medical schools taught mindfulness to medical and dental students. The format used to teach mindfulness ranged from simple lectures to one day workshops and eight to ten week course in mindfulness based stress reduction. Particularly, two medical schools (one in US and one in Australia) stood out as they had incorporated mindfulness into medical curriculum. Studies revealed that those students who participated in such programs had reduced psychological distress and experienced better quality of life.

Authors opine that though strong evidence is present pertaining usefulness of teaching mindfulness, there are clarifications required related to some issues. These issues pertain to things such as best time to teach mindfulness during the medical career, format to be used while targeting different sections of medical professionals, sustenance of learnt things during mindfulness course and serious debating over integrating mindfulness training into core curriculum of medical training.

Saravanan and Kingston (2014) conducted a randomized control study of psychological intervention on first year medical students with the aim of reducing anxiety, amotivation and psychological distress. The measures given to 436 students were Westside Test Anxiety Scale, Kessler Perceived Stress Scale and Academic Motivation. Among the sample measured, 74 students had moderate to high test anxiety and they were randomly categorized into either experimental or wait list control group. The intervention group of 32 students was given five sessions of psychological therapy consisting of psycho education, relaxation and systematic desensitization. The wait-list control group of 33 students received one session of advice and suggestion.

The intervention group, post intervention had significantly lesser anxiety, psychological distress and amotivation and higher extrinsic motivation scores compared to pre-intervention scores.
Yusoff and Esa (2011) attempted a systematic review of studies on stress management in medical students (from 1978 to 2011). Among the vast amount of studies found on various academic databases, 23 articles were included in the final review.

Review revealed that stress management had positive outcomes such as improved physiologic and immunologic markers and psychological health, better quality of life, spirituality and empathy. Lower levels of loneliness and mood problems and better ability to cope effectively were the other benefits of stress management.

Several limitations were also noted that could be improvised in future research such as longer duration of post intervention follow-up, rigorous research method, studying effects of intervention during different study years, personalized stress intervention, researching on specific effects of stress intervention on professionalism, doctor-patient relations, and indicating theoretical basis of stress intervention studied.

Dosset et al. (2013) investigated the effects of an elective known as HEART developed by the American Medical Student Association implemented in fourth year of medical education for promoting wellness in medical students. In a four weeks duration, HEART program teaches students humanism, self-care and informs about complementary and alternative medicine modalities, encourages communication, activism, and community building.

The first eight groups who underwent HEART program in 2010 were surveyed using a questionnaire inquiring about educational impact of the elective. Qualitative analysis was also adapted. Among the 168 alumni, 73% took the survey. Of all the students 755 were females and majority (77%) of the students were at or above 35 years of age and working in primary care (66%). Most (89%) reported that elective taught them professionalism and skills to communicate well (92%). Majority of the alumni also highly agreed that they learnt to better cope with stress in medical training (80%), enhanced their self-care skills (75%) and increased their ability to empathize with patients (71%).

Qualitative analysis of personal and professional effects of the elective came up with twelve common themes, of which self-discovery, self-care, development in college and community were often cited ones.
Harwani et al. (2014) studied the effects of 11-weeks mind-body medicine (MBM) skills program (including techniques such as meditation and guided imagery) on mindfulness, stress levels and empathy of first-year medical students of George Town University. A total of 118 first-year medical students were administered Perceived Stress Scale (PSS), Freiberg Mindfulness Inventory (FMI), Positive and Negative Affect Scale (PANAS), and the Interpersonal Reactivity Index (IRI) before and after they underwent the MBM program. Following the program, students had significant increases in their mindfulness, positive affect, with significant decrease in perceived stress, negative affect and decrease in personal distress in response to distress in others. Also, reduction in stress and negative affect were significantly related to enhanced mindfulness. Hence, mind-body medicine skills program was proven to improve the well-being of medical students.

De Vibe et al. (2013) examined the effectiveness of Mindfulness-Based Stress Reduction (MBSR) programme on mental distress, study stress, burnout, subjective well-being, and mindfulness of medical and psychology students studying at University of Oslo and the University of Tromsø. A total of 228 students, of which 76% were females, were randomly assigned to an intervention and control group. Control group had no intervention. Participants of both intervention and control group were administered measures namely, General Health Questionnaire, Maslach Burnout Inventory Student version, Perceived Medical School Stress, Subjective Well-being, and Five Facet Mindfulness Questionnaire and additional indices of compliance. Measures were given before and after intervention. Intervention yielded a reduction in mental distress and better subjective well-being and improved scores on the mindfulness facet of non-reacting in the intervention group as compared to the control group. These changes were predicted by higher programme attendance and mindfulness exercises. Females had significant effects. They reported decline in study stress and a rise in the mindfulness facet ‘non-judging.’

Gordon (2014) reviewed the usefulness of Mind-Body Skills Groups for medical students developed 20 years ago by The Centre for Mind-Body Medicine, in association with Georgetown University School of Medicine in improving well-being of students at 15 medical schools where this program is implemented. It was observed that Mind-Body Skills groups was effective in reducing stress in medical students and in enhancing
students’ experience of medical education and helping them to feel confident in their future career as physicians.

Some evidence for the effect of yoga on medical student stress in the Indian context has emerged. However, effects of programs consisting of core psychological principles have been hardly studied.

In the Indian settings, Malathi and Damodaran (1999) in a group of 50 first year medical students investigated the effects of yoga practices on anxiety in routine activities and anxiety prior exams. Anxiety as measured by Spielberg Anxiety Inventory was seen to reduce following yoga intervention. Also high anxiety scores before exams were seen to reduce on the day of exams following yoga intervention. The feedback taken after yoga practice indicated improvement in well-being, enhanced relaxation, enhanced concentration, better confidence, higher efficiency, good interpersonal relations, optimistic outlook and lowered levels of irritability.

Another Indian pilot study (Bansal, Gupta, Agarwal, & Sharma, 2013) examined the effect of a short term yoga intervention on mental well-being of 82 medical students in third semester of study when they were posted in community medicine. Students belonged to the age range of 18-23 years and were administered General Health Questionnaire-28 (GHQ-28). There was a significant improvement in general and mental well-being following of students following the yoga intervention.

Apart from introducing wellness programs, curricular changes also may help relieve stress in medical students. Slavin, Schindler, and Chibnall (2014) tested the effects of a new and integrated, multifaceted, preclinical curricular change program introduced by the Saint Louis University School of Medicine starting in the 2009–2010 academic year.

Changes to course content, class hours, scheduling of classes, grading, electives, learning communities and efforts to improve resilience and mindfulness experiences were associated with low depression, low anxiety and lower stress and improved community cohesion.
2.2. Coping

People use varied strategies to handle stress and these strategies can be broadly termed as coping. Though a number of definitions exist, a very well accepted definition of coping is given by Lazarus and Folkman (1984). They define coping as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984). This is an operational definition which indicates coping to be a process-oriented phenomenon, not a stable trait or result. It also suggests that it is not automatic but rather learned. In addition, coping includes management of stressful condition which need not mean mastering the situation. Management involves methods such as minimizing avoiding, denying, tolerating, resolving, or accepting a stressful condition as an individual tries to get a control over his or her environment.

Two major components in the process of coping are appraisal and coping (Lazarus, 1966). Appraisal is the act of perceiving a stressor and analysing one’s own ability to deal with the stressor. Appraisal can be made in three different conditions; firstly, during the experience of a stressor, secondly, during the anticipation of a stressor, and thirdly, during the experience of a chance for mastery or gain (Lazarus, 1966). After appraising a stressful situation a decision is to be made as to how one will respond or ‘cope’ with the stressor. One may choose to master the stressor, reduce the stressor or tolerate the stressor. The coping style one adopts is in the end is determined by the extent to which one believes that he /she has the resources to resolve the stressor (Lazarus, 1966).

How an individual copes with stress depends on the nature of stress and the coping options that are available to him. Individuals differ in the coping methods they use to deal with stress. The adaptive coping strategies chosen by the individual is determined by several factors such as individual’s views about the world, the extent of success or failure the individual has had with coping methods used earlier and the internal or external limitations the individual is facing (Paragment, 1997).
2.2.1. Types of Coping

There exist several ways of categorizing coping. The multitude ways of classifying coping has been comprehensively reviewed by Skinner et al. (2003). This section will first attempt to give a general account of the major types of coping and then narrow down to the types of coping studied in the area of student stress, specifically medical student stress.

2.2.1.1. Problem focused and emotion focused coping strategy. One popular way of categorizing coping is into problem focused and emotion focused coping strategy and avoidant coping strategy.

Problem focused coping according to Carver, Scheier, and Weintraub (1989, pg. 267) “is aimed at problem solving or doing something to alter the source of the stress”. Problem-focused aims at removing or reducing the effects of the stressor. For instance, an individual having financial problems, may focus on relying on his savings, going for a loan from bank, asking friends to lend some money or cutting down on expenses.

According to Carver et al. (1989, pg., 267) “emotion focused coping, is aimed at reducing or managing the emotional distress that is associated with (or cued by) the situation”. In other words emotion-focused coping is aimed at minimizing distress triggered by stressors. Emotion-focused coping includes a wide range of responses, ranging from self-soothing (e.g., relaxation, seeking emotional support), to expression of negative emotion (e.g., yelling, crying), to a focus on negative thoughts (e.g., rumination) (Carver and Connor-smith., 2010).

Other strategies such as blaming, wishful thinking, venting, seeking emotional support, or meditating may fall under the rubric of emotion focused strategies. Unlike problem based coping strategies, emotion focused strategies may not attempt to change the situation directly but attempts to change the interpretation of how an event is understood. For instance, one may construe an unfortunate event as “this is better, as something worst may have happened” or “this experience taught me few valuable things”. Hence, emotion focused coping is adapted when events cannot be changed.

Emotion-focused coping can be either be adaptive or maladaptive (Penland, Masten, Zelhart, Fournet & Callahan, 2000; Billings & Moos, 1984; Crockett et al., 2007;
Bouteyre et al., 2007). Generally, coping strategies which focus on negative emotions and thoughts are known to increase psychological distress (e.g. venting of emotions and rumination), while coping strategies that regulate emotion (e.g. seeking social support, and acceptance) reduce distress.

A coping behaviour can become problem-focused or emotion-focused based on the intention of its use. For example, seeking support is emotion focused if the goal is to obtain emotional solace and reassurance, but problem focused if the goal is to obtain advice or instrumental help. Problem and emotion-focused coping may be interrelated and having complementary coping functions rather than being viewed as two fully separate and independent coping categories (Lazarus 2006).

Effective problem-focused coping by diminishing the threat can also diminish the distress generated by that threat. Also, emotion-focused coping by diminishing negative distress makes it possible to consider the problem more calmly, making way for a better problem-focused coping.

2.2.1.2. Avoidant coping. Avoidant coping are cognitive and behavioural efforts put forth to minimize, deny or ignore dealing with stress (Holahan, Moos, Holahan, Brennan, & Schutte, 2005). Though some researchers include avoidant coping under emotion-focused coping, there are conceptual differences among the styles. Avoidant coping is passive as it attempts to ignore a stressor, whereas emotion-focused coping is considered to be active (Admiraal, Korthagen, & Wubbels 2000; Holahan et al., 2005). Avoidant coping involves behaviours, such as denying the existence of problem or wishful thinking withdrawal, and substance use appear to be the most maladaptive as it is associated with increased distress and poor outcomes (Aldwin & Revenson, 1987; Ben-Zur, 1999; Bouteyre, Maurel, & Bernaud, 2007; Crockett et al., 2007; Folkman, 1997; Wijndaele et al., 2007). Although, avoidant coping temporarily relieves the person of distress by distancing him/her from the problems, it leads to accumulation of stressors and eventually ends up in more problems and psychological distress.
2.2.1.3. Engagement (approach) versus disengagement (avoidance). Another way of classifying coping is into engagement or approach coping and disengagement or avoidance coping. Engagement coping is aimed at dealing with the stressor or related emotions, and disengagement or avoidance coping is aimed at escaping the threat or related emotions (e.g., Moos & Schaefer 1993, Skinner, Edge, Altman & Sherwood; 2003).

Engagement coping includes problem-focused coping such as cognitive restructuring and some forms of emotion-focused coping such as support seeking, emotion regulation, and acceptance. Disengagement coping is somewhat similar to the concept of avoidant coping and involves methods such as denial, and wishful thinking and use of substance as an escape from the problem. Disengagement coping is usually emotion focused in nature as it involves an attempt to escape feelings of distress. In disengagement coping, people can act as if the stressor does not exist and therefore nothing needs to be done about it.

Strategies such as wishful thinking and fantasy temporarily distance the person from the stressor and denial creates a boundary between reality and the person’s experience. Though disengagement coping helps in escaping emotional upheaval, it is usually ineffective in reducing distress over a longer period as nothing is done about the threat’s existence and its subsequent impact. Longer the one avoids dealing with the problem, the more complex and difficult it becomes to resolve. Also, avoidance and denial are known to promote a paradoxical increase in intrusive thoughts about the stressor and an increase in negative mood and anxiety (Najmi & Wegner 2008). Additionally, some kinds of disengagement coping such as excessive use of alcohol or drugs can create social and health problems.

2.2.1.4. Accommodative coping and meaning focused coping. Under the rubric of engagement coping, two more classifications are there. One focuses on attempts to control the stressor itself, known as primary control and the other aims at adapting or adjusting to the stressor, known as accommodative or secondary-control coping (Morling & Evered 2006; Skinner et al., 2003). The concept of accommodative coping has its origin in the ideas derived related to the process of successful aging (Brandstadt & Renner 1990). It contains making adjustments in the self when faced with external
problematic and limiting situations. Accommodative coping involves strategies such as acceptance and cognitive restructuring. Some people classify self-distraction as accommodative coping, though from a long time it is known as disengagement coping. In the recent times, factor analyses have repeatedly indicated that intentionally engaging in positive activities is a means of adapting to uncontrollable events (Skinner et al., 2003).

2.2.1.5. Meaning-focused coping. Meaning focused coping as proposed by Folkman (1997) involves processes where in people resort to their beliefs and values to find, or remind themselves of, benefits in stressful experiences (Tennen & Affleck, 2002). Meaning-focused coping may include reorganizing life priorities and ascribing ordinary events with positive meaning. This concept originates from findings which reveal that stressful experiences are accompanied by positive as well as negative emotions (e.g., Andrykowski, Brady, & Hunt, 1993), and positive feelings affect outcome of events. Additionally, it also emphasizes on the fact that people look for advantages and meaning in adversity (Helgeson, Reynolds, & Tomich, 2006; Park, Lechner, Antoni, & Stanton, 2009).

2.2.1.6. Proactive coping. There are some particular types of responses as pointed out by Aspinwall & Taylor (1997) which indicate that some coping occurs proactively before the occurrence of any stressor. Proactive coping is aimed at preventing threatening or harmful situations from arising. Proactive coping comes under problem focused coping and involves putting together resources which will be useful if a threat arises. This also includes being vigilant for signs that a threat may be building. If the initial signs of threat are perceived, one can engage in methods that will prevent it from growing or that will remove oneself from its path. If the prior sign of an upcoming threat aids one in avoiding it, then one will have less number of stressful events and also will experience less intensity when faced with unavoidable stressors.

Research shows that there are varied ways of grouping coping (see- Compas et al., 2001; Skinner et al., 2003) and they can be overlapping in nature. A particular behaviour can be seen as one way of coping in a specific situation, while it also can be termed as another coping method in a different situation. The distinction is based on convenience and the context in which coping is studied. The structure of coping cannot be fully justified by any single distinction.
2.2.2. Coping and Stress

Life of students is generally filled with many day to day challenges such as academic pressures, interpersonal strains, and financial constraints and so on. However, how much negative impact stress has is modified by the way of coping strategies used to combat stress. While maladaptive coping can intensify stress, adaptive coping paves the way for successful adjustment to college life.

This section will focus on reporting studies that focus on the common types of coping in the context of stress and related phenomena. Emphasis will be laid on student stress, particularly medical student stress.

The most commonly reported coping types are problem-focused, avoidant, and emotional focused strategies. Problem-focused coping has been found to be most adaptive, while avoidant coping is the least adaptive. Emotion-focused coping includes a number of varied coping styles that have been shown to be both adaptive and maladaptive (Billings & Moos, 1984; Penland, Masten, Zelhart, Fournet, & Callahan, 2000; Wijndaele et al., 2007; Crockett et al., 2007; Bouteyre, Maurel, & Bernaud, J-L, 2007).

A number of past studies have investigated the processes involved in coping with a specific stressor, namely, examination stress (e.g., Carver, Scheier, & Weintraub, 1989; Folkman & Lazarus, 1985; Zeidner, 1995). For example, Zeidner (1995) showed that situational emotion-focused coping was related positively to state anxiety, whereas problem-focused coping predicted midterm examination grades. Another study by Struthers, Perry and Menec (2000) showed that problem-focused and emotion-focused coping styles were positively related to perceived stress associated with introductory psychology course, and problem-focused coping mediated its effects on college students’ motivation which was positively related to academic grades. Similarly, in a recent study (Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012) task-oriented coping was related positively to students’ grades.

A recent study by Ben-Zur and Zeidner (2012) based on the cognitive model of stress (Lazarus, 1999), examined 294 Jewish and 234 Arab students’ stress appraisals, coping strategies, and emotional and behavioural reactions to academic stressors. Perceived stress was positively related to emotional support and avoidance coping,
which, in turn, were related to high negative affect and risk taking. The findings suggest interventions among students to aid them to successfully adapt to academic stress. Following an academic stressor, students who reported more perceived stress and the use of avoidance coping reported a higher frequency of risky behaviours, which were correlated with negative mood.

Many studies have revealed that problem-focused coping leads to reduction in distress. Wijndaele et al. (2007) demonstrated the usefulness of problem-focused coping in alleviating psychological distress in the general population. In their study of 2,616 Belgian adults, Wijndaele et al. showed that individuals who took up problem-focused coping had less stress, anxiety and depression, than individuals who took up other coping methods. However low response rate (28%) was a limitation of this study.

Problem-focused coping leads to alleviation of distress in clinical populations (Billings & Moos, 1984; Cronkite, Moos, Twohey, Cohen, & Swindle, 1998).

Sherbourne, Hays, and Wells (1995) demonstrated strongest proof for this in clinically depressed population. Depressed subjects in their study felt better when they used problem-focused coping than avoidance coping. Depression levels and coping methods of 604 depressed individuals were assessed at two time points: 1 year following baseline and 2 years following baseline. The study recorded highest improvement for severely depressed individuals who adapted problem-focused coping. However, the study had an important shortcoming to be noted. No specialized measure of coping was used. Instead, one self-report measure was designed which assessed a host of factors such as support, stress, coping style and lifestyle factors.

Stress, anxiety and depression are low in students when they adapt problem focused coping than other coping strategies. Penland et al. (2000) found persons who adapted problem-focused coping had a higher reduction in depressive symptoms as compared to individuals using other coping strategies.

Crockett et al. (2007) also demonstrated problem-focused coping to be the most adaptive coping strategy adapted by university students. Crockett and colleagues studied relations between problem-focused coping and stress, anxiety and depression in 148 Mexican American college students. The findings revealed that problem-focused coping
lead to alleviation of depressive symptoms. Another study by Bouteyre et al. (2007) further emphasizes the negative association between problem focused coping and psychological distress in French university students. Among 233 students 41% experienced depressive symptoms. However, students using problem-focused coping showed lesser depressive symptoms.

Emotion-focused coping has both adaptive as well less effective coping strategies (Billings & Moos, 1984; Penland et al., 2000; Wijndaele et al., 2007; Crockett, 2007; Bouteyre et al., 2007). The maladaptive coping strategies like venting of emotions and ruminations involve negative emotions and thoughts and lead to a rise in psychological distress. Coping strategies of seeking social support and acceptance facilitate emotion regulation and lead to decrease in distress. Coping involving emotional regulation are useful as they stop individuals from paying excessive attention to negative emotions and ensure that they actively resolve their negative emotions (Carver et al., 1989). For example, seeking social support is useful, as it prompts students to take advice from others to decide on what adaptive coping methods to use (Bouteyre et al., 2007; Knibb & Horton, 2008). Likewise, acceptance is adaptive as it makes individuals to act proactively after accepting a distressing situation, as opposed to persisting in negative emotions (Carver et al., 1989; Knibb & Horton, 2008). Contradictorily, emotion-focused styles that involve engaging in negative emotions are bad as people who adapt them usually focus excessively on their negative emotions instead of putting efforts to remediate them (Billings & Moos, 1984). Some of the coping styles, such as venting of emotions and rumination are usually considered maladaptive as they enhance negative emotions and allow the distress to persist (Windle & Windle, 1996; Knibb & Horton, 2008).

Several studies have demonstrated contradictory findings with regard to emotion-focused coping. Billings and Moos’s (1984) examined the association between coping and depression among 424 men and women being treated for depression. The finding revealed that patients who were depressed had less severe symptoms when they tried to regulate their affect. However, depressed patients who used venting had higher dysfunction.
Other studies also have shown the mixed findings with regard to use to emotion-focused coping in university students. In a study of 233 first year psychology students, Bouteyre et al. (2007) found higher use of venting lead to higher depressive symptoms. In contrast, Penland et al. (2000) found venting to be a good coping style as students had lesser depression on expressing their distress.

These varied findings may implicate the role of other factors that may alter the relation between venting and psychological distress.

Social support which also is considered an emotion-focused coping strategy may also help in alleviating psychological distress. On examining the relation between emotion focused coping and psychological distress in general population, Wijndaele et al. (2007) observed that those individuals who received social support on a regular basis had lesser anxiety and depressive symptoms.

Role of social support as a coping method in university students is also important. Crockett et al. (2007) in a study of college students showed seeking social support to be a good coping strategy in students experiencing high stress, because students who received social support had lesser number of anxiety and depressive symptoms, than students who didn’t have social support. Similar evidence accounting for importance of social support comes from studies of Penland et al. (2000) and Bouteyre et al. (2007).

Avoidant coping is known to cause higher distress than other coping methods. Billings & Moos (1984) reported that depressed patients who used avoidant coping had lesser improvement and higher dysfunction. A robust evidence for the negative effects of avoidant coping arises from Holahan et al. (2005). In a ten year study which examined life stresses, coping styles and depressive levels in 1,211 individuals, Holahan et al. revealed higher use of avoidance coping to be associated with higher depressive symptoms. Assessment of depressive symptoms was carried out at study entry, then four years later and finally after ten years later. It was observed that people using avoidance coping at study entry had higher chronic and acute stressors after four years and higher depressive levels after ten years. A key element of Holahan et al.’s study is that they controlled for depression at the start of the study, thus suggesting that avoidance coping may have led to rise in life stressors and depression.
Stress and psychological distress in non-clinical samples and college students have also been associated with higher use of avoidance coping (Wijndaele et al., 2007; Penland et al. 2000). In a study of college students, Penland et al. (2000) found that when students used avoidant coping styles, they had higher depressive symptoms. In another study also (Crockett et al., 2007), higher use of avoidance coping lead to higher anxiety and depression as compared to use of problem-focused coping. Dwyer and Cummings (2001) also found that university going students used more avoidance-focused strategies had greater stress.

Gender difference in coping also has been reported. Majority of evidence suggests use of emotion focused and avoidance based coping styles are higher in females than males (Lazarus & Folkman, 1980; Endler & Parker, 1990b; Matud, 2004; Tamres, Janicki, & Helgeson, 2002; Brougham, Zail, Mendoza, & Miller, 2009; Eaton & Bradley, 2008; Ptacek, Smith, & Zanas, 1992). Problem-focused coping is used more by males than emotion-focused and avoidant ones (Lazarus & Folkman, 1980; Endler & Parker, 1990b; Eaton & Bradley, 2008). But, there is evidence to say that women too use problem or task focused coping (Endler & Parker, 1990b). Ptacek et al. (1992) attributes this gender difference in coping to gender socialization than to inherent difference in coping of men and women.

2.2.3. Coping with Stress in the Context of Medical Students

In medical students, in concurrence with the general literature, most of the time problem based coping has been found to be associated with better stress and distress outcomes, while some of the maladaptive emotion focused coping styles and avoidant coping have been found to be associated with higher stress and higher mental distress.

As early as 1986, Frith found in her study of undergraduate medical students that alcohol intake as a coping method was predominant among medical students.

Tyssen, Vaglum, Aasland, Gronvold, and Ekeberg (1998) studied the association between use of alcohol to cope with tension and hazardous drinking in cross-sectional surveys of two Norwegian nation-wide samples of medical students. One sample included medical students entering Norwegian medical schools (N=370) and other sample contained medical students who were at the end of medical training (N=522).
Nearly, 55.6% of the total sample was women. Questionnaires included Symptom check List-5 and Perceived Medical School Stress Scale.

Around 10.5% of the students made use of alcohol to cope, and there was no gender difference in use of alcohol. A strong association was seen between use of alcohol to cope with tension and hazardous drinking, when controlling for other possible predictors. Use of alcohol to cope was further associated with increasing age, mental distress and lack of religious activity.

Other studies also have reported use of alcohol as a coping strategy (Guthrie et al., 1995, 1998, Yousafzai et al, 2009). Apart from alcohol, tobacco usage and use of drugs have also been reported (Miller & Surtees, 1991; Ashton & Kamali, 1995).

With regard to other coping strategies, Wolfe (1998) in a four year retrospective study of graduating medical students found that problem focused coping strategy was the most often used coping method. Vitaliano, Maiuro, Russo, and Mitchell (1989) found that problem-focused coping and social support seeking was negatively associated with medical students’ distress symptoms, while emotion-focused coping was positively associated with medical students’ distress symptoms.

Chan (1992) in a study of first year undergraduate medical students reported that they used problem focused strategies (including seeking social support) from friends, as well as maladaptive strategies such as rumination and pre-occupation with problems without taking steps towards problem solving. Poor emotional regulation, blaming oneself and brooding were perceived as not useful.

Chan (1992) opined that coping skills aimed at active problem solving, appropriate emotional regulation and seeking out and maintaining social support should be taught to students in an organized fashion. Medical students should not be expected to acquire these in a haphazard manner.

Mosley et al. (1994) examined stress, coping, depression, and somatic distress in 69 students studying in third year of medicine. They found coping efforts to contribute largely in prediction of distress and this prediction was much more than the variance contributed by stress alone, especially in relation to depression. Engagement coping
strategies such as cognitive-restructuring, problem-solving, and social support were negatively associated with symptoms of depression. While disengagement strategies such as problem-avoidance, self-criticism and social withdrawal were positively associated with symptoms of depression.

The first study among the series of studies on medical student stress conducted by Stewart, Betson, Marshall et al. was in 1995 where in 140 Hong Kong Chinese second year medical students were surveyed in comparison to medical students who were about to begin their medical education, and 74 other non-medical university students. Distress was seen to be less when active coping styles and positive re-interpretation coping were used. Distress was high when wishful thinking was adapted.

In 1997, Stewart, Betson and Lam et al. in order to find predictive variables that would identify students having the most difficulty in managing stress during medical training studied one-hundred and twenty-one medical students at two points in time. The first survey was done prior to the beginning of medical training, while the second survey was done approximately 8 months after the beginning of classes. Students who began their first year with relatively low 'A' level grades, higher distress, and avoidance strategies were found to be at higher risk for developing depression and anxiety symptoms at the time of second survey. At both surveys, use of avoidant coping strategies resulted in higher depression and anxiety. Active coping and positive reinterpretation resulted in decreased depression and anxiety at second survey.

In another subsequent study, Stewart, Lam, Betson et al. (1999) studied first year medical students’ personality variables, stress response and coping methods in relation to academic performance before beginning of classes and eight months later. With regard to coping strategies, more use of humour and wishful thinking was associated with lesser academic performance.

In another study of stress in 275 first year medical students, Moffat, McConnachie, Ross, and Morrison (2004) using COPE as the measure found that students used more active coping strategies. Both stressor group scoring and coping strategies showed some variation with gender and caseness as identified by the General Health Questionnaire. Distressed students used denial and behavioural disengagement...
significantly more than non-distressed students. Non-distressed medical students used positive reframing significantly more than the distressed students.

Stern, Norman, and Komm in 1993 examined how medical students cope with various kinds of stress using the cognitive-transactional model of stress. On multivariate analyses of variance (MANOVAs) preferred coping methods differed according to type of stressor and study year. First year students made higher use of self-blame and problem-solving styles to cope with medical-school-related stressors, than fourth year students. Fourth year students made higher use of confrontative coping than first year students, in order to deal with interpersonal stressors. Gender difference did not impact coping responses. Appraisal process was seen to moderate the effect of coping strategies used to manage stressful situations.

In Park and Adler’s (2003) study that examined the relationship between both problem-focused and emotion-focused strategies and the well-being of first-year medical students, the use of emotion-focused coping strategies (particularly escape avoidance), was related to lower levels of psychological well-being. On the other hand, problem-focused strategies, particularly planful problem solving, were related to higher levels of psychological well-being among these students.

In a study done in Malaysia on stress in 450 medical students from three universities (Johari & Hassim, 2009) it was seen that distressed medical students used more of self-distraction, venting of emotion, denial, humour, behavioural disengagement and self-blaming as coping strategies compared to non-distressed colleagues. Venting of emotion, active coping and religion were negatively correlated with stress symptoms while self-blame, self-distraction, instrumental support, denial, humour, behavioural disengagement, emotional support, and acceptance were positively correlated with stress symptoms. When prediction of stress by coping styles was considered, venting of emotion negatively predicted stress in the way of reducing stress and self-blame was seen to positively predict stress in the way of increasing stress.

Ko, Yoon, and Park (2007) studied 249 medical students from undergraduate and Graduate Entry Programme of a medical school in Seoul, Korea, with aims of exploring the coping strategies used by medical students and finding out how coping styles
accounted for medical students' subjective well-being. Coping style was measured using the Ways of Coping Checklist. Subjective well-being was measured with Positive/Negative Affect Scale and Satisfaction with Life Scale. Medical students were found to use avoidance and problem-focused coping strategies more often than emotion-focused coping strategies and seeking social support. Graduate Entry Programme students used avoidance less often and seeking social support more often than undergraduate students. Both problem-focused coping and seeking social support positively contributed to positive affect. Problem-focused coping negatively and avoidance positively contributed to negative affect. Life satisfaction was positively accounted for by problem-focused coping.

Another cross-sectional study by Al-Dubai, Al-Naggar, Alshagga, and Rampal in 2011, among 376 medical and medical sciences undergraduates in Management and Science University in Malaysia, assessed stress and coping by a global rating of stress and brief COPE inventory. The findings revealed that use of active coping strategies such as active coping, religious coping, positive reframing, planning, and acceptance was higher than use of avoidant coping strategies such as denial, self-blame, and alcohol or substance use).

Alcohol use was the least used coping strategy. The authors opine that this could be resulting out of the students’ religious beliefs, although under-reporting cannot be ruled out. Females used self-distraction, religious coping, emotional support, instrumental support, and planning, more than males. However, male students used more alcohol or substance consumption than female students did.

Older students (aged more than 21 years) used active coping, reframing, and planning more than younger students did. The reasons cited for this is that older students would have adapted to the college environment better and would have had a longer period of contact with mentors than younger students did.

A multicentre cross-sectional examined stress level, stressors, and coping strategies in 359 first year medical students from four Malaysian public universities and factors contributing to stress at the end of year (Yusoff et al., 2011). The top five coping strategies adapted were turning to religion, active coping, positive reinterpretation,
acceptance, and planning. Two out of the top three coping strategies were emotion-focused coping (turning to religion and positive reinterpretation). Even though positive coping strategies were adopted by the students as main coping strategies, yet the prevalence of distress was very high. Since this was a cross-sectional study, the recovery period from distress, of those who cope with this positive coping, could not be measured. It will be interesting to explore this matter further.

The supplementary data of this study revealed that denial, behavioural disengagement, self-blame, restraint coping, venting of emotion and use of emotional support were positively correlated with the GHQ-12 scores. Humour on the other hand was negatively correlated with the GHQ-12 scores.

A 10 year longitudinal study examined coping as one of the psychological factors that determined success in medical career (Tartas, Walkiewicz, Majkowicz, & Budzinski, 2011). In part I (1999-2005), medical students were examined each subsequent year, beginning with admission. Assessment included academic achievement (high school final examination results, entrance exam results, academic results during medical school) and psychological characteristics (sense of coherence, depression, anxiety, coping styles, value system and need for social approval). In Part II (2008-2009), the same participants completed an internet survey containing a burn out inventory, a self-designed survey, and 4 years after graduation. It was found that 69% of satisfaction with a medical career was predicted by the influence of previously used coping styles. It seems that broadly avoidant coping styles are more useful in adapting to the environmental requirements during medical studies than approach coping styles.

Yusoff, Abdul Rahim, and Yaacob (2010) in a cross-sectional design examined stress and coping strategies among 42 house officers in a Malaysian hospital. The implication for such a study was to guide medical teachers to find ways to prepare their students to cope with stress well before housemanship training. The questionnaires used were General Health Questionnaire (GHQ-12), General Stressors Questionnaire and Brief COPE inventory.
Findings pointed at major coping strategies practiced being turning to religion, acceptance (emotion focused coping methods) which are relatively adaptive and self-distraction (avoidant coping style) which is maladaptive.

Apart from studies that have used structured questionnaires to measure coping, there are other studies which have examined coping through qualitative methods, interview methods or using few questions.

One Portuguese qualitative study (Zonta, Robles, & Grosserman, 2006) examined quality of life of medical students in a Federal University by analysing empirical data derived from selected statements of 25 participants and from the literature. Through the course of exploration, they found that participants came up with stress coping strategies such as balancing study and leisure, organizing one's time, giving importance to interpersonal relationships and day-to-day phenomena, physical exercise, health nutrition and sleep, being religious, improving one’s personality to deal with negative events and availing psychological help.

Sharif, Al-Kamil, and Attiya (2005) conducted a cross-sectional study on stress and coping strategies among 300 medical students of the University of Basrah. Coping was assessed by seven questions. Frequent use of maladaptive strategies was seen. Majority (66.1%) reported repeated absence from lectures, 60.3% tended to cry, 52.9% reported sleeping for longer periods and 47.9% tended to be isolated from family and friends. However, the limitation of this study was that the use of adaptive coping methods was not explored at all.

Sohail (2013) in a study of first year medical students reported that males and females used different coping methods. Seventy five percent of males went out with friends, while 68% utilized internet chatting and text messaging. Around 48% of male students used tranquilizers and 50% adapted counselling from seniors or doctors. Among females, 92% saw television, 87% had internet chatting and text messages. While 48% students used virtual online or cell interaction with people, books were read by 48% and 45% used tranquilizers.
A study (Masiak, Kuśpit, Surtel, & Jarosz, 2014) conducted at Poland examined stress coping styles and personality types of 570 medical students hailing from rural and urban origin studying at the Medical University of Lublin (MUL). Findings on Coping Inventory for Stressful Situations revealed that task oriented coping and avoiding by engaging in a substitute task was more in students from big cities compared to students from small cities. Also, females used coping methods of avoidance and seeking social contacts than male students.

An et al. (2012) studied role of coping and personality in stress and other factors in 157 medical students studying in one of the medical colleges in Korea. Around 27% of the sample consisted of females and the mean age was 21.8 years. Medical Stress Scale (MSS), Temperament and Character Inventory, Hamilton Depression Scale, Beck Depression Inventory, and Coping Response Inventory were the scales used in the study. A mean stress score of 25.5 was found on MSS. Apart from being associated with novelty seeking and higher depression, academic stress as measured by MSS was positively associated with avoidant coping strategies and negatively related to active-cognitive coping and active-behavioural coping.

Active cognitive coping strategies involve acceptance, focusing on inner strength and positive reframing. Active-behavioural methods include external behaviours such as problem solving or going for professional advice. Avoidant coping methods involve things such as substance use, worrying to oneself and ignoring the problem.

With specific reference to coping, among the subcategories of MSS, “School curriculum and environment” and “personal competence/endurance” were positively related to avoidance coping and negatively related to active behavioural coping. Financial situations subcategory of MSS was negatively related to active cognitive coping. In the regression model that checked the impact of personality, depression, coping and age on academic stress, active-cognitive ($B = -.30$) and active-behavioural coping ($B = -.22$) methods, negatively predicted academic stress while avoidance coping ($B = .30$), positively predicted academic stress.

Regression analysis with subcategories of stress showed that “School curriculum and environment” were positively predicted by avoidant coping and negatively predicted
by active cognitive coping along with other factors. ‘Personal competence/endurance’ subcategory was positively predicted by avoidant coping and negatively predicted by active behavioural coping along with other factors.

The coping methods that were found most helpful by medical students in Chang et al.’s (2012) burnout study were support from peer and faculty, extracurricular activities and regular counselling aid.

In Soliman’s (2014) cross sectional study on stress and coping in first year medical students of a medical college at Saudi Arabia, the common coping methods were getting together with family and friends (37.2%), eating dinner out (27.6%), eating well (34.8%), respecting one’s physical limits (40.0%) avoiding peer comparison (24.1%) and going for walks (18.6%). Seeking help from academic guidance office (31%), students’ rights office and student council (28.3%) were disagreed by students as adapted methods of coping to deal with stress. Despite of having established offices such as students’ rights office and student council, students did not think that these helped them to cope with stress. It would be interesting to study the barriers that stop students from seeking help from these sources.

In the Indian context, few studies on medical students have examined coping strategies. In one study, Supe (1998) examined stress causal factors and controlling factors in first year, second year and third year MBBS students. Way-of-coping scales by Folkman and Lazarus (1986) was used to measure coping. Stress was more in medical students who used coping styles of positive reappraisal, accepting responsibility and planful problem solving. The reason speculated for this was that students realised their own mistakes and tried to overcome it. Stress was lesser in students who used escaping and distancing oneself from difficult situation. Further, stress was significantly high in those medical students who used more of positive reappraisal as compared to accepting responsibility, and escaping. Stress was also high in students who adopted planful problem solving in comparison to using the coping styles of accepting responsibility, self-control and seeking social support. The above study showed very unlikely findings where in problem focused coping methods were seen to be associated with more stress, while avoidant coping strategies were related to less stress.
Sreeramareddy et al. (2007) examined medical students in one of the medical colleges in Nepal where in nearly half of the students were Indians. They found that students made higher use of active coping strategies such as positive reframing, planning, acceptance, and active coping than avoidant coping strategies of denial, alcohol/drug use and behavioural disengagement. They speculate that though alcohol/drug use was the least reported strategy, there could be underreporting of such behaviours. Male students used active coping and alcohol/drug more often than females. Use of alcohol/drugs was more in the clinical years than in the basic science years where discipline is more. Instrumental support seeking was more in basic science years, suggesting the possibility of students seeking advice from senior to solve academic and daily problems. In the logistic regression analysis, emotion focused coping strategy of self-blame was related to GHQ caseness and venting with academic stress. The avoidant coping methods of denial and disengagement was associated with psychosocial stressors, while substance use was associated with health related stressors.

In another study conducted by Shah et al. in 2009, stress and coping was examined in 126 medical undergraduate students from a medical college in Ahmedabad, India. It was seen that a majority of students preferred to cope with stressful conditions by talking to their friends (28.57%), which was followed by an avoidant coping method of going to sleep (25.39%). The next preferred strategy was playing or watching sports (19.04%). The least preferred ways indicated by the students were either physical exercise or chewing or smoking tobacco (6.34%). Even though 34.92% students felt the importance of planning and procuring study and related materials, it was ranked very low in their preferences.

A Pakistani study (Shaikh et al., 2004) reported that resorting to sports, music and hanging out with friends were common coping methods used by medical students to cope with stress.

In the past five years there have been several studies that have discussed coping methods used by medical students to deal with stress.

In a recent Indian study, Cherkil, Gardens, and Soman (2013) studied the association between coping styles and stress in medical students studying at a medical college in Kerala.
Stress was assessed by Severity of Stress Scale (S3S)-Medical Students’ Version with domains of academics, self-expectations, relationships, living conditions, and health and value conflicts. Coping styles were assessed by Brief COPE scale.

Academic stress and self-expectations were observed to be among the high stress domains. Higher level of stress in academic domain led to use of coping styles of non-cope/negative coping (39%), blame (43.6%), and humor (41%). Same coping styles as in academics were seen to be followed when stress in self-expectation domain was high. In addition, religion as coping style was also used often. Non cope/negative coping (39%), blame (43.6%), and humour (41%) were also used more when perceived stress was high in relationship domain. Living conditions which was experienced as most stressful led to use of similar predominant coping strategies of negative coping, blame and humour as in other stress domains, but in addition, substance abuse (60%) was also employed frequently. The trend of predominant coping styles used in other stress domains was also seen in stress domain of health and value conflict and substance use was also used often (26.7%). Positive coping found moderate use in stress domain of academics (36%).

Further, over all stress was seen to be significantly and positively related to coping styles of negative cope, blame and humour. Stress in academic domain and self-expectations had a significant positive association with positive cope and religion. Coping style of blame was found to be significantly and positively related to stress domains of academic stress, self-expectations and relationships. Humour was found to be significantly and positively associated with stress domains of self-expectations, living conditions, and health and value conflict.

In another recent Indian study (Gade et al., 2014) of 131 first year medical students, the often used coping strategies to reduce stress were using internet, TV and music, being humorous with friends, seeking friends support, taking control of possible things and acceptance of things that do not change. Other often used methods were relaxing, healthy diet, engaging in a hobby, getting away from work, viewing problems differently. Ignoring problems, ignoring own needs with working hard, praying and meditating were also some other methods adapted to cope with stress. On the whole, students used adaptive coping strategies rather than avoidant strategies like alcohol and drug abuse.
In Patil et al.’s (2014) study on stress and coping strategies of first year medical students studying at a medical college in Tamilnadu, India, the often adopted coping strategies among males were spending time with friends followed by music and relaxing and involving in sports. In females, the common coping methods were taking rest and enjoying music followed by spending time with friends and being in solitude. Coping methods of resting, sports and preferring solitude was reported more by male students.

Kate, Shetty, Deshmukh and Moghe’s (2010) study on stress and coping strategies of 83 first year and 103 second year medical students enrolled at a medical college at Mumbai, India, showed that a small number of students from both years focused on problem solving and reported that they learned from the mistakes. While, a majority of students in both first and second year showed run away behaviours in the face of problems. A majority of second year students spent time with friends and sought advice from family members, while a small number of first year students spent time with friends and sought advice from family members. However, a single student reported of resorting to substance use such as consuming tobacco or alcohol.

Mane et al.’s (2011) study of stress in various professional courses, revealed that frequent ways of coping with stress for medical students were talking to friends, sleeping, watching entertainment programs and talking to parents or relatives.

The coping methods that were found most helpful by medical students in Chang et al.’s (2012) burnout study were support from peer and faculty, extracurricular activities and regular counselling aid.

Wachholtz and Rogoff (2013) examined the relation between spirituality and burnout experience of 259 medical students at a Northeastern Medical school in The US. Burnout was seen to have a significant positive relation with maladaptive coping (r= .66; p<.01). Clinical year students sought more emotional and instrumental support. Women were more likely to use adaptive coping, planning, emotional support, instrumental support, venting and self-blame more than males.

Gomathi, Ahmed, and Sreedharan (2013) compared causes of stress and coping methods used by students enrolled in first and second year of several health related professional programs at Gulf Medical University, United Arab Emirates (UAE). Medical students were one of the groups studied. The predominant coping strategies used by both
first year and second year students were religion/praying (78% and 71%), planning (76% and 65%), active coping (71% and 70%), positive reframing (68% and 62%) and seeking instrumental support (56% and 57%).

Other maladaptive coping strategies were also used by first and second year students such as self-distraction (52% and 51%), self-blame (50% and 42%), ventilation (35% and 30%) and certain amount of students (28% and 25%) reported of having given up coping. First year students were seen to use emotional support significantly more than second year students. However, there were no differences in stressors or coping methods between gender and various programs.

Prinz, Hertrich, Hirschfelder, and deZwaan (2012) in a recent study examined stress burnout, depersonalization, depression, anxiety and coping strategies in 109 medical and 73 dental students. It was seen that students who showed high values on the clinical variables also had high levels of dysfunctional coping.

The implications for understanding coping strategies in relation to medical student stress is two folded. One, it helps to understand what are the adaptive strategies that are helping students to effectively cope with stress. Such strategies can be taught to other students to enable coping with stress. Second, knowledge of deficient coping strategies that increase stress can be used to prevent adoption of such strategies or else such coping may be subjected to modification by appropriate intervention.

2.3. Social Support

Social support has been long ago recognized as an important protective factor against stress and negative health outcomes. Several definitions of social support exist guided by different theoretical back grounds. Most often researchers rather than defining the concept give criteria or delineate the components that social support is made of.

2.3.1. Definitions

Several definitions have been proposed to understand social support.

Cobb (1976) defined social support as “information leading individuals to believe that they are: cared for and loved, esteemed and a member of a network of mutual obligations” Lin, Simeone, Ensel, and Kuo (1979) describe social support as “support
accessible to an individual through social ties to other individuals, groups, and the larger community”.

Social support refers to “the existence or availability of people on whom we can rely, people who let us know that they care about, value, and love us” (Sarason, Levine, Basham, & Sarason, 1983, p. 127).

Thoits (1986) considers social support as a fund which people can draw upon to deal with stressors and it constitutes instrumental, informational and emotional functions, performed by the significant others, such as members of family, friends and co-workers in the person’s life who is having stress.

According to Cohen (2004, pg. 676) “social support refers to a social network’s provision of psychological and material resources intended to benefit an individual’s ability to cope with stress”.

2.3.2. Types of Social Support

Various researchers have given differing taxonomy of social support. Some of the types of social support as given by different researchers are discussed in the section that ensues.

Social support is conceptualized as a part of coping resource by Folkman and Lazarus (1985), and they propose three types of support, namely emotional support, tangible support and informational support. Emotional support conveys to the other that he/she is loved. Tangible support involves providing service or material goods. Informational support includes giving information and advice.

Somewhat similar to Folkman and Lazarus’s (1985) distinction, House and Kahn (1985) offer three types of social support: Instrumental support which means providing material help like giving money. Informational support involves giving important advice or guidance in helping one to cope with current problems. Emotional support refers to showing care, empathy and making way for expression of emotions to reduce distress.

Cohen and Wills (1985) propose two types of social support: structural support and functional support. Structural support refers to amount of support received or perceived, and can be understood in terms of how many ties a person has with others,
how many relations one has, how many social roles one performs and frequency of contact with others in social network. Whereas, functional support refers to functions or actions that support givers do in their role of assisting people who require support.

According to Cohen and Willis (1985) there are four important functions of social support namely esteem, informational, social companionship, and instrumental social support. Esteem support means making other person feel that he is accepted and his esteem is regarded. Informational support involves helping in defining understanding and dealing with problems. Social Companionship indicates engaging in leisure activities with others and instrumental support is characterized as providing material aid, money and other needed services.

Wortman (1984), Wortman and Dunkel-Schetter (1987) reviewing different types of social support identified various types of supports. Emotional-affectional support which involves expression of positive affection which may include the information that the person to whom the support is given to is cared loved and regarded with esteem. A second kind is informational support, where one is given the needed information and advice. Another kind of support is known as affirmational support which involves showing agreement with or conceding to the appropriateness of a person’s beliefs or feelings. Yet, another kind of support is appraisal support that encourages one to openly express feelings and beliefs. Next, is tangible instrumental support, which involves giving material aid or assistance with tasks. Finally, affiliational support means conveying to the support receiver that he is a part of social network that is characterized by reciprocal help and mutual obligation.

Barrera (1986) gave what he thought precise taxonomy of social support which included social embeddedness, perceived support and enhanced support. Social embeddedness means social resources, such as number of people to support and amount of social contacts that are available to a person. This is measured by analysing various social support networks. Perceived social support is how much one thinks that he has received the expected social support and how much he is satisfied with it. This is measured in terms of availability and adequacy of supportive relations. Enacted support means the frequency of helping behaviours or actions that one engages in assisting the support receiver.
Vaux (1990) conceptualizes social support has having the components of 1) support network resources which constitutes of people whose help can be resorted to in times of need 2) supportive behaviours or actual actions of helping the one in need, and 3) subjective appraisals of the support network resources and supportive behaviours.

Stress support matching hypothesis has been discussed by several authors (Cohen & Mckay, 1984; Cutrona & Russell; 1990) and this proposes that social support may not benefit to all stressors. Whether, a type of social support will benefit depends on whether, it functions effectively in dealing with a stressor at hand. Generally, emotional support functions effectively in most of the stressful situations, while, other support types function specifically in relation to the specific needs brought about by stressful situations (Cohen & Willis, 1985). For example, in case of academic stress, exam performance will be more influenced by student’s ability and therefore instrumental support in form of advice would be more suitable for exam stress more than emotional support. Also, in case of death of a pet, emotional support would be better than financial aid.

2.3.3. Models of Social Support
Two main models are mainly stated in accounting for the effects of social support.

2.3.3.1. Main effects model or buffering hypothesis. This model proposes that social support is beneficial only for people who experience stress. Social support plays the role of coping resource which reduces or stops the ill effects of stressors. But, social support is not helpful for people who do not have stress.

In other words, buffering would mean that harmful relations between stressors and psychological responses or distress would be attenuated or buffered for those with high social support than those with low social support. However, the amount of social support would not matter when levels of stressors are low.

Statistically, the stress-buffering model is supported by an interaction of stress and social support. As per this model, support influences at two points in the stress- pathology causal mechanism (Cohen & Mc Kay, 1984; House, 1981). At first point, support may come in between the stressful event and experience of stress by reducing or halting a stress response. In such a happening, others, through their support may help redefine or reduce the
harm that a situation endangers or boost one’s ability to deal with the stressful situation. This prevents one from appraising a situation as stressful. Secondly, beliefs that one will get support may reduce the emotional reaction to stressful events, attenuate physiological responses and modify maladaptive behaviours. Finally, support may act by reducing stress reaction or directly affecting physiological responses. In many ways, support may reduce the effects of stress by helping to find a solution to the problem, by helping one appraise a problem as less stressful, or helping to distract from the problem.

Support may suppress the neuroendocrine system to make one less reactive to stress and also encourage health promoting behaviours such as exercise and good nutrition (Cohen & Willis, 1985).

Sufficient evidence exists for the buffering effects of social support on the relation between stress and psychological distress, depression and anxiety (Cohen & Wills, 1985; Kawachi & Berkman, 2001; Cohen, Mermelstein, Kamarck, & Hoberman, 1985).

Dahlem, Zimet, and Walker (1991), examined the moderating effect of social support on stressful life events and depression, and found that only in people having high level of stress, social support was related to depression.

One landmark study that demonstrates the stress buffering effect of social support in physical health is a longitudinal study of healthy Swedish men over 50 years (Rosengren, Orth-Gomer, Wedel, & Wilhelmsen, 1993). The men having more numbers of stressful life events in the year before baseline assessment were at a greater risk for mortality during a seven year follow-up duration. This effect was seen to be reduced in those men who felt that high levels of emotional support were available. However, for those people with less stressful events, levels of emotional support did not make any difference.

2.3.3.2. Direct effects model. This states that social support is known to be beneficial irrespective of the level of stressors. If one perceives has having less support, then that perception itself can be a source of stress. But, the benefit of support can operate, when people perceive that others will give support when stressful events occur, or as an outcome of being part of a social network. When one perceives that others will help, this may result in higher positive affect, increased self-esteem and stability (Cohen & Syme, 1985; Cohen, Gottlieb & Underwood, 2000). Such a state of mind might influence one’s
proneness to illness through effects on neuroendocrine functioning (Jemmott & Locke, 1984), or by making changes in health-promoting behaviour. Being a member of a social network may bolster one’s feelings of control as it makes way for regular social interaction and the feedback that follows one to adopt proper social roles (Hammer, 1983, Thoits, 1983). Also, such a mind-set will affect health through its effect on behaviour and physiology. Feedback from others in the social network would help in avoiding stressful situations which otherwise could result in negative physical and mental outcomes.

The way this model works can be demonstrated by a statistical analysis where in a negative correlation would emerge between social support and stress reaction regardless of the amount of stressor experienced. While, stress reaction decreases as social support increases, stressor-social support and stressor-stress reaction correlations may be non-significant.

Evidence for the main effect model is seen in studies reviewed by Cohen & Wills (1985), which indicate that higher integration in the social network is associated with lower illness levels.

Social support’s effect on physiological, psychological and physical health is well documented. Social support is known to change physiological and neuroendocrinial responses to stress such as increases in heart rate and heightened blood pressure (Stansfeld, Fuhrer, Head, Ferrie, & Shipley, 1997). Social support also decreases cardiovascular reactivity (Lepore, Allen, & Evans, 1993; León, Nouwen, & Sheffield, 2007). Steptoe, Owen, Kunz-Ebrecht, and Brydon (2004) found increased HPA reactivity and noradrenergic activity in people who were lonely.

Evidence in animal studies indicate that social attachment and engagement in social interactions is facilitated by two neuropeptides namely, oxytocin and vasopressin (Bartz & Hollander, 2006). Similar implication of oxytocin has been documented in human beings as well. In a laboratory stress situation named Tried Social Stress test involving artificial creation of a job interview and public speaking, lead to increase in salivary cortisol and anxiety in men. However, oxytocin and social support attenuated anxiety and lead to low cortisol reactivity in these men (Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003).
There is also evidence for genetic factors interacting with environment in influencing the effects of social support on health indices. In one of the initial studies of gene and environment interaction, Kaufman et al. (2006) in a group of maltreated children found that combination of the met allele of the brain-derived neurotrophic factor (BDNF) gene and the two short alleles of the serotonin transporter (5-HTT) gene predicted the highest depression scores in maltreated children. This relation of the above mentioned genes and depression was moderated by social support. This shows that if psychosocial factors such as social support are modified, then genetic risk for developing mental illness in the presence of stressor can be reduced.

Ample evidence exists suggesting that social support may be related to good immune functioning (Dixon et al., 2001; Miyazaki et al., 2005; Persson, Gullberg, Hanson, Moestrup, & Ostergren, 1994; Lutgendorf et al., 2005).

In one such study, Lutgendorf et al. (2005) studied link between social support and natural killer cell activity in ovarian cancer patients and found that social support was a good predictor of natural killer cell activity in peripheral blood.

In one of the longitudinal studies examining social support in relation to immune function (T-cell counts) in HIV+ men over a five year study, social support was seen to be a salient predictor of helper-cells during later years of four and five (Theorell et al., 1995).

Of interest is also growing evidence for the links between social support and immune-mediated inflammatory processes. The cytokine interleukin-6 which is important in inflammation process and immune function increased in presence of supportive interactions in case of blister wounds, and also was related to better wound healing compared to interactions marked by conflict (Kiecolt-Glaser and colleagues, 2005).

There is abundant evidence in the literature suggesting the direct and inverse relation of social support to severity of physical and psychological symptoms (Zimet, Dahlem, Zimet, & Farley, 1988; Goplerud, 1980; Procidano & Smith, 1997; Schaefer, Coyne, & Lazarus, 1981; Wilcox, 1981; Saltzman & Holahan, 2002; Penley, Tomaka, & Wiebe, 2002; Komproe, Rijken, Ros, Winnubst, & Hart, 1997; Fernández-Ballesteros, 2002).
In the context of mental health, social support is known to affect depression. Studies have shown that poor social support is related to onset and relapse of depressive disorder (Paykel, 1994) and poor treatment response to depression (Oxman & Hull, 2001). On the other hand, good social support has been known to directly and indirectly protect against depression (Saltzman & Holahan’s 2002; Gadalla, 2009a; Shin, Han, & Kim, 2007; Sarason, Levine, Basham & Sarason, 1983).

Cohen, Mermelstein, Kamarck, and Hoberman (1985) found that in their study samples of students and adults, both reported higher depressive and physical symptoms, but strength of these associations were reduced in people who perceived that support was available from social networks.

Social support is also known to impact other mental health problems such as anxiety (Sarason et al., 1983), suicide (McLaren & Challis, 2009), post-traumatic stress disorder (Ozer, Best, Lipsey, & Weiss, 2003; Boscarino, et al., 1995) and psychological distress (Cohen & Wills, 1985; Levy, 1983).

The association of low levels of social support with higher morbidity and mortality in a number of medical illnesses is also well documented. For instance, in the famous Alameda County Studies, both men and women without social ties were 1.9 to 3 times more likely to die from ischemic heart disease, cerebral vascular disease, cancer, and other diseases in nine-year duration as compared to individuals with more social ties (Berkman, 1995).

Price et al. (2002) studied 514 women listed for a breast biopsy after mammogram screening and found that those women who had a recent major life stressor and lacked close emotional support were at nine times higher risk of developing breast cancer.

In one of the studies (Knox et al., 2000), which studied the association between social support and carotid atherosclerosis, it was seen that social support was linked to less underlying atherosclerosis in females at high risk for developing heart disease. But, lower social support was related to high odds of carotid artery lesions in these women.
2.3.4. Gender Differences in Social Support

There is mixed evidence for the effect of gender differences on social support.

However, while considering the socialization process, it seems that females are socialized to confide in others and be more expressive (Matud 2004) while, males are encouraged to be autonomous and less expressive of their emotions (Olsen & Shultz, 1994). These differences may have implications on what kind of sources of support males and females may use.

There is evidence to say that women seek support more often than males when under stress (Taylor et al., 2000). This is truer in the case of emotional support as reported by Tamres, Janicki, and Helgeson (2002). This could be because females perceive more stress than males.

Day and Livingstone (2003) in a group of university students found that women made higher use of family and friends’ support than male students. However, family support did not differ between gender, when perceived stress was controlled. But, females used more friends’ support regardless of the stress.

Colarossi (2001) found that adolescent females had more supportive friends than males, while males had more family support than males. Hays and Oxley (1986) also found that in first year college students, females sought more peer support than males. However, there was no gender difference on use of family support. There is also proof for the fact that females use family support more than males (Narayanan, Menon, & Spector, 1999).

In a study of working people in Sweden, it was seen that absence of social support at work strongly predicted higher stroke and myocardial infarction in women compared to men (André-Petersson, Engström, Hedblad, Janzon, & Rosvall, 2007).

In men, specifically, social support is known to protect them from suicide (McLaren & Challis, 2009). The reason for social support not figuring out as a protective factor for males may be due to the type of support assessed i.e. emotional. Males use emotional support than other types of support (e.g., Verger et al., 2009).
2.3.5. Social Support in College Students

College can be exciting as well as stressful at the same time. Students have to cope with vast syllabus, exams, and assignments within a compact frame of time. Family, peer and faculty support will go a long way in helping students to cope with the stressful demands of college life and succeed.

Macgeorge, Samter, Gillihan, and Graves (2005) studied the role of supportive communication from friends and family in buffering the effects of academic stress on health in 739 college students.

Findings revealed that association between academic stress and depression decreased as instrumental support increased. Further, emotional support was negatively related to depression in all levels of academic stress.

Asberg (2000, unpublished thesis) in a sample of 241 college students found that stress, inadequate social support and escape-avoidance coping were associated with increased depression and lower life satisfaction in both males and females. Social support was seen to moderate the relation between stress and negative outcomes, specifically during high stress. Also, stress and social support interacted with each other to predict depression in both males and females, and anxiety in males.

Misra, Crist, and Burant (2003) examined the interrelations among life stress, academic stressors, perceived social support and reactions to stressors in 143 international students. With regard to social support, Misra et al. (2003) found that low levels of social support predicted high amounts of academic stressors.

In an interesting study (Rayle & Chung 2007-2008) that examined the Nancy Schlossberg’s (1989) concept of mattering experience (experience of others depending and being interested in us) along with gender and social support was examined in relation to academic stress in a group of 533 first year undergraduate students. Irrespective of gender, support from college friends emerged as the most powerful predictor of mattering. Also, mattering to college best predicted academic stress.

A study conducted (Feldman et al., 2008) on 321 Venezuelan university students wherein the relations of academic stress, social support and their associations with mental health and academic performance were examined, it was seen that higher social support
was associated with less academic stress and better mental health. Less support from friends was related to high stress levels in women, while less support from close friends and less general social support was associated with high stress in men. Academic performance was better in both males and females, when academic stress and social support from close people was perceived to be moderate.

In a survey (Sun, Buys and Wang, 2011) of 2046 Chinese students hailing from nine Universities of Bejing, the relation between depression (as measured by GHQ) and social factors was examined. Among other factors, low levels of social connectedness and lack of support from family and friends was associated with reported depressive symptoms.

A Malaysian study (Md, Md, & Dzulkifli, 2011) examined relationship between social support and psychological indices in 120 undergraduate university students. The study findings indicated that higher social support meant lower psychological problems of anxiety, depression and stress.

Many studies have shown that social support can alleviate effects of psychological problems and assist to deal with academic workload (Calvete & Connor-Smith, 2006; Villanova & Bownas, 1984; Dollete, Steese, Phillips, & Matthews; 2004; Tao, Dong, Pratt, Hunsberger, & Pancer, 2000.; Friedlander, Reid, Shupak, & Cribbie, 2007).

In a study (Holahan, Valentiner, & Moos, 1994) of first year students, students with higher parental support had more well-being and happiness and less depression and anxiety than students with low parental support. Wentzel (1998) showed that family and friends predicted students’ well-being and development of pro-social goals.

Studies have shown that social support correlates negatively with psychological problems. For example, the negative effect of low social support on anxiety, stress and depression was demonstrated by Nahid and Sarkis (1994) when they found in a sample of college students that low levels of social support was associated with high level of anxiety stress and depression.

Dwyer and Cummings (2001) examined the association of self-efficacy, social support and coping with stress levels of 75 University students. Students using more social support from friends used higher emotional coping such as talking to others. Also, women had more social support from friends than men.
In view of the lack of studies on social support in Middle Eastern cultures, Brannan, Diener, Mohr, Mortazavi, and Stein (2013) studied associations between perceived social support and well-being in college students of Jordan, Iran and United States. In all countries, perceived support from family predicted well-being. In Jordan and US, friend support was related to high levels of positive mood. Whereas, in Iran perceived support from friends did not predict well-being.

In a survey (Grant-vallone, Reid, Umali, & Pohlert, 2003-2004) done on 118 college students, associations between self-esteem, family support, peer support and support service utilization on one hand, and adjustment and college commitment on the other hand were examined. Students with high self-esteem and more peer support had better academic and social adjustment. Also, students making frequent utilization of support services experienced better social adjustment.

Smith and Renk (2007) studied social support among other predictors of academic related stress in 93 students enrolled in a psychology course. On Multidimensional Scale of Perceived Social Support (MPSS), female college students were seen to receive higher social support from significant others when compared to their male counterparts. Whereas, there were no gender differences in the support received from family members and friends. On Young Adult Social Support Inventory (YA-SSI), female college students were seen to receive more support from parents, siblings and college friends in comparison to male students.

Social support by significant others positively predicted academic stress, but parental support was not related to academic stress. The authors posit that social support seeking from significant others would have been higher when facing high stress. They speculate that presence of boyfriends and girlfriends may have more of an immediate influence in their day to day living compared to parents who are far away.

Social support has shown to be beneficial in easing the transition to college phase of learning (Hays & Oxley, 1986).

In one of the studies that examined gender differences in perceived stress and social support among 186 undergraduates, it was observed that women perceived greater stress than men and they were more likely to seek support from partner and friends as
compared to men. Emotional support seeking also was greater in women when compared to men. However, when perceived stress was controlled for gender difference, some sources and types of support ceased to exist.

Cutrona, Cole, Colangelo, Assouline, and Russell (1994) studied the interrelation between family support, family conflict and academic achievement in 418 undergraduate students using appropriate measures. They found that parental social support, particularly reassurance of worth predicted Grade Point Average (GPA) after controlling for academic aptitude, family achievement orientation and conflict in the family. Support from friends or romantic partners did not predict GPA.

The present era is marked by technological revolution that has contributed largely to reduce the distance between people. Facebook is such an outcome of the technological growth where people can constantly network with each other. This medium is used largely by the younger generation to communicate. Therefore, this gives reason enough to speculate whether communication through Facebook can be a viable source of support.

A study (Wright, 2012) examined perceptions (homophily and attraction) of support providers, emotional support and perceived stress among college students who use Facebook.com. It was seen that perceived emotional support from other fellow Facebook users predicted low stress. Also, perceptions of homophily and attraction related to support providers predicted higher emotional support.

Vertin (2002) studied 421 Cincinnati students and examined the types of stressors they experienced in relation to the availability, helpfulness and frequency of the reception of social support as measured by Weekly Stress Inventory (WSI) and the College Student Social Support Scale (CSSSS).

It was seen that most students had available, helpful and frequent use of social support networks. However, their frequency of social support use was lower than availability and helpfulness of social support. The authors opine that the reason for this could be that students were too busy to seek help or found it difficult to seek social support. Females were seen to have more available, helpful and frequent use of social support networks than their male counterparts.
Hamdan-Mansour and Dawani in 2008 examined perception of social support in relation to perceived stress among 241 university students in Jordan. Higher social support was associated with lower stress and female students had higher stress and social support than male students. Perceived social support was seen to be a better predictor of stressful life events than social support from friends.

In another study of 22 psychology graduate students Goplerud (1980) found that social support from peer and faculty during the first ten weeks of the study was related to low levels of stressful life events, and physical and psychological symptoms throughout the next six months. The quality of faculty-student interactions was an important factor that moderated the negative results of the major life changes at the beginning of graduate school.

A study on 314 undergraduate and post-graduate social work students examined the relation between academic stress and resilience and the moderating effect of social support on the relation between academic stress and resilience (Wilks, 2008).

Friends’ support was seen to significantly moderate the relation between academic stress and resilience. In other words, friends’ support along with resilience played a protective role in an academically stressful environment. Family support was seen to significantly moderate the relationship between academic stress and resilience.

In an African American student sample, higher levels of social support were significantly related to low levels of stress (Negga, Applewhite, & Livingston 2007). MacGeorge, Samter, Gillihan, and Graves (2005) found evidence for a moderating effect of informational supportive communication from family and friends on the association between academic stress and psychological health.

Mallinckrodt, Leong, and Kralj (1989) studied sources and types of social support that helped graduate students to deal with stress. They were also interested in knowing the gender differences. Women had more stress and less tangible support from their academic departments and less cohesive support from their family. Social support had direct effects in men indicating that irrespective of levels of stress, social support was useful for men. But, social support did not have a buffering effect for men indicating that social support is not beneficial to them in the event of other stresses related to life changes.
In women, social support was useful only in interaction with stress. It accounted for 40 percent of variation in depression and 31 percent of variation in anxiety in interaction with life change stress.

Quality of living conditions, finances, and child rearing contributed significantly to the social support buffering effects for women. In other words, when these factors were positive, they reduced the effects of other stressors, but when negative, the impact of other life stressors were high. Family condition was a strong stress buffer for women. In conclusion, women experienced greater role strains.

In an online survey (Chao, 2011) of 459 college students, a model that links stress social support, problem-focused coping and well-being was tested. The results showed that social support buffered the relationship between perceived stress and well-being.

Avoidant coping was seen to reduce well-being at both high and low social support levels. Students adapting high avoidant coping in a low social support condition had the lowest well-being when they were stressed.

Problem based coping was seen to mediate the moderating effect of social support on the relation between stress and well-being. When individuals received support by family and friends, problem based coping worked better to enhance their well-being.

Reifman and Dunkel-Schetter (1990) studied the stress buffering and main effects of four types of structural social support on well-being of 161 college students. Frequency of taking part in activities with other students was negatively related to depressive symptoms and positively related to health and physical fitness. Other social factors such as number of friends in college campus, belonging to social groups or having a romantic relationship did not have main effects or stress buffering effects.

### 2.3.6. Social Support in Medical Students

The literature pertaining to social support in general is vast. However, role of social support in medical students’ well-being has been sparingly examined. Some available literature in this regard is discussed in the following section.

Rospenda, Halpert, and Richmond (1994) studied the buffering effects of social support on stress and its enhancing effect on academic performance in a cohort of 153 third year medical students at the University of Illinois College of Medicine at Chicago.
Social support was not found to have a buffering effect on stress. However, social support from outside the medical college contributed to a significant variance in role related stress and academic performance. Higher supports from outside the medical college were related to poor grades in women, but with low stress levels in men. Both outside the college and inside the college, support was associated with poor grades for the whole sample. The authors opine that time spent on social support outside the school may have jeopardized the time spent towards academic goals. They further conclude that time management interventions may be more useful than support interventions, particularly for women.

In a longitudinal study (Strayhorn, 1989) of relation between medical students’ mental and social well-being, and the difference in the expectations and the actual reality of learning condition and social support, it was found that at the end of the first year, social support was positively related to social well-being. A significant trend was observed wherein social support was negatively associated to mental well-being, and social support was seen to positively interact with students’ perception of the learning environment.

When a comparison of perceived support factors of first year medical students in the regular track curricula (RT) and transformed track curricula (TT) were made in one of the German medical colleges, it was seen that students in the RT perceived to be more supported than students in TT in aspects of study conditions, and social support received from the university. Perception of support included factors such as good peer and faculty support, quality based courses, and curriculum meeting students expectations. Students in both RT and TT curricula did not differ in their perceptions of support received from sources outside the university (Kiessling, Schubert, Scheffner, & Burger, 2004).

A Korean study examined stress, resilience, social support and quality of life of 53 undergraduate and 43 postgraduate medical students during clinical clerkship. Higher stress was associated with lower social support and higher quality of life was related to increased levels of social support (Kim & Cho, 2012).

Chang, Eddins-Folensbee, and Coverdale (2012) investigated the prevalence of burnout, stress, depression and social support usage by 526 medical students studying in first three years of medical college. High burnout range was around 55%, and 60% of participants experienced depressive symptoms. Among the most helpful resources in dealing with stress and burn out, were social support from peer and faculty.
In a study (Peng et al., 2012) which examined the role of resilience, personality and social support in the relation between negative life events and mental health problems of 1,998 Chinese medical students, mental health problems were seen to negatively correlate with social support.

Attrition is one of the major problems in medical education. Lack of social support can lead to social isolation and the consequent dropping out of medical college as is shown in the recent study done by Maher et al. (2013). Maher et al. (2013) examined factors related to attrition over a ten year period (2001-2011) in a medical school. Among other factors, 20% of the students who dropped out experienced social isolation. Such students had difficulty in socializing; felt had no one to talk to and had no friends.

Mental health outcomes have also been associated with social support. In an earlier study, Foorman and Lloyd (1986) investigated relation between social support and psychiatric symptoms in 82 first year medical students at the University of Texas Medical School at Houston and found that at the beginning of the college year, students with high social support had less psychiatric symptoms. But during the middle of the year, higher social support was seen to be associated with increased psychiatric symptoms. The authors opined that during certain times in medical colleges, the time required to maintain social ties may compete with time demands of task related to medical curricula.

Jeong et al. (2010) studied interpersonal social support among other factors in relation to prevalence of depression in 120 medical students in a Korean medical college. Social support was assessed using the interpersonal support evaluation list (ISEL). Depression as measured by Center for Epidemiology Studies Depression Scale (CES-D) was seen to occur 10 times more in students with low levels of perceived interpersonal support. The authors concluded that social support needs to be provided to promote mental health in students.

Faculty support mitigates the negative effects of stress experienced by medical students. Ninety six faculty members from 12 medical schools were examined for their interpersonal supportive behaviours towards students experiencing personal problems. Faculty on an average spent around 50 minutes per week discussing student’s personal problems. Students had problems in faculty interactions, finances and emotional health.
Faculty listened, offered support and empathized with students. Most medical faculty happened to appreciate their role as helpers and felt helping to be a predominant component of their job (Brown & Barnett, 1984).

Social support programs go a long way in supporting the medical students. A study (Bell, Smith, Brokaw & Cushing, 2004) tested the effectiveness of a family day program to educate families and friends of the new medical students about the stress contributing factors in medical education. Following the program, the post assessment scores indicated that families and friends of medical students understood the importance of social support systems for medical students as a consequence of which they may offer better support to medical students.

Goetzel, Croen, Shelov, Boufford, and Levin (1984) studied how medical students benefitted from self-help support groups at Albert Einstien College of Medicine. Twenty six students who attended these self-support groups were tested for the reasons for attending them and the gains they had.

The students reported that primary reasons for attending these groups were to have social affiliations and need to express feelings in a comfortable environment. Among the benefits from participation in such groups were informal contact with faculty and support from fellow students. Students perceived these groups as meaningful and wanted to have more such contacts.

Malik (2000) was interested to study the factors contributing to a successful support scheme in 144 second year and third year medical students at the University of Dundee. Students were administered tools pertaining to contacts with their personal mentors, frequency and activities during meetings, and their satisfaction with the support scheme. Twenty eight faculties were also asked to complete tools similar to that of students. Around 18% of the students and five percent of the tutors opined this support scheme to be very successful. The high success rating was attributed to regular and frequent meetings with teachers being genuinely interested in their students and taking part in students’ social and academic activities.
In a recent study (Oser et al., 2014) of medical student mistreatment, a question regarding how school support programs helped students cope with stress and burnout elicited responses from 56.3% of students. Nearly, a third of students reported that institutional support was in no way helpful. Among the 133 students who felt that something was helpful and 99 of them felt at least one institutional program helped them. Student oriented programs such as student-led peer-as-resource networking program (PRN) was perceived to be helpful by 38 students. Faculty support and mentoring support was thought of as helpful by 28 students, 28 found counselling useful, while 25 felt structured events such as courses and student affairs activities helpful. Among the 32 students who used non institutional coping methods, noted were engaging in religious practices, seeking family and friend support, involving in extracurricular activities such as volunteering and exercise, and taking time out from study.

Sandars, Patel, Steele, and Mcareavey (2014) discuss the importance of developmental student support in the medical education which aims at a wholesome development of the student apart from academic and clinical competence. The authors opine that providing support through a developmental approach widens the scope of support reception by all students rather than support being offered to only “at risk” students. Also, this kind of support enables resilience development and adequate adjustments of students with learning problems. In addition, career guidance can be a part of such support system to enable students to get clarity about their career in medicine. Sandars et al. (2014) emphasize that medical schools need to develop an organizational culture where all feel responsible for providing support to students, with additional support offered from identified personal tutors.

Student support in the form of mentoring is important to enhance students’ well-being. Frie, Stamm, and Buddeberg-fischer (2010) conducted a PubMed literature search on mentoring programs between 2000 and 2008. Among the 438 publications identified, 25 articles were selected as they had structured intervention programs and appropriate study measures.
Fourteen papers consisted of mentoring programs that reported of providing career related guidance, encouraging professionalism, research productivity and personal growth. There were one-to-one as well as group mentorship programs, some of which catered to first two years of medical education, and others continued through the duration of medical education. Students were observed to benefit from the student faculty relation in the way of receiving advice and support for career choices. Other uses were better academic performance, increased research productivity and enhanced well-being. Remaining 11 surveys covered the essentials of being an effective mentor and compliant mentee. The characteristics of an effective mentor were found to be ability to empower the mentee, be a good role model to emulate, help mentee develop a professional network and facilitate mentee’s personal development. On the other hand, for the effect of mentoring to work, a mentee should have agendas, follow advice, accept criticism, and critically evaluate performance and benefits received from the mentoring support.

In the Indian context, there are few studies that have given exclusive attention to social support in medical students.

Supe (1998) studied social support among other factors in relation to stress in first year, second year, and third year MBBS students at an Indian medical college. On Zimmet’s The Multidimensional Scale of Perceived Social Support (1998), he found that friends as a source of support was felt more by second year students than students in other study years. But, friends as a source of support was felt less by third year students. Supe opined that more perceived support by friends in second year students may be a result of students spending more time at college than home. Peer support may be perceived less in third year as serious competition may begin amongst students.

Surprisingly, students with higher peer support experienced more stress. The reason cited by the author for this phenomenon is high availability of peer support during high levels of stress.

Sreeramareddy et al. (2007) in a study of stress in undergraduate medical students in Nepal, where most students were Indians, students of clinical years were seen to use instrumental support. The authors proposed that students in clinical science years may be more connected with seniors and would be more likely to take advice for solving their
academic concerns. Students, whose parents were doctors, were observed to use more of emotional support.

In another study of stress in 126 Indian medical students, seeking support from friends was the predominant way of dealing with stress (Shah et al., 2009).

Mohanty et al. (2011) in a study of stress in 302 Indian medical students studying in 1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} MBBS and internship found that social support prominently impacted lifestyle of the students.

In the Indian study (Nandi et al., 2012) done at a Kolkata teaching hospital examining stress and stressors in medical students, stressed students were observed to have significantly poor social support from friends and family when compared to non-stressed students. Better social network was associated with higher mental well-being.

Literature review showed that there is a dearth of social support studies in the context of medical students in India. Only one study was found which examined the effects of both family and friend social support.

Therefore, this study purported to measure not only the support provided by family and friends but also the dimensions of availability, helpfulness and reception of the support in medical students.

2.4. Resilience

The term resilience has been defined as a positive outcome in the context of adversity (Luthar, Cicchetti, & Becker, 2000a). Wolin and Wolin (1993) defined resiliency as the “capacity to bounce back, to withstand hardship, and to repair yourself (p. 5)”. According to Masten, "Resilience in an individual refers to successful/adaptation despite risk and adversity" (Masten, 1994, p. 3). The general understanding of the term resilience is to bounce back from times of adversity, stress or illness.

Resilience as a concept was initially introduced in the 1970s in the developmental context pertaining to children (Garmezy, 1974, 1985; Rutter, Tizard, Yule, Graham, & Whitmore, 1976). Resilience research was however preceded by vast research on children at risk for developmental psychopathology (Rutter, 1987; Cicchetti & Garmezy, 1993). While studying children at risk for psychopathology, it was seen that some children did
well despite adversities. They were seen as “invulnerable” (Pines 1975, Anthony, 1974). Owing to either stable personal characteristics such as good intellectual ability, or conducive factors of environment, these children could overcome negative conditions and positively adapt. Later, the concept of resilience came to be understood as a dynamic process rather than a stable internal factor (Luthar & Zelazo 2003).

Two important aspects related to resilience are recovery and sustainability. Recovery refers to the process of bouncing back or recovering completely from a challenging situation (Masten, 2001). Sustainability means the ability to move along while facing adverse situations.

Risk and protective factors are always referred to while discussing resilience.

Fraser and Terzian’s (2005) define risk factor as: “Broadly defined, the term risk factor relates to any event, condition, or experience that increases the probability that a problem will be formed, maintained, or exacerbated” (p. 5). Risk factors inhibit resilience and increase the probability of negative outcomes in the context of adversity. Biological risk factors may include low birth weight and congenital defects (Rak & Patterson, 1996). Environmental risk factors may include poverty, low parental education, family conflict and negative parental rearing practices (Brooks, 2006; Luthar & Ziegler, 1991; Masten, 2011; Rak & Patterson, 1996).

Protective factors are defined as "influences that modify, ameliorate or alter a person's response to some environmental hazard that predisposes to a maladaptive outcome" (Smith & Carlson, 1997). They buffer the effects of stress or risks on an outcome and enhance better adaptation.

Protective factors may include intellectual ability (Baldwin et al., 1993; Luthar & Zigler, 1991, 1992), sociability (Luthar & Zigler, 1991) and internal motivation (Masten, 2001). Other protective factors may be good family environment with positive characteristics, good attachment and bonding (Garmezy, 1991; Luthar & Zigler, 1991; Rutter, 1987; Masten & Coatsworth, 1998), positive school experiences (Rutter, 1987; Werner & Smith, 1982), and good friends (Werner, 1997).
Review of literature points that resilience is discussed in three major contexts. Recovery of people undergoing trauma forms the first area. Second area is of those individuals who are at high risk for developing problems, but surprisingly surpass the limitations and show good adaptation than expected. Finally, it is the context of those people who adjust well in the face of stressful encounters. Rutter’s (1979) 10 year longitudinal study illustrates the first context, where in children of parents having mental illness were examined. These children generally didn’t develop mental illness despite adverse conditions. The answer lied in the fact that some of the internal factors of children and external factors of good school environment that fostered healthy development served as protective factors for these children.

Second context is rightly represented by the illustrative study of Werner and Smith (1977) where in a high risk group of children of Kauai Hawaii were studied. The risk conditions of these children were poverty, parental stress, parental psychopathology, family discord etc. Nearly, a third of this sample was seen to adapt successfully to life when reaching adulthood. Compared to high risk children who developed problems as adults, the resilient children at risk had good traits such as good self-help skills, affectionate style, good language etc.

The third context of resilience process is best shown by the longitudinal project competence study initiated by Garmezy in 1970’s (Garmezy Masten, & Tellegen,1984), where in children’s resiliency process in the context of stressful experiences were studied. The findings point that children with lower intelligence and from lower class and with non-conducive family environment were less competent and were more problematic.

However, some of the disadvantaged children did not show behavioural problems and exhibited higher competence. Over the years (Masten & Tellegen, 2012) several findings emerged with regard to why some children despite adversity adapted well even as adults, which pointed to the role played by both environmental and individual factors in the manifestation of resilience.

The four waves of resilience research are discussed by Masten and Wright (2010). The focus of first wave of research was on describing, defining and measuring the concept of resilience. Efforts were directed towards examining the differences between people who fared well and who did not fare well in various risk or adverse conditions.
The outcome of first wave of research showed that characteristics of people, relationships and resources predicting resilience were consistent across various contexts and these protective factors still yielded predictive power in subsequent waves of research.

The second wave of research in resilience extends to focus on identifying and understanding the specific processes that foster resilience. Research in this context also involves multiple layers of analysis and neurobiological mechanisms.

The third wave was marked by efforts to examine resilience related protective and promotive processes through interventions such as effective parenting (Brooks & Goldstein, 2001).

The more recent fourth wave includes studies that are integrative and examine the interaction of genes, neurobehavioural correlates and statistics to better understand the processes that lead to resilience (Masten, 2007). One of the examples of fourth wave studies is studying neuro plasticity in resilience (Cicchetti & Curtis, 2007).

Various explanatory models of resilience exist in order to understand how people thrive in adverse or risk laden contexts.

2.4.1. Models of Resilience

Garmezy et al. (1984) has put forth three models of resilience:

2.4.1.1. Compensatory model. In compensatory model, certain factors neutralize exposure to risk without necessary interaction with the risk factors. Instead, they have direct independent or main effects on outcome regardless of amount of risk.

For instance, poor young people are more prone to show violence than those who don’t live in poverty. However, if adults manage or monitor the violent behaviours of young people, it may reduce the effects poverty has on likelihood of violent behaviours (Fergus & Zimmerman, 2005).

2.4.1.2. Protective model. In protective model, a factor has varying effects depending on the level of the risk. As per Garmezy et al. (1984) a conditional relation exists between personal attributes or factors and stress with regard to adaptation. When risk is high, a protective factor will have stronger effects. Hence, it may have a buffering or
ameliorative influence on a negative outcome. For example, high levels of parental social support will lessen the relation between poverty and violence in young people (Fergus & Zimmerman, 2005).

2.4.1.3. Challenge model. In the challenge model, the stressor or risk is seen as enhancing competence or leading to a steeling effect at moderate amount of stress or adversity (Garmezy et al., 1984). Too little stress may not be challenging and too high levels may result in higher negative outcome. But, moderate levels of stress will be challenging enough, helping one to mobilize resources to deal with stress. Subsequently, when the adversity is overcome it will strengthen one’s competence and inoculate one against such similar adversities (Zimmerman & Arunkumar, 1994).

2.4.1.4. Protective-stabilizing model. This model refers to contexts where a protective factor helps in neutralizing the risk effects (Luthar et al., 2000a). In the absence of protective factor high amounts of risk may lead to higher negative outcomes. The presence of protective factor nullifies the relation between the risk and outcome.

2.4.1.5. Protective reactive model. In this model, though the protective factor may not completely remove the relation between a risk and outcome, the relationship may be weakened. In other words, the association between risk and outcome is high in the absence of protective factors (Luthar et al., 2000a). For instance, young people abusing drugs are more prone to indulge in high sexual behaviour. Yet, the relationship may be less strong in those young people who have had sex education than those who have not received sex education (Fergus & Zimmerman, 2005).

2.4.1.6. Protective-protective model. This model proposes that one protective factor enhances the effects of another protective factor on an outcome (Brook et al., 1986, 1989). For example, parental support may enhance the positive effect of academic ability in bringing about more positive academic outcomes than when these factors act alone (Fergus & Zimmerman, 2005).

Of late, there are resilience models which examine genes and environment interaction influence on outcomes (Kim-Cohen & Gold, 2009). There are also models related to “differential susceptibility” and “sensitivity to context” which hold the view that some children are susceptible or sensitive to the influence of adverse or positive contexts (Boyce & Ellis, 2005; Belsky, Bakermans-Kranenburg, & IJzendoorn, 2007).
In all the models discussed, resilience is seen as a dynamic and interactional concept as it involves processes that occur during and after risks or adverse conditions that threaten the organisms across the life span.

The concept of resilience is seen to overlap with related concepts such as ego-resiliency (Block, 1989), hardiness (Kobasa, 1979) and self-efficacy (Bandura, 1997).

Most of the early focus of resilience studies was centred in children from a developmental psychopathology perspective. Research focus included children who were seen to thrive despite adverse conditions as against those children who did not fare well. With regard to adults, the importance of resilience began to grow much later. It has been researched in terms of adaptive factors in the face of life threatening illness such as HIV and cancer (Bower, Kemeny, Taylor, & Fahey, 1998; Taylor, 1983). Resilience studies in adults have also focused on how people adapt in face of traumas, such as natural disasters or personal traumas, such as an unexpected negative life event like loss by death or accidents (deRoon-Cassini, Mancini, Rusch, & Bonanno, 2010).

Positive outcomes resulting out of post traumatic events were termed as post-traumatic growth and studied. Some researchers argued that most adults can face trauma and function well after trauma with little disruption to their daily functioning (Bonanno, 2004, 2005). In studies of New York dwellers that underwent the World Trade Centre attack, it was seen that a majority suffered only one or no trauma symptoms, had no depressive symptoms or substance abuse problems and thus were characterized as being resilient (Bonanno, Galea, Bucciarelli, & Vlahov, 2006, 2007a).

Bonanno (2004) has described this resilience in adults as “the ability of adults in otherwise normal circumstances who are exposed to an isolated and potentially highly disruptive event, such as the death of a close relation or a violent or life-threatening situation, to maintain relatively stable, healthy levels of psychological and physical functioning” (p. 20).

2.4.2. Types of resilience proposed by Bonanno and Diminich. In a paper Bonanno and Diminich (2013) introduce two terms emergent resilience and minimal impact resilience to delineate the difference in resilience arising out from long time adversity and single event related traumas.
2.4.2.1. **Emergent resilience.** Emergent resilience has roots in the developmental research. This refers to emergence of adaptation in the context of chronically adverse situations such as poverty, parental loss etc. (Garmezy, 1991; Sandler et al., 2003). The focus here is on studying risk and protective factors that influence the process of adaptation and resulting adjustment over a longer time frame work.

2.4.2.2. **Minimal impact resilience.** This concept has emerged over the last decade mainly from the research focused on psychological well-being in adults (Bonanno, 2004; Bonanno et al., 2006). Minimal impact resilience refers to how people cope with trauma arising from loss or acute life events. The adjustment outcomes studied are more proximal to the sometimes isolate acute traumas (Bonanno, 2004; Bonanno et al., 2011). The minimal impact resilience that occurs after an acute trauma may result in little or no disruption of functioning and stable pattern of adjustment without break from before the trauma, or subsequent to the traumatic event.

Not all people respond to a trauma in the same way. Some are badly affected. A few take many months to recover after struggles. There are considerable number of people who may function normally immediately after the event and seem to be resilient (Bonanno, 2004).

Earlier, absence of distress in the face of loss was not seen as a normal phenomenon. It was seen to be either a sign of excellent emotional strength or emotional numbness (Bonanno, Westphal, & Mancini, 2011). However, mounting evidence points to a reality of existence of resilient people who undergo post traumatic experiences (PTEs) with little effects on their day to day functioning (Bonanno et al. 2002b; Bonanno, 2004).

Skodol (2010) attempted a synthesis of overlapping concepts that have been used to describe certain traits of resilient personality based on the review of research of such concepts that have shown to mitigate effects of stress or adverse conditions. The following are the traits of resilient personality: a strong sense of self characterized by a self-esteem, self-confidence or self-efficacy, self-understanding, a positive future orientation, hardiness, ego-resiliency and adaptive defence mechanisms (such as affiliation, altruism, anticipation, humour, self-assertion, self-observation, and sublimation are adaptive). Among other traits are good interpersonal skills, such as sociability, greater interpersonal understanding and ability to be emotionally expressive in interpersonal situations (Skodol, 2010).
Research on resilience began with high risk children exposed to adverse circumstances (Garmezy, 1984; Werner & Smith, 1982; Rutter, 1976, 1979) and extended to traumatic stressful circumstance such as death of family member or terror attack (Bonanno, 2004, Mancini & Bonanno, 2009, Bonanno et al., 2007a) and illness such as cancer(Taylor, 1983). Studies have also taken place on risk and resilience in the context of daily stress (Diehl & Hay, 2010; Ong, Zautra, & Reid, 2010). Also, resilience research has gone beyond the youth extending to older adults where in higher resilience has been associated with better health and social outcomes (Hardy, Concato, & Gill, 2004; Wagnild, 2003).

2.4.3. Academic Resilience in the Educational Context

Resilience has been widely studied with reference to psychological and physical outcomes in relation to a host of adverse situations such as poverty, parental psychopathology, and poor parenting, and so on. However, attention to resilience in academic settings with reference to academic development has still a long way to go (Martin & Marsh, 2003).

Resilience is an important construct in the educational settings as most students generally face continued academic demands, while certain students may face other personal and resources related risk factors such as academic failures, stress, poor economic and disadvantaged conditions of living. Of students who face various risk factors and setbacks in educational context, there are some who despite such conditions are resilient and have academic success and progress. Researching on identifying and fostering resilience related factors may help in attuning the educational environment in such a way as to reduce academic failures and enhance educational success.

Specific to the academic context, certain researchers have discussed the concept of academic or educational resilience (Martin & Marsh, 2003; Howard & Johnson, 2000). Padron, Waxman, and Huang (1999), defined educational resilience as “the heightened likelihood of success in school and other life accomplishments despite environmental adversities brought about by early traits, conditions, and experiences.” Alva (1991) used the term “academic invulnerability” to refer to students “who sustain high levels of achievement motivation and performance, despite the presence of stressful events and
conditions that place them at risk of doing poorly at school and ultimately dropping out of school” (p. 19).

Martin and Marsh (2003) defined academic resilience as “a student’s ability to overcome academic setbacks, stress and study pressure associated with school”. Based on a study Martin and Marsh (2006) proposed a 5-C model of resilience. Accordingly, confidence (self-efficacy), coordination (planning), control, composure (low anxiety), and commitment (persistence) were observed to predict academic resilience.

Most of the research on academic resilience has been conducted in school settings.

Gonzalez and Padilla (1997) in a study to identify factors that contributed to the academic resilience and achievement compared 133 resilient and 81 non-resilient Mexican American high school students selected based on their grades. Some of the factors examined were: role of family, teachers and peers; sense of belonging and school environment and teacher feedback. Findings showed that sense of belonging to school was the only salient predictor of academic resilience. Also, resilient male students perceived higher teacher feedback as compared to non-resilient male students.

Alva (1991) studied a cohort of tenth grade Mexican-American students to examine factors contributing to academic invulnerability among some students compared to students who didn’t do academically well, though both types of students hailed from similar socio-economic backgrounds. Results indicated that students who had confidence in their intellectual ability and felt responsible for their academic future were more academically successful. In addition, their academic invulnerability was linked to greater educational support from teachers and friends and subjective appraisals.

Martin and Marsh (2006) in a study of 11th and 12th grade 402 Australian high school students purported to test validity of a resilience scale and examine educational psychological indicators of academic resilience. Results showed that five factors namely, confidence (self-efficacy), coordination (planning), control, composure (low anxiety), and commitment (persistence) predicted academic resilience. Psychological outcomes predicted by academic resilience were enjoyment of school, class participation and self-esteem.
There are many other studies that have examined academic resilience in school settings and found academic resilience to be associated with good academic outcomes (Reyes & Jason, 1993; Waxman, Huang, & Padrón, 1997; Reis, Colbert, & Hebert, 2005).

### 2.4.4. Resilience in College Students

Resilience is an important attribute for students at higher levels of education as it will enable them to manage their ongoing academic demands and other additional stressors they may face in their attempt to balance study and other life activities.

Despite the importance of resilience, there are few studies which have examined its role in well-being of college students. Some of the studies that have examined resilience in college students are reviewed here.

Hartley (2011) examined relationships between interpersonal resilience, intrapersonal resilience, and mental health in relation to academic and social integration in a sample of 605 undergraduate students. It was seen that intrapersonal resilience factors (tenacity, tolerance of stress and negative emotion, positive acceptance of change, control, and spirituality) along with interpersonal resilience (i.e., social support) explained variance in cumulative grade point average, aptitude, achievement and sense of belonging in the university. A strong relation was also observed between inter and interpersonal resilience factors and mental health.

Another study (Ahangar, 2010) investigated the relation between resilience and personality dispositions, cognitive and decision making styles in 130 management students from Tehran whose age ranged between 20-25 years. Students were administered resilience inventory (Monika Guttman,) Myers-Briggs type indicator (Myers, McCaulley, Quenk, & Hammer,1998) decision style inventory (Rowe & Mason, 1987), and cognitive style inventory (CSI) (Jha, 2001). Resilience was seen to have a positive relation with thinking personality type indicating that students who logically evaluated things found it easier to bounce back from stress. On the other hand, resilience had a negative relation with feeling-personality type indicating that when students managed their problems emotionally they could not recover easily from adverse conditions. With regard to cognitive styles, resilience had a positive relation with
systematic and intuitive cognitive styles. This suggests that students who used an evaluative approach and incorporated past experiences in problem solving were able to handle their stressors well. In the context of decision making, behavioural decision making was seen to negatively correlate with resilience. Behavioural decision making style being characterized by low tolerance for ambiguity and low cognitive complexity posits one towards short term problem solving and inadequate decision making, hence impeding resilient response to adverse situations.

Sills, Cohan, and Stein (2004) in a sample of college students studied the relation of resilience to personality traits, coping styles and psychiatric symptoms. Results indicated that resilience was negatively related to neuroticism and positively associated with extraversion and conscientiousness.

In the Indian context, few notable studies on resilience in college students have been conducted by Narayanan. In 2007, Narayanan studied relation of resilience to Eysenck personality dimensions in 186 postgraduate students who were between 21-23 years of age. Resilient students were found to be low on psychoticism and neuroticism and high on extraversion. In another study by Narayanan (2007) relation of resilience to probabilistic orientation among professionals who were scientists and graduate students was examined. Among the students, resilience was seen to be positively associated with probabilistic orientation.

In another study (Narayanan, 2008) that examined relation between resilience, risk taking and creativity among 181 students in post graduate programs, resilience was found to be positively related to creativity and negatively related to risk taking.

In yet another study (Narayanan, 2008) that explored personality traits determining resilience among 155 graduate students, resilient students were seen to be high on affiliation, cognitive structure, dominance, endurance, exhibition, nurturance and understanding, and low on impulsivity.

A study (Park and Lee, 2011) on nursing students from three colleges examined the effects of ego-resilience and stress coping styles on college adaptation. The results indicated a positive relationship between college adaptation and stress coping styles, and ego-resilience suggesting that ego-resilience could be an important factor of college adaptation.
Wilks (2008) designed a study to find the relationship between academic stress and perceived resilience among social work students, and to identify whether social support (friend and family) acted as a moderating protective factor in the relation between academic stress and resilience. The sample had 314 undergraduate and postgraduate social work students. Academic stress was measured by Kohn and Frazer’s (1986) Academic Stress Scale (ASS). Social support was measured by Maton et al.’s (1996) smaller, 20-item version of the Perceived Social Support Scale (PSSS20; Procidano & Heller, 1983). Resilience was measured by 15-item Resilience Scale (RS15) developed by Neill and Dias (2001). Results revealed that students had moderate amount of academic stress and social support and experienced substantially high level of resilience. Academic stress was inversely related to resilience and explained most of the variation in resilience scores. Academic stress was also inversely related to social support. Both family and friend’s social support was not only positively related to academic stress, but also positively predicted academic stress.

Friend support was seen to significantly moderate the relation between academic stress and resilience. The negative influence of academic stress on resilience was reduced by the interaction of friend support with stress. Friend support acted as a protective factor fostering resilience. However, when influence of extraneous factors such as students’ home relations, relations at work and school status were controlled for, the moderating effect of friend support waned. Author discussed that friend support is likely to moderate the effect of academic stress on student’s resilience in actual life settings in the presence of relational factors, rather than controlled statistical conditions. In the opinion of the author, students may not view academic stress as a major standalone stressor in the presence of other relational stressors.

In the moderation models tested, family support did not significantly moderate the negative relation between academic stress and resilience, hence family support did not act as a potential protective factor of resilience.

Author citing many developmental theorists states that college students (Erikson, 1968; Loevinger, 1994) will be in a phase of detaching from family identity and engaged in forming outside friendships and social networks. In view of this, family support may not exert that much of an influence in a college student’s life.
In a group of 225 Turkish college students, Terzi (2012) attempted to study the role of secure attachment style and coping strategies in determining resilience. Secure attachment style and coping strategies of active planning, avoidance, accepting and cognitive restructuring figured as the significant predictors of resilience. Acceptance and cognitive restructuring orientation was seen to increase the resilience scores, when secure attachment style score was low. However, with a rise in secure attachment style, acceptance/cognitive restructuring was not seen to yield any influence on the resilience scores.

Derosier, Frank, Schwartz, and Leary (2013) conducted a study on 644 first year college students from seven universities to examine the stressors they faced during transition to college and assess the ways in which resilience along with cumulative stress and responses to stress affected students’ well-being. It was found that first year students faced considerable stress leading them to engage in maladaptive ways of dealing with stress. Results showed that students who were more resilient were better in coping with the transition to college related stressors. Higher resilience was also positively associated with self-esteem and engagement behaviours that promoted mental and emotional well-being. Resilience was seen to promote positive mental and emotional well-being of students during college transition irrespective or independent of the level of overall stress and maladaptive behaviours in response to stress experienced. Based on the research findings, the authors emphasized the need for programs that could enhance resilience and foster better college adaptation and academic success.

Johnson, Dinsmore, and Hof (2011) with an aim to study the relation between resilience and alcohol consumption recruited 88 male and female college students. They were assessed by Connor-Davidson Resilience Scale (Connor and Davidson, 2003) and a researcher-developed survey of alcohol. Findings indicated that higher the resilience score, lower was the level of alcohol consumption. Females had lower resilience scores than males. Authors opined that college authorities should consider making resilience based preventative and intervention service with a special focus on building resilience in female students.
In a unique study, Hjemdal, Friborg, Stiles, Rosenvinge, and Martinussen (2006) examined whether Resilience Scale for Adults (RSA) could predict development of psychiatric symptoms in the context of exposure to stressful life events. The sample consisting of 201 Norwegian students were twice (with a three month interval in between) administered Hopkins Symptom Checklist-25, Resilience Scale for Adults (RSA) and Stressful Life Events (SLE) scale.

Students with higher resilience had no change in level of psychiatric symptomatology when exposed to stressful life events. Students with low levels of resilience had higher amount of psychiatric symptoms when they faced stressful life events. The two factors of resilience scale namely, RSA-Social competence and RSA-planned future both independently predicted psychiatric symptoms after three months. Social competence involves one’s perception of ability to have flexible social interactions, ease in social interactions and level of pro-social behaviours. The factor planned future measures the extent of one’s positive look of future, self-confidence about succeeding and ability to plan achievable goals. The results suggested that both these resilience factors acted as protective factors in buffering the negative effects of stressful life events.

2.4.5. Resilience in Medical Students

Research on resilience in the context of medical education has been sparse so far and discussions and debates on relevance and role of resilience in medical training has recently begun to gain momentum (Howe, Smajdor, & Stockl, 2012; Eley & Stallman 2014; Tempski, Martin, & Paro, 2012; Dyrbye & Shanafelt, 2012).

Howe et al. (2012) conducted a literature search in order to understand the relevance of resilience for effective professional training in medical education. Authors opine that resilience is important to develop, as clinical practice posits situations with moral and ethical dilemmas. Moral injury may be suffered because of moral choices that need to be made in situations such as witnessing trauma or death, which may be against common moral norms. Having to shift between varying moral contexts also may prove stressful to clinicians. There are also instances, especially in students, where they face passive moral injury, when they are not able to act in emotionally distressing situations.
Authors opine that resilience may help students to face such situations in a less distressing manner.

Medical professionals may also have to face ethical challenges in their attempts to give optimal care in the context of deficiencies and contradictory policies in the health systems. Hence, it is important for medical professionals to be resilient to prevail in such a system, take principled decisions and try to improve systems. Medical training of students should also emphasize on such values, which can be relied on when students as future practitioners have to face difficult experiences and improvise service delivery (Howe, Smajdor, & Stockl, 2012).

Based on literature review, Howe et al. (2012) state that viability of considering certain attributes at admission and feasibility of using tools to measure resilience should be examined in future research. Though, professional training of medical students does not constitute resilience as of now, authors state that current didactic teaching contexts may be utilized optimally to train in resiliency. For instance, exposing students in a gradual manner to uncertainties in clinical learning with opportunities to overcome difficulties may help them to value persistence and commitment. Students may also be encouraged to recognize resilience in others and reflect whether they have such competency in them. Training by using challenging scenarios where in ethical and moral decisions need to be taken may also be a viable option. Such case simulations may enable students to think effectively about solutions and persist in face of challenging difficulties working in the rubric of hierarchy of the organization they are in. The authors (Howe et al., 2012) conclude that resilience so far is not well acknowledged in clinical educational settings. Hence, it is important to make efforts to research into the construct of resilience in medical education, and take measures to recognize and develop resilience in training and practice.

Eley and Stallman (2014) in their commentary state that in the current era where student resilience and well-being are emphasized in medical education, a parallel phenomenon is occurring in higher education where materialism and consumerism is emphasized. This results in students feeling they are “entitled” to get a degree as they pay rather than “strive” for the same, thinking it has an opportunity. Thus, this mentality is associated with materialism rather than intrinsic motives which are associated with well-being.
In another thought provoking commentary on nurturing resilience and well-being in medical students, Eley and Stallman (2014) begin with opining that medical schools of late have become very flexible in their curriculum in an attempt to accommodate student from any difficult personal circumstance (for example, providing materials to learn in varied formats such as videos, online teaching, emails). This may not facilitate them to build resilience and develop responsibility. Also, they speculate whether experiences provided by universities always foster good learning resilience and well-being or lead to mental health problems and undesirable student behaviours.

Therefore, Eley and Stallman (2014) have proposed that medical educators should direct the course of medical education by developing the 3 RS in medical curriculum: Resilience, Responsibility and Resolve.

Elucidating on resilience, these authors (Eley & Stallman, 2014) opine that resilience is of utmost importance in medical training as students have to face high work pressure, uncertainties, suffering and death. Eley and Stallman (2014) state that education puts forth avenues to learn resilience provided that students accept failures and are ready to strive repeatedly, and reflect on these experience to enhance their resilience.

To foster resilience and other attributes of responsibility and resolve, Eley and Stallman (2014) state that medical schools should allow for certain factors to operate. Firstly, a positive learning environment should be provided where gaining skills and competency is valued. Failures need to be tolerated and trying repeatedly should be encouraged, so that resilience can be built through effort, persistence, commitment and problem solving. Secondly, there should be such a social environment which will encourage self-management and professionalism. For instance, more scope to traditional live lectures should be provided as such measures enhance peer interactions, student-teacher interaction, good communication and self-management skills. Whereas, recorded lectures have less scope for interaction and valuable teacher experience cannot be utilized fully. Thirdly, schools should have clear rules and expectations to be followed and guidelines about consequences. Keeping deadlines and insisting on their completion make students acknowledge importance of meeting obligations and managing stress. When things don’t turn according to expectations or don’t go smoothly, it gives an
opportunity to develop resilience in adverse situations. Also, technology based communication such as e-mails instill immediate need gratification. Rather, researching on own for answers enhances self-management skills. Fourthly, opportunities should be available for students to show leadership. High expectation to excel should be maintained as it will make students persist and commit to achievement leading to personal growth. Lastly, integrity needs to be reinforced. School culture and faculty should be good role models for students to emulate principles underlying academic success.

There are some studies which have examined resilience in medical students in relation to stress and burnout.

Dyrbye et al. (2010) in a longitudinal design examined factors related to resilience and recovery from burn out in 1321 medical students from five medical colleges in US. Students were classified as resilient if they did not have burnout at any time-point. Whereas, students who had burnout at single or both time points were considered as vulnerable. Resilient students in comparison to vulnerable students had lesser likelihood of depression, had higher quality of life, experienced less stress, had lesser number of stressful life events, had lesser chances of being unemployed, perceived higher social support, experienced the learning climate to be more positive and were less fatigued.

Elizondo-Omaña et al. (2010) evaluated whether resilience was related to academic performance in comparative groups of first and second semester medical students enrolled in regular anatomy and remedial anatomy course (that had students who didn’t pass regular anatomy class). Connor-Davidson resilience scale was used to assess resilience. Though the students of both courses differed in their anatomy grades, their scores were similar on resilience scale. Resilience did not relate significantly to academic performance and hence did not predict performance in gross anatomy. However, students in regular course who scored more than 75 on resilience scale slightly fared well on academic performance than the rest of the class. Also, in the remedial course, students with resilience scores of 87 and more did well academically than the others in the remedial course.
Another study (Mehzabin et al., 2011) was conducted in United Arab Emirates intended to study the association of intrinsic component of resilience with socio-demographic factors among entry level medical students. Fifty eight students were administered a two part questionnaire developed by the researchers. The first part consisted of questions pertaining to socio-demographic details, while the second part consisted of questions related to intrinsic and extrinsic aspects of resilience of the students.

The intrinsic component of resilience was high and uniform among the students. The resilience scores did not vary with age, gender, religion, nationality, family structure, parents’ education and number of friends. Yet, students from nuclear families, with Western nationality and students’ parents who had university level of education, students who shared their feelings with others and outside the family, and those who had five to nine friends had slightly higher resilience scores.

A study (Kim & Cho, 2012) examined stress, resilience, social support, and quality of life (QOL) of medical students during a clinical clerkship and identified the factors that affected their QOL. Further analysis revealed that negative effects of stress on QOL of medical students can be mitigated by resilience. Therefore, authors suggest measures to be taken to enhance resilience and reduce stress.

In a sample of 1,998 Chinese medical students, Peng et al. (2012) examined how resilience moderated the relation between negative life events and mental health problems along with investigating factors affecting mental health problems of students. Students were administered: The Adolescent Self-Rating Life Events Check List, Eysenck Adult Personality Questionnaire-Revised, Social Support Rating Scale, Connor-Davidson Resilience Scale, and Symptom Check List.

Higher negative life events and neuroticism was associated with lower resilience. Mental health problems were negatively related to resilience along with social support and extraversion. Regression analysis showed that resilience moderated the impact of negative life events on mental health problems suggesting that fostering resilience may enhance college adaptation.
A Norwegian study (Kjeldstadli et al., 2006) aimed to identify medical students who were resilient and examine if these students were different from their peers with respect to stress, coping and personality traits.

A total of 421 medical students from four Norwegian Universities were compared with two samples of non-medical students. The medical students were assessed once at school entry, next in third year and finally in the graduating sixth year. A group of resilient students were found, who had stable life satisfaction throughout the medical education. The resilient students felt medical school as less interfering in their personal and social life compared to students with fluctuating levels of life satisfaction. Also, lesser use of maladaptive emotion focused coping was associated with higher life satisfaction. Low levels of vulnerability personality trait seem to affect higher level of life satisfaction through the coping strategy of wishful thinking.

An interesting study (Haglund et al., 2009) was conducted that examined stressful clerkship events experienced by third year medical students (2006-2007 academic year) studying at Mount Sinai School of Medicine. One twenty five students completed monthly surveys regarding stressful events. Stressful events were coded as non-traumatic or traumatic based on whether or not they met trauma criteria of Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM IV). The students undertook scales measuring psychological well-being (anxiety, depression, post-traumatic stress symptoms), risk and resilience factors at the beginning of the year. Twice during the year psychological well-being was measured. At the end of the year, psychological well-being, risk and resilience factors, and personal growth were measured. Number of students participated at baseline were 106, while it reduced to 82 at year end. Most students i.e. 101 students finished at the minimum of one month survey.

Student patient interaction consisted of students seeing patients die, having serious illness and undergoing operations that involved risk to life. Having to participate in stressful medical procedures, such as chest compressions, manual ventilations, facing aggression from patients and exposure to infectious bodily fluids were other stressful student-patient interaction reported.
Physician-student interactions involved student ill treatment in the form of belittling comments, verbal abuse and sexual harassment by superiors and support staff. The events involved in physician-patient interactions were students watching unprofessional behaviours by superiors towards patients such as negligence, poor patient care and making fun of patients. Other stressful events experienced were exhaustion from work, stress related to school assignments, finances and peer adjustment.

Among the 875 stressful events, nearly 23% (199) of them met the criteria of being traumatic as per the DSM-IV PTSD diagnostic criteria. Most of the traumatic events were stressful student-patient interactions. The majority of the rest of the traumatic events involved physician-student interactions such as physicians’ poor patient care leading to extreme suffering of patient, or patient death, or violent patients threatening physical well-being of physicians. A very small number of other events were termed traumatic. One event reported involved a physician-student interaction, where in students reported being humiliated and sexually harassed.

Among these 199 students termed traumatic events, 173 events elicited a rating of at least 6 (on a scale of 1-10) with regard to levels of fear, horror and helplessness.

Among the non-traumatic stressful events, 676 events elicited feelings of fear, helplessness and horror of 6 and more (on a scale of 1-10). Among events which elicited such strong emotional impact, 30% involved student-patient interactions, a considerable 40% involved physician-student interactions reflecting superiors’ mistreatment of students and 21% consisted of stressful physician-patient interactions showing physicians as being poor role models for patient care.

During the whole of year, on an average every student experienced two traumatic events. A little more than half of students had at least one traumatic event mostly experienced in internal medicine or surgery postings. Traumatic events were not significantly related to anxiety, depression or post traumatic outcomes at the end of the year. Also, students who had more traumatic events reported higher personal growth by the end of the year showing that they were resilient. Authors opine that, this resilience may have been enhanced because of discussing events with other medical team members who might have been supportive. Also, these traumas may be less pain arousing as these
can be anticipated in a medical school and other events outside the medical school may be more distressing.

Students’ experience of non-traumatic events did not lead to any positive growth by end of the year. Most notable was that non traumatic events were positively associated with depression and post traumatic events during end of year. Majority of the non-traumatic events had stressful physician-student or physician-patient interactions showing superiors’ mistreatment of students or modeling poor patient care. A large majority (80%) experienced one of these non-traumatic events and these were reported mostly in Internal Medicine, Surgery, or Obstetrics-Gynecology rotations. Hence, well-being of students was concluded to be compromised because of the students’ mistreatment and poor professional role modeling portrayed by the faculty.

In order to set up a protocol for identifying the personal competencies important to determine entering students’ success in medical schools and to ways to measure them during admission, American Medical College's Innovation Lab Working Group (ILWG) and Admissions initiative (Koenig et al., 2013) conducted a multi-step multiyear process. To determine personal competencies, the group carried out literature review, surveyed North American medical school admission personnel and sought input from admission related people. To establish apt tools that would give information for pre-interview screening, the group reviewed literature, evaluated scales’ psychometric properties along with other procedures. The process resulted in nine personal competencies among which one factor was resilience and adaptability that was likely to determine likelihood of medical school success at entry level.

Souri and Hasanirad (2011) studied the relationship between resilience, optimism and psychological well-being in 414 Iranian medical students. They were administered the Ryff Scale of Psychological Well-Being (RSPWB), Connor-Davidson Resilience Scale (CD-RISC), and Scheier and Carver’s Life Orientation Test (LOT). Resilience was found to predict psychological well-being and optimism to an extent was seen to mediate the relation between resilience and psychological well-being.
In the Indian context, there are no studies documenting the role of resilience in buffering stress in medical students. Therefore, this study purports to examine relationship between stress and resilience in medical students.

2.5. Optimism

Scheier and Carver (1985) defined optimism as generalized positive outcome expectancies and pessimism as generalized negative outcome expectancies. In other words, optimists expect good things to happen to them, while pessimists expect bad things to happen to them. Dember, Martin, Hummer, Howe, and Melton (1989) define optimism and pessimism as a positive and negative outlook of life respectively. The difference in the ways how optimists and pessimists approach and interact with the world has a notable impact on their lives. These differences between them exist in the way they face problems, cope with adversities, and also the social and socioeconomic resources they possess (Carver & Scheier, 2002).

There are different types of optimism discussed in the literature. Following is a brief description of various types of optimism.

2.5.1. Types of Optimism

2.5.1.1. Dispositional optimism direct belief model. This construct attempts to study optimism through the direct beliefs individuals have regarding future life events. This view is referred as “dispositional optimism” or the “direct belief model.” Direct belief model is more capable of just measuring if a person has an optimistic or pessimistic view of future event as is.

Dispositional optimism, which is also a variable in this study is a concept given by Scheier and Carver (1985). They defined it as the tendency to believe that one will generally experience good vs. bad outcomes in life. These expectancies were conceptualized to be global and were considered to be relatively stable across time and context and formed the basis of an important characteristic of personality. Hence, the term ‘dispositional optimism’.

Though Carver and Scheier’s research of optimism and pessimism began with focus on the effects of situation-specific expectancies, the focus slowly shifted to a consideration of expectancies that are more general rather than situation based.
The concepts of optimism and pessimism concern people’s expectations for the future. Therefore, these ideas are related to a class of psychological theories of motivation, called expectancy-value theories. Expectancy-value models begin with the idea that behaviour is aimed at attaining desired goals (Carver & Scheier, 1998). Goals are actions, end-states, or values that people see as being either desirable or undesirable. People try to accommodate their behaviour to what they view as desirable and avoid from what they see as undesirable. An action doesn’t occur unless there is a valuable goal to achieve.

Another important component of this motivational model is a sense of expectancy: either confidence that the goal can be attained or doubt that goal may not be reached. If people doubt they can attain a goal, they may withdraw from working towards it. They may stop before time, or they may not even take the beginning step towards it. An attitude of confidence will make people believe that eventually they will reach a desirable outcome making them persevere even in the face of great adversity.

The expectancy concept can be applied to varied contexts. Confidence and doubt can range from small to moderate to wider contexts. Optimism and pessimism are broad, generalized versions of confidence and doubt. Confidence and doubt pertains to the whole life, rather than to one specific context (Scheier & Carver, 1992).

Thus, optimists should tend to be confident and persistent when faced with diverse life problems (even when progress is difficult or slow). Pessimists should be doubtful and hesitant in the same situations. Optimists believe adversity can be overcome successfully while pessimists expect disaster.

Such differences in how people face adversity have implications for success in completing goal-directed behaviour. They also affect the ways in which people deal with stress.

2.5.1.2. Explanatory style. This view determines people's beliefs based on past experiences and is more of an indirect approach to studying optimism. This view is based on a person’s attributional style (Scheier, Carver, & Bridges, 2001). Attributional styles are formed by the way we perceive or explain past life experiences.
Negative explanations lead to expectations of negative outcomes for future events and positive explanatory style leads to expectation of positive outcomes. People are said to possess positive explanatory style when they believe that past experiences were positive and that negative memories were not under their control (external factors). On the other hand, people who blame themselves for bad happenings (internal factors) and think they are not worthy are said to have negative explanatory style or are pessimistic.

Seligman (1998) proposed three major factors that determine what a person's explanatory style is: permanence, pervasiveness, and personalization.

The concept of permanence is that people believe they cause bad events and the resulting negative experiences will remain permanently. Such views are pessimistic. For instance, “Bad things always happen to me”. Temporary, non-permanent (optimistic) styles of thinking are opposite to such thinking such as "I fail whenever I don’t work hard”. The way the events are interpreted determines whether we let them to interfere with our functioning. Speaking in relative terms is healthier than absolute terms.

Another factor that determines a person's explanatory style is pervasiveness. Pervasiveness (specific vs. universal) is determined by the extent to which individuals allow negative circumstances to color the entire range of experiences. For instance, when one fails to secure a set target, determines oneself as total failure in everything is ascribing his misfortune in “universal” terms. Whereas, if someone failing to achieve a set target, isolates this event as one isolated incident is giving a “specific” explanation of the event.

Universal pervasiveness leaves no scope for distinctions between different life events or personal qualities. Specific pervasiveness style prevents people from explaining things in black and white terms and facilitates a view of adverse events as situation specific. This allows for maintaining awareness and enhancing one’s positive attributes even in the face of negative incidents.

The final component of a person's explanatory style is personalization (internal vs. external). Personalization refers to the way people ascribe causes to bad events. Here, the attribution may occur in the way of blaming themselves (internal), leading to low
self-esteem, or they blame others (external), and tend to like themselves better. For instance one may think “I am an idiot which is internal attribution or externally attribute another as “you are useless”. Too much external personalization is not healthy as it nurtures denial of one’s shortcomings or projection of their feelings of insecurity on to another. An objective external personalization is healthier.

Attributional styles typically are measured through the use of the Attributional Style Questionnaire (ASQ). The benefit of examining optimism through the use of this model is that the negative attributions can be identified and changed through therapy if necessary (Gillham & Seligman, 1999). The problem with the use of attributional theory in understanding optimism is that it can be very complex and is subjectively based on self-report of past experiences (Scheier et al., 2001).

2.5.1.3. Unrealistic optimism. Unrealistic optimism is the belief that nothing bad will happen because the person feels invincible to things such as accidents, diseases, etc. Research has found unrealistic optimism and optimism to be related in contributing to psychological and physical well-being. (For example, Davidson & Prkachin, 1997). The general criticism of unrealistic optimism is that these individuals may be negating or not actively participating in healthy behaviours or activities. Unrealistic optimism may lead people to deny their problems and develop optimistic biases about the future.

2.5.1.4. Realistic optimism. The combination of optimism and reality is realistic optimism. This view is based on the following three models which look at optimism in the past, present, and future (Schneider, 2001).

The first model is known as the “benefit of the doubt principle”. This is concerned with how individuals classify their past experiences: whether experience is judged realistically or unrealistically. To view a situation in a realistic manner, one needs to be cognizant of the circumstances or biases that may influence his/her thought process. For example, a student gives an exam and thinks about his/her performance as good. In this case if the person has given an objective rating of the performance, considering all the factors that could determine the results, then he/she would be having realistic optimism about the performance and other future exams. However, if the person develops biases
about the performance and feels he or she did well in the exam, even if in reality the performance was poor, then he/she would be fostering unrealistic optimism.

Another model of realistic optimism is the “appreciate the moment principle”. Appreciation is defined as the ways in which everyday people, events, and experiences, are not taken for granted and are looked upon as adding meaning to a person’s life. The principle underlying here is that if one can relish what one has in life then life is more satisfying and joyful. The core concept here is that the awareness of the way we interact in our lives is the key factor in determining if we are optimistic or pessimistic. The common example of viewing a half glass of water as “half full” or “half empty” can provide valuable information about the way a person lives their life. It determines whether one is appreciative of what one has or not appreciative of what one has but focuses on what one lacks in a negative way. Importance of reflecting on the reasons for a half empty response lies in the relevance it may have in other parts of life. For example, a person viewing the glass as, “half empty” may be putting in half-hearted effort in his/her job or education because of lack of drive or lack of acknowledgement of the skills and/or accomplishments he/she deserves credit for (Schneider, 2001).

The last type of optimism is described as “optimism-unrealistic expectation or adaptive motivation”. This orientation compares the unrealistic biases associated with optimism with the adaptive, motivational properties it possesses. If some individuals believe that nothing will affect them in future as they are immune to dangerous diseases such as cancer, AIDS, etc., then it could be viewed that these individuals are unrealistically optimistic about their future. Whereas, adaptive motivation means people’s belief that they can avoid a disease or negative event because they have and are continuing to work on preventing them. In addition, such people have positive spirit when challenged with negative life situations. Being realistic about the condition, they are confident about their abilities to deal with whatever happens (Schneider, 2001).

The various constructs of optimism are overlapping in the research literature and many studies do not mention what theoretical framework of optimism has been used. In the following sections, initially attempts will be made to report studies on optimism (specifically dispositional optimism) in relation to parameters commonly reported
including stress. Subsequently, studies on optimism in the context of college students will be reviewed.

2.5.2. Dispositional Optimism and Well-Being

There are a host of studies that have examined the influence of dispositional optimism on well-being. Most of the studies have been about psychological well-being in medical context. One of the first studies that examined the effect of dispositional optimism on emotional well-being was in the context of development of depressive feelings after childbirth (Carver & Gaines, 1987).

Women completed the Life Orientation Test and a depression scale in the last third trimester of their pregnancy. Subsequently, they again took the depression scale three weeks after childbirth. Optimism was seen to be related to lower depressive symptoms at the initial assessment. More importantly, optimism predicted lower levels of depressive symptoms postpartum, even when controlling for the initial levels. Hence, optimism acted as a protective factor against development of depressive symptoms after childbirth.

Another research assessed people a month before surgery and eight months afterward (Fitzgerald, Tennen, Affleck, & Pransky, 1993). Optimists had less distress before surgery, and (controlling for pre-surgical life satisfaction) optimists had more life satisfaction after surgery. Optimism about life appeared to funnel into a specific optimism about the surgery, and from there on to satisfaction with life. A similar earlier study by Scheier et al. (1989) found that optimists had higher quality of life than pessimists and this continued to be so even up to five years after the surgery (Scheier & Carver, 1992).

Optimism has also been studied in the context of psychological adjustment in cancer. Carver et al. (1993) conducted a study on women with breast cancer. They were interviewed at diagnosis, the day before surgery, a few days after surgery, and 3, 6, and 12 months later. Optimism (at initial assessment) predicted less distress throughout a year even while controlling for effects of medical variables and earlier distress. Stanton and Snider (1993) also found that optimism predicted better mood before breast cancer biopsy, and this relationship did not vary following a positive biopsy result, or after surgery.
In a study of head and neck cancer (Allison, Guichard, & Gilain, 2000), patients were assessed before treatment and three months afterward. Optimists reported higher quality of life before treatment and also after treatment, controlling for initial ratings.

Another study was done in context of in vitro fertilization including subjects who had unsuccessful attempts (Litt, Tennen, Affleck, & Klockm, 1992). Participants were assessed eight weeks before the procedure for their optimism, distress, expectancies for fertilization success, and the impact of infertility on their lives. Reassessment of distress was done following two weeks after notification of a negative pregnancy test. Demographic variables, gynaecological history, marital adjustment and the reported effect of infertility on participants’ lives did not predict distress at the second assessment. But, lower optimism (high pessimism) predicted distress even after controlling for distress at the initial assessment. In other words, higher optimists were seen to be least distressed after a disappointing event.

Taylor et al. (1992) studied the relationship between dispositional optimism and distress in gay and bisexual men who were at risk for developing acquired immunodeficiency syndrome (AIDS). Subjects had undergone tests to ascertain human immunodeficiency virus (HIV) antibody status, and all were aware of the results of their antibody tests. Two groups were made on the basis of whether they were HIV seropositive (+) or HIV seronegative (-). None of the subjects had any sign or symptom of AIDS. Optimism was measured by LOT and distress was measured by Beck’s hopelessness scale and Profile of Mood States scales and another additional measure constructed by the researchers to know AIDS related worries. It was found that optimists (both in HIV+ and HIV− men) reported significantly less distress on both measures of distress. Hence, optimism protected people from distress during tough times.

In another study, Antoni and Goodkin (1988) examined women who were undergoing testing for an abnormal Pap smear for finding the degree of atypical neoplastic growth in the cervix were administered psychological tests. The participants were not aware of their physical diagnosis at the time of psychological assessment. Among the psychological variables assessed were a set of psychogenic attitudes among which premorbid pessimism (a dispositional attitude of helplessness-hopelessness) and
future despair (a more focused attitude of hopelessness about the future) were important. The face validity of the items on the scale indicates that they measure optimism-pessimism construct. It was found that these attitudes were significantly related to disease indicators. Women with a more severe diagnosis of abnormality had scores indicating greater pessimism than did women with less severe abnormality.

In a relatively recent study, the influence of optimism has also been examined in treatment of ischemic heart disease (Shnek, Irvine, Stewart, & Abbey, 2001). It was found that less optimism related to more depressive symptoms shortly after hospitalization. Even at one year follow-up, lower optimism continued to predict more depressive symptoms after controlling for earlier depression and a variety of other variables.

Apart from medical context, optimism has been found to be negatively related to depression, perceived stress, and social anxiety (Scheier & Carver, 1985). Creed, Patton, and Bartum (2002) in their study of optimism-pessimism career related variables and well-being in 504 high school students found that those with high optimism fared better in career related measures, had better self-esteem, and lesser psychological distress. While, those with high pessimism fared badly on career related variables, had low self-esteem and more psychological distress.

2.5.3. Optimism and Physical Health

Research has been done on the role of optimism in physical health as well. Optimism may add to the resilience of individuals against stresses of life, hence preventing the physiological responses from accumulating over time and resulting in deterioration of physical health. In other words, optimism may contribute to longevity and better physical health, and even greater longevity.

Scheier et al. (1999) conducted a study that examined patterns of rehospitalisation after coronary artery bypass surgery in cardiovascular patients. This group of patients require frequent hospital admissions. Interestingly, it was seen that, optimism predicted significantly less likelihood of rehospitalisation and a longer duration before rehospitalisation. Optimism was seen to exert an influence independent of other psychological variables indicating that optimism alone had a strong effect rather than effects resulting out of interaction with other variables.
One of the most important studies on optimism and cardiovascular diseases was done by Tindale et al. (2009) as part of Women's Health Initiative (WHI). This was a large scale study aiming to study changes in and predictors of quality of life, chronic disease, morbidity and mortality among women across America.

Recruiting WHI subjects, Tindale et al. (2009) studied over 95,000 women across an 8 year period. At study entry all women did not have any cancer or cardiovascular disease. The results revealed that optimists were less likely than pessimists to develop coronary heart disease (CHD). They were also less likely to die from CHD-related causes, and had lower total mortality due to all other causes, throughout the span of study. The contribution from optimism varied from 9% for incident cases of CHD to 30% for CHD-related mortality.

Higher optimism, but not lower pessimism, has been found to be prospectively associated with lower ambulatory diastolic blood pressure (Raikkonen, Matthews, Flory, Owens, & Gump, 1999) and better pulmonary function (Kubzansky et al., 2002).

Evidence for positive effect of optimism on immunity has also been recorded in case of men undergoing biopsy (Ebrecht et al., 2004) and older adults getting influenza vaccine (Kohut, Cooper, Nickolaus, Russell, & Cunnick, 2002).

Brennan and Charnetski (2000) studied the relationship between optimism and immune system functioning by taking an important immunity indicator - Immunoglobulin A (IgA). Subjects were assessed by Attributional Style Questionnaire (ASQ), and saliva samples for secretory IgA were obtained. Significant negative correlations between the composite pessimism score and IgA, as well as the hopelessness score and IgA were found. Results indicated that pessimistic explanatory style was related to immune system deficits and poor health.

However, other research have found that under challenging condition, optimism related to lower, rather than higher, immune responses (Segerstrom, 2005, 2006b). Segerstrom (2005, 2006b) opines that the reduction under high challenge may indicate greater behavioural engagement with the challenge, which can suppress immune responses so as to save energy.
Studies have reported on how optimism predicts longevity. Giltay, Geleijnse, Zitman, Hoekstra, and Schouten (2004) studied 900 elderly Dutch persons and found that those reporting a high level of optimism at baseline were less likely to die over the next 10 years.

Another research with a longitudinal design was done with medical patients to examine whether an optimistic outlook influenced their rate of survival and/or quality of life (Maruta, Colligan, Malinchoc, & Offord, 2000). The study had 839 patients and was carried out over a span of thirty years. The patients were selected in the time period between 1962 and 1965 while they were patients for various medical conditions at the Mayo Clinic in Minnesota. Optimism was assessed by the optimism-pessimism scale (PSM) of the Minnesota Multiphasic Personality Inventory-I (MMPI-I) at the beginning and again thirty years later. High scores meant pessimistic explanatory style and low scores meant a positive explanatory style.

After thirty years, only 86% were assessed. Rest of the 14% of initial sample had either died or were unable to be found. The results showed that those who had higher pessimism had a higher rate of health problems. Health problems increased further as the amount of pessimism increased. Optimists had lesser health problems. The researchers hypothesized that optimists may take a more proactive approach towards receiving the medical care they need.

A recent meta-analysis done by Rasmussen, Scheier, and Greenhouse (2009) sums up the evidence for the effects of optimism on physical health. A total of 83 studies were included for the analyses. On the whole, the mean effect size for the relationship between optimism and physical health outcomes was highly significant ($p < .001$). Studies with subjective measures had greater effect sizes than studies with objective measure of physical health. Supplementary analyses were also carried out grouping studies into those that focused solely on mortality, survival, cardiovascular outcomes, physiological markers (including immune function), and immune function only, cancer outcomes, outcomes related to pregnancy, physical symptoms, or pain. In each category, optimism was a significant predictor of health outcomes or markers, all $p < .001$. 
2.5.4. Pessimism and Well-being

While optimism has positive benefits for health, pessimism can have adverse consequences for well-being. It fosters lesser efforts, lesser persistence, giving up tendencies and maladaptive behaviours in individuals.

A study on women with a family history of alcoholism found that pessimists were more likely than optimists to report drinking problems (Ohannessian, Hesselbrock, Tennen, & Affleck, 1993).

Yet, in another study done by Strack, Carver, and Blaney (1987) where people that had been treated for alcohol abuse were followed as they entered an aftercare program, pessimists were found to be more likely to drop out from the program and have a relapse compared to optimists.

Robinson-Whelen, Kim, MacCallum and Kiecolt-Glaser (1997) examined whether optimism or pessimism was a more important predictor of health and wellbeing among adults experiencing severe, chronic stressors than those who were not. They found that pessimism, but not optimism, was able to predict health and wellbeing, confirming that the two dimensions related to external variables in a different manner.

In another recent study, the illness related disruption of normal social activities after treatment was examined in breast cancer patients (Carver, Lehman, & Antoni, 2003). At each assessment interval, pessimism predicted more disruption of social activities, increased emotional distress and fatigue. Pessimism in the face of a health threat made patients to withdraw from the social activities that normalize life.

Suicide would be the extreme step of giving up. Beck, Steer, Kovacs, and Garrison (1985) conducted a 10-year follow-up of people with suicidal ideation. During the hospitalization, all had completed the BDI (Beck, 1967) and the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974), assessing pessimism. Ten years later, pessimists were more likely to have committed suicide than optimists.

Subsequent studies have shown that optimism and hope are associated with reduced depressive symptoms in college students (Range & Penton, 1994; Seligman, Schulman, DeRubeis, & Hollon, 1999). Therefore, college students who are optimistic may be less likely to have suicide ideations.
Hirsch, Conner, and Duberstein (2007) directly examined the role of optimism in suicide ideation in a group of 284 college students. Optimism was assessed with the Life Orientation Test-Revised and the suicide ideation was measured with Beck Scale for Suicide Ideation. It was found that optimism was inversely associated with suicide ideation, even after controlling for age, gender, depressive symptoms, and hopelessness. This suggested that optimism was a strong protective factor against suicide.

Optimism has also been studied in other stressful contexts such as caregiving. In a group of caregivers of cancer patients Given et al. (1993) found that caregivers' optimism predicted less depression and less adverse impact of caregiving on their physical health. Similar results have been found among caregiver spouses of Alzheimer's patients (Hooker, Monahan, Shifren, & Hutchinson, 1992; Shifren & Hooker, 1995). Optimism has also been found to be significantly related to mental health among caregivers for stroke patients (Tompkins, Schulz, & Rau, 1988).

2.5.5. Optimism and Well-Being in the Context of College Students

College can be a stressful and challenging time. Optimistic orientation can enhance college students’ ability to deal with various kinds of stressful encounters and facilitate their adjustment.

In one of the earliest studies, Scheier and Carver (1985) studied college students during the final weeks of their academic semester, which usually is a stressful time. LOT and a brief physical symptom checklist were administered four week before the end of semester and again at the time of closing of classes. Optimistic students reported developing significantly fewer physical symptoms than did pessimists overtime. This relationship remained to be so even when baseline level of symptoms was controlled.

In another study of adaptation to college life, Scheier and Carver (1992) studied whether optimism was a predictor of changes in perceived stress, depression, loneliness, and social support over time. The students completed the outcome measures at the beginning and end of the semester. It was seen that optimism significantly predicted changes in perceived stress, depression, loneliness, and social support over time. Throughout their first semester of college, optimists became significantly less stressed, less depressed, less lonely, and more socially supported than did their pessimistic counterparts.
Aspinwall and Taylor (1992) studied college student adjustment for students transitioning from high school to their first year of college which can be a stressful time. Optimism, self-esteem, locus of control, desire for control, and baseline mood were assessed at the entry of college. Psychological and physical wellbeing measures were administered at the end of the semester. Higher optimism at entry of college predicted lower levels of psychological distress at the end of the semester. This effect was observed to be independent of effects of self-esteem, locus of control, desire for control, and baseline mood.

One of the studies (Harju & Bolen, 1998) examined the effects of optimism on quality of life in 204 college students by grouping them into low, moderate and high optimism groups. Coping was also examined. The results found that the high optimists rated themselves as having the highest quality of life and more effective coping skills than low optimists. Women also had higher GPA’s than men and academic performance tended to drop with lower levels of optimism.

Chang (1998a) designed a study to examine the influence of optimism and stress related appraisals on coping and psychological and physical adjustment in 726 college students. It was found that stress-related appraisals were associated with optimism, coping, and adjustment. A significant difference was seen between optimists (n=109) and pessimists (n=110) in secondary (but not primary) appraisal, coping, and adjustment. In addition, optimism was found to significantly predict adjustment, beyond what was accounted for by appraisals and coping.

Another study by Chang (2002) examined role of an interactive model of optimism–pessimism and stress in predicting psychological symptoms and life satisfaction in a group of 340 younger, and a group 316 of older adults. Significant inverse correlations between scores on the LOT-R and the PSS in both the younger and older adult samples indicated that optimism is associated with less stress and pessimism is associated with greater stress. Both the young and the old subjects differed significantly on mean levels of optimism-pessimism, appraised stress, and psychological adjustment. However, older adults experienced greater optimism than younger adults. While, younger adults appraised greater stress and reported more psychological symptoms than older adults. Despite experiencing more stress, younger adults did not differ from the older adults on life satisfaction.
In the context of examination of an interactive model of optimism-pessimism and stress, it was seen that optimism-pessimism interacted significantly with stress appraisal in predicting each of the psychological outcomes in young adults after controlling for main effects of optimism-pessimism and stress. In young pessimistic adults, the positive relation between appraised stress and psychological symptoms was found to be significantly worse than optimists. The negative association between appraised stress and life satisfaction was also found to be significantly more exacerbated for pessimists, than for optimists.

Even in older adults, the positive relation between appraised stress and psychological symptoms was found to be significantly more exacerbated for pessimists, than for optimists after controlling for main effects of optimism-pessimism and stress. However, the interaction between optimism-pessimism and stress appraisal was not found to be significant in predicting life satisfaction in older adults.

The above study highlights how pessimism can deter psychological adjustment and life satisfaction, suggesting the need for increasing optimism to improve adjustment.

To evaluate Tennen and Affleck's (1987) vulnerability hypothesis, Chang and Sanna (2003) examined whether optimism-pessimism moderated the link between accumulated negative life stress (over the past year) and psychological adjustment (depressive symptoms and life satisfaction), and physical adjustment (physical symptoms and vulnerability to illness) in a large sample of 500 college students. Optimism-pessimism and negative life stress significantly predicted both psychological and physical adjustment. Barring life satisfaction, a significant Optimism-Pessimism × Accumulated Negative Life Stress interaction was found for all of the outcomes. Further, it was seen that optimism, but not pessimism, exacerbated the associations between accumulated negative life stress and poor psychological and physical outcomes.

Brissette, Scheier, and Carver (2002) made an attempt to study the mediating role of social support and coping in the relationship between optimism and adjustment to stressful life events in a group of college students. Students of both genders were given measures of perceived stress, depression, friendship network size, and perceived social support at the beginning and end of their 1st semester of college. Coping was assessed at
the end of the 1st semester. Greater optimism, at the start of the 1st semester of college, was associated with smaller increases in stress and depression and greater increases in perceived social support (but not in friendship network size) over the course of the 1st semester of college. It is evident from this study that optimism acts as a buffer against stress and optimists perceive more support which may have cognitive value in dealing with stress.

In a longitudinal study of 1st year university students, Chemers, Hu, and Garcia, (2001) examined the effects of academic self-efficacy and optimism on students' academic performance, stress, health, and commitment to remain in school. Predictor variables were high school grade-point average, academic self-efficacy, and optimism and moderator variables were academic expectations and self-perceived coping ability. Both the predictor (optimism being one of them) and moderator variable which were assessed at the end of the first academic quarter were related to classroom performance, personal adjustment, stress, and health, measured at the end of the school year. Optimism with academic self-efficacy was strongly related to performance and adjustment. Optimism with self-efficacy had a direct relation to academic performance and they indirectly had an effect on classroom performance, stress, health, and overall satisfaction and commitment to remain in school through expectations and coping perceptions (challenge-threat evaluations).

To examine optimism in relation to life event stress and academic stress exclusively in African-American college students, Baldwin, Chambliss, and Towler (2003) designed a study that involved 106 African-American college students. Life Orientation Test (Scheier, Carver, & Bridges, 1994) along with Perceived Stress Scale (Cohen, Karmarck, & Mermelstein, 1983) and Student Stress Scale (Mullen and Costello, 1981) were administered. Results indicate that optimistic students had significantly less perceived stress (as rated on Perceived Stress Scale) than their pessimistic counterparts. Though, optimism (as rated on Student Stress Scale) was not significantly related to academic stress, the relationship was observed to show a trend in this direction.
College retention is another area where role of optimism has been studied. Inability to manage stress can lead to dropping out of college. Optimistic attitude may help in managing stress and thereby increase college persistence.

Nes, Evans, and Segerstrom (2009) investigated the relationship of optimistic expectancies with college retention. Academic optimism and dispositional optimism were associated with greater levels of motivation and judgment, and with a lower rate of college dropout. Academic optimism was also related to academic achievement. Both academic and dispositional optimism predicted student retention.

In one of the latest studies (Ünivâr, Avşaroğlu, & Uslu, 2012) conducted on undergraduates students (N=479) of tourism and hotel management in Turkey, optimism and life satisfaction were examined. The findings revealed that all the students had high optimism and moderate life satisfaction. High optimism was also related to high life satisfaction. With regard to gender differences, female students were more optimistic and satisfied than male students. Also, higher level of income was related to higher optimism and greater life satisfaction.

Yet, another recent methodologically sound study by Besser and Zeigler-Hill (2012) examined whether optimism along with other positive personality features of hope, and happiness were associated with the levels of psychological distress (i.e., perceived stress, depressive symptoms, and anxiety), functional impairment, and self-esteem in 217 freshman university students in Israel during the entire course of their first semester.

The study had a three-wave longitudinal design. Positive personality features that were assessed at Time 1 which is first week of semester were examined for their associations with assessments of psychological distress, functional impairment, and self-esteem during the third (Time-2) and fifteenth weeks (Time-3) of the semester.

Results showed significant increase in distress symptoms and functional impairment during the course of the semester. Optimism along with other positive personality features at Time-1 were associated with levels of psychological distress, functional impairment, and self-esteem at Time-3 and these associations were mediated by Time-2 assessments of distress, functional impairment and self-esteem. Further, optimism reported at a Time-2 was associated with greater distress, more functional impairment, and lower self-esteem at Time-3 assessment.
One important revelation to be noted in this study is that optimism along with other positive personality features more strongly predicted distress, functional impairment, and self-esteem at the beginning of the semester rather than at the end of the semester. This means that associations between positive personality features and outcomes at the end of the semester were mediated by the assessment of these outcomes obtained around the start of the semester. The researchers explained that this suggests toward a possibility of positive personality features demonstrating their strongest protective properties early in the duration of a prolonged period of stress, in this case, near the beginning of the semester for new students.

The above mentioned study adds evidence to the potent and protective role optimism may play in stress in the context of college. Especially, it may be more helpful to gear up the individuals at the beginning of any stressful period.

In the Indian context, there are very few studies that have examined role of optimism in college student population. One study by Singh and Mansi (2009) examined the relation of optimism, self-efficacy and locus of control in relation to well-being in a sample of 250 students between the age of 18 and 25 years. Students were administered P.G.I. Health Questionnaire, Optimistic-Pessimistic Attitude scale, Self-Efficacy Scale and Locus of Control Scale. Results indicated that positive self-efficacy, optimistic attitude and locus of control affected the well-being in a meaningful way. It was seen that optimistic attitude was inversely related to well-being (low score on PGI Health questionnaire means better well-being). This indicates that optimism proved to be a trait to nurture that would enhance well-being in college students.

2.5.6. Optimism in Medical Students

Studies investigating the role of optimism in medical students are also few. Pritchard et al. (2007) conducted a longitudinal panel study to examine best predictors of adjustment to college during first year of study (which is a transition period) among law and medical students. They surveyed 242 undergraduate law and medical freshmen students at the beginning and end of their first year. Students’ optimism along with physical health, alcohol use and smoking habits, stress levels, perfectionism, self-esteem, coping tactics, optimism, extroversion, and psychological adaptation to college were
assessed. A decline in physical and psychological health was observed from the beginning to the end of the year. Maladaptive coping methods and perfectionism predicted poorer physical health and alcohol use at the end of the year. Optimism and self-esteem predicted better physical and psychological outcomes. With specific regard to optimism an inverse relationship between health and optimism was observed. Students with higher optimism had fewer health problems than did those with low optimism. Optimism was also seen to be inversely related to psychological health (i.e., negative moods). Higher optimism led to fewer psychological health problems than lower optimism. One drawback of this study was that optimism and related variables were not examined separately in law and medical students. Both the professional courses may have different kind of challenges and stresses to deal with; hence viewing them separately would be essential.

Another study by Banihashemian et al. (2009) comparing medical and non-medical students found that pessimism was negatively related to general health in medical students and pessimism was higher in medical students compared to non-medical students.

Gardner and Parkinson (2011) examined optimism, self-esteem, satisfaction with social support, and coping strategies in relation to study-related subjective workload, stress, and life satisfaction in 150 veterinary undergraduate students studying in the second, third, and fourth years of the five-year BVSc program at Massey University. It was found that students with more optimism and self-esteem were less stressed than those who were more pessimistic or lower in self-esteem. Thus, optimism played a significant role in buffering against stress in a veterinary academic environment.

In another study, Souri and Hasanirad (2011) examined relationships between resilience, optimism and psychological well-being in 414 medical students (213 males and 191 females) Scheier and Carver’s Life Orientation Test was used for assessing optimism. Optimism was seen to be significantly and positively related to psychological well-being. Optimism also mediated the relationship between resilience and psychological well-being. Optimism, regardless of the degree of resilience was seen to influence psychological well-being to an extent.
An Indian study (Singh & Jha, 2013) examined the relation between optimism and academic achievement among 171 medical and 175 engineering students hailing from 3 medical and 4 engineering colleges of Uttar Pradesh, India. Anxiety was assessed by Sinha’s Comprehensive Anxiety Test (SCAT, 2007), and optimism was assessed by Learned Optimism Scale (LOS, 2000). Anxiety was negatively related to optimism and academic achievement, while optimism was positively related to academic achievement. Anxiety was higher and optimism was lower in medical students as compared to engineering students.

2.5.7. Optimism and Coping

Research evidence exists for the relation between optimism and coping. Optimism and coping may be directly related to each other or they may mediate with each other to influence well-being and other related parameters.

Optimism has been found to be associated with adaptive and approach coping styles such as active coping, planning and problem focused coping, and pessimists appear to be avoidant copers (Carver, Scheier & Weintraub, 1989; Scheier & Carver, 1992). Indeed, several of the studies described earlier, in the context of well-being, also looked at coping.

In the health context, there are many studies which have reported the influence of optimism on coping. Scheier et al. (1989) in the study of coronary artery bypass surgery examined the role of attentional-cognitive strategies. Before surgery, optimists reported making plans for their future and setting goals for recovery more than pessimists. In addition, optimists as compared to pessimists also focused less on negative aspects such as distress and symptoms. Following surgery, optimists were more likely than pessimists to seek information about the medical plans from the physicians in the coming months. In addition, optimists also were less likely to suppress thoughts about their symptoms. Also, after six months evidence emerged for the positive impact of optimism on quality of life through the indirect effect of these differences in coping.

The earlier described study of failed in vitro fertilization (Litt et al., 1992) also investigated coping. Pessimistic individuals used escape as a coping response and usage of escape, in turn, led to more distress after the fertilization failure. Optimists reported being benefited from the experience more than pessimists.
In a study of non-heterosexual sample at risk for getting AIDS, positive coping skills and optimism were found to be associated with less psychological distress (Taylor et al., 1992).

Cancer research is an area where many studies have examined relations between optimism and coping. In a study by Stanton and Snider (1993) it was seen that pessimistic women used more cognitive avoidance for coping with an upcoming biopsy than optimists. Cognitive avoidance used before the biopsy predicted distress afterward among women with positive diagnoses. Another study of cancer patients mentioned earlier (Carver et al., 1993) examined how women coped with treatment for breast cancer prior surgery and several time points during first year after diagnosis. They tested mediational hypotheses involving optimism, pessimism, coping, and pre-surgical distress in breast cancer patients. Both before and after surgery, optimism related to coping that involved accepting the reality of the situation and humour. Pessimism related to overt denial and to giving-up tendencies at each time point. The coping responses that were related to optimism and pessimism were also related to distress. They found that several coping responses mediated the effects of optimism on pre-surgery distress. Specifically, acceptance and denial mediated the effects of optimism on pre-surgical distress among these women.

One of the studies (David et al., 2006) had the main purpose to investigate how optimism, pessimism, and coping mediate with each other in predicting distress levels among pre-surgery breast cancer patients. Optimism was related to self-distraction and instrumental support. Pessimism was related to planning, positive reframing, denial, self-distraction, instrumental support, active coping, religion, venting, and behavioural disengagement. Mediational analyses revealed that optimism and pessimism completely mediated the effects of coping responses (i.e., planning, denial, and self-distraction) on distress, except for venting. Also, pessimism partially mediated the impact of instrumental support on distress. In the analyses conducted to see whether coping mediated the impact of optimism and pessimism on distress, it was found that only venting mediated the effects of pessimism on distress.
In their meta-analysis of optimism and coping (N=11,629), Solberg Nes and Segerstrom (2006) discuss coping responses based on two broader categories of coping namely, problem focused versus emotion focused (Lazarus & Folkman, 1984) and engagement coping versus disengagement coping (e.g., Skinner, Altman, & Sherwood, 2003). Results revealed that optimism was positively associated with broad measures of engagement coping, and with problem-focused coping \((r = .17)\) and negatively associated with avoidance, maladaptive emotion focused coping or disengagement coping \((r = -.21)\).

Optimism was also seen to be positively associated with the two subtypes of engagement coping responses: those that are problem-focused (e.g., planning, seeking instrumental support) and those that are emotion focused (e.g., cognitive restructuring, acceptance). Furthermore, optimists were responsive to what sort of stressor was being confronted. Optimism predicted more problem-focused coping with controllable stressors (e.g., academic demands) and more emotion-focused coping with uncontrollable stressors (e.g., trauma). Thus, optimism predicted ability to adapt flexible engagement coping. Optimism related negatively to disengagement coping, and to both specific types of emotion-focused disengagement (e.g., behavioural disengagement) and maladaptive disengagement (e.g., denial, wishful thinking). In summary, the meta-analysis revealed that optimists used more engagement and problem focused coping while pessimists used more of maladaptive disengagement and emotion focused coping.

### 2.5.8. Optimism and Coping in the Context of College Students

Relation of coping and optimism was first explored in college students. Scheier, et al. (1986, Study 1) in a study of situational coping and optimism, undergraduate students asked students to recall the single most stressful event that had happened to them during the preceding month. Subsequently, they completed the Ways of Coping Checklist (Folkman & Lazarus, 1980) keeping in mind the stressful event they had recalled. Optimism correlated positively with problem-focused coping, and this was more so in students who perceived the stressful event to be controllable. In addition, in the case of uncontrollable stressor, optimism was also positively related to coping styles of positive reinterpretation and acceptance. This latter association became manifest, however, only when subjects perceived the stressful event as uncontrollable. Negative correlations were observed between optimism and maladaptive coping styles of denial and distancing from the problem.
Another study of relation between optimism and dispositional coping methods in college students (Carver et al., 1989), found a similar pattern of findings as mentioned in the earlier study. Optimists reported a dispositional tendency of using more active, problem-focused coping and planful coping in dealing with stressful events. On the contrary, pessimism was associated with the dispositional tendency to disengage from the problem with the use of denial and behavioural disengagement. Also, optimists reported a bias toward accepting the reality of stressful events, while pessimists used more ineffective coping strategies such as denial and substance abuse.

The mediational role of coping in the relationship between optimism and psychological well-being also was examined in the college adaptation study by Aspinwall and Taylor (1992). Optimistic students engaged in more active coping and less avoidance coping than did pessimistic students. Avoidance coping was related to poorer adjustment; active coping was related (separately) to better adjustment.

Optimists have also been found to have better coping abilities when they experience more control over life events. College students were more optimistic about hypothetical performance on an upcoming exam when they believed more in their efforts to do well on the exam (Chang, 1998).

In a study that examined impact of optimism and appraisals on coping, physical and psychological adjustment in 726 college students showed that stress appraisals were related to optimism, coping and adjustment. Optimists significantly differed than pessimists in secondary appraisal, adjustment and coping. Dispositional optimism was also seen to add significant incremental validity in predicting adjustment above what was accounted for by coping and appraisals (Chang, 1998).

Chen, Kee, and Tsai (2008) conducted a study on 248 Hong Kong undergraduates in the context of academic examinations wherein they examined the relationship between dispositional optimism and coping strategies. High optimism was associated with more usage of self-encouragement and less use of cognitive avoidance.
A study done by Lopez and Cunha (2008) on 343 college subjects to study the moderating role of hope on optimism and pessimism over proactive coping found that optimism predicted proactive coping independent of hope. However, hope appeared to moderate the relationship between pessimism and passive coping, a criterion variable which emerged from the psychometric analysis of the properties of proactive coping measure. In specific, for subjects with low pessimism, high or low hope did not influence coping. For individuals, higher levels of hope reduced use of passive coping strategy.

Peacok and Wong (1996) examined in a study of 118 college students, whether locus of control beliefs and optimism predicted control appraisals and coping related to three different anticipatory stressful situations (employment decisions, teacher bias, and natural disaster). Initially students completed measures of locus of control (Rotter I-E), optimism (Life orientation Test) and control appraisals (Stress Appraisal Measure). After two weeks, Inventory of Coping Schemas assessing coping methods used to deal with each stressor was completed.

Results indicated that optimism and locus of control relatively independently and almost equally predicted control appraisals, which is the view that personal coping resources are capable of meeting situational demands. With regard to coping, mostly control appraisals emerged as better predictors of coping than either locus of control or optimism. It was only in the case of passive-emotional coping, optimism and locus of control beliefs emerged as better predictors of coping than control appraisals. That is, higher levels of external control beliefs and lower levels of optimism predicted passive emotional coping.

In an earlier discussed study, where in Brissette et al. (2002) examined the degree to which social support and coping mediated the association between greater optimism and better adjustment to stressful life events, support for mediating role of coping was found. Greater use of coping strategy of positive reinterpretation and growth along with social support accounted for superior adjustment in optimistic individuals.

Unlike any other study, Harju and Bolen (1998) examined 204 college students’ optimism coping and quality of life by categorizing them into low, moderate and high optimism groups. Life Orientation Test-Revised (LOT-R), the Brief Cope, and one
previous measure of quality of life constructed by the researchers were used. With regard
to coping, high optimists were the only group that used effective coping strategies to deal
with stress. Mid-level optimists were found to use maladaptive coping strategy of alcohol
as a way of coping with stress.

Given the evidence for the role of optimism in buffering stress and its
interrelation with coping in influencing stress, the need to enhance optimism in student
population cannot be under emphasized. Preliminary findings with adolescents and
college students suggest that training individuals to think optimistically can reduce
depression (Hawkins & Miller, 2003; Vaillant, 2003). Similar training may help students
to face adverse situations successfully. Also, it may be useful in preventing extreme
outcomes such as suicides (Hirsch, Conner, & Duberstein, 2007).

The review of literature came up with very few studies on optimism in medical
students. Further, relation between optimism and coping in the context of medical
students has also been hardly examined. Therefore, the current study would like to
explore the relationship between optimism and coping, and any mediating role optimism
may have on the relation between coping and stress.

2.6. Perceived Academic Control

Locus of Control is an important construct introduced by Rotter in his social
learning theory (Rotter, 1966) and it refers to the extent to which individuals perceive
control over their lives, and environment (Lefcourt, 1976).

Locus of control has internal and external dimensions. Internal locus of control
means a person's belief that rewards or outcomes are contingent upon one's own
behaviour. On the other hand, external control upholds the belief that rewards or
outcomes are controlled by outside forces and will occur independently of one's own
actions (Rotter, 1966).

Several theories of perceived control have been proposed. Some of the important
theories are briefly outlined in the following section.
2.6.1. Models of Locus of Control

In the context of perceived control, Rotter’s locus of control model takes an important place (1966). Rotter explains the locus of control as having internal and external modes—“internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behaviour is contingent on their own behaviour or personal characteristics versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable” (pg. 489, 1990).

2.6.1.1. Value-expectancy models. The focus here is on expectancies of success or outcome related expectations which mean how people estimate likelihood of being able to produce desired outcomes (Wigfield & Eccles, 2002; Atkinson, 1964).

2.6.1.2. Causal attributions. Popularized by Weiner (1986, 2005), causal attribution theory focuses on the reasons or causes people give for their successes and failures. The attributions may be based on effort, ability, task difficulty or luck. Further, these attributions may differ on dimensions such as stability, ability, intentionality and controllability.

2.6.1.3. Learned helplessness. Learned helplessness is characterized by disruption in motivation, affect, and learning following exposure to non-contingent (uncontrollable) outcomes. Individuals experiencing learned helplessness have motivational and behavioural deficits and have emotional withdrawal (Seligman 1975, 1981).

This concept was developed in 1960s by Martin Seligman. Seligman (1975) in an experiment found that dogs showed helplessness when they received repeated electric shocks, which they were unable to prevent or avoid and this helplessness generalized to situations where avoidance and escape was possible. The same theory was extended to humans in explaining depression where in depression was seen to be a result of a belief that significant life events both aversive and fulfilling are outside of one’s control (Seligman, 1975).
Subsequently, an attributional component was added to learned helplessness theory (Abramson, Seligman, & Teasdale, 1978; Peterson, Meier, & Seligman, 1993). Attributions about cause of uncontrollable events were thought of as important factors in determining the effect of experiences and beliefs of uncontrollability. According to the new theory, individuals with stable global and internal attributions of causes of failure were seen to exhibit learned helplessness more than individuals with unstable, specific and external attributions.

2.6.1.4. Self-efficacy theory. Bandura’s (1977) self-efficacy theory also partly focuses on perceived control. Self-efficacy refers to a person’s belief in the ability to perform a specified task. A strong sense of self-efficacy impacts performances in many settings including academic settings. High self-efficacy people face challenging activities without avoiding them. “People’s self-efficacy beliefs determine their level of motivation, as reflected in how much effort they will exert in an endeavour and how long they will persevere in the face of obstacles” (Bandura, 1989, pg.1176). A person with high self-efficacy focus on utilizing cognitive assets to achieve desired outcome. This could represent internal locus of control.

Literature shows internal locus of control to be more adaptive and associated with less stress (Garber & Seligman, 1980; Rees and Copper, 1992; Schafer & Mckenna, 1991), while external locus of control is associated with high stress (Garber & Seligman, 1980; Jennings, 1990).

In a study of association between perceived control, biological and subjective stress responses, subjects with external locus of control had more psychological and physical problems, less satisfaction with life (Bollini, Walker, Hamann, & Kestler, 2004). In addition, locus of control was seen to moderate the relation between control and cortisol responses, specifically people with more internal locus of control had lower cortisol levels (Bollini et al., 2004).

2.6.2. Concept of Perceived Academic Control

The variable of interest to this study, perceived academic control (PAC) was coined by Perry and it refers to “students’ beliefs about whether they possess certain attributes, such as intellectual ability, physical stamina, effort expenditure, task strategies,
social skills, and educational experience, and whether such attributes make a difference to their scholastic performance (cause-effect contingencies)” (Perry, Hall, & Ruthig, 2005, pg. 365). Students may differ on where they fall on the continuum of academic control. Students with low perceived academic control may be prone to failure and feel helpless while students with high academic control will have higher academic success and experience mastery.

Perry et al. (2005) view that perceived control is similar to the concept of autonomy, independence and self-reliance. They trace the primary origins of the concept to Rotter’s (1966) conception of locus of control and, Glass and Singer’s (1971) view of it as a conditional stressor. According to Perry et al. (2005), the development of this construct is influenced by other similar concepts such as White’s (1959) competence motivation, De Charm’s (1968) personal causation, Seligman’s (1975) learned helplessness, Dweck’s (1975) mastery, Wortman and Brehm’s (1975) reactance, Bandura’s (1977) self-efficacy, Deci and Ryan’s (1985) self-determination theory, Rothbaum, Weisz, and Snyder’s (1982) primary/secondary control, Kuhl’s (1985) action control, Weiner’s (1985) causal attributions and Langer’s (1985) mindfulness.

Perry et al. (2005) explain the term “perceived” in perceived control refers to the actual reality of how predictable and controllable a situation is as perceived by the individual facing that situation.

People may vary in their perceptions, wherein, an event that is fairly predictable and controllable may be viewed as a low-control event by one individual and as a high control event by another individual. Sometimes, an unpredictable event may be taken as a high control situation. People may vary in their views of control of same situation (Perry et al., 2005).

In the academic settings, how academic control operates in affecting academic outcomes can be best seen in situations where there is limited perceived predictability.

Even when academic conditions can be objectively controlled, some students may subjectively view them as not under control. On other hand, uncontrollable academic situations may be seen as controllable (Perry et al., 2005).
With regard to perceived academic control in college environment, perceived control has two facets, namely, individual characteristics and characteristics of the environment. Perceived academic control in itself can be regarded as an individual specific factor which affects academic motivation and performance (Perry et al., 2005).

Weiner’s (1985, 1995) attributional perspective was added to perceived academic control to understand the reasons students give to substantiate their successes and failures.

Students will search reasons in their personal characteristics to explain their successes and failures. The attributions regarding their personal arena may pertain to reflections such as smartness and ability to endure demands of academic life. Apart from personal factors, environmental properties that influence the attributions about academic success and failure may include instructional quality, content level, grading system etc.

Perry (1991) emphasizes that perceived control in academic condition means students perception of the amount of influence they have on academic outcome and responsibility they assume for their academic performance related results. The stronger the belief that the academic outcome is determined by students’ own action and personal factors, greater will be the sense of academic control.

Perry et al. (2005) explore the operation of perceived academic control through Weiner’s attribution theory which has three dimensions: locus of causality, that is where the origin point of causes of successes and failures lies, inside or outside the individual; stability of causes, whether causes are stable or temporary and controllability, which means whether the causes can be controlled by the person.

Applying Wiener’s theory to achievement context, Perry et al. (2005) explain an instance where in a student failing a test attributes this outcome to lack of ability which is generally seen as an internal, stable and uncontrollable cause, which would result in a student taking personal accountability for failure and feel emotions such as shame and sadness. Experiencing this negative affect would make students perceive course as difficult and lead to avoidance behaviours. Expectations of failure and stable belief of not having ability may interact with negative emotions and hinder students’ motivation to do well thus affecting performance in the future and increasing the possibility of dropping out from the course.
On the other hand, internal temporary and uncontrollable attributions like the ones that operate in effort related attribution may lead to different academic outcomes. If a student attributes the reason for academic failure to lack of effort, then negative affect such as guilt may occur, however, this would be less harmful and won’t affect the self-concept badly. Since, the lack of effort can be attributed as a transient or unstable and controllable cause which can be subjected to modification, the expectations about success or failure may not create that much anxiety. As a result, student may strive, experience more control or may be more motivated to do better by adapting better strategies, as lack of effort is something that is unstable and controllable and therefore can be mastered as against lack of ability which is more stable and uncontrollable, thus resulting in feeling of helplessness (Perry et al., 2005).

2.6.3. Locus of Control in College Students

Locus of control studies have been done in the context of college education even before the conception of the concept of perceived academic control.

For instance, as early as 1977, Bar-Tal and Bar-Zohar (1977) reviewed research studies which have used various instruments to measure locus of control in students enrolled in various educational programs. Around 86% of the studies revealed that internal locus of control were positively related to academic achievement.

Wolk and Bloom (1978) in a study of college students, found that students with internal-locus-of-control had better focus on work regardless of efforts at distracting them, as compared to students with external locus of control whose performance decreased when the same stressors faced by internal locus of control students were present.

Sagone and Decaroli (2013) conducted a study that examined influence of self-concepts on locus of control and academic self-efficacy in psychology, medical and law students studying at a University. It was observed that students with higher internal locus of control regarding day to day circumstances in their lives, had higher self-concept in present and future, and perceived themselves as efficient in academic context.
In another study (Ghasemzadeh, Karami, Sadat, & Soleimani, 2012) of 370 Iranian college students, higher internal locus of control was associated with higher self-esteem, while external and chance related control was related to low-self-esteem.

Yet, another study (Ghasemzadeh & Saadat, 2011) of Iranian college students showed internal locus of control to be positively predictive of academic achievement.

Academic locus of control is locus of control in the academic settings (Trice, 1985).

The academic locus of control (ALOC) tool was developed by Trice (1985) to assess LOC in relation to academic performance of college students. Many studies have shown ALOC to be related to academic achievement (Daum & Wiebe, 2003; Uguak, Elias, Uli & Suandi, 2007; Cook & Brown, 2009).

A research focusing on impact of student’s ALOC on procrastination showed that students with internal ALOC procrastinated for lesser days than students with external locus of control (Janssen & Carton, 1999).

Landis, Altman, and Gavin (2007) in a study of 127 undergraduate psychology students found that students with internal locus of control and high self-efficacy used more study skills than those with moderate LOC and self-efficacy.

Onwuegbuzie and Daley (1998) in a group of 154 college students found that ALOC was significantly related to study skills and aspects of self-perception such as perceived scholastic competence, perceived self-worth, perceived intellectual ability and a scale from social interdependence scale. ALOC along with parts of self-perception contributed to 39% of variance in study habits. Individually, ALOC explained 27% of variance.

In a group of Indian students aged between 16-19 years, Gupta and Sinha (2004) studied LOC and goal orientation. They found that students with internal LOC though had better academic results, they were not significantly different than those with external locus of control.

Eksterowicz (1999) in a study of 59 students enrolled in psychology courses found that students with external locus of control had lower GPAs and grades in comparison to students with internal LOC who had better academic achievement.
Some studies have also examined relation of stress to locus of control in relation to stress and academic outcomes in college. Abouserie (1994) examined academic and life stress in relation to self-esteem and locus of control in college students. With regard to locus of control, students with external locus of control beliefs were having higher stress than those with internal locus of control. Another study examined locus of control in mild, moderate and severe stress groups of college students. Findings revealed that students having high stress levels had external locus of control perceiving that they were influenced by other people and luck than those having low levels of stress. However, no group differences emerged on internal locus of control.

The effects of academic stress on self-control were examined in a group of undergraduate students at two points in time: one four weeks before exams and other during exams.

Findings indicated that anxiety about forthcoming exams decreased self-control and led to failures in self-control. Stress was negatively related to self-control (Oaten & Cheng, 2005).

Findley and Cooper (1983) made a literature review of studies done on relation between LOC and academic achievement. The results pointed towards internal locus of control being associated with higher academic achievement. This relation was greater in males. The relation was stronger in the case of specific tools of LOC and with standardized measures of achievement and intelligence than with grades given by teachers.

Kalechstein and Nowicki (1997) undertook a meta-analytic review of studies done on relation between control expectancies and academic achievement published from 1983-1994. Both generalized and specific control expectancies were associated with academic achievement. In both types of expectancies, internal locus of control was seen to be positively associated with academic achievement. However, specific control expectancies were not higher than generalized expectancies in predicting academic achievement.

Twenge, Zhang, and Im (1998) conducted a meta-analytic study of studies done on locus of control in US college students between 1960 and 2002. It was observed that
average college student in 2002 had higher external locus of control than 80% of college students in 1960s. Hence, locus of control was seen to grow more external over the years.

Authors opine (Twenge, Zhang, & Im, 1998) that results are in line with the alienation model which has propagated that there is an increase in cynicism, individualism, and self-serving bias that is becoming increasingly evident in US culture. Authors discuss implications of such a trend as negative as higher external locus of control is associated with low scholastic achievement, helplessness, inefficient stress management, poor self-control and higher depression.

2.6.4. Perceived Academic Control in College Settings

In the college context, Perry emphasizes (1991, 2003) that perceived academic control is most important in transitional phases of education such as transition from college to first year of study, which is a time where students are exposed to new and unanticipated experiences, such as importance of performing, pressure to do extremely well, possibility of academic failures and important choices in career. Students may perceive low control environment on entering college as transitional phases may have unexpected achievement demands.

There have been several studies which have proven that better sense of academic control are associated with better affect in college situations.

Schonwetter, Perry, and Struthers (1993) in a study of students’ achievement related feelings in an introductory psychology course found that students with higher perceived control experienced more pride with regard to academic performance than students with less control.

In yet another study, Perry, Hladkyj, et al. (2003) reported that high control students had less course-related anxiety and boredom than low-control students.

In an Indian study, Dasgupta (1992) found that students who sense better control over questions that would appear in introductory psychology tests would experience less stress than students who feel no sense of control over test questions.

Perceived academic control is also known to influence academic performance. In a longitudinal one year study of students in introductory psychology course, students having higher academic control at the beginning of the course obtained better grades at
the end of the year in comparison to students who had lower academic control (Perry et al., 2001).

A three year longitudinal study examined four groups of students with high and low academic control and high and low failure preoccupation. Students with higher academic control had better 3 year GPAS and had lesser dropout from study courses. Specifically, higher academic control students with high failure concerns had better three year GPAS and were less likely to stop studying in university or withdraw from study courses. On the contrary, students with high academic control with less concern for failures fared poorly (Perry, Hladkyj, Pekrun, Clifton, & Chipperfield, 2005).

Academic persistence is one of the positive outcomes of better sense of academic control. Studies have shown that students with higher perceived academic control are more likely to persist in their studies and less likely to drop out from courses as compared to students with lesser perceived academic control (Ruthig, Hladkyj, Hall, Pekrun, & Perry, 2002; Perry, et al., 2005).

Even if perceived academic control has positive effects, its effects can be influenced by the role of other factors. In an investigation of how emotions such as enjoyment, boredom and anxiety moderated the effects of academic control on academic performance and persistence in students of introductory psychology grades, it was seen that, positive emotions were seen to help academic control to enhance academic performance and reduce dropout from the course. Negative emotions nullified or impeded the positive influence of perceived academic control. Students reporting high control had higher enjoyment and better grades and low dropout rate. While, among students experiencing less enjoyment, high academic control did not contribute to academic improvement. Even for students with high boredom or anxiety, perceived control did not enhance academic performance (Ruthig et al., 2008).

Self-regulation has also been observed to influence the impact of academic control. Perry et al. (2001) conceptualized self-regulation as a preoccupation with failure or negative events, and in a study of introductory psychology students found that student with increased failure preoccupation and higher academic control had better grades than those students with low failure preoccupation irrespective of their level of control. Failure preoccupation seems to be a negative thing but Perry et al. (2003) opine that higher
failure preoccupation students with better academic control on academic performance are better able to monitor the causes of failure and try to prevent the recurrence of failure.

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Perry, Hall, and Ruthig (2005) and Hall et al. (2006) also highlight the importance of incorporating Rothbaum, Weisz, and Synder’s (1982) dual process-model of perceived control to account for reasons as to how students despite conditions of low control, are able to sustain academically and maintain their personal control without feeling utterly helpless. The dual process model has two components: primary control and secondary control. Primary control involves attempts to change the environment and secondary control involves efforts to adapt to one’s environment. By primary control students can directly impact academic related outcomes. By secondary control students adapt to academic pressures, academic failures and unpredictability.

In low control achievement environment, students may take up secondary control methods such as reinterpreting negative academic outcomes in a positive way or viewing a particular aspect of academic performance as not important in the larger context. Whereas, students with primary control make efforts to change external results or design ways to reach goals such as seeking more instructional help or reorganizing study methods.

The beneficial effect of secondary academic control is supported by studies.

Hladkyj et al. (1998) measured secondary academic control of students in first year of college and found that it was positively associated with elaborative learning, self-monitoring, intrinsic academic motivation, course enjoyment, success feelings and better adjustment at the end of the year of college.
In another study of 3973 students in introductory psychology course from five different years, higher levels of secondary control was seen to be associated with higher academic mastery, better adjustment to college and higher meta-cognitive engagement (Hladkyj et al., 2003).

Though secondary control helps in remedying the emotional effects of low control, it need not necessarily enhance achievement in final grades, hence it may not be useful for bettering academic performance per se (Hall, Perry, Ruthig, Hladkyj, & Chipperfield, 2006).

Research has also speculated whether having high levels of both types of control is useful. Ruthig et al. (2008) found that students who were unsuccessful and who have high primary and secondary control achieve higher cumulative GPA, have less stress, are less likely to drop out, have higher academic success and higher positive academic related feelings.

Hall, Hladkyj, Ruthig, Pekrun, and Perry (2002) give reasons for how students with high levels of primary and secondary control fare better than others with other combinations of primary and secondary control. Hall et al. argue that students with high levels of primary and secondary control are able to maximize their perceived control as they are able to shift from one type of control to the other when needed. When in failure situations, where primary control is less, if students are able to shift to using secondary control methods, they will be able to sustain their sense of control.

Hall, Judith, Chipperfield, Perry, Ruthig, and Goetz (2006) examined the uses of primary and secondary control in students and also studied the mediating effects of gender and stress in 888 college students. In males, primary control was indirectly associated with better overall health and low stress, and both primary and secondary control was associated with less illness behaviours. In females, secondary control alone was associated with better overall health and less illness symptoms, mediated by low stress levels.

In another eight month longitudinal study, Hall, Perry, Ruthig, Hladkyj and Chipperfield (2006) examined how primary and secondary control impacted academic motivation, and emotions such as stress, regret, pride and performance in 703 first year
college students. Primary control was related to good performance better academic motivation and higher positive emotions. In unsuccessful students who used primary control rather than secondary control motivation and performance seemed to worsen in the long run.

In the context of students enrolled in health related professional training, there is one study by Clark and Stoffel (1992) which found that allied health students generally had greater internal locus of control. Among occupational therapy and health information administration students, occupational therapy students had greater externality than health information administration students.

2.6.5. Locus of Control/Perceived Academic Control in Medical Students

The studies on locus of control in medical students are few and most of them have mainly focused on health locus of control. Studies on academic control in medical students are further less in number.

Grover and Smith (1981) examined relations between prior achievement, academic anxiety, locus of control, and academic performance in the first year medical students. Academic anxiety was associated with performance. Locus of control was significantly associated with academic anxiety and academic achievement. Also, as students progressed through their first year, their locus of control was seen to shift towards greater externality.

Wolf et al. (1991) examined psychosocial changes during first year of medical study. There were 128 first year medical students whose self-esteem, health locus of control, hassles, uplifts, mood, and symptoms of stress were assessed at the beginning and end of first year. Students fared worse on psychosocial measures during the end of first year. Factors such as self-esteem, power and other locus of control reduced, while hassles increased during the year.

In one of the studies (Shamseddeen, et al., 2006) done on medical students in a Lebanese university, the three types of locus of control, namely, internal locus of control, chance locus of control and powerful other locus of control were tested in relation to demographic and risky healthy behaviors. Pure internals were associated with socio-
demographic characteristic of gender and self-perceived health while chance locus of control was related to health risk behaviors. Pure externals were not associated with demographic or health behaviours.

Keeping in mind the popularity of problem based curricula contributing to greater well-being in medical school, Kuhnigk and Schauenburg (1999) compared preclinical medical students enrolled in a traditional and problem-oriented medical curriculum, on measures of subjective well-being, locus of control and personality traits. Students in problem-based medical program experienced less depression and anxiety and less external locus of control (i.e., less powerlessness and fatalism).

2.6.6. Perceived academic control as a Mediator

Perceived academic control may impact the effect of psychosocial variables such as optimism on students’ health. Studies examining the mediating role of PAC are few. One such study was done by Ruthig et al. (2009) who examined the mediating role of perceived academic control on the effects of optimism and social support on 288 first year college students’ psychological health. It was tested whether optimism and social support at the beginning of the academic year predicted stress and depression at the end of the year. Next the mediating role of PAC on the effects of optimism and support was tested. Subsequently, it was examined whether stress and depression predicted degree commitment and academic performance at the end of the year. Results showed that optimism and support predicted less stress and depression and their effects were mediated by PAC. Depression was seen to predict less degree commitment and lower academic performance as measured by cumulative GPA. Therefore, PAC mediated the protective effects of optimism and support in addition to the protection of students against adverse psychological health. The authors opined that factors such as optimism are like stable traits which may not be that amenable to change. Whereas, PAC which is more state dependent, is more amenable to change. Hence, enhancing PAC may help in supporting optimism to buffer the effects of stress.

In the light of lack of studies examining the role of perceived academic control on stress in medical students, this study explored whether perceived academic control predicted stress in medical students. Further, the mediating effect of PAC on the relation between optimism and stress and stress categories were also examined.
2.7. Motivation

Motivation is the reason behind acting in a particular way. It is the driving force that makes one strive towards achieving a certain goal or desired outcome. Motivation is important in all spheres of life. In the academic context, motivation is essential for successfully achieving academic goals.

Several definitions of motivation have been proposed by various authors. Sage (1977) defined motivation as “the direction and intensity of one's effort”.

According to Locke and Latham (2004) “the concept of motivation refers to internal factors that impel action and to external factors that can act as inducements to action”. The three aspects of action that motivation can affect are direction (choice), intensity (effort), and duration (persistence). “Motivation can affect both the acquisition of people’s skills and abilities and also the extent to which they utilize their skills and abilities” (Locke and Latham, 2004).

Gottfried (1990) defines academic motivation as “enjoyment of school learning characterized by a mastery orientation; curiosity; persistence; task-endogeny; and the learning of challenging, difficult, and novel tasks” (p. 525).

Academic motivation, as per Pintrich and Zusho (2002), refers to internal processes that instigate and sustain activities aimed at achieving specific academic goals.

Many theories have been proposed to understand the concept of motivation. As early as 1900, Freud conceptualized that all behaviours are manifested because of the instincts, and behaviours in varying degrees are focused on fulfilling what these instincts put forth.

2.7.1. Theories of Motivation

Many theories have been put forth by different researchers such as Skinner’s (1938) operant behaviour theory, Murray’s needs theory (Murray, 1938), hierarchical needs theory (Maslow, 1943), drive theory (Hull, 1943), expectancy value theory (Atkinson, 1966), attribution theory (Weiner, 1974, 1979), social cognitive or self-efficacy theory (Bandura, 1977, 1997) self-determination theory (Deci and Ryan, 1985, 1991, 2000) and, achievement goal theory (Pintrich & Schunk, 1996; Pintrich, 2000b).
2.7.1.1. Murray’s theory of needs. Murray (1938) proposed taxonomy of 20 basic needs as a part of understanding personality and motivation. Achievement need is one of the important needs among these needs. Need for achievement was classified by Murray under those needs that initiated “actions which express what is commonly called ambition, will to-power, desire for accomplishment and prestige” (pg. 80, Murray, 1938). Achievement motivation was defined by Murray as need “to overcome obstacles, to exercise power, to strive to do something difficult as well, and as quickly as possible (pg.80-81, 1938). This was the starting point for researchers to carry forward the concept of achievement motivation and research its applicability in varied contexts including education.

Murray developed the Thematic Apperception Test, which had 20 cards about which people had to write stories. These stories when analysed would reveal the motives of the person writing it.

2.7.1.2. Maslow’s hierarchy of needs. Maslow developed a theory of hierarchy of needs which consisted of list of needs starting from basic physiological needs, moving on to safety needs, then love and belonging needs, followed by esteem needs and finally to self-actualization need, where in a person ultimately realizes his fullest potential. Maslow (1943) explaining the basis of hierarchy of needs says “human needs arrange themselves in hierarchies of pre-potency. That is to say, the appearance of one need usually rests on the prior satisfaction of another, more pre-potent need”.

2.7.1.3. Hull’s drive theory. Hull’s drive theory proposed that there are internal states of discomfort that drive an organism to perform certain behaviours to make the internal states to reach homeostasis. Reduction of drive such as hunger and thirst is the primary reason behind motivation.

2.7.1.4. McClelland’s need for achievement theory. McClelland and colleagues (McClelland, Atkinson, Clark, & Lowell, 1953) furthered the work of Murray by using the TAT to assess and research on achievement motivation. He developed an elaborate method for scoring achievement motivation. McClelland and colleagues’ research (McClelland et al., 1953) demonstrated that TAT stories written in high achievement conditions revealed themes reflecting desire to achieve and perform excellently. Stories
written in low achievement condition reflected themes such as sedentary lifestyle, and recall of past events.

2.7.1.5. Expectancy value theory. Atkinson (1954, 1964, 1966) developed the expectancy value model wherein he discussed aspects of achievement such as striving for success, choice in achievement related tasks, and persistence. According to Atkinson (1957), people’s behaviours are determined by motives to achieve success and motives to avoid failure. Atkinson (1957) proposed that achievement related acts depend on achievement motivation, expectancies of success or failure, and incentive values. Expectancy for success is individual’s expected probability of success on a task. Incentive value is the relative attractiveness of succeeding on a task. Incentive value is inversely related to probability for success.

Atkinson and Feather (1966) reviewed results of some of the studies conducted by Atkinson and his group of researchers (Atkinson & Raynor, 1974, 1978) and reported that achievement motivated people (high in achievement need and low motive to fail) look forward to face challenges, start out as optimistic about success, are persistent when likely to succeed, but quit when success seems less likely. The failure prone individuals (high need to avoid failure and low need for achievement) don’t take up activities where they will be evaluated. If they have no choice but to work, they may choose activity, where they are likely to succeed or choose such an activity where no one can succeed and feel that they may be acknowledged for at least trying.


Emphasizing broader psychological and socio-cultural aspects, elaborating expectancy and value components and focusing on achievement tasks in real world rather than laboratory tasks are some of the important ways in which this model differs from Atkinson’s original model. Expectancies and values are affected beliefs about tasks. These beliefs consists of belief about ability, perceived difficulty of task, individual goals, self-schema and affective memories. Past experiences along with perception of
others attitudes and views of previous achievement influence how the expectancies are shaped.

Eccles and her co–researchers examined how expectancies, values, and their determinants, influenced choice, persistence, and performance. Expectancies and values are seen to be directly related to performance and task choice. As per Eccles and colleagues, values depend on characteristics of varied tasks, and influence of the qualities of these tasks on a person’s desire to do a task (Eccles, 2005). Values are subjective and people can have different values for the same task. Positive and negative task characteristics influence choice of tasks. Four major components of achievement task values are attainment value or importance, intrinsic or interest value, utility value or usefulness of the task, and cost (Eccles et al., 1983). Attainment value is the importance of doing well on a given task. Intrinsic or interest value is the enjoyment one gains from doing the task. Utility value or usefulness refers to how a task fits into an individual’s future plans. Cost refers to what the individual has to give up doing a task. Some studies have examined this theory in college students. Bong (2001b) examined whether Eccles and Wigfield’s theory could predict college students performance and motive to enrol in future course. It was seen that value attached by students to their current course influenced the decision to continue enrolment.

Hood, Creed, and Neumann (2012) examined relation between attitudes toward statistics and achievement based on Eccles’ Expectancy Value Model in a group of Australian psychology college students enrolled in a statistic course. Past performance, effort and expectancies directly explained the variance in students’ achievement.

2.7.1.7. Attribution theory. Attribution theory proposed by Wiener (1974) seeks to understand the causes (external or internal) people ascribe to the occurrence of events and behaviours. Weiner (1985) worked towards developing an attributional theory of achievement motivation. According to this theory, attributions about achievement outcomes are more important than motivational state or actual outcomes in determining future achievement behaviours. Weiner and his co-researchers (1992) classify effort, task difficulty and luck attributions as the crux of this theory. These achievement attributions can be seen across three dimensions of locus of control, stability, and controllability.
Internal and external are two types of locus of control. Stability determines whether attributions change over time or not i.e., whether they remain stable or are unstable. Controllability refers to what extent causes are perceived to be controllable or uncontrollable.

As per this theory (Weiner, 1992) the causal dimensions have influence on differing aspects of achievement. The stability dimensions impact one’s expectations of success. When an outcome is attributed to stable cause such as ability, it is likely to lead to more positive expectancies about future success than attributing an outcome to unstable cause such as affect. Locus of control has implications for affect. For instance, if failure is attributed to inside cause, then it leads to shame, whereas if failure is attributed to external cause, then it may result in anger. Also, if causal factors are seen as not controllable, it may lead to more negative affective reactions.

2.7.1.8. Self-efficacy theory / social cognitive theory (Bandura, 1977, 1986). Self-efficacy is defined as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391).

According to Bandura (1977) self-efficacy influences what activities a person chooses and how much effort he invests in them and how persistent he is in doing those activities. Lower self-efficacy may lead one to avoid an activity, while higher self-efficacy makes one engage in activity. In contrast to people who doubt their abilities, efficacious individuals work harder, persist more in face of adverse conditions. Self-efficacy doesn’t alone influence behaviour. Only in the presence of adequate skills, positive expectations about outcome and personally valued outcomes, self-efficacy is likely to impact the direction and choice of behaviour (Bandura, 1989b).

Bandura’s social cognitive theory lists three source of motivation (Bandura, 1986). One such source is biological which may arise from internal physiology and also be triggered by outside unpleasant events. However, these biological motivators are under anticipatory and generative cognitive control rather than being influenced only by biological urges (Bandura, 1991a).

The second source of motivators is social incentives. Through developmental experience people learn that positive experiences occur along with others’ interest and approval, while unpleasant experience occurs with disapproval. Hence, social reactions
on their own act as predictors of rewarding and punishing results and turn to be incentives. People learn to do things that are approved by others and learn to avoid activities that are disapproved by others. Therefore, approval and disapproval of people who possess power to dispense rewards and punishment is given importance than similar expressions from people who don’t possess such power and thus don’t affect one’s life (Bandura, 1991b).

Third source of motivation is cognitive where in, people motivate themselves and plan their actions by forethought. People anticipate possible outcomes of the actions they make take and accordingly set goals and plan course of action to achieve those goals. The ability to self-motivate and take purposeful actions is based in cognitive activity. The three types of cognitive motivators are causal attributions, outcome expectancies, and cognized goals. These motivators are based on attribution theory, expectancy-value theory and cognized goals (Bandura, 1991b).


Hsieh, Sullivan, and Guerra (2007) examined differences in self-efficacy and goal orientation in adequately and underperforming college students. According to the findings, self-efficacy along with mastery goals were positively associated with academic standing and performance avoidance goals were seen to be negatively associated with academic standing. Students performing adequately had higher self-efficacy and pursued mastery goals when compared to underperforming students. Among those students who had high self-efficacy, underperforming students had more performance avoidance goals as compared to adequately performing students.

In another study, Vuong, Brown-Welty, and Tracz (2010) examined the effects of self-efficacy on academic success of first-generation sophomore college students studying in a California University. The study results indicated that self-efficacy belief affected academic success and persistence rate of sophomore student.

Goal setting or achievement goal orientation theory is a well-known proven theory in the academic settings (Dweck, 1986; Locke & Latham, 1990; Elliot &
Murayama, 2008; Pintrich, 2000). A goal is what the individual is consciously trying to do. Generally, three kinds of goal orientations are known. Mastery goals are those where development of competence is focussed (Ames, 1992a). Enjoying the activity of learning and acquiring new skills is characteristic of individuals who have mastery goals. Performance approach goals are those where in the focus is to demonstrate competence (Ames, 1992a). The driving force of performance approach goals is to perform for the sake of demonstrating one’s abilities to others and gain recognition. Here, the performer tries to impress others as having high ability (usually in comparison to others) and tries to avoid being viewed as having low ability by others (Dweck, 1986). Performance avoidance goals are those where attempts are focussed on avoiding failures and possibility of showing low ability to others (Elliot, 1997). Individuals with performance avoidance goals will avoid taking up tasks where there is possibility of failure and where they are likely to be evaluated in relation to others. Many studies have demonstrated that mastery goals lead to positive outcomes such as self-efficacy (Kaplan & Maehr, 1999), use of deep learning methods (Elliot & McGregor, 1999) and good performance outcome (Matos, Lens & Vansteenkiste, 2007).

Performance approach goals have been known to be conducive to performance outcomes (Elliot, McGregor, & Gable, 1999; Urdan, 2004), primarily achieving high grades (Church, Elliot, & Gable, 2001; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000) but, sometimes are related to negative performance related outcomes such as anxiety and low retention of learnt material (Midgley, Kaplan, & Middleton, 2001). The performance avoidance goals are negatively related to negative performance outcomes (Elliot, 1997) including low efficacy, anxiety, and low grades (Urdan, Ryan, Anderman, & Gheen, 2002).

Other goal orientations have also been proposed. Extrinsic goal orientation is aimed at achieving extrinsic incentive (Maehr & Nicholls, 1980; Maehr, 1984). Social goal orientation involves social and interpersonal reasons behind achievement behaviour (Maehr, 1984).

Another goal orientation is work avoidance (Nicholls, Patashnik, & Nolen, 1985; Brophy, 1983; Archer, 1994) where in students may not even want to pursue success and
even if they work, they try to do so with minimal effort. Work avoidance is seen to negatively affect performance (Archer, 1994; Nolen, 1988; Meece, Blumenfeld, & Hoyle, 1988).

Studies on college students have explored the role of goal orientations on academic outcomes.

Mattern (2005) conducted a study to examine difference in achievement patterns between students who had either mastery or performance goals as compared to students who held both goals simultaneously. The sample consisted of 143 students enrolled in a foundational teacher education course. Results indicated that on one-way ANOVA, there was no significant difference between multiple goal groups and the single goal groups on course grade. But, high mastery group and high performance group differed on course grade.

Harackiewicz, Barron, Carter, Lehto, and Elliot (1997) in a study examined the personality predictors of achievement goals and impact of these goals on motivation. Performance, work mastery and competitive orientations were observed to predict the goals adapted. High work mastery individuals adopted more of mastery goals and less of work avoidance goals. Students with mastery goals showed more interest in class, while students with performance goals gained higher levels of performance.

In another subsequent study (Harackiewicz, Barron, Tauer, & Elliot, 2002b), the predictive role achievement goals, ability and high school performance in predicting academic performance over the years of college study was examined. Subsequent to measuring factors that predict students’ interest and performance in students of first semester introductory psychology course, the students were followed till they graduated. Mastery goals were seen to predict continued interest, while performance goals predicted performance. Ability measures and high school performance predicted academic performance but not interest in subject.

2.7.1.9. Self-determination theory of motivation. Self-determination theory (SDT) developed by Deci and Ryan (1985b) is a well-known and relevant theory in the educational settings. According to this theory, motivation is not a unitary concept, but is a
multi-dimensional concept that varies in not only its levels but also in its quality or orientation (Deci & Ryan, 2000, 2008; Guay, Ratelle, & Chanal, 2008).

Orientation means the type of motivation and refers to the underlying attitudes and goals that underlie the actions arising out of the motivation. Hence, different reasons may be behind different types of motivation (Deci and Ryan 2000). SDT theory is driven by the idea that quality and type of motivation is more important than quantity of motivation in determining many outcomes such as performance, effective learning strategies and psychological well-being (Deci and Ryan, 2008).

SDT theory distinguishes between two basic types of motivation namely, intrinsic and extrinsic motivation (Deci & Ryan, 1985b).

Intrinsic motivation refers to doing an activity for the satisfaction or enjoyment that is inherent in it rather than out of desire for any separable outcome (Deci & Ryan, 1985b, 2000). Intrinsically motivated individuals are motivated to act for the enjoyment or challenge an activity poses rather than because of external pressure or desire of rewards (Deci & Ryan, 2000). An example of intrinsic motivation is that a person studies a subject because he is interested rather than because his parent wants him to do so or because he has to achieve first place in class.

Extrinsic motivation refers to doing an activity, where in a separable outcome is awaited, such as attaining a reward or avoiding a loss or punishment (Deci & Ryan, 1985b; 2000). For instance, a student studies, hoping to get praise from the teacher and high marks.

Intrinsic motivation is dependent on fulfilment of innate psychological needs of autonomy, competence and relatedness (Deci & Ryan, 1985b; 2000).

Need for autonomy means behaving in a self-determined manner and according to one’s own interest and doing things one wishes to do (Deci & Ryan, 1985b; Ryan, 1993). Non-controlling and supportive environment enhances autonomy. Competence means feelings of self-efficacy or confidence that one can attain the decided goals and manage one’s environment effectively (Deci & Ryan, 1985b). Optimal challenges, supportive feedback and reducing discouraging evaluations facilitate development of competence.
A Sense of relatedness is being able to connect with others and feel cared for (Deci & Ryan, 1985).

Vallerand and colleagues (Vallerand, Blais, Briere & Pelletier, 1989) further provided a three division of intrinsic motivation based on literature on intrinsic motivation. These three types of intrinsic motivation are intrinsic motivation to know, to accomplish things, and to experience stimulation.

Intrinsic motivation to know is defined as the “fact of performing an activity for the pleasure and the satisfaction that one experiences while learning, exploring, or trying to understand something new” (Vallerand et al., 1992, pg.1005).

Intrinsic motivation towards accomplishment is defined as the “fact of engaging in an activity for the pleasure and satisfaction experienced when one attempts to accomplish or create something” (Vallerand et al., 1992, pg.1005).

Intrinsic motivation to experience stimulation is defined as “engaging in an activity in order to experieince stimulating sensations (e.g., sensory pleasure, aesthetic experiences, as well as fun and excitement) derived from one’s engagement in the activity” (Vallerand et al., 1992, pg.1006).

Intrinsic motivation is known to be associated with good academic outcomes, such as higher course persistence (Vallerland & Bissonette, 1992), better course performance (Amabile, Hill, Hennessey, & Tighe, 1994; Moneta, & Siu, 2002) and higher conceptual learning (Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). In a review of literature on intrinsic and extrinsic goals in the academic settings, Vansteenkiste, Willy, and Deci (2006) found that overall studies reviewed indicated that intrinsic goals led to deeper pursuit of learning activities, higher academic persistence and conceptual learning.

Intrinsic motivation is also related to positive psychological health and parameters of well-being such as good affect and self-actualization. However, it is also negatively related to ill being, depressive and anxiety symptoms (Kasser & Ryan, 1996; Niemiec, et al., 2009).
Deci and Ryan (Deci & Ryan, 1985b, 1991) have proposed that extrinsic motivation can be further divided into different types. External regulation is a type of extrinsic motivation which refers to behaviour that is regulated by external rewards or constraints. For instance, a person may engage in a certain activity as he is pressurized by his family to do so.

Introjected regulation is wherein the reasons for behaviour come from outside to begin with but later become internalized. The former external source of motivation is internalized and is maintained by internal pressure such as anxiety, guilt or feelings associated with self-esteem (Ryan & Connell, 1989). The earlier external monitoring recedes and is replaced by self-monitoring and self-sanctioning. Introjected regulation is the first manifestation of internal regulation, but internalization is not full as earlier external reason for motivation though is internalized but is recognized as originating from self (Williams & Deci, 1996). For instance, the reason for studying well comes from the reason of maintaining the role of an ideal student.

In identified regulation, the behaviour is seen as valued by one and chosen as important by oneself and person identifies self with the motives. The motive is still extrinsic as the task is not done for the inherent satisfaction derived from it, but it’s a way to a goal that needs to be realized. Yet, the activity is chosen by the individual to be performed as it is useful and important. The feeling here is more of a sense of purpose rather than pressure to do the activity (Koestner, Losier, Vallerand, & Carducci, 1996). For instance, the individual chooses to study as he has to fulfill life related important goals.

Integrated regulation is when the identified regulation is fully consolidated into the self. The person through self-examination makes the reason for activity to match with one’s values and needs. The higher the internalization of these reasons, the higher the likelihood of these extrinsically driven actions to become self-determined. Though integrated regulation is similar to intrinsic motivation in being autonomous and valued by the self, it still is extrinsic in nature as the reasons for the actions coming from integrated regulation is still because of external reasons (Ryan & Deci, 2000).

Deci and Ryan (1985) also proposed the concept of amotivation where in individuals fail to understand the relation between their actions and outcomes of their
actions. It is the least self-determined type of motivation. They lack both extrinsic and intrinsic motivation and have no intention to take up an activity. They are likely to feel incompetent and have an external locus of control in perceiving the causes of their behaviour.

Pursuing extrinsically motivated goals affects learning and well-being negatively (Vansteenkiste, Timmermans, Lens, Soenens, & Van den Broeck, 2008; Timmermans et al., 2004; Niemiec et al., 2009).

Amotivation has been known to be associated with negative educational outcomes such as poor academic persistence (Vallerand & Bissonnette, 1992; Vallerand et al., 1989), stress at school (Baker, 2004) high boredom and poor concentration (Vallerand et al., 1993).

According to Deci and Ryan (1985, 1991) the different types of motivation fall on a continuum of self-determination starting from the least self-determined types of regulation (i.e., in the order of amotivated, external and introjected) to the most self-determined types of regulation (i.e., in the order of identified, integrated and intrinsic).

Motivational profiles have been proposed by researchers where by motivation can be divided into autonomous and controlled type. Intrinsic motivation and identified regulation comes under autonomous motivation. Controlled motivation consists of introjected and external regulation (Ryan & Connell, 1989; Sheldon & Elliot, 1998; Vansteenkiste, Sierens, Soenens, Luyckx & Lens, 2009; Shahar, Henrich, Blatt, Ryan, & Little, 2003; Ratelle, Guay, Vallerland, Larose & Sene`cal, 2007).

Autonomous motivation has been found to be associated with positive academic and psychological outcomes. Controlled motivation leads to academic persistence (e.g., Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004), better academic performance (e.g., Grolnick, Ryan, & Deci, 1991; Soenens & Vansteenkiste, 2005), deeper level learning (Grolnick & Ryan, 1987; Vansteenkiste et al., 2009), lesser procrastination (Senecal, Julien, & Guay, 2003) higher levels of creativity (e.g., Amabile, 1985), and lower levels of stress (Ryan & Deci, 2000).
Research evidence existing about controlled motivation reveals that it predicts many negative outcomes such as surface level of learning or processing (Vansteenkiste, et al., 2005), higher procrastination (Senecal et al., 2003), higher drop out (Vallerland, Fortier, & Guay, 1997) and poor achievement (Soenens & Vansteenkiste, 2005).

In the context of SDT theory there are two environments; autonomy supportive and controlling (Deci & Ryan, 1985b). In autonomy supportive environment a person in a superior position like teacher enables the student by providing him useful information, choices, clear guidelines, adequately challenging tasks, and worthy praise while reducing pressures (Reeve & Jang, 2006; Reeve, 2002). Autonomy supportive environment generally enhances intrinsic motivation or identified regulation and autonomy supportive classrooms are known to increase intrinsic motivation and improve conceptual learning (Deci, Schwartz, Sheinman, & Ryan, 1981; Grolnick & Ryan, 1987).

In a controlling environment, the person in authority may pressurise to behave in the way he wants others to behave to achieve desired outcomes if needed by coercion (Deci & Ryan, 1987). The person’s autonomy is thwarted. In a learning context, this involves, pressurizing students from external sources such as by means of rewards, punishments (Deci, Koestner, & Ryan, 1999), orders (Reeve, Bolt, & Cai, 1999) and evaluations (Schaffner & Schiefele, 2007). Sometimes, pressure can be internal such as use of subtle methods that may induce guilt or withholding affection (Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005).

Controlling environments have been associated with lower conceptual learning and lower achievement (Benware & Deci, 1984; Gronlick & Ryan, 1987).

2.7.2. Motivation in College Students

Studies on role of motivation in college setting will be covered here. Some studies on college students pertaining to each perspective of motivation are reviewed in the earlier section where theories on motivation were reviewed.

Black and Deci (2000) adapting a self-determination perspective, investigated the effects of students’ self-regulation and their view of faculty autonomy support on their academic performance and adjustment, when they were enrolled in an organic chemistry course. The study brought about several findings. Students enrolling in the course for
autonomous reasons when compared to students with controlled orientation had higher perceived competence, interest/enjoyment, greater course persistence, lower anxiety and grade focused performance goals during the course. When the autonomy support from faculty was high, the course performance was better. However, autonomy support enhanced academic performance for students who in the beginning of course had low autonomous self-regulation. But, faculty autonomy support did not have an effect on students who had initially high autonomous self-regulation.

Considering that lack of sleep is one of the significant health problems associated with negative academic outcomes of American students, Edens (2006) investigated the effects of sleep on academic motivation in 377 college students. The research goals were to examine the relation of sleep habits with self-efficacy, performance versus mastery goal orientation, persistence and procrastination. It was found that 42% of the students had excessive daytime sleepiness (EDS). Students with EDS endorsed performance goals than mastery goals, procrastinated more and had lesser self-efficacy than students who felt adequately rested.

Stoeber, Julian, Childs, Hayward, & Feast (2011) investigated the relations between harmonious and obsessive passion for studying, and academic engagement (vigor, dedication, and absorption) and burnout (exhaustion, cynicism, and inefficacy) in 105 university students. The relations were examined when the effects of autonomous and controlled motivation were controlled for. The reasons why the researchers opine that effects of autonomous and controlled motivation should be controlled for, while examining relation between passion and academic engagement, and burnout is that both forms of passions are related to autonomous and controlled motivation. Harmonious passion is rooted in autonomous internalization where in activity done is based on free choice rather than depending on any rewards or other contingency. Whereas, obsessive passion comes from controlled behaviours, wherein though activity is regarded as a choice of self, it follows behavioural contingency such as rewards. Also, autonomous motivation is related to positive outcomes and controlled motivation to negative outcomes such as burnout. Therefore, for these reasons it is crucial to control the effects of autonomous and controlled motivation for examining the associations between harmonious and obsessive passion for studying and academic burnout.
The findings revealed that harmonious passion predicted higher dedication and lower cynicism, while obsessive passion predicted higher absorption. Both harmonious and obsessive passion contributed to variance in academic engagement and burnout irrespective of the effects of autonomous and controlled motivation.

Ratelle, Guay, Vallerland, Larose, and Sene’cal (2007) examined profiles regarding autonomous, controlled and amotivated regulation levels and investigated whether these profiles differed on academic adjustment outcomes. In total, three studies were done, one of which was on college students. This study showed three profiles: firstly, students who had high autonomous motivation and low levels of controlled motivation and amotivation; secondly, students with high levels of both autonomous and controlled motivation and low amotivation; thirdly, students who were low on all three types of motivation. However, compared to students in other studies, autonomous students in college group had more academic persistence.

Hastings, West, Perrot, and Deloney (2001) conducted a study on 80 first year pharmacy students to examine whether there was a change in student’s goal orientation (mastery, performance and academic alienation) during the course of first year of college. Goal orientation was measured first in fall semester and repeated in spring semester. According to the results, throughout the year the students maintained a mastery goal orientation. However, during the year, scores on mastery scale steadily decreased for an average of .24 per item and simultaneously academic alienation scores increased for an average of .38 per item. Also, internal locus of control scores decreased for an average of .31 per item. Authors opine that increase in scores of certain items such as “As long as I pass the course I don’t care what grade I get,” indicates that as students proceed through the course they may eventually learn to adapt an attitude of learning only so much that is required to pass even though they may have entered the course with a desire to master and learn lifelong skills. Such an attitude is contrary to the education policies which focus on encouraging learning of long term skills. The authors further reflect as to whether the learning environment fosters such a preference for alienation goals which in turn may hamper students’ life-long learning skills.
In a study of 369 competitive swimmers, Pelleitier, Fortier, Vallerland, and Briere (2001) examined the role of autonomy support style and controlling style of coaches along with five forms of self-regulation as per the self-determination theory. A prospective three wave design was adapted for the study. Findings pointed that controlling style of coaches brought about less self-determined forms of motivation such as external regulation and amotivation. Higher levels of self-determined motivation was witnessed when coaches’ interacting styles were perceived autonomy supportive.

Competitors who had greater levels of self-determined motivation at Time 1 had greater persistence when they were measured again prospectively at Time 2 & 3. Persistence was significantly predicted by introjected regulation at Time1; however this relation ceased to exist at time 2. Higher external regulation predicted lesser persistence at Time 3. Amotivated individuals at the initial assessment had higher attrition at both Time 2 and Time 3.

Kruck and Lending (2003) investigated a model developed by Eskew and Faley (1988) to predict academic performance in an introductory college level information systems course. Among other variables motivation was seen to predict performance.

A study (Baker, 2003) was done on second year University students with two purposes. First purpose was to investigate the relation between motivational orientations and university adjustment, stress and well-being. Second purpose was to determine the predictive ability of motivational orientations to predict academic performance. It was observed that after controlling for age and gender, amotivated behaviours resulted in poor psychosocial adjustment to university, higher stress and greater mental distress while studying. Intrinsic motivation to know was related to lower stress. Extrinsic, intrinsic or amotivation was not related to subsequent academic achievement.

Previous research which has proved that academic commitment a form of motivation predicts college achievement (GPA), (Kluger and Koslowsky,1988) and happiness encourages goal striving (Lyubomirsky, King, & Diener, 2005), where in happy students rate their college desirability as high than unhappy students (Lyubomirsky, 2001) indicating that happiness may contribute to greater college commitment.
In view of this, Okun, Levy, Karoly, and Ruehlman (2009) examined how dispositional happiness could directly or indirectly affect GPA in 317 first-year students. Through commitment to college, dispositional happiness had a positive indirect effect on cumulative GPA. Dispositional happiness was also seen to have a negative indirect effect on cumulative GPA through satisfaction with peer relations. Hence, dispositional happiness was seen to be positively associated with motivational factors that enhance academic performance. Commitment to college was more in happy students than unhappy students. Students strongly committed to getting a college degree had better academic performance than those students who had a weak commitment to getting a college degree indicating that poor commitment to college reduced the chance of succeeding at college.

Struther, Perry, and Menec (2000) examined the mediating effects of motivation and coping styles on the relation between academic stress and performance in college students. It was observed that the relation between academic stress and course grade was mediated by motivation and problem focused coping. Higher stress led to lower grades. Motivation and academic performance was better in students who employed problem focused coping compared to emotion focused coping.

Vallerland and Bissonnette (1992) wanted to extend the research on role of intrinsic, extrinsic and amotivational styles in predicting behavioural persistence to real life settings. As the academic year began, 1042 first-term junior college students were assessed on a motivational scale developed based on self-determination theory. During the end of the semester, students were grouped into drop outs and those who persisted in the course. Individuals showing academic persistence were identified as having more intrinsic, integrated, and identified motivation and less amotivated to academic activities when compared to those students who dropped out. The motivational characteristics identified in persistent students were more in females than males.

A study (Senecal et al., 1995) on academic procrastination was done examining the role of autonomous self-regulation in predicting the same. Students from a junior college (N=498) were administered academic motivation scale, procrastination scale and measures of anxiety, depression and self-esteem. Results revealed that intrinsically
motivated students procrastinated less than those students with less autonomous motivation types of external regulation and amotivation. The motivational variables accounted for 25% of variance in academic procrastination than other adjustment variables. Hence, authors conclude that procrastination is primarily because of motivational reasons.

Rajiah, Coumaravelou, and Ying (2014) studied prevalence of test anxiety and psychological distress along with examining whether test anxiety predicted psychological distress and amotivation in undergraduate pharmacy students in Malaysia. Among the students tested, 32.5% of them had test anxiety and 61% reported of psychological distress. Test anxiety was related to psychological distress. Test anxiety significantly predicted amotivation indicating that test anxiety led to amotivation in students.

Fazey and Fazey (2001) examined autonomy related psychological factors such as competence, self-esteem, motivation and locus of control in first year undergraduate students at the time of entering college study. The fresh students had a positive profile marked by internalized motivation and internal locus of control. Since students arrive to college with potential to be autonomous in their learning, authors opine that college should provide an autonomy supportive environment for autonomous attitude in learning to be maintained throughout the years of college study.

A study (Kyndt, Dochy, Cascallar, & Struyven, 2011) that investigated the direct and indirect effect of motivation on students’ approaches to learning showed that autonomous motivation is positively related to deep approach to learning and negatively associated with surface approach to learning. With higher autonomous motivation, perception of lack of information was lesser and likelihood of adapting a surface approach to learning was lesser.

Another study (Kyndt, Cascallar, & Dochy, 2012) examined the relation between perceived workload, motivation for learning and working memory capacity (WMC) with students’ approaches to learning. Among other findings, it was seen that workload and motivation were related. Students with high WMC and average motivation had higher scores on surface learning approaches and low scores on deep learning approaches as compared to students with high autonomous motivation. This indicates that autonomous motivation facilitates deeper learning.
Kemp, Molloy, Pajic, and Chapman (2014) conducted a qualitative study on motivational orientations of 17 Australian biomedical doctoral students from eight universities. External motivation and introjected control were the motivational determinants that were found in this cohort and these were related to alienation, disengagement and poor learning outcomes.

There are few studies that have examined the impact of motivation on stress and psychological distress. One such study was conducted by Rucker (2012) who examined the relation between motivation, perceived stress and academic performance in 146 German and Dutch undergraduate psychology students studying at the University of Twente. Students filled up questionnaire having Academic Motivation Scale, the Perceived Stress Scale and extra questions about academic performance and other additional stressors. Lack of motivation was seen to be related to higher levels of stress and lower academic performance. Perceived stress was related to rate of failure. Females and German students experienced higher stress.

Gavala and Flett (2005) examined the relation between perceptions of stress and discomfort in university environment and the relation of these variables with academic enjoyment /motivation in 122 Maori psychology students studying at Massey University. Additionally, how perceived control and cultural identity moderated these relations were also studied. Higher stress and feelings of discomfort at University along with lower academic control led to experience of lower sense of well-being and lesser academic enjoyment and motivation.

An investigation (Agolla & Ongori, 2009) examined the reasons for stress experienced by a sample of 320 undergraduate students at a Botswana University. Along with factors such as academic workload, inadequate resources, poor performance, low motivation was also a significant reason for causing stress in students.

Salanova, Schaufeli, Martinez, and Breso (2009) investigated in 527 university students, the influence of psychosocial factors namely, performance obstacles and facilitators as well as psychological well-being indicator namely, burnout and engagement on success. It was revealed that study engagement mediated the relation between performance obstacles and facilitators and future performance. However,
burnout did not predict future performance, through its relation with absence of facilitators and presence of obstacles. This indicates that motivational factors such as study engagement have an upper hand over negative studies such as burnout in predicting future academic performance.

Based on the review of studies it can be concluded that self-determined motivational styles seem to lead to better academic outcomes (e.g., Black & Deci, 2000; Ratelle, Guay, Vallerland, Larose & Senecal, 2007; Kyndt, Dochy, Cascallar, & Struyven, 2011) while poor motivation is associated with stress or low psychological well-being (e.g., Rucker 2012; Gavela & Flett, 2005).

2.7.3. Motivation in Medical Education

Emphasis on motivation in medical education is gaining momentum only recently.

Kusurkar, Croiset, Mann, Custers, and Ten Cate (2012) keeping learning-oriented teaching as a framework reviewed the literature on motivation theory in general education and medical education to examine the extent of influence of motivation theories in the development of medical education curriculum.

Authors (Kusurkar et al., 2012) opined that though in general education, influence of motivation theory is recognized and applied quantitatively and qualitatively, motivational elements seemed to be undervalued in medical education. It is not to say that no progressive changes have occurred in medical curriculum. Developments such as initiation of standardized and regulated medical education, problem-based learning, learner-centeredness, integrated teaching, outcome-based methods of teaching, and emphasis on community-based approaches have been witnessed. However, apart from improvising cognitive and metacognitive regulation, the affective component which is stimulation of motivation of students has not been part of the focus. The authors suggest that stimulation of student motivation should be an inseparable part of medical curricula. Elements of intrinsic motivation, student autonomy, adequate feedback and emotional support should be part of curriculum planning. Finally, authors opine that medical curriculum planning, implementation and outcome assessment should regard stimulation of student motivation.
Kruskar, Tencate, VanAsperen, and Croiset (2011) reviewed the medical education literature in order to understand the extent to which motivation has been studied as an independent and dependent variable in medical education. After a thorough literature search, 56 articles were included for being reviewed. As an independent variable motivation was seen to affect learning and study behaviour, academic performance, choice of medicine and specialty within medicine and intention to continue medical study. As a dependent variable, motivation was seen to be influenced by age, gender, ethnicity, socioeconomic status, personality, year of medical study. Also, the modifiable basic needs-autonomy, competence and relatedness-that are components of intrinsic motivation as per SDT influence motivation in medical education. Under autonomy, autonomy support, curriculum and patient responsibility were seen to affect motivation. With reference to competence, self-efficacy, selection procedure, type of assessment, rewards, task value, and knowledge acquisition are seen to influence motivation. Relatedness associated factors that were found to affect motivation were early patient contact and well-being.

Many researchers have focused on SDT perspective of autonomous motivation and autonomy support, and their association with academic outcomes in medical education.

William and Deci (1998) based on review of studies on motivation in medical education emphasize that autonomy supportive medical education can foster humanistic orientation in medical students and make them more psychologically adjusted and have better conceptual understanding and educational outcomes.

In addition, autonomy supportive education makes medical students more humanistic and facilitates them to interact in an autonomy supportive way with patients resulting in optimum health care delivery and positive patient health outcomes.

Williams, Weiner, Markakis, Reeve, and Deci (1994) in an attempt to extend the existing educational motivational concepts to medical settings examined what effects would educational model of “facilitating students' interest” (autonomy supportive) in comparison to “controlling students' learning” have on learning during internal medicine clerkship. Eighty nine fourth year medical students participated in the study. Student
autonomy supporting instructors instilled higher feeling of competence in students when compared to controlling instructors. Perceived competence in turn increased students’ interest in internal medicine which predicted their choosing of internal medicine residency.

In two studies, (Williams & Deci, 1996) self-determination was tested in second year medical students who were part of an interviewing course. According to the study one findings, students with autonomous orientation had higher psychosocial beliefs at the initiation of the course, perceived more autonomy and reported of taking up the course for autonomous reasons. Also, students who perceived their faculty as autonomy supportive felt more competent and grew more autonomous in learning during the 6 month course. The second study had a longitudinal design of two and half years wanted to extend the findings of earlier study and confirm whether autonomy supportive environment rooted in biopsychosocial approach would foster internalization of psychosocial values. Findings showed that students perceiving their faculty as autonomy supportive had higher autonomous learning which in turn contributed to a notable rise in perceived competence and psychosocial beliefs during their course. In addition, students demonstrated being autonomy supportive while interviewing a simulated patient after six months and endorsed stronger psychosocial beliefs two years later.

Williams, Saizow, Ross, and Deci (1997) examined how self-determination model would predict medical students’ career choice of internal medicine or surgery depending on how much autonomy support they received from the faculty during the third year clinical postings of these two subjects. The results indicated that when medical students perceived clerkship learning environment as autonomy supportive, the students would feel more competent and interested in the corresponding medical posting. This in turn predicted that they would choose that specialty as a career, and this was irrespective of their prior likelihoods of going into that specialty. Therefore, authors opine that if faculty make a particular clerkship learning environment as autonomy supportive, it will enhance students’ interest and probably motivate them to choose further residency in that specialty.
Sobral (2004) examined patterns of motivation and relation between motivation and learning features in 297 undergraduate medical students after their first year through a four year period. Academic motivation scale was used to measure academic motivation. Reflection-in-Learning Scale (RLS) and the short version of the Approaches to Studying Inventory (s-ASI) were used to measure reflection in learning and learner orientation respectively. During a two year follow-up, academic achievement and peer tutoring experience were obtained.

A majority of the students had strong autonomous motivation and this was related to students’ perceptions of quality of course with reference to its meaningfulness and value. Autonomous motivation was also related to higher levels of reflection in learning, academic achievement and intention to continue studies.

According to the groups classified by AMS subscales, the groups which displayed higher levels of autonomous motivation had higher academic success indicated by persistence behaviour, repeated tutoring activity and achievement. Slow growth in academic achievement was associated with both low levels of autonomous and controlled motivation. Intention to continue studies had a negative relation with motivation. A moderate one year temporal stability was seen for the scores of autonomous and controlled motivation.

Students decide to pursue a medical career either because of intrinsic reasons such as genuine interest or because of controlled or extrinsic reasons such as status associated with the profession. According to SDT, the outcomes related to effort, academic performance and adjustment to the study may vary according to the motivation orientation endorsed by the students. Based on this premise, Kruskar, Croiset, Galindo-Garré, and Ten Cate (2013) set out to investigate motivation profiles of students based on combinations of high or low intrinsic and controlled motivation. In addition, the association of varied motivational profiles along with varied study outcomes was studied. Eight hundred forty four students enrolled in the study. Students were assessed by Academic Motivation Scale (AMS) (Vallerland et al, 1993), Study Process Questionnaire (SPQ) (Biggs, Kember & Leung, 2001) to measure study strategies, a question on number of hours spent on study every week and “exhaustion from study” scale from Maslach Burnout Inventory-Student Survey (MBI-SS) (Schaufeli, Martinez, Marques-Pinto, Salanova, & Bakker, 2002).
Four clusters of motivations were observed. Results showed that High Intrinsic Low Controlled motivation (interest motivated profile) was associated with good study hours, deep learning approach, good academic performance and low burnout related exhaustion as compared to status motivated and low motivated students. High Intrinsic High Controlled motivation (interest + status motivated profile) was generally related to good learning outcomes, except that this profile was associated with use of high surface strategy for studying. Low Intrinsic High Controlled (status-motivated profile) and Low Intrinsic Low Controlled (low-motivation profile) motivation was associated with undesirable learning outcomes. With regard to gender differences, males had high controlled motivation than females indicating different mentoring needs than females.

Based on SDT theory and the fact that both autonomous and controlled motivation can coexist, Kursurkar, Ten Cate, Vos, Westers, and Crosiet (2013) examined 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. The subjects were 383 medical students studying at VU University Medical Centre Amsterdam. The study also examined whether this model differed among males and females and among students admitted through two different streams of qualitative and weighted lottery method. AM (Autonomous Motivation) which represents high self-determined motivation was formed by adding up identified regulation and intrinsic motivation components of AMS scale. CM (Controlled Motivation) that represents low self-determined motivation was made by adding up introjected and external regulation. RAM was formed by incorporating both AM and CM to have an idea of overall self-determined motivation. Analyses by Structural Equation Modelling revealed that high RAM positively affected good study strategy and study effort, which in turn positively affected academic performance represented by grade point averages. The same model held good for both males and females and students selected through both qualitative and weighted lottery method.

There are few studies on medical students that have examined motivation from other theoretical orientations.
In a study designed to examine relation between learning motivation and academic outcomes Reed (2007) recruited 131 medical and 29 physician assistant students studying at University of North Texas. Students were administered Modified Archer Health Professions Motivation Scale (MAHPMS) at the beginning and end of a semester. It was seen that nearly 75% of students reported of having mastery learning and internal locus of control. Among the physician assistant students, alienation to learning and performance goals were positively related to grades obtained. Also, for the majority portion of the time, alienation to learning (that is trying to achieve goals with minimal effort) predicted high-risk academic performance. At the end of the semester, among both medical and physician assistant students, external locus of control predicted high-risk performance for 81% of the time.

Firouznia, Yousefi, and Ghassemi (2009) examined the impact of academic motivation on academic achievement of 344 medical students studying in fourth to final year studying at Isfahan University of Medical Sciences. Higher motivation scores in areas of competition, effort, social concern, and task (as measured by Inventory of School Motivation), was related to higher marks at pre-clinical and clinical exams. Regarding gender differences, boys had higher task and competition motivation than girls. In addition, students in clinical years had greater motivation for social power than pre-clinical students.

Chaput de Saintonge and Dunn (1998) in a pilot study of 10 medical students (in their first general medical postings) examined two factors namely, self-efficacy and attribution that could affect medical students’ motivation to learn. Students were assessed during the beginning of the postings and after eight weeks. Self-efficacy was measured by a scale adapted to medical learning settings (Bandura & Wood 1989).

Students were seen to attribute bad events to internal causation. Increase in perceived self-efficacy was related to attribution that bad events were local and more transient than at the beginning of the postings. This indicated that along with attributing internal reasons to bad events, students felt better able to cope with rise in their perceived efficacy as learners.
In a longitudinal study of 136 second year medical students, Artino, La Rochelle, and Durning (2010) examined the associations between students motivational beliefs (task value and self-efficacy), achievement emotions (enjoyment, anxiety and boredom) and academic achievement. Appropriate measures were administered during first and second trimesters. The academic achievement comprised of students’ average course examination grades and national board shelf examination (NBSE) scores. At last, the overall effects of the model were $R^2 = 0.20$ and $0.14$ for the course examination grade and national board shelf examination score, respectively.

A study (Tanaka, Mizuno, Fukuda, Tajima & Watanabe, 2009) conducted in one of the medical colleges of Japan, examined relations between personality traits and intrinsic motivation in 119 second year medical students. Measures used were Intrinsic Motivation Scale toward Learning and Temperament and Character Inventory. In multiple regression analysis while adjusting for age and gender, TCI dimensions of persistence, self-directedness and self-transcendence (all adaptive personality traits) were positively related to intrinsic academic motivation. The authors discussed that temperament being heritable is likely to manifest early in life. Hence, persistence, a tendency to persevere despite setbacks and continue with the task at hand is likely to be heritable. Therefore, based on past findings of link of intrinsic motivation with intention to continue studies, it is not surprising that people with intrinsic motivation are likely to persist more.

Further, traits of self-directedness, co-cooperativeness and self-transcendence are integral part of a well-developed self-concept. These traits being part of a balanced and matured character are likely to be required for the development of intrinsic motivation, thus explaining their association with intrinsic motivation in this study.

Another study (Madjar, Bachner, & Kushnir, 2012) was done with the aim of investigating how self-reported psychosocial abilities and frustration tolerance might be associated with different motivational orientations among 143 first-year medical students. Hierarchical multiple regressions revealed mastery goal orientation to be positively associated with low frustration tolerance, while performance goal orientation was positively associated with frustration tolerance.
Some studies have examined association of socio-demographic variables with motivation. One such study was carried out on Dutch medical students (Kusurkar, Kruitwagen, ten Cate, & Croiset, 2010) to investigate the effects of selection, and educational background, age and gender on strength of motivation to attend medical school. The students were Graduate Entry (GE) medical students who enter medical study after Bachelor’s degree in Life Sciences or related field and Non-Graduate Entry (NGE) students who enter medical education soon after high school. Students were assessed on Strength of Motivation for Medical School (SMMS). The main findings of the study were that higher strength of motivation was seen in GE students as compared to NGE students. Also, females had greater strength of motivation when compared to males. Age, gender, educational and selection variables explained 7.9% of variance in strength of motivation. Age was the strongest predictor among all variables.

Kruskar, Crosiet and Ten Cate (2013), in a sample of 95 medical students (27 males and 68 females) studied the gender differences in motivation, learning strategies, effort and performance in relation to perceived autonomy and competence in learning. Autonomous motivation (AM) and controlled motivation (CM) was assessed by the Academic Motivation Scale. Deep and surface approach towards study was measured by Study Process Questionnaire; Study exhaustion was assessed by Maslach Burnout Inventory. Perception of autonomy was studied by Learning Climate Questionnaire and competence in learning was measured by the Perceived Competence Questionnaire and content matter. Analyses showed that males had higher CM, more use of surface approach and lower use of deep strategy to study, and lesser credits obtained when compared to females. However, the perceived competence in learning was more in males. There was no gender difference in perceived autonomy. However, males perceived higher competence despite their performance being equal or less than males. The authors opine that either male overestimated their competence or females underestimated their competence. Also, faculty should tailor their advice according to the gender needs.

Effects of motivational styles on stress have also been studied.

Park et al. (2012) designed a study to investigate the interrelation among factors that may have an impact on stress in 160 medical students. Measures used were Medical
Stress Scale, Minnesota Multiphasic Personality Inventory, Hamilton Depression Scale, Beck Depression Inventory, and Academic Motivation Scale. In general, stressed students had lower academic performance and higher depression than non-stressed students.

With reference to subcategories of AMS, stressed students were more amotivated and had higher extrinsic identified regulation and intrinsic motivation to accomplish things. In relationship analysis, amotivation and extrinsic identified regulation were positively related to medical student stress. Intrinsic motivation to know, intrinsic motivation to accomplish things and extrinsic external motivation were negatively related to stress. The path analysis indicated that motivation, academic performance and stress formed a triangular feedback loop in which stress had the likelihood of being associated with motivation, and motivation may be indirectly related to stress through academic performance. This indicates that students with higher amotivation may face difficulty to sustain good academic performance which in turn may result in experience of high stress. Authors opine that attempts to enhance motivation may be benefitted from stress management interventions as appropriate stress intervention may increase motivation.

Ahn, Park, Baek, and Chung (2007) examined in a group of 308 medical and premedical students (from Universities of Seoul and Incheon) whether academic motivation and academic stress influenced their academic performance. It was seen that perceptions of academic performance were related to academic motivation, stress in general academic area and medical study. Gender differences were observed in variables measured. Female students had higher academic performance perception, intrinsic motivation and lower extrinsic motivation than male students. Compared to medical students, pre-medical students had higher academic performance perceptions and extrinsic motivation orientation. Amotivation was seen to significantly predict academic performance perceptions.

In India, there are few studies that have examined the role of motivation in medical education. Out of the studies found, two are on Malaysian students studying in India.
Abraham, Kamath, Upadhya, and Ramnarayan (2006) examined changes in medical students’ approaches to learning after adapting clinically orientated physiology teaching (COPT) in the undergraduate physiology. COPT specifically aims to enhance deep approach to learning and decrease surface and strategic approach to learning. Subjects were 223 first year medical students of Melaka Manipal Medical College (Manipal Campus) before and after applying the COPT. Short Inventory of Approaches to Learning (SIAL) was administered. SIAL has three scales namely, surface approach, deep approach and strategy approach. Under each of these scales, there are a number of subscales, amounting to a total of 14 subscales. Pertaining to motivation, surface approach has a subscale on extrinsic motivation, deep approach has a subscale on intrinsic motivation, and strategic approach has a subscale assessing achievement motivation. Following the implementation of COPT, a significant rise in the use of the deep learning approach (as seen by a rise in all subscales) and a significant decrease in the use of surface approach to learning (as evidenced by decrease in most of the subscales of surface approach) were observed. However, some of the scores on subscales of strategic approach increased after COPT. With regard to motivation, intrinsic motivation component of deep approach was seen to slightly increase following COPT. Interestingly, extrinsic motivation component of surface approach was seen to increase. Though all other subscales of strategic approach increased in their scores, achievement motivation subscale score was seen to marginally decrease.

Another recent study (Barkur, Govindan, & Kamath, 2014) on Malaysian students in an Indian medical college focused on examining the goal orientations in second year medical students and associations between goal orientations and academic performance. The study population which consisted of 244 second year medical students of Melaka Manipal Medical College, Manipal were administered a validated scale on goal orientation. Students were categorized as high and low performers based on their marks obtained in first year university exams. The salient finding of this study was that low performers adapted work avoidance goal orientation more than high performers, thus explaining why low performers perform less.
Yet, another Indian study (Shankar, Singh, Gautam, & Dhaliwal, 2013) though did not adapt any motivation theoretical perspective, was carried out with intention of knowing what motivated medical students to take up a medical career along with knowledge of and preparation for the same. Students hailed from a Delhi based medical college and around 103 students attempted to answer the study questionnaire. Nearly 55% of students got admitted into the medical course by attempting twice or more times suggesting motivation to sustain efforts to get into medical training. Also, nearly two third of students decided upon a medical career before completion of 10th standard education suggesting that most students are early deciders. However, knowledge regarding what subjects and kind of learning is to be followed in medical study was poor. Many students had a family member in health field, may be a parent who encouraged them to take up medicine. Nearly, half of students sought advice from a person in the medical field. Most students had not undergone career preparation activity. Authors opine that family should motivate students to take up career preparation activities. In addition, policy makers also can devise strategies to educate students in their decision making about joining medicine.

There is a lacuna of Indian studies examining motivation from the useful SDT perspective in general and in medical education in particular. In addition, association of motivational aspects with stress and well-being have not been well-examined. Keeping this in background, current study intended to examine how motivation impacts stress in medical students.

2.7.4. Resilience as a Mediator between Academic Motivation and Stress

Martin (2002) views that though motivation is an important factor determining academic outcomes, the achievements and gains students make may not be useful or may be lost, if they are not resilient towards stress and setbacks in academic settings. Hence, it is important to foster academic resilience along with academic motivation to help students to achieve academic success. Considering the importance of academic resilience, Martin (2002) has proposed a model of motivation including resilience for student enhancement.
In view of the above findings, the current study would like to examine whether resilience is an important factor to be considered along with motivation in dealing with stress in higher educational settings. Though, Martin (2002) emphasizes academic resilience rather than general resilience, this study would like to test whether the construct of general resilience would enable motivation to reduce stress in medical students. If resilience in general is found to be beneficial, then future research can focus on testing the role of academic resilience.

Therefore, this study would like to explore whether resilience mediates the effects of various types of motivation and amotivation on overall stress and stress categories in medical students.

To summarize, literature review on the variables of study reveals that most of the studies (including Indian) examining stress so far have focused on using generic measures such as GHQ 12/GHQ 28 (Sherina et al., 2004; Sreeramareddy et al., 2007; Abraham et al., 2009; Jafari et al., 2012; Reang & Bhattacharjya, 2013; Nandi et al., 2012), Kessler-10 (Nair et al., 2013), Presumptive Stressful Life Events Scale (PSLE) (Mannapur et al., 2010) and Perceived Stress Scale (Brahmbhatt, et al., 2013; Thangaraj & Lilian, 2014; Sunni & Latif, 2014) These measures do not essentially cover the important stress areas specific to medical education. Therefore, this study purported to examine stress in different years of medical education addressing various specific areas of medical education such as academic performance, patient and clinical responsibilities, personal life issues, faculty relations and professional identity using a specific scale (Professional Student Stress Survey) suitable for medical students.

While stress is known to be modified by various psychosocial and academic factors such as coping, social support, optimism, resilience, academic control and motivation, very few studies have examined all these factors in a single framework. In addition, whenever these factors are examined, only one or sometimes two factors are focused on in a study.

In the context of coping in medical students, it is generally found that problem based coping and adaptive emotion based coping are associated with less stress and distress, while maladaptive emotion based coping and avoidance based coping are
associated with high stress and distress (Vitaliano et al., 1989; Chan, 1992; Stewart, Betson, Marshall et al., 1995; Stewart, Betson, Lam et al., 1997, Moffat et al., 2004; Park & Adler, 2003; Johari & Hassim, 2009 Ko et al., 2007).

Similarly, social support is positively associated with well-being, better quality of life and negatively associated with mental wellbeing, stress, mental health problems, attrition in medical students (Strayhorn, 1989: Kim & Cho, 2012; Nandi et al., 2012; Peng et al., 2012; Maher et al., 2013). In the Indian scenario, few studies have examined role of social support coming from peer and family in mitigating the negative effects of stress n medical students (Supe, 1998, Nandi et al., 2012; Sreeramareddy et al., 2007; Mohanty et al., 2011). Role of faculty support has been hardly examined in the Indian context. This study purported to fill in this gap and measure faculty support. Further, pertaining to the concept of support, measuring for presence of support doesn’t necessarily mean that it is helpful and made use of. This study therefore made use of a scale that measured support from friends and family in dimensions of availability, helpfulness and reception.

Role of resilience as a protective factor in the context of medical students’ stress has been sparsely investigated. Debates on relevance of resilience in medical training have been recently surfacing in the literature (Howe et al., 2012; Eley & Stallman 2014). Some studies have focused on studying resilience in relation to other factors such as academic performance and socio-demographic variables (Elizondo-Omaña et al., 2010; Mehzabin et al., 2011). Yet, few other studies have examined resilience in terms of life satisfaction and personal growth following traumatic events in medical training (Kjeldstadli, et al., 2006; Haglund et al., 2009). Only a countable few studies using construct specific resilience measures have examined resilience and found it to be positively associated with better quality of life (Kim & Cho, 2012), lesser mental health problems (Peng et al., 2012) and higher psychological well-being (Souri & Hasanirad, 2011) in students. Literature search did not reveal any Indian studies examining the effects of resilience on stress. Hence, the study purported to examine the effects of resilience on stress in medical students.
Optimism helps to buffer stress. The numbers of studies examining this relation in medical students are few and they have found higher optimism to be related to fewer psychological health problems (Pritchard et al., 2007) and higher psychological well-being (Souri & Hasanirad, 2011). In the Indian context, only one Indian study was found which compared medical and engineering students and revealed optimism to be negatively related to anxiety and positively related to academic achievement. Further, medical students had lower optimism and higher anxiety compared to engineering students. In order to establish whether optimism helped to deal with stress in medical students, this study planned to assess optimism in relation to stress.

Locus of control is perception of extent of control over one’s life. Internal locus of control helps to better deal with stress than external locus of control. In the academic context, perceived academic control refers to the extent students perceive control of factors influencing their academic outcomes. Studies examining effects of locus of control on stress in medical students are sparse and have shown locus of control to decrease as hassles increase (Wolfe et al., 1991) and be related to academic anxiety (Grover & Smith, 1981). Perceived academic control and its relation to stress outcomes in medical students have not been examined so far. Therefore, this relation was thought of being examined in this study.

Self-determination perspective has been most often used to examine academic motivation in medical education. Motivational research in medical education has revealed that autonomous supportive education may foster humanistic orientation, better psychological adjustment, higher autonomous learning and higher feelings of competence (Williams et al., 1994; William & Deci, 1996, 1997). Autonomous motivation leads to better reflective learning, academic achievement and intention to continue studies (Sobral, 2004). Low controlled motivation is related to better studying approaches, high academic performance and low burn out related exhaustion (Kruskar, Croiset, Galindo-Garré, et al., 2013). In the context of stress only one study was found which revealed amotivation and extrinsic identified regulation to be positively related to medical students’ stress and intrinsic motivation to know, intrinsic motivation to accomplish things and extrinsic external motivation to be negatively related to stress in medical students (Park et al. 2012). There is a dearth of Indian studies focusing on motivation in
medical education, especially from the self-determination perspective. In addition, the effects of motivation on stress needs to be further established. Hence, it was decided to examine how motivation impacts stress in medical students in this study.

All the psychosocial and academic factors afore mentioned may not only affect stress directly but may be interrelated to each other in their effects. There have been studies establishing the mediating effects of coping in the relation between optimism and distress (Billingsley et al., 1993; Carver, et al., 1989; David et al., 2006). It is also possible that optimism may mediate the effects of coping on distress but the evidence for the same is less. Some evidence is also present for the mediating effect of perceived academic control on the relation between optimism and stress (Ruthig et al., 2009). Resilience also has been observed to mediate the effects of academic motivation on stress (Martin, 2002). In view of these, it was decided to examine the three mediating effects: mediating effects of coping on the relation between optimism and stress; mediating effects of perceived academic control on the relation between optimism and stress; and mediating effects of resilience on the relation academic motivation and stress.

The way in which the interrelations among the study variables will be examined is illustrated in the concept diagrams in the following pages.
Diagram 1: Depicting the relationship between psychosocial and academic factors with stress.
Diagram 2: Mediating effects of dispositional optimism on the relation between coping and stress.

Diagram 3: Mediating effects of perceived academic control on the relation between optimism and stress.

Diagram 4: Mediating effects of resilience on the relation between academic motivation and stress.