For any research understanding, it is quite necessary to review previous studies in the area of investigations and know the trends of research practices and the directions of the findings there from. History reveals that man learns from the experience of others. He generally seeks help and guidance from the past experiences and from the experiences of others. Before tracing out the framework and frontiers of the present study, it becomes necessary to review the studies conducted in the past in the related field, to know what earlier researches have done on the problems relating to the present study or on the problems allied to it.

The survey of related literature is an important prerequisite and crucial aspect of actual planning and execution of any research project. The review of literature is an exacting task calling for deep insight and clear perspective of the overall field. A review of the literature promotes a greater understanding of the problem and its crucial aspects and ensures the avoidance of unnecessary duplication. It is also necessary to study the works of others even to keep the researchers informed of the researches that her predecessors have done in their related field. It will not only keep her informed about the investigations done before but also enable her to utilize the knowledge revealed by other investigators to develop and further her own study of the present research study. Related literature is the base on which hypotheses were laid, besides this; it also provides a comparative data and the bases on which the significance of ones findings can be evaluated and interpreted.

Emphasizing the importance of the survey of related literature, Good, Barr and Seates (1941) have pointed out “Survey of related literature helps us to know whether evidence already solves problems adequately, without further investigation and thus may save duplication. It may also contribute to the general scholarship of investigators by providing ideas, theories and explanations valuable
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in formulating the problem and may also suggest appropriate methods for research followed”.

In the words of Good (1959), “The key to the vast store house of published literature may open doors to sources of significant problems and explanatory hypotheses, and provide helpful orientation of procedure, and comparative data for interpretation of results. In order to be truly creative and original, one must read extensively and critically as a stimulus to thinking”.

According to Best (1986), “The research for reference material is a time consuming but fruitful phase. A familiarity with the literature of any problem area helps the student to discover what is already known, what others have attempted to find out, what methods of attack have been promising or disappointing and what problems remains to be solved”.

Therefore, the study of related literature in research is of immense importance because it stimulates and encourages the investigator to develop deep into various aspects of the problem. It also helps in paving the way for understanding the potentialities of the problem in hand. With these thoughts, the investigator reviewed the literature, which she could gather from different sources. However the investigator selected only those studies, which were directly or indirectly related to the research topic. Some of the previous research studies relevant to Job stress, Anxiety, Blood Pressure, Hypertension, Heart Rate and Relaxation Techniques were abstracted and are quoted in this chapter.

2.1 JOB STRESS

From an historical perspective the prevalence of job stress can be seen from a study by Kahn et al. (1964), in which approximately one third of respondents in a national sample were found to be experiencing some kind of work related stress.
Walsh's (1979), study of Chicago teachers, 50.6% of the respondents claimed physical or mental illness as a direct result of their jobs.

Although the role of the lecturers is not traditionally considered by society to be one that elicits high level of occupational stress, the situation has now changed. During the past 20 years or so academics have witnessed some real changes in their work environment. Academic retrenchment has resulted in increased workloads and a decrease in the level of control that lecturers have over their work. (Melandez and Guzman, 1983).

This loss of autonomy has helped to provide the potential for the manifestation of high levels of work stress (Hickcox, 1983).

Prolonged exposure to stress seems to disrupt the normal functioning of the immune system. In studies with animals, subjects exposed to inescapable shock demonstrated reduced production of lymphocytes relative to subjects exposed to shocks from which they could escape (Ader and Cohen, 1984).

Beaastro and Gold (1984). Studied teacher's stress and burnout implications for school health personnel and concluded that burnout poses a serious health risk to teachers and that school health personnel should provide teachers with information and skill to cope with occupational stress.

Martin (1984) reported that generally existence of stress and job satisfaction caused poor dental health among the industrial employees.

In fact, some authorities estimate that stress plays some role in 50 to 70 percent of all physical illness (Frese, 1985). Moreover, included in these percentages are some of the most serious and life threatening ailments known to medical sciences. To list just a few, stress has been implicated in the occurrence of heart disease, high blood pressure, hardening of the arteries, ulcers, and even diabetes.
Psychologists once believed that stress actually improves performance on a wide range of tasks. They held that the relationship between stress and task performance takes the form of an upside-down U: at first, performance improves as stress increases, presumably because the stress is arousing or energizing. Beyond some point, though, stress becomes distracting, and performance actually drops. While this relationship may hold true under some conditions, growing evidence suggests that even low or moderate levels of stress can interfere with task performance. (Motowildo et al., 1986; Steers, 1984).

In a study Bandopadhaya et al. (1986) investigated the relationship between the extent of stressful life experiences and alternations in the level of hormones in the lung cancer and oral cancer patients. Results revealed that both the cancer groups showed highest degree of exposure to aversive stressful life events prior to the onset of cancer.

Eckles (1987), reported in his study that health and psychological outcomes can lead to poorer teaching performances, lowered self esteem, poor job-satisfaction, increased absenteeism, poor decisional-making and bad judgment.

The work environment of the 1990’s characterized as it is by structural change, higher job performance expectations, increased organizational competitiveness and redundancy might be expected to increase stress levels even further (Glowinkowski & Cooper, 1987).

Manthei and Solman (1988), isolated seven stress factors: pupil recalcitrance, poor remuneration, curriculum demands, low professional recognition, poor working conditions, community antagonism and time demands.

Daily life is filled with countless minor sources of stress that seem to make up for their relatively low intensity by their much higher frequency. That such daily hassles are an important cause of stress is stated by (De Longis et al., 1988; Kanner et al., 1981; Lazarus et al., 1985). In short, the more stress people report as a result of daily hassles, the poorer their psychological well being.
Balgopal (1989), reported that intrinsic stressors or extensive productivity demands have negative impact on workers mental health.

Brogdon (1989) reported significant relationship between stress, health, locus of control and health beliefs.

Okebukola and Jegede (1989), in their study of 1024 teachers in Nigeria, representing urban and rural areas, new and old schools and single sex and co-educational schools reported higher stress scores of female teachers as compared to their male colleagues.

Borg and Falzon (1989), conducted a study in Malta on 844 primary school teachers. In this study, a direct relationship between length of teaching experience, found teaching significantly more stressful than those who had been teaching for 11-20 years and significantly more so than those with less than 11 years experience. This may be the result of greater professional responsibilities which automatically accompany the seniority in service.

The ever increasing urbanization more than offsets the resources allocated to urban schools resulting in larger classes and meagre equipment. These two factors are usually associated with higher level of perceived teacher stress (Borg, 1990).

Pierce and Mollay (1990), have found that teachers in a “high burnout group perceived more role stress, indicated by higher levels of role conflict. Role ambiguity and conflict can play a major role in burnout”.

Punch and Faletto (1990), found among Western Australian secondary school teachers job related factors that are related to stress. There was perceived lack of efficiency/achievement, inadequate access to facilities, lack of collegial support, excessive societies expectations, lack of influence, student misbehaviour and lack of precise recognition. The teacher’s responses to their working environment were often gender related.
The result of Singh’s (1991) study showed that workers in the public & private sector have a higher level of mental health dimensions; significantly differ from their counter-parts working in public and private firms/industries. They have a better mental health and significantly differ from workers working in loss making industries.

Mishra et al. (1991), opinionated that occupational stress is related to mental health. Traditionally negative mental states such as depression, tension and anxiety were considered to be important parameters of mental health, the absence of which indicated that the employee was mentally healthy. However, the absence of these states may indicate that the person does not experience difficulty in handling problems. In other words, the psychological well-being is dependent on the presence of certain states that provide a sense of control and adequacy. These positive states are perceived as control, social support and self-efficacy. These are accepted determinants of psychological mental health. Social network environments are the criteria for effective human adaptation, which results in psychological well-being.

Malik et al. (1991), found that “teaching experience did not account for a significant portion of the variance in the dependent variable”, that is teacher stress.

Borg et al. (1991), reported that their sample of primary school teachers rated problems with time and resources, lack of professional recognition, pupil misbehaviour and poor relationships as major occupational stressors.

Winchester (1992), studied women attorneys' stress, job satisfaction and their use of chemicals. The result methodology used was an explanation multi-variate analysis based on an anonymous survey questionnaire completed by 204 attorneys. Results of their study demonstrate that there are significant gender differences in the areas of alcohol consumption, primary health care responsibility...
responsibility and income. Social support for both gender was the most significantly associated with level of stress.

Tuetteeman & Punch (1992), have recently reported evidence showing that perceived level of influence and autonomy and perceived level of efficacy and achievement (which are associated with control of work environment) can have an ameliorating effect on the reported level of teacher's psychological distress.

The link between stress and personal health, according to medical experts is very strong indeed (Kiecolt-Glaser & Glaser, 1992).

In a British setting Brown & Ralph (1992), have reported a major study by a British Teachers Union showing the most common source of teachers stress as structural change, classroom discipline, heavy workloads, lack of resources and poor school management.

Smith (1993), showed that major stressors stemmed from professional identity and time constraints. They reported that 66% of their stress comes from work. Burnout levels were in the moderate range for emotional exhaustion and personal accomplishment and in a low range for depersonalization. Health status was perceived to be moderate social support, had inverse relationship to job stress/strain; was positively related to positive health status; and the partially moderate relationship between job related strain & health status.

Cooper and Kelly (1993), Studied a wide range of senior educators ranging from primary school heads to principals of higher education institutions. The two main sources of occupational stress that emerged as predictors of teachers job dissatisfaction and mental ill health were "work overload" and handling relationships with staff.

Saxon (1993), reported that the main sources of occupational stress for Texas special education administrators are responsibility and role overload, with responsibility being a source of maladaptive stress.
SURVEY OF RELATED STUDIES

Bergin’s (1993), study demonstrated a high perception of role related stress. There is no strong evidence that physiological ill-health could be directly attributed to occupational stress.

The results of a survey reported by Hall (1994), showed that the employees considered stress to be ‘part and parcel’ of the job. Of those surveyed:

- 70% stated that stress was inevitable in their organization.
- 40% indicated that their organization did not accept or recognize ‘stress’ as an illness.
- 58% said that anyone who claimed to be ‘stressed’ at work could adversely affect their promotion prospects, and
- 74% predicted that the occupational stress would increasingly become more of an issue in the next five years.

Lee (1994) found that the stress among the teachers was significantly higher that the average level among the principals. Time management, work related stressor, discipline and motivation were the biggest stressors for teachers.

Task-based stress was the highest stress source for the principals. Hedin (1994), found total workload stress or the degree of perceived stress originating from the combined load of paid and unpaid duties has been postulated to be an important contributor to negative health consequences for working women.

Education establishment as well as large organizations, function in an increasingly competitive environment that requires lecturers to respond to external challenges and pressure at a time when there are fewer resources available to them. At the same time, however, there are greater expectations of them. According to Hills (in Fisher 1994: IX), a lecturer now has to teach increasingly more from shrinking resource base & in the face of an explosion of knowledge and skills not seen before. The effort of having to research, administer and teach has become considerable, and to many, unacceptable... Most academics will be the first to say their lives have become stressful.
SURVEY OF RELATED STUDIES

**Blix et al. (1994),** studied the majority of teachers reported a good fit between motivation style and job rewards. Female teachers were noted exception with higher misfit scores than their male counterparts. 66% indicated they perceived stress at work at least 50% of the time teachers also reported burnout stress-related health problems, lowered work productivity, inability to cope with work stress and job change consideration. Heavy work load was the most frequently cited reason for considering job change. Female teachers were more likely to consider job change as a result of job stress. Research related activities were to be more stressful than either teaching or service. A positive perception of ability to manage work stress was negatively correlated with stress symptoms.

**Myers (1995),** found the relationship between stress and organizational variables was low, while individuals personal characteristics significantly influenced the perception of occupational stress. Cognitive coping resources were found to be most effective in dealing with occupational stress.

Teacher with (a) 11-25 years of experience, (b) 6-10 years of experience, (c) more than 25 years of experience, perceived by the pupils perception and support of education to be significantly more stressful than teachers with only one year of experience ([Wheeler, 1995](#)).

**Kennedy’s (1995),** study is an attempt to find in what ways participation in deferred salary leave plans is perceived by teachers to help relieve stress of elementary and secondary school teachers in four public schools/boards in Ontario, Canada. Findings of this research suggest that when teachers have the opportunity to absent themselves from the workplace and engage in activities of a personal and for professional nature, they return to work rejuvenated and with new perspectives on teaching students and colleagues. Originally designed as an alternative to reduction in the work force during a time of declining enrollments in Thunder Bay Ontario, these plans are now perceived by teachers as an enhancement of their workplace environment.

Results of study by **Alikah (1995),** indicated generally lower stress levels overall. Further it was found that the females, middle age groups and the assistant
professor group had higher stress ranks, faculty with lower salaries and faculty teaching only one type of class had lower stress levels. Also, the research and professional identity scales had the most significant different levels of stress.

Douglas (1995) found that teachers burnout is significantly influenced by the psychological disposition of an individual and is aggravated by the institution and environment in which the teacher works. Though school system can take steps to provide working conditions that prevent and/or alleviate burnout, it is the teacher who must develop coping strategies that will diminish or eliminate the stress that induces burnout. When teachers only focus on blaming the institutions and environments in which they work for the high stress they experience and not take action to protect themselves from the factors contributing to burnout, they will experience the disillusionment, frustration and stress that leads to burnout. Teachers who accept responsibility to respond to the high stress they experience in the workplace and take positive steps to manage the conditions contributing to disillusionment, frustration and stress are less likely to burnout.

According to Cockburn (1996), in a study states that “The negative effect of teacher’s stress are of international concern. There has been an abundance of publications advising teachers and general public on how they might alleviate their stress. It is important that research also addresses teachers stress in terms of the individual. Reasons for this include:

1. They are the people who experience the stress and have direct knowledge of it
2. Their reaction to it may well have repercussion for others in terms of days off through ill health and a reduction in teaching quality
3. Several studies have demonstrated that teachers endeavour to alleviate their stress and that some strategies are more effective than others
4. Finally, related to the above a commonly recommended stress reducing technique is that individuals change their attitude towards the negative aspects of the experience

According to one of the respondent of the study - “There is a general assumption that all teachers are stressed almost to the point that it is the expected
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norm and if you don’t feel stressed you are not doing the job properly/don’t understand the difficulties.”

A consistent result in these studies has been that most of the association between some stressful events and depression is due to mediating effect on role-related stressors. Recent research has also begun to focus on chronic stressors as mediators of the effects of life events on depression. These studies suggest that enduring stressful sequelae of stressful events account for most of the effects of life events on major depression (Kessler, 1997).

Davies (1997), in his study suggests that private school teachers experience moderate levels of stress. Comparison between types of private schools revealed that there was no significant difference between the stress levels of teachers in large schools. Teachers in large schools experience higher levels of stress than teachers in small and medium size schools. However, the measurable difference between them translates into a very small difference in terms of the real stress levels of these teachers in their professional lives. A significant difference was found between the stress levels of public (M = 2.60) and private school teachers (M = 2.27). However, while private school teachers experience lower than average levels of stress, the stress levels of teachers in public schools falls in the higher than average range.

Results of Geick (1998), study reveals that female and male officer rate job-related stress and stressors similarly. However, the reported frequency of exposure to those stressor was consistently, lower for the female officers. Female officers utilized exercise and counseling more often as methods of coping with stress than their male counter parts. A significant difference between female and male police officers was found in general stress levels and post traumatic stress disorders. While female officers reported less general stress than male officers, a higher percentage of female officers reported that they possessed all the indicators necessary to be considered suffering from post traumatic stress disorder. Both male and female officers reported being dissatisfied with support from significant others and responded in a cynical manner to 40 percent of the items measuring cynicism. In this study female officers indicated the desire for and need to address
stress and stressor unique to women in law enforcement. This need also exists for male police officers. Police work is stressful regardless of gender and stress management training should be implemented to compact and control stress for both female and male police officers.

Fanning (1998) studied the relationship between stress in public school elementary teachers and conditions in the classroom. The Teacher Concerns (Stress) Inventory (TCI) and Perceived Stress Scale (PSS), produced scores which were statistically significantly similar for the levels of stress measured for each other. Although earlier studies gave anecdotal data regarding a possible relationship found between the support teachers felt from their supervisor, usually as school principal and lower level of stress measured. The data did not support a relationship between stress and the number of remedial students in a teacher’s classroom. This study did not find a significant difference in levels of stress between teachers who are members of different ethnic groups and genders.

Work-related stress accounts for $200-300 billion a year in the American workplace and is associated with a host of physical & emotional health problems. Work overload, sexual harassment, office politics and unclear job role are just some of the common stressors lurking in the work place. When any or all of these demons are allowed to run rampant “all hell breaks loose” Or to put it more politely we experience job stress (De Leno, 2000).

According to Bedi (2001), Scientific Studies have shown that stress increases blood pressure and cholesterol levels. It increases the permeability of arterial walls to cholesterol. It also decreases the ‘good’ cholesterol (HDL). It decreases estrogen levels, leading to irregular menstrual cycles & and increase in the incidence of heart disease in women. Normally women are ‘protected’ from heart disease till menopause due to the presence of normal levels of estrogen. It also produces in increase in blood clotting (which can cause heart attack) and an increase in arrhythmias (irritability and irregular beating of the heart). When the stress response becomes chronic, stress hormone levels remain high, causing anxiety, insomnia, coronary artery spasm & increased blood clotting.
poor health - and see their health decline than are women in more flexible jobs with reasonable demands & social support.

2.2. CONCLUSIONS ON REVIEW OF JOB STRESS

1. Researchers are of the view that job stress is the major source of stress (Kahn et al., 1964; Smith, 1993; Hall, 1994 and De Leno, 2000). However some researchers believe that daily hassles are an important source of stress. (De Longis et al., 1988; Kanner et al. 1981; Lazarus et al, 1985).

2. More than 50% respondents claimed physical or mental illness as direct result of their jobs. Even the most serious and life threatening ailments like heart disease, high blood pressure, ulcers, diabetes etc. have their roots in stress. (Walsh, 1979; Frese, 1985; Ader and Cohen, 1984; Bandyopadhyaya et al., 1986; Brogdon, 1989; Belesastro and Gold, 1984; De Longis et al., 1988; Kanner et al. 1981; Lazarus et al, 1985; Martin, 1984; Balgopal, 1989; Singh’s, 1991; Mishra et al. 1991; Tuetteeman & Punc, 1992; Kiecolt-Glaser and Glaser, 1992; Smith, 1993; Hedin, 1994; Blix et al. 1994; Cockburn, 1996; Kessler, 1997; Geick’s, 1998; De Leno, 2000; Bedi, 2001 and www.researchmatter.harvard.edu, 2002).

However Bergin’s (1993). did not find any strong evidence that physiological ill health could be directly attributed to occupational stress.


SURVEY OF RELATED STUDIES

Researchers indicated that the main sources of job stress for teachers are heavy workload, inadequate facilities, time demands, low recognition, poor remuneration, discipline and poor collegial support. (Manthei and Solman, 1988; Borg, 1990; Punch and Tuetteman, 1990; Borg et al., 1991; Brown & Ralph, 1992; Cooper and Kelly, 1993; Saxon 1993; Lee, 1994; Hedin, 1994; Douglas, 1995; De Leno, 2000; and www.researchmatters.harvard.edu, 2002).

5. There exists a relationship between stress and chemicals or drugs used (Winchester, 1992).

6. Studies show that female teachers scored on stress as compared to males (Okebukola and Jegede, 1989; and Blix et al., 1994).

7. Teachers with more years of teaching experience were more stressed than the one's with less years of experience (Borg and Falzon, 1989 and Wheeler, 1995). However Malik et al (1991) did not find any significant relationship between teaching experience and teacher's stress.

8. Teachers are more stressed than principals (Lee, 1994).

9. Teachers teaching in large schools are more stressed as compared to those teaching in small or medium sized schools (Davies, 1997).

10. Public school teachers are more stressed as compared to private school teachers (Davies, 1997).

11. Studies also point out that certain coping strategies or relaxation techniques help reduce job stress. (Beicastro and Gold, 1984; Mishra et al, 1991; Winchester Vega, 1992; Myers, 1995; Kennedy's, 1995; Douglas, 1995; Cockburn, 1996 and Tuck et al., 1998).
SURVEY OF RELATED STUDIES

2.3. ANXIETY

Harburg et al. (1964), studied 16 PF correlates of systolic blood pressure in a group of 100 males entering college. Suspicion (component L) & overall anxiety were found to be significant correlates.

Low and Swift (1971), measure Contingent Negative Variable (CNV) in subjects completing a discrimination problem. The CNV, a measurable from of brain activity which appears maximally in frontal region during state of preparation or expectancy was smaller in amplitude in high anxious subjects and diminished further as the anxiety or stress content of the experiment was increased.

Sarason (1972), Phillips et al. (1972), & Spielberger et al. (1976), have critically examined the empirical evidence on the treatment of test anxiety.

Konefal et al. (1972), reported effectiveness of neurolinguistic programming in lowering trait anxiety & increasing the sense of internal control on 27 men & 30 women participating in a 21 day residential training in Neurolinguistic programming.

Pilowsky et al. (1973), related ASQ scores to various measures of cardiovascular functioning in a group of 12 male subjects suffering from essential hypertension. Among the significant results were a negative relationship ($r$ = -0.56) between heart rate at rest and component L, and positive relationship ($r$ = 0.60) between resting diastolic blood pressure and component C (Higher diastolic B.P. = more emotionally unstable). The total ASQ score & all anxiety components except L were significantly related to total peripheral resistance in the cardiovascular system.

Segers et al. (1974), found that males with clinical or EKG evidence of CHD were significantly higher than control on overt, covert, and total anxiety levels. Control group comprised of those who had no clinical or EKG evidence of
SURVEY OF RELATED STUDIES

CHD. Their average anxiety score was 27.3. CHD group-clinical or EKG evidence of CHD but no previous consultation with physicians regarding any symptoms their average anxiety score was 27.4. On the other had CHD group-clinical or EKG evidence of CHD & previous consultations with physicians regarding symptoms their average anxiety score was found to be 33.6. This shows that those who had previously consulted a doctor about their cardiac complaint were more anxious than those who had not. Those who had not previously consulted a physician (43% of the total CHD group) are indistinguishable in terms of anxiety from the control group. Lest we conclude that ignorance is bliss, all CHD patients - at least those over 45 years of age - show similarly disturbed physiological patterns though the differences from controls are statistically significant only in terms of elevated systolic pressure & triglyceride level.

The work of Ferguson & Gowan (1974), revealed that all individuals in their study were tested before & after a 6 1/2 week period of time during which experimental subjects were given training in transcendental meditation. Before and after scores for the experimental group (N=31) were 36.24 and 30.30. While the scores of control group increased from 30.3 to 31.8.

The stress of anxiety and rage, in the pressure of cardiac ischemia, can lead to Ventricular arrhythmias, fibrillation and sudden death (Lown & Verrier, 1976; Levine, 1963; Wolf, 1971; and Olsson & Rehnqvist, 1982).

It is a vital approach if by approaching anxiety analytically, it can be determined when anxiety is functional, when dysfunctional & what could be done to optimize the effect on performance (Mc. Keeachie, 1977).

According to Sharma (1978), researches on Anxiety are also needed in India.

Seamian and Passer (1978) findings indicate that sport competition can be perceived as threatening in an anxiety including experience by some & under some circumstances. Various inter-personal and situational factors related to threat
SURVEY OF RELATED STUDIES

perception and state anxiety reaction were determined. The situational factors of the game win lose & margin of win clearly indicate the importance of success & failure in evaluative settings with respect to decrease and increase in perceived threat and state anxiety level.

Gerson (1978), in his study determined if the theory of competitive stress & a measure of competitive trait anxiety could predict pre-competitive state anxiety. A multiple regression analysis with pre-competitive state anxiety as a criterion variable and team standing batting average and SCAT as the predictor variables yielded a significant relationship between SCAT and pre-competitive state anxiety. This supports the hypothesis that there would be a positive relationship between SCAT & pre competitive state anxiety. An additional multiple regression analysis with batting average as the criterion variable indicated that the anxiety measures were significant predictors of performance.

Weingberg (1978), set out to test drive theory prediction through research concerning the relationship between anxiety & motor performance. He examined forty high trait anxious subjects and forty low trait anxious subjects, who threw 10 balls at a target, consisting of five concentric circles. Performance results indicated a significant (trait anxiety X feed back interaction) with high trait anxious subjects performing best after success & low trait anxious subjects performing best under failure.

Hall (1980), determined the effect of locus of control, success, failure and trait anxiety on the perception of threat to self. He examined effects of success-failure relative to locus of control as measured by a post performance attribution question and assessed A-trait and pre & post performance A-state (n = 32) by the Spielberger state-trait Anxiety Inventory. He found interaction of success-failure and locus of control relative to post performance. A-state shows externals to have higher A-trait then internals.

In social situations the individual tries to reduce anxiety and with lack of it one becomes careless of the rights & feelings of the others (Jack 1982).
SURVEY OF RELATED STUDIES

Anxiety and hostility can increase general arousal and facilitate the release of catecholamines - a class of neurotransmitters that play an important role in the sympathetic nervous system. The release of catecholamine epinephrine has the effect of boosting our overall readiness to act, including our blood pressure. Although the effects of emotional stressors are usually brief, extreme reactivity to anxiety, hostility and anger may indicate a predisposition to develop hypertension (Rosenman, 1988).

Eppley & Shear (1989), found that TM is significantly more effective than other forms of meditation or somatic relaxation techniques in reducing trait anxiety. In 146 independent outcomes indicated the effect of TM program on reducing anxiety much greater than other meditation.

In an experimental study by Lesky (1989), on 21 parachutists observed that in situation inducing anxiety, high anxious persons (HA) overestimate (short production) time intervals, while they underestimate in neutral situations. HA showed greatest overestimation during lift where stress is highest. Heart rate (HR) as an indicator of general activation does not correlate (Pearson-r) with time estimation. Parachuting is indeed a stressing action as can be seen by the high heart rate level without physical work. Different moments in a jumps sequence result in different stress, the highest scores of hear rate are found shortly after opening the parachute and before landing.

It is found that high level of anxiety aids in learning simple material but interferes with the complex material. Therefore the anxiety in the middle ranges stimulates affective bearing (Mathur, 1990).

According to Wasir (1990), Disturbed mind, undue mental tension stress and anxiety result in: (1) increased rate and force of contraction of heart, (2) Higher blood pressure, (3) increase in circulating catecholamines, blood fats & platelet adhesiveness, (4) narrowing or spasm of the coronary arteries which are the channels for blood and oxygen supply to the heart and (5) cardiac arrhythmias or irregularities of heart beat. These processes, if occur repeatedly may result in a serious damage to the heart, including angina and even fatal heart attacks.
In a study Deffenbacker & Stark (1992), found that relaxation coping skills (RCS) procedure was effective in reducing anger and general anxiety. Although the treatment groups did not differ from each other. But subjects administered RCS reported significantly lower general tendency to express anger outwardly, whereas cognitive coping skills (CCS) subjects reported significantly less general anxiety.

In India no efforts have been made on the treatment of test anxiety (Jain, 1995).

In a study by Malathi et al (1998), the effect and relaxation changes in psycho-physiological parameters in response to stress of examination in 75 medical students was studied. Initially, five parameters (anxiety level, heart rate, blood pressure, galvanic skin resistance & choice reaction time) were recorded. Students were randomly divided into groups of 25 each. One group practiced yoga (Gr-Y) & another relaxation (Gr-R) and third (Gr-C) was control group. All the five parameters were recorded again. The five parameters (anxiety level, heart rate, blood pressure, galvanic skin resistance & choice reaction time) showed a decrease in Gr-Y and Gr-R as compared to Gr-C.

Chavan (in Sharma 2000), said, “Attempt to commit suicide is psychosomatic illness, caused by fear and anxiety. Approximately 10% of the persons who are depressed end up attempting suicide.

Young people suffering from social anxiety disorder (SAD) are at an increased risk for the development of major depression, suggest a group of German & American researchers (2001). Those with both SAD & depression were eight times more likely to have depressive disorder and to contemplate or attempt suicide. They had more symptoms of depression, and a longer duration of major episode of depression than other young adults.

Men who suffer from depression and anxiety are more than three times as likely to die from a stroke as other men. But depressed and anxious men are not much more likely to have non-fatal strokes, say Margaret May & Colleagues
SURVEY OF RELATED STUDIES

(2002) at the university of Bristol. The team found that men with depression or similar mental illness were much more likely to have fatal strokes, while the men who did not die from their strokes were slightly more likely to have depression.

Singh (2002), found in patients with high anxiety score, only 45% showed high stress scores. A guardian closest to the patient was asked to score the stress level of the patients as perceived by him/her. 90% correlation with anxiety score was seen, bringing to light the inability of the patient to identify stress (denial & negation) leading to anxiety disorder. The scores of stress scale & resistance to stress scale were conversely proportionate.

2.4. CONCLUSIONS ON REVIEW OF ANXIETY

1. Increased Blood Pressure correlated significantly with increased anxiety (Harburg et al., 1964; Pilowsky et al., 1973; and Wasir 1990).

2. Low and Swift (1971), found that contingent negative variable (CNV) diminished with increased anxiety or stress.

3. Researchers have found that meditation, neurolinguistic programming and relaxation reduced anxiety significantly. [Ferguson & Gowan (1974); Konefal et al (1972); Eppley & Shear (1989); Deffenbacher & Stark (1992) and Malathi et al (1998)].

4. In India more researches and treatment of anxiety is needed (Sharma 1978; Jain 1995).

5. Components of anxiety, leaving component (L) were significantly related to total peripheral resistance (Pilowsky et al., 1973).


8. With reduced level of anxiety one becomes careless (Jack 1982).
SURVEY OF RELATED STUDIES

9. Success and failure in competition depends on decrease or increase in state anxiety level (Scanlan and Passer, 1978 and Gerson, 1978). While individuals with high trait anxiety performed better (Weinberg, 1978 and Hall, 1980).

10. Anxiety facilitates the release of catecholamines (Rosenman, 1988 and Wasir, 1990).

11. Anxiety, hostility and anger may indicate a predisposition to develop hypertension (Rosenman, 1988 and Wasir, 1990).
   In situations inducing anxiety high anxious persons overestimate, while underestimate in neutral situation (Lesky, 1989 and Singh, 2002).
   Psychosomatic illness depression, attempt to suicide are related to anxiety (German & American researchers, 2001; Chavan, 2000 and May et al 2002).

2.5. BLOOD PRESSURE

Weiner (1977), stressed the point that high blood pressure and essential hypertension is a heterogeneous disease made up of several still

Harburg et al (1978), found that elevated blood pressure correlated positively with high stress living areas as well as darker skin colour in mixed white/black population

Kannel & Dawber (1980), proposed that high blood pressure whether transient or fixed; systolic or diastolic; casual or basal in either sex and at any age increases the risk of coronary heart disease

By assessing BP reactivity to mental challenge a probably relevant pathophysiological mechanism in the development of essential hypertension is observed. During mental stress testing in laboratory, the different haemodynamic patterns of normotensive outpatients with borderline hypertension and mild hypertension could consistently be demonstrated (Obrist, P.A. 1981 and Falkner et al, 1981)
SURVEY OF RELATED STUDIES

That examinations and three kinds of psychological tasks exaggerate BP responses in patients with borderline hypertension or in persons at risk for hypertension has been cited as presumptive evidence that the pressor episodes are mediated by the brain. The neural meditation of repetitive short term episodes of raised BP then lead according to Folkow (1982), to structural adjustments in arterioles to produce sustained hypertension.

Nissinen, et al. (1983), opined that Blood pressure (BP) might be the one with the most practical value as over a broad range its reduction clearly decreases the risk of cardiovascular disease and therefore large scale hypertension detection programme might be useful.

Wood et al. (1984), demonstrated that a positive blood pressure (BP) response to the cold pressor test predicted later hypertension.

In two studies according to Weiner (1986), acute variations in blood pressure added nothing to the risk for cardiovascular disease due to raised Blood Pressure levels. Yet there is evidence that chronic sustained social discord disruption and unemployment are associated with essential hypertension. Chronic work stress has also been found to be correlated with raised Blood Pressure and left ventricular enlargement when blood pressure is measured at work rather than at home or in the doctor’s office. However, at none of these three sites for measurement was there any evidence of increased blood pressure reactivity, suggesting that the average workload affects the mean not, the extreme levels of blood pressure attained.

According to Weiner (1986), excessive BP Variability eventually leads to increased peripheral resistance, or to adaptations to tissue over perfusion.

The study of Ruddel et al (1986), on employees of the Federal Government in Bonn found in two different mental stress paradigms (YG in the field, MA in the Laboratory), that blood pressure and heart rate (HR) elicited increases. This suggests that BP and HR during mental challenge is a reliable characteristic of these (Hypertensive) patients. However, no increased BP
responsiveness was found in borderline hypertensive (BH) or hypertensive (H) when these hypertensives were stressed under field conditions. When challenged properly and care is taken for an adequate baseline, hypertensives always have larger blood pressure increases to experimental stress than normotensives. In prospective studies it could even be demonstrated that blood pressure hyperreactivity might be a valid precursor of later hypertension.

Shapiro (1986), opined that apart from purely genetic influences, social interactions in the family may provide a source of influence in that factors that affect blood pressure, such as eating & exercise habit patterns, are reinforced in family settings. Stress response tendencies may be similarly reinforced.

A subgroup of borderline hypertensive patients has been identified whose plasma catecholamine levels are higher and whose urinary excretion of catecholamines is exaggerated on standing. Stresses produce greater catecholamine and BP responses. Ganglionic blocking agents reduce blood pressure, a fall in level that closely correlates with a fall in plasma norepinephrine (Weiner, 1986).

Subjects with a Type A behaviour patterns have higher systolic and diastolic blood pressure, and heart-rate responses and a faster pulse transit time in response to tasks done under the constraint of time, or demanding attention (Weiner, 1986).

In a study by Lamprecht & Bernard (1986), results led to conclusion that not only psychic conflicts within the frame of the mind body unity affect blood pressure regulation, but despite individual difference there seem to be similar conflict areas, which to a higher degree influence, via the autonomic system, blood pressure regulation. The genetic predisposition herein plays a significant role. Blood pressure regulation could be seen therefore as the heel of Achilles. Regressive wishes are seen which correspond with the increased depression score in the Giessen test (self picture). The patients seem to be under pressure from a rather high ego ideal. The inhibition in the area of social contact and affective blockade was found in the picture frustration test which is in agreement with the
SURVEY OF RELATED STUDIES

Social isolation and the overly compliant friendly subordinated behaviour. The observed psycho-physiological connections within BP regulation and the possibility of inducing an increase in blood pressure by the emotional reactivation of these conflicts or to induce a decrease in blood pressure in situations in which coping was possible could imply therapeutic consequences as an adjunct to pharmacotherapy for patients with labile hypertension or situational hypertension.

Studies show that heart attacks are more frequent in persons who live under mental tension and those who lead a sedentary life. Meditation and moderate physical exercise has a positive role in the human well-being. Heart attacks are extremely rare in the Bhutanese who, by and large, are physically very active, have a released attitude of mind and are peaceful & tolerant (Wasir, 1990).

According to Wasir (1990), disturbed mind, undue mental tension, stress & anxiety result in (1) increased rate & force of contraction of heart, (2) higher blood pressure, (3) increase in circulating catecholemamines, blood fats & platelet adhesiveness, (4) narrowing or spasm of the coronary arteries which are the channels for blood and oxygen supply to the heart, (5) cardiac arrhythmias or irregularities of heart beat. These processes if occur repeatedly, may result in a serious damage to the heart including angina & even fatal heart attacks.

In the highly industrialized countries like the USA & some of the European countries, 60-70% of all deaths are caused due to diseases of heart, blood vessels and high blood pressure. In India, comprehensive statistics are not available. But in major cities, heart and blood pressure disease account for about 30% of total mortality. In the cardiac clinics of the AIIMS we see about 10,000 new cardiac patients per year, with the number increasing steadily. The various heart diseases are (1) Congenital, (2) Rheumatic, (3) Coronary (heart attacks & angina), (4) Hypertensive Heart Disease, (5) Arrhythmias (pulse rhythm abnormalities), (6) Infection of heart and pericardium and (7) Cardiomyopathies (heart muscle disease). Rheumatic heart disease is the commonest in our country followed by coronary disease, high blood pressure & congenital heart disease in their rate of occurrence. About 5-10% of urban and 3-5% of the rural population have high blood pressure. In the present rating, the prevalence of coronary disease...
(heart attacks) and Hypertension will not take long to attain an “epidemic” form if timely adequate preventive measures are not taken. In a city like Bombay, study showed that about 15% of adult population is suffering from high blood pressure (Wasir 1990).

Heart disease is the leading cause of death in the U.S. In 1997, 725,000 persons died of heart disease (31% of all deaths). Almost 2,000 Americans die of heart disease each day. That is one death every 44 seconds. The good news is that the death rate from heart disease has been steadily decreasing. The age adjusted death rate decreased by 3% from 1996 to 1997 and 34.6% from 1979 to 1997. Unfortunately heart disease still causes sudden death and many people die before even reaching the hospital (Bianco, 1998).

In a study by Malathi et al (1998), the effect and relaxation changes psychophysiological parameters in response to stress of examination in 75 medical students was studied. Initially five parameters (anxiety level, heart rate, blood pressure, galvanic skin resistance & choice reaction time) were recorded. Students were randomly divided into groups of 25 each. One group practiced yoga (Gr-Y) & another relaxation (Gr-R) and third Gr-C was control group. All the five parameters were recorded again. The five parameters (anxiety level, heart rate, blood pressure, galvanic skin resistance & choice reaction time) showed a decrease in Gr-Y and Gr-R as compared to Gr-C.

The aim of Barnes et al (1999), study was to provide a preliminary investigation of the acute effects of TM on TPR i.e. total peripheral resistance 32 healthy adult subjects were divided into a TM group of long-term TM practitioners they comprised of 18 subjects, and a control group of 14 “very healthy” subjects. Hemodynamic functioning was assessed immediately before and during three conditions. During this session, the meditation group showed a decrease in blood pressure and less constriction of blood vessels while control group (SBP \(-3.0\) Vs +2.1 mmHg, P/Ld 04, TPR \(-1.0\) Vs +0.3 mmHg/liter per minute, P/Ld 03).
Porter, Stone and Schwartz (1999) in a study on one hundred college students found moderate correlation between trait & state anger expression. Significant associations were found between a number of situational variables and state anger expression scales. Neither trait nor state anger expressions scales were related to blood pressure levels. Hence they concluded that these results indicate that trait and state measures of anger expression are not equivalent and that situational factors play an important role in anger expression. Situational variability may be an important factor in determining the health consequences of emotion expression.

Stress at work often increases blood pressure during the final weeks of pregnancy. Australian Researchers (2001) have found that working outside the home during the final weeks of pregnancy may jeopardise the woman’s and her unborn baby’s health. Working women were found to have higher blood pressure during workdays than non-workdays, and they were also at increased risk of pregnancy-induced hypertension. High blood pressure during pregnancy can lead to heart, kidney & liver damage & is potentially dangerous to the mother & fetus. The study adds to a growing body of research suggesting that for some women, working & gestating can be a mix dangerous to one’s health.

The studies support evidence suggesting that stressed people and those prone to mood swings are at greater risk of heart disease. Scientists at the Medical college of Georgia discovered that people who practiced TM regularly had significantly lower blood pressure than those who did not. And also that practice of TM keeps blood vessels open, thus lowering the blood pressure. They also found that high blood is a major risk factor for heart disease (Barnes, 2002).

Effect of exercise on blood pressure has been well documented in a research study conducted at the University of Hartford. Blood pressure reduction of 6-10 mm of Hg in hypertensive men were noticed immediately after they had bicycled at a moderate level for 30 minutes. The reduction lasted for up to 13 hrs (Thompson 2002).
2.6. **CONCLUSIONS ON REVIEW OF BLOOD PRESSURE**

1. Study found that high blood pressure is a heterogeneous disease (Weiner, 1977).

2. Researchers have found that mental stress, high work load / work stress correlated with raised blood pressure (Harburg et al. 1978; Wood et al. 1984; Obrist & Falkner et al. 1981; Weiner, 1986; Ruddel et al. 1986; Wasir, 1990; Australian Researchers, 2001; and Barnes 2002).

3. Dark skin color correlated positively with elevated blood pressure (Harburg et al. 1978).

4. Pressor responses are mediated by brain (Folkow 1982).

5. Blood pressure variability eventually leads to increased peripheral resistance or structural adjustments in arterioles to produce sustained hypertension (Folkow, 1982 and Weiner, 1986).

6. Plasma Catecholamine levels are found to be higher in some cases of borderline hypertensive patients (Weiner, 1986).

7. Type A subjects have higher level of blood pressure and heart rate as compared to Type B. (Weiner 1986).

8. Blood pressure value is of practical value for detecting hypertensive cases and any decrease in it decreases the risk of cardiovascular disease (Nissinen et al. 1983; Ruddel et al. 1986).

9. Elevated Blood pressure increases the risk of coronary heart disease, kidney and liver damage (Kannel and Dawber 1980; Australian researchers, 2001).

10. Social environment plays an important role in affecting blood pressure (Weiner, 1986; Shapiro, 1986).

11. Researchers have shown that moods, conflicts and emotions play an important role in affecting one’s blood pressure (Lamprech & Bernard, 1986; Porter, Stone and Schwartz 1999; and Barnes 2002). But Lamprech & Bernard (1986) found that genetic predisposition also plays a significant role in regulating one’s blood pressure.

SURVEY OF RELATED STUDIES

To induce a decrease in blood pressure level coping skills, relaxation and physical exercises were effective (Lamprecht and Bernard, 1986; Wasir, 1990; Malathi et al. 1998; Barnes et al. 1999; Barnes, 2002; and Thompson, 2002).

2.7. HYPERTENSION

Essential Hypertension has long been in the front rank of psychosomatic disorders. Early theorists argued that essential hypertension might derive from unconscious conflicts about the expression of hostility and aggression (Ayman, 1934 and Birger, 1945) while Alexander (1950) included essential hypertension among his archetypal psychosomatic disorders.

According to Ayman (1934), familial pattern of inheriting hypertension is if one of the parents is hypertensive, 28% children are affected. If both parents are hypertensive, 41% children are reportedly affected.

In the classic studies by Brod and his colleagues (1960), Hypertensives and normotensives did not differ in the magnitude of pressor responses; however, marked differences were observed in regional vasomotor adjustments, and the duration of reactions was prolonged in hypertensive. Secondly, positive results might only be expected in mild hypertensives, since nonneurogenic mechanisms sustains the elevated pressure of established cases. The other factor that appears to be of great significance is the type of challenge to which hypertensives are exposed.

Sinha, B.C. (1970), reported that hypertension and diabetes account for about 40% of all cases of CHD reported in India.

Although the relationship between childhood and adult blood pressure is not firmly established, longitudinal tracking studies suggest that children in higher percentiles of blood pressure reading remain at the same level and may be at an increased risk of hypertension as adults (Johnson et al. 1975).
SURVEY OF RELATED STUDIES

Esler & his co-workers (1977), using the Cattell 16 PF have identified a sub group of borderline hypertensive patients, who are submissive and guilt ridden with higher levels of unexpressed and unexpressable anger. These patients are also categorized by high plasma renin and nor epinephrine levels.

Korner & Fletcher (1977), pointed out that the haemodynamic disturbance underlying many cases of early and mild hypertension is an elevation in cardiac output.

According to Falkner, et al (1979) and Light & Obrist (1980) the normotensive sons of a hypertensive parent do respond with increased heart rates and systolic BP's to mental arithmetic and shock avoidance tests.

As the disorder of haemodynamic progresses, there may be a switch towards increased total peripheral resistance as the factor sustaining high blood pressure (Lund-Johansen, 1980). Although the factors causing high cardiac output are not well understood, it is probable that augmented traffic in the cardiac sympathetic nerves are involved.

Goldberg et al (1980) surveyed some 2700 normal subjects by means of questionnaires to measure depression, psychological well-being and a measure of current stress. Three years later, 26,000 normal subjects took part in a physical health programme and 790 hypertensive subjects were identified as common to both programmes. Persons of low socioeconomic status were found to be more likely to have high blood pressure than those with higher socioeconomic background. There was no relationship between hypertension and depression, satisfaction with life, happiness or aggression.

High blood pressure whether transient or fixed, systolic or diastolic, casual or basal in either sex and at any age increases the risk of coronary heart disease (Kannel & Dawber, 1980).

Subjects undergoing some real life challenge, such as an important examination, develop marked pressor responses in the hypertensive range in
SURVEY OF RELATED STUDIES

anticipation of, during and even some minutes after their academic ordeal. (Von Uexbull, 1982) Hence repeated pressor bouts of this kind eventuate in essential hypertension.

According to Abbound (1982), acquired and genetic factors can lead to vascular muscle defects and increased sympathetic drive, which, either both or each alone, can lead to an increased vascular resistance. Acquired factors can either help a predisposition to become a manifest disease, act by itself to cause a disease or prevent a genetic trait from becoming manifest. Among the acquired factors, we differentiate between those lying inside the personality, which means that they are early acquired in life, and those lying outside of the individual such as job stress (Kornitzer, M. et al. 1982), noise exposure (Johsson & Hansson 1977) etc. How the external stressors are perceived depends upon this personality make up and the social support system.

Essential hypertension is considered by many authorities to be a multifactorial disorder in which many different elements (such as reninangiotensin system, baroreceptor reflex and the structural changes in the vasculature) are involved to a varying extent in different individuals. Some of these factors are important in the early stages, while others are more likely to be responsible for the maintenance rather than the initiation of blood pressure elevation (Korner, 1982).

According to Steptoe (1982), "It should also be emphasized that psychological factors are not being considered as the exclusive, or even the major cause of hypertension. Nevertheless, evidence is accumulating to suggest that emotion and behaviour are involved in the disease process in some individual. These issues have important implications for the management of high blood pressure."

In medicine, the major emphasis has been on treatment of heart disease through drugs and surgery. However, about 50% of all cases of heart disease can be accounted for by the direct effects of tobacco smoking, high blood pressure and elevated serum cholesterol level on the cardiovascular system. Other risk factors are body weight, impaired glucose tolerance, cardiac rhythm abnormalities, level
SURVEY OF RELATED STUDIES

of physical conditioning and age. People who are at risk on three major risk factors are likely to sustain eight times more cardiovascular disease than those not displaying these characteristics Surwit et al (1982).

An association has been established between high cardiovascular reactivity and a family history of hypertension, suggesting a constitutional predisposition plus excessive stress response as significant in the development of hypertension. In a study completed by Greenberg (1983) found that subjects with a family history of hypertension had larger blood pressure responses to caffeine by itself & to caffeine plus mental stress compared to subject without such a family history. If repeated pressor responses to environmental stimuli occur in predisposed or high risk individuals, the potential for developing hypertension may be significantly increased.

On the study of the role of catecholamines in essential hypertension Goldstein’s (1983) studies indicate that plasma noradrenaline concentrations are elevated in young mild hypertensives.

Blood pressure is somewhat lower in children as compared to adults. Starting from childhood the blood pressure rises, the greatest increase occurring in the peripubertal period (WHO 1985).

The blood pressure is the single most useful test for identifying individual at a high risk of developing CHD Hypertension accelerates atherosclerotic process, especially if hyperlipidemia is also present & contributes importantly to CHD. In the past, emphasis was placed on the importance of diabolic blood pressure. Many investigators feel that systolic blood pressure is a better predictor of CHD than is the diastolic. However, both components are significant risk factors. The risk role of “mild” hypertension is generally accepted WHO (1985).

Emotions can also play a role in the progression of hypertension, or high blood pressure, a condition in which the pressure within the blood vessels in abnormally high. Prolonged hypertension when untreated, can result in extensive damage to the entire circulatory system. Indeed about 30% of cardiovascular
disease deaths each year are attributable to hypertension. Some evidence suggests that emotions can affect the regulation of blood pressure through neurohormonal mechanism (Krakoff et al. 1985).

Steptoe (1986) found that the sympathetically mediated cardiovascular reactions to psychological challenges may initiate the pathogenic process in some patients, triggering the progression towards sustained hypertension.

It has been estimated that even a small reduction in the average blood pressure of the whole population by a mere 2 or 3 mm Hg would produce a large reduction in the incidence of cardiovascular complications (WHO, 1986; Rose, G. 1981).

Anxiety and hostility can increase general arousal and facilitate the release of catecholamines - a class of neurotransmitters that play an important role in the sympathetic nervous system. The release of catecholamine epinephrine has the effect of boosting our overall readiness to act, including our blood pressure. Although the effects of emotional stressors are usually brief, extreme reactivity to anxiety, hostility and anger may indicate a predisposition to develop hypertension (Rosenman, 1988).

High blood pressure affects about 5% of the total population (in large cities even up to 10-15%). About 70% of these persons suffer from mild hypertension that is lower or diastolic pressures between 90-104 mm Hg. This degree of hypertension can be easily controlled by non-drug means, that is by the self-care approach which comprises of: (1) Avoiding excess of salt (sodium) intake in diet and taking dietary items which are rich in potassium salt, like citrus fruits and vegetables. (2) Avoiding excess use of Alcohol (not more than an equivalent of two ounces of whisky per day). (3) Taking regular physical exercise. (4) Control of weight in those who are obese and (5) Practice of meditation and yoga, which provides mental relaxation and reduces the tone in blood vessels, thus resulting in normalizing blood pressure. These non-drug measures when observed also by those who have severely elevated blood pressures, help in reducing their quantity of drug requirements (Wasir, 1990).
SURVEY OF RELATED STUDIES

Individuals whose pressure is consistently high have hypertension which contributes to strokes and heart attacks. Hypertensives are two-three times more susceptible to coronary artery disease and four times more likely to suffer a stroke than those with normal blood pressure (Ornstein and Carstensen, 1991).

Basu (1991), in a study of hyperactivity and essential hypertension, a behavioral approach, examined the hypothesis of a hyperactivity component in essential hypertension. 23 male patients (aged 30-55 years) having essential hypertension and 25 normotensive controls took a mental arithmetic task and a mirror tracing procedure and had their blood pressure (BP) monitored immediately after completion. The patients completed the tasks again after 25 sessions of biofeedback and psychotherapy. Findings confirm that hyperactivity can be judged as an independent risk factor of essential hypertension. It was also observed that hyperactivity could be adequately controlled by behavioral methods & that such treatment resulted in a significant reduction of baseline mean BP.

Latha and Kaliappan (1991), in a study named Yoga pranayama, thermal biofeedback techniques in the management of stress and high blood pressure investigated the effectiveness of yoga relaxation, pranayama and thermal biofeedback techniques in the management of high blood pressure and stress. Ss were 14 essential hypertensive patients (aged 45-70 years) 7 of whom underwent training in yoga and thermal biofeedback techniques for 6 months, while the rest 7 Ss served as controls. Results show a significant reduction in the systolic blood pressure during treatment phases. Moderate reduction in the diastolic pressure was noticed only when the thermal feedback was introduced. This also corresponded to a significant reduction in the intake of antihypertensive drugs.

In the epidemiological study of hypertension, carried out in young persons (15-24 years) in Delhi urban population Gopinath N. et al (1994), reported overall prevalence rate of 30.9/1000 (male = 41.2/1000, female = 21.7/1000). The prevalence rate of hypertension in young persons is significantly higher in urban population compared to rural population reported by this study.
SURVEY OF RELATED STUDIES

According to Malhotra (2000), stress and sedentary lifestyles were the main reasons because of which people of younger age groups suffered from coronary heart problem. At present more than 8% of the Indian population had some kind of coronary disease which was rather alarming in comparison with the other western nations. He further stated that the statistic collected revealed that people in the age group of 20-30 were found suffering from hypertension, diabetes, high cholesterol level & blood pressure which led to blockage of arteries resulting in heart attacks.

The aim of the study was to test the hypotheses that the trajectory of psychological risk (i.e., persistent or increasing measures in depression & anxiety symptoms, anger, and low social support over time) increase the risk for the development of hypertension and that blood pressure levels fluctuate with psychological changes in women. Initially healthy normotensive middle-aged women (n=541, 90.6% white, 8.9% African American) were followed across an average of 9.2 years of follow up. Psychological characteristics were assessed repeatedly via standardized test questionnaires, and Cox proportional hazard and random regression models were used to analyze their impact, adjusting for hypertension risk factors (age, race, years of educations, parental history of hypertension, baseline blood pressure, body mass index, physical activity, alcohol use & cigarette smoking). 75 women became hypertensive during the follow-up period. Baseline levels of depression, anxiety, anger and social support did not predict subsequent hypertension. A high level of anxiety throughout the follow-up, an increase in the level of feelings of anger, and a decrease in the level of social support over the follow up were significant predictors of hypertension incidence (all P < 0.05), although covariate adjustment reduced some of the significance levels to non-significance. In women, increases in depressive symptoms are significantly associated (P < 0.001) with concurrent increases in the levels of systolic blood pressure, especially among hypertensive patients (P < 0.0001). Increasing levels of anger, decreasing levels of social support and high anxiety increase the likelihood of women's development of hypertension in midlife. These results emphasize the importance of evaluating the trajectory of psychological risk during the period of evolving hypertension (Raikkonen, Matthews and Kuller, 2001).
SURVEY OF RELATED STUDIES

Many studies have shown that systemic hypertension is one of the major factors in the initiation and progression of renal disease. For maximum benefit, the blood pressure should be maintained as near to normal as possible. Every effort must be made to bring the blood pressure below 140/90 mm Hg and the need for a strict blood pressure control must be explained to patient. Tight blood pressure control would be expected to roughly double the time required for end stage renal disease (ESRD) to develop (Prashar, 2001).

A community based epidemiological study of hypertension was carried out on a random rural sample of young persons (15-24 years) of Gurgaon district in Haryana state. Of the 1422 subjects examined, 17 were found to be hypertensive. The overall prevalence rate was 12.0/1000 (male 12.7/1000, female 11.3/1000) (Chadha et al. 2001).

The body’s physical response under stress, whether real or imagined threat activates the “fight-or-flight” mechanism. This fight-or-flight response has a purpose. But this mechanism functions best when used occasionally, for brief period only. If activated repeatedly, the effects are harmful and potentially disastrous. It is not uncommon for people in modern societies to maintain high stress levels most of the time. The current epidemic of hypertension and heart disease in the western world is in part a direct result (Redwood, 2002).

Between 20 and 50% of natural deaths can be traced to hypertension. In fact, about 20% of adults worldwide have hypertension & five percent of children have it, too (www.hypertension-online.com 2002).

Doing just 30 to 45 minutes of mild to moderate exercise such as brisk walking or biking three times a week can bump your blood pressure down a few points. Some vigorous exercise, such as riding a stationary bike for 40 minutes, running for 30 minutes or doing laps in the pool can lower blood pressure by more than 10 points (www.hypertension-online.com 2002).

Amazingly, less than 0.01% of Medicare expenditure are spent on primary prevention. The other 99% is for medical treatment, tests, etc. Almost all other
SURVEY OF RELATED STUDIES

developed nations spend more per capita on prevention than the United States. Numerous studies have verified that prevention improves health & decreases medical costs. For instance, cardiovascular disease is the number one cause of death, disability, and contributor to high Medicare expenditures. Over 400,000 medicare enrollees die of heart disease each year. However, recent studies have shown that preventive interventions, particularly the TM program can cost-effectively lower cardiovascular disease risk in the elderly and save lives (www.mcm.edu, 2002).

Effect of exercise on blood pressure has been well documented in a research study conducted at the University of Hartford. Blood pressure reduction of 0-10 mm of Hg in hypertensive men were noticed immediately after they had bicycled at a moderate level for 30 minutes. The reduction lasted for up to 13 hours (Thompson, 2002).

2.8 CONCLUSIONS ON REVIEW OF HYPERTENSION

1 Researchers have found that essential hypertension is in the front rank of psychosomatic disorder and that the psychological factors play an important role in progression of hypertension (Ayman, 1933 and Binger 1945; Alexander, 1950; Esler & his co-workers, 1977; Lund-Johansen, 1980; Steptoe, 1986; Abbound, 1982; Goldberg et al. 1980; Steptoe 1982; Krakoff et al. 1985; Rosenman, 1988; Basu, 1991 and Kuller et al. 2001).

2 Hypertensives and normotensives sons by hypertensives respond positively to pressor response (Brod & his colleagues, 1960; Falkner et al, 1979; Light and Obrist, 1980; Von Flexbull, 1982; and Greenberg, 1983).

3 Researches indicate that hypertensives are also categorized by high plasma rennin and norepinephrine levels (Brod & his colleagues, 1960; Esler & his co-workers, 1977; Goldstein, 1983; Korner, 1982; Surwit et al. 1982; Krakoff et al. 1985; and Rosenman, 1988).
4. Haemodynamic disturbances are found in hypertensives in the form of elevated cardiac output, total peripheral resistance, vasomotor adjustments (Brod & his colleagues, 1960; Korner & Fletcher, 1977; Lund-Johansen, 1980; Abbound, 1982; and Korner, 1982).

5. Genetic factors or family history of hypertension suggest constitutional predisposition to develop hypertension (Abbound, 1982; Ayman, 1934; and Greeberg, 1983).


7. Persons of low socio-economic status are found to be more likely to have high blood pressure than those with higher socio-economic background (Goldberg et al. 1980).


10. Percentage rate of hypertension varies between 10-15% but the rate may be higher in urban areas as compared to rural (Surwit et al 1982; Wasir 1990; Gopinath et al. 1994 and Chadha, 2001). According to www.hypertensiononline.com 2002, between 20 to 50% of natural deaths can be traced to hypertension.

11. Percentage rate of coronary heart disease is 50%. Surwit et al (1982) According to K rakoff et al (1985) 30% of cardiovascular disease deaths each year are attributable to hypertension. While Malhotra (2000) have reported that at present in India 8% of population has some kind of coronary disease.


2.9. HEART RATE

The study of Ruddel et al (1986), on the employees of the Federal Government in Bonn founding two different mental stress paradigms (video games in the field, Mental arithmetic in the laboratory) that BP and heart rate (HR) elicited increases. This suggests that blood pressure and heart rate during mental challenges is a reliable characteristic of hypertensive patients.

Weiner (1986), found that subjects with a Type A behaviour pattern has higher systolic and diastolic blood pressure and heart-rate responses and a faster pulse transit time in response to tasks done under the constraint of time or demanding attention.

In an experimental study by Lesky (1989), on 21 parachutist observed that heart rate (HR) as an indicator of general activation does not correlate (Pearson r) with time estimation. Parachuting is indeed a stressing action as can be seen by the high heart rate level without physical work. Different moments in a jumps sequence result in different stress; the highest scores of heart rate are found shortly after opening the parachute and before landing.

HRV is generated in part by periodic inputs of both respiration and blood pressure variability (BPV) into the medullary cardiovascular centers (Saul, JP, 1990).

According to Wasir (1990), Disturbed mind undue mental tension stress and anxiety result in -
1) Increased rate & force of contraction of heart.
2) Higher blood pressure.
3) Increase in circulating catecholeamines.
4) Narrowing or spasm of the coronary arteries which are the channels for blood and oxygen supply to heart, and
5) Cardiac arrhythmias or irregularities of heart beat.

These processes, if occur repeatedly may result in a serious damage to the heart, including angina and even fatal heart attacks.

According to Mashin et al (1997), “The necessity to work out the effective methods of evaluation of emotional liability for professional diagnostics in order to form individual programmes for professional improvement and psychological assistance for self-development in atomic power station personnel is substantiated. The results of experimental study of emotional liability by psychophysiological means (heart rate variability analysis) are preferred.”

In a study by Malathi et al (1998) the effect of yoga & relaxation changes in psychophysiological parameters in response to stress of examination in 75 medical students was studied. Initially five parameters (anxiety level, heart rate, blood pressure, galvanic skin resistance & choice reaction time) were recorded. Students were then randomly divided into groups of 25 each. One group practiced yoga (Gr-Y) and another relaxation (Gr-R) and third Gr-c control group. All the five parameters were recorded again and there was significant improvement in choice reaction time in Gr-Y and Gr-R as compared to Gr-C after yoga and relaxation training. The five parameters showed a decrease in Gr-Y and Gr-R as compared to Gr-C.

Otzenberger et al (1998 and 1997) found that brain state substantially affects human HRV and that the changes are seen more clearly in the fractal component then in the periodic component. They also showed that during sleep the dynamics of human HRV are closely related to the EEG mean frequency reflecting the depth of sleep.

According to Halberg et al (2000), magnetic storms trigger myocardial infarctions and mechanisms relating to heart rate variability.
The aim of this study was to compare the effects of psychological relaxation on the heart rate variability (HRV) in subjects with a number of negative functional states: asthenia, depression, neurotic symptoms. The performed analysis allowed to reveal the dynamics of the HRV characteristics for each negative functional states and to determine indicators, which are significant for their diagnosis. The effectiveness of using HRV analysis for the control and management of the psychological relaxation process and the diagnosis of a number of negative functional states in substantiated by the study results (Mashin & Mashina, 2000).

According to Togo and Yamamoto (2000), Decreased fractal component of human heart rate variability during non-REM sleep. The results of the study show that the contribution made by the fractal component to the total variance in the beat-to-beat R-R interval declined significantly as the depth of non-rapid eye movement (non REM) sleep increased, that the IIV time series was largely periodic (i.e., non-fractal and that BPV was unaffected by sleep stage. Finally the fractal component of HRV during REM sleep was found to be quite similar to that seen during waking. These results suggest that mechanisms involving EEG desynchronization and/or conscious states of the brain are reflected in the fractal component of HRV.

This study aims to investigate heart rate variability in a group of physically healthy depressed patients in comparison to healthy subjects. The results of the study indicate that there was no statistically significant difference between the study and control groups on the measures of heart rate variability (HRV). No significant relationship between the levels of anxiety and depression and HRV measures were found. In physically healthy depressed adults HRV does not differ from healthy subjects this means that depression does not pose an additional risk factor for cardiovascular disease in physically healthy adults. This finding gives support to some previous research which did not find any relationship between depression and heart rate variability (Sayar et al., 2002).
2.10. CONCLUSIONS ON REVIEW OF HEART RATE

1. Mental Exercises increase heart rate (Ruddel et al. 1986).
2. Researches have reported that during mental tension, stress, and anxiety the heart rate increases (Lesky, 1989 and Wasir, 1990).
3. Studies also indicated heart rate as a reliable source, under mental stress for detecting hypertensive patients (Ruddel et al. 1986).
4. Heart rate variability are generated by periodic inputs of both respiration and blood pressure variability (Saul, 1990).
5. Yoga and relaxation brings about a decrease in heart rate (Malathi et al. 1998; and Mashin & Mashina, 2000).
7. Physical state of the individual plays an important role in producing HRV. Sounder healthy individual showed less variability (Sayar et al. 2002).
8. Researchers have found that physical environment plays a role in heart rate variability (Halberg et al. 2000).
9. Type A subjects demonstrated higher heart rate under demanding situations as compared to those with Type B behaviour pattern (Wenier, 1986).

2.11. RELAXATION TECHNIQUES

Under modern conditions of physical stress, multiplying distraction and mental strain, what is equally, if not more essential than exercise for the health of the nervous system is recreation, relaxation & sleep. This is so because it is a fact that every bodily power needs rest after exertion. It is also known that even machines cannot operate without rest. The heart rests between beats, and the muscles relax after every contraction. All bodily movements and for that matter, even the mental activities involve some form of essential or subtle muscular contraction. During waking hours, thus we constantly pass through series of complicated muscular contraction, which result from multifarious nerve stimuli.
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The high tension of modern living further adds to the nervous strain and invariably devitalizes both the nervous and muscular systems. Besides recreation and sleep, therefore, the power of relax whenever fatigue is experienced is probably the only most important safeguard one can possess to keep these systems in their normally healthy conditions (Yogendra, 1947).

In another study, it was observed that the uropepsin excretion in eleven male and eight female subjects studied before and after four weeks’ training in yogic asanas, was reduced significantly after the training. The reduction was considered due to the relaxing and tranquilizing effects of asanas. Uropepsin is the kind product of pepsin a digestive enzyme secreted by the stomach. Production of pepsin is governed, among other factors by hormones called corticosteriods which are secreted by the adrenal cortex. In any kind of physical or mental stress, corticosteriod production is increased to meet the stress. On the other hand, if stress is reduced, the production of corticosteriod is diminished. Reduction in uropepsin excretion, is considered as another proof indicating that asanas have calming and soothing effect on the body. Hence helps in sitting calm & composed for longer periods of time (Karambelkar, et al 1968).

In a study, the effect of distracting conditions, such as doing mental arithmetic, exposure to loud noise and flash-light, and pressing ice-cold objects on the thigh, were observed in people sitting in an ordinary and the yogic posture. The responses were measured in terms of respiration, heart-beat, electrical resistance of the skin and activity of the brain. It was found that reactivity was less in the yogic posture than in the ordinary sitting posture. This was significantly indicated by changes in respiration. From this it was concluded that even adopting a simple yogic posture has a quieting effect on the body (Partap, 1969).

From the therapeutic point of view pranayama techniques can safely be used in patients of chest diseases to increases the capacity of lung. Furthermore, studies of pressure changes in the thoracic cavity in pranayamic breathing favourably influence blood circulation, thus making pranayama helpful in treating certain cardio-respiratory disorders (Swami, 1969).
Nicoletti (1972), investigated the effectiveness of a deep muscle relaxation technique in the reduction of generalized and speech anxiety. Both types of subjects showed a significant reduction in ASQ scores following six hours of relaxation training.

Wallace (1972) research found that the TM technique produces a physiological state of restful alertness. During the technique the physiology becomes deeply rested, as indicated by significant reductions in respiration minute ventilation, tidal volume and blood lactate and significant increase in based skin resistance (an index of relaxation).

Birk (1973), took the position that biofeedback or operant conditioning of physiological response systems can be viewed as a form of behavioural therapy for the control of symptoms of disorders such as high blood pressure and migraine headache.

Study by Sherman & Plummer (1973), student subjects received individual training in relaxation throughout a six-week period. Male subjects showed a significant improvement on anxiety scale when compared to a control group. On the basis of this study Sherman & Plummer (1973) concluded that relaxation may be useful skill for controlling tension. In relaxation therapy group there were 9 males and 12 females while control group had 12 males and 12 females. In experimental males the average drop in anxiety raw scores was 4.2, as for experimental females the average drop in anxiety raw scores was 3.5.

The work of Ferguson and Gowan (1974), revealed that all individuals were tested before and after a 6 1/2 week period of time during which experimental subjects were given training in transcendental meditation. Before and after scores for the experimental group (N=31) were 36.24 and 30.30. While the scores of control group increased from 30.3 to 31.8. Hence the training in transcendental meditation to experimental group helped them reduce their anxiety level.
Benson (1975), concluded, based on his research that meditation acted as an antidote to stress. He also demonstrated that effects of meditation are essentially opposite of the fight-or-flight response. And that the meditation:

- Decreases the heart rate
- Decreases the respiratory rate
- Decreases the blood pressure in people who have normal or mildly elevated blood pressure
- Decreases oxygen consumption

The results of studies of athletes who have been taught relaxation techniques are mixed. Case studies of sprinter (Winter, 1982) as well as a shot-putter (Nideffer & Deckner, 1970) suggest that the technique is a potentially useful one. Moreover, studies have also shown that this technique reduces physiological indices of higher activation, including oxygen consumption and heightened respiration (Beary, Benson and Klemchuk, 1974), as well as blood pressure and muscular tension (Deabler, Dillenkoffer and Elder, 1973). Lanning and Hisangra (1983) have also reported positive group changes in performance and in anxiety using relaxation techniques.

A study in Indian Athletes - meditators and a control group- reported that the meditators significantly improved in the 50-meter dash, in the standing long jump, and in an agility test (Reddy, Bai and Rao, 1976). A variety of cardiovascular measures (including respiratory efficiency and blood pressure changes) were also changed in significant and positive ways among the experimental group of meditators, when compared to controls. Further work by Reddy et al (1976) also indicates that some positive changes may be elicited in skills requiring the larger muscle groups. However, in studies by Williams and others few changes were found in fine (small) muscle skills (Williams et al., 1976; Williams & Herbert, 1976). As a result of a survey of this work Williams (1978), concluded that while positive changes in anxiety and muscular tension seems to result from the practice of meditation techniques.

In two studies, with American football players and basketball participants, De Witt (1980), found that biofeedback training produced more relaxed
performers, as well as both objective and subjective performance changes. Daniels & Landers (1981), used biofeedback with shooters, and their results paralleled those of De Witt. Positive changes were elicited both in the control of the autonomic patterns in the shooting performance of those treated.

Yoga, which combines training in Shavasan (complete relaxation), meditation and certain practical hathyoga asanas, has been very successfully used with depressed nurses (Walia et al. 1984). Many forms of transcendental meditation practiced and taught by many yoga acharays have proved to very effective in reducing tension.

Research on stressful life events in India is extremely limited and confined to clinical case studies. A time has come when attention is focused on non-drug intervention like yoga, exercises, diet, self-understanding, meditation, etc. Each one of us is not only a victim of stresses created by others but also is a "stress carrier" (Pestonjee, 1985).

For both experimental group and control group patients, medication was re-evaluated after the 6-month period of group therapy. Medication was changed, reduced or increased on the basis of blood pressure changes. Medication was changed, reduced or discontinued more frequently in the experimental group than in the control group (Basler et al., 1986).

Medical researchers have formed a reduction of important cardio-vascular risk factors such as high blood pressure and serum cholesterol. Large health insurance have found that people practicing transcendental meditation, in all age groups combined, displays a 50% reduction in both inpatient and outpatient medical care utilization compared to controls. Hospitalization is 87% lower for heart disease and 55% lower for cancer. And what is most remarkable, meditators over 40 years old have approximately 70% fewer medical problems than others in their age groups (Orme-Johnson, 1987).

Other research has found that meditating individuals in their mid 50s have a biological age twelve years younger than their chronological age, and that
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people beginning the practice even at 80 years of age live longer and are healthier and happier than controls of the same age. (Orme- Johnson, 1987).

Meditation and relaxation therapies are very much in vogue in India. Many studies have been reported where the relaxation therapy have proved to be very effective and successful, in reducing stress, viz., with managers & administrators (Dubey, 1989); with sportsmen (Zilli, 1989; Singh, 1989); with hypertension patients (Khumar, 1989).

Eppley & Shear (1989), found that TM is significantly more effective than other forms of meditation or somatic relaxation techniques in reducing trait anxiety. In 140 independent outcomes-indicated the effect of TM program on reducing anxiety much greater than other meditation.

Leder (1990), made a comparison between western & Indian approach. He finds a progressive diagnostic and symptomatologic fragmentation with consequent specificity of the therapeutical intervention. But in India and other third world counties, one sees unity, global conceptions and general principles predominating, for e.g. Yoga, Meditation, Satsang and Dhyan. Whereas in west, is a surfeit of empiricism, in India there is a surfeit of theory (doctrine).

Regular practice of relaxation response result in 1) desirable reduction in heart rate, 2) Control of blood pressure, 3) hormonal and metabolic changes in the body during stressful situations. It thus trains the mind not to upset the heart functioning under daily stresses of life and thus helps in prevention of conditions like angina, cardiac arrhythmias, high blood pressure and heart attacks. (Wasir, 1990).

Jain, Rai, Valecha, Jha. et al (1991), (Central Research Institute for Yoga, New Delhi) in a study entitled effect of Yoga training on exercise tolerance in adolescents with childhood asthma examined the effect of yoga training in 46 young asthmatics (aged 11-18 yrs) having a history of childhood asthma. Yoga training yielded a significant increase in pulmonary
function and exercise capacity. A follow-up study lasting for 2 yrs showed a good response with reduced symptom score and drug requirements in these subjects.

Latha and Kaliappan (1991), in a study named Yoga pranayama, thermal biofeedback techniques in the management of stress and high blood pressure investigated the effectiveness of yoga relaxation, pranayama and thermal biofeedback techniques in the management of high blood pressure and stress. Ss were 14 essential hypertensive patients (aged 45-70 yrs) 7 of whom underwent training in yoga and thermal biofeedback technique for 6 months, while the rest 7 Ss served as controls. Results show a significant reduction in the systolic blood pressure during treatment phases. Moderate reduction in the diastolic pressure was noticed only when the thermal feedback was introduced. This also corresponded to a significant reduction in the intake of antihypertensive drugs. Training in yoga and thermal biofeedback procedures were least effective in altering the precisions associated with stressful experiences.

According to Davis (1992). Coping Resources used by the teachers in the study serve to prevent the reported adverse physical and psychological symptoms of job-stress from becoming overwhelming and causing burnout.

Pestonjee (1992) has reported finding indicating that the relaxation practices incorporated in the Indian traditions are useful in coping with stress. These practices have served Asian societies over a long history to counter balance daily stressors and perhaps even to withstand crisis like famines, epidemics and wars.

The objective of this study was to examine the relationship between the weekly practice of meditation and its effect on mean blood pressure in people between the ages of 35 to 70m years. Of 100 people surveyed, 21 agreed to practice meditation on a weekly basis. The population consisted of men and women who received health care from the community health center. The results revealed a significant drop in the systolic blood pressure and a nearly significant drop in the diastolic blood pressure of the 21 patients who practiced meditation on a weekly basis. (Johnson, 1998).
Barnes et al. (1999), The aim of this study was to provide a preliminary investigation of the acute effects of TM on TPR i.e. total peripheral resistance. Subjects were 32 healthy adults. Subjects were divided into TM group of long-term TM practitioners they comprised of 18 subjects, and a control group of 14 "very healthy" subject. Hemodynamic functioning was assessed immediately before and during three conditions. During this session, the meditation group showed a decrease in blood pressure and less constriction of blood vessels while control group showed increases. The TM group had decreases in systolic blood pressure (SBP) and TPR, compared with increases in control group (SBP -3.0 Vs -2.1 mmHg; P/Ld.04; TPR/-1.0 Vs +0.3 mmHg/litre per minute. P/Ld.03) TPR decreased significantly during TM. Decreases in vasoconstrictive tone during TM may be the hemodynamic mechanism responsible for reduction of high blood pressure over time.

INS (2000) reports that The 5000 government employees from Uttar Pradesh Secretariat participated in yoga and meditation to relieve stress. Chief Secretary Yogendra Narain states that yoga and meditation actually relieved them of their stress.

Touch Research Institute (2000), conducted a study on thirty adults with controlled by hypertension (for at least the last six months), were randomly assigned in either a massage therapy group or a progressive relaxation group. Those in the massage group were given twice-weekly 30-minute massage sessions in the afternoon or early evening for five weeks. Participants in the progressive muscle relaxation group received instructions on twice-weekly 30-minute exercise for five weeks. Researchers instructed subjects to only perform their session in the afternoon or early evening. Pre- and post-treatment assessments included a State Anxiety Inventory (STAI) to assess current emotions. A salivary sample to measure the levels of stress hormone cortisol, systolic and diastolic blood pressure measures the Center for Epidemiological Studies Depression Scale (CES-D) questionnaire to rate depressive symptoms, Symptom Checklist-90-Revised (SCL-90-R), self-report symptom inventory of depression, anxiety and hostility, and urinary catecholamines and cortisol measurement. Results showed that while both groups has lower anxiety levels.
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(STAI) and lower levels of depression (CES-D), only the massage therapy showed decreases in sitting diastolic and systolic blood pressure, and reclining diastolic blood pressure; decreases in salivary and urinary cortisol; stress-hormone levels, and lower stores for depression, anxiety & hostility.

Persons who exercise regularly improve both physically and mentally, are less likely to be anxious or depressed and are generally better equipped to cope with mental fatigue (Kanwar, 2000).

Regular exercise helps by relaxing the body and mind, makes the heart stronger, improves oxygenation, reduces weight, produces sound sleep and increases stamina. Exercise causes the arteries to secrete a special hormone (EDRF) which produces an increase in size of the arteries. Aerobic exercises raise the heart rate for an extended period of time. Yoga as a part of stress management, definitely helps. It has been shown to reduce stress hormone levels in the blood, regulate the heart beat and blood pressure and facilitate normal functioning of the inner lining of the coronary arteries (Bedi, 2001).

ENS (2001a). reports that “VLCC conducted a workshop on Aromatherapy each therapy of 20 minutes duration. According to Vandana Luthra, President VLCC, aromatherapy can be used for both treatment and making body, skin, hair and mind relax. The aromatic essence of these amazing essential oils works like magic in relieving stress and anxiety. Aroma oils are used for countering negative attributes and enhancing positive attributes.”

ENS, (2001b) Walking for as little as an hour a week, can cut a woman’s risk of heart disease by half, say researchers. A study conducted by Brigham & Women’s Hospital in Boston, Massachusetts found that walking reduced heart disease risk among 40,000 women, including those who smoked, were overweight and had high cholesterol. Women who walked for up to an hour over the course of a week lowered their heart disease risk by 14% compared with women who did not exercise, while those who walked one to one and a half hours a week, reduced their heart disease risk by 51%.
According to Orme-Johnson, (2002), Research conducted around the world documents that the TM program is effective for all cultural and ethnic groups. All age groups benefit, from increased alertness in infants of meditating parents to increased health, happiness, and longevity in meditating elderly. The findings that TM decreases stress is validated by physiological changes such as decreased cortisol (the major stress hormone), decreased muscle tension, normalization of blood pressure, increased autonomic stability, and increased EEG coherence. A variety of psychological changes also indicates decreased stress, including decreased anxiety and depression, decreased post-traumatic stress syndrome, and increased self-actualization. Likewise, stress reduction demonstrated the sociological changes, such as decreased hostility, increased family harmony and reduced criminal behaviour in incarcerated felons.

Research also shows that regular practice of TM reduces anxiety, depression, and anger. And that this technique makes a person more self-sufficient, more spontaneous, more productive, better able to meet challenges, and more capable of warm interpersonal relationships (www.mum.edu, 2002).

The relaxation response is a physical state of deep rest that changes the physical and emotional responses to stress (e.g., decrease in heart rate, blood pressure, and muscle tension). If practiced regularly, it can have lasting effects when encountering stress throughout the day and can improve health (www.mbmij.org, 2002).

Studies show that transcendental Meditation (TM) program reverses stress-related illness, makes people healthier, and even reduces medical cost as much as 13% per year. Hospitalization for cancer are 55% less for TM meditators. The improvement in health is most significant for older age groups. In terms of reduced health care cost, people with worst health show the greatest benefit from learning TM. However, everyone benefits because the practice of TM prevents disease (www.mum.edu, 2002).
“Preliminary data on Transcendental Meditation is about a 50% reduction in health care utilization on patients who practice it for heart disease and other major disease over five years” (Schneider, 2002).

“Studies have shown that serotonin goes up and cortisol goes down. The level of cortisol seems to be related to hypertension, cardiovascular disease and probably even cancer” (Ionsdorf, 2002). This indicates that the incidence of hypertension, cardiovascular disease and even cancer goes down with regular practice of Transcendental Meditation.

The Japanese Ministry of Labour commissioned a five-month study of the effects of Maharishi’s Transcendental Meditation program on 447 of their employees in a major heavy industry. The study found decreased physical complaints, decreased anxiety, decreased depression, decreased smoking, decreased insomnia, decreased digestive problems, and a decreased tendency towards neurosis and psychosomatic problems among those who learned this technique compared to non meditating controls (www.mum.edu., 2002).

One study of recidivism found that 259 inmates of Folsom and San Quentin prisons and Deuel Vocational Institute in California, who learned Transcendental Meditation technique had 35-40% fewer new prison terms compared to the matched controls, whereas it is known that traditional prison education, vocational training and psychotherapy do not consistently reduce recidivism (www.mum.edu, 2002).

A large scale study of 11,000 prisoners and 900 staff officers in Senegal, West Africa in 1987 found that Transcendental Meditation program markedly decreased prison violence, health problems and that it reduced recidivism to a mere 8% (www.mum.edu, 2002).

The data is now as substantial that it can be stated, without fear of contradiction, that meditation and relaxation techniques have been scientifically shown to be highly beneficial to health. Over a thousand research studies, most of them published in well respected scientific journals, attest to a wide range of
measurable improvements in human function as a result of meditative practices (Redwood. 2002)

Zinn’s studies have demonstrated decreases in many kinds of pain in people who had been unresponsive to standard medical treatment. A large majority of the patients in Kabat-Zinn’s studies who were taught to meditate improved, while control group of similar patients showed no significant improvement (Zinn. 2002)

Barnes (2002) the studies support evidence suggesting that stressed people and those prone to mood swings are at greater risk of heart disease. Scientists at the Medical College of Georgia discovered why people who practice transcendental meditation daily had significantly lower blood pressure than those who did not. The practice keeps blood vessels open, thus lowering the pressures and high blood pressure is a major risk factor for heart disease.

Effect of exercise on blood pressure has been well documented in research study conducted at the University of Hartford. Blood pressure reductions of 6-10 mm of Hg in hypertensive men were noticed immediately after they had bicycled at a moderate level for 30 minutes. The reduction lasted for up to 13 hours (Thompson, 2002)

TM is the most effective technique for eliminating accumulated stress from the nervous system. A natural remedy for stress related disorders including insomnia, chronic anxiety, hypertension, addictions, chronic headaches, depression, pain attacks, heart disease and learning disorders. The best program for developing human potential and self-actualized qualities including Self-esteem, self-control and self-confidence (www.users.erois.com. 2002)
2.12. CONCLUSIONS ON REVIEW OF RELAXATION TECHNIQUES

1. Relaxation in an important safeguard to keep body systems in their normally healthy conditions and to live longer and happier (Yogendra, 1947; Swam., 1969; ENS, 2001a and b; www.mbbi.org, 2002; www.mum.edu, 2002; Redwood, 2002; and Orme-Johnson 2002).


3. Training in relaxation, yoga etc diminishes the production of stress hormones i.e corticosteirod (Karambelkar et al. 1968; Wasir, 1990; Touch Research Institute, 2002; Bedi, 2001; and Lonsdorf, 2002).


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10. People practicing Transcendental meditation displayed a 50% reduction in both impatient and outpatient medical care utilization (Orme-Johnson, 1987).

11. Regular practice of relaxation responses helps in prevention of cardiac diseases and even cancer. Hence reduces the number of cases for hospitalization for heart diseases and cancer by 50% (Wasir, 1990; Orme-Johnson, 1987; ENS, 2001b; Schneider, 2002; Lonsdorf, 2002; www.mum.edu, 2002; and www.users.erols.com, 2002).

12. Practicing various relaxation responses brings down the medical cost as much as 13% per year, reports www.mum.edu (2002).

13. Studies have demonstrated that relaxation decreases pain (Zinn, 2002; and www.users.erols.com, 2002).

14. Studies also indicate that relaxation counters negative attributes and enhances positive attributes. Relaxation diminishes negative attributes like criminal behavior, hostility etc. and increases positive attributes like family harmony and self-actualization etc (Touch Research Institute, 2000; ENS, 2001a; Orme-Johnson, 2002; www.mum.edu, 2002; and www.users.erols.com, 2002).

15. Continuous or daily practice of relaxation decreases elevated blood pressure and even at time discontinues or reduces medication for high blood pressure disorder (Benson, 1975; Basler, et al., 1986; Wasir, 1990; Latha and Kaliappan, 1991; Johnson, 1998; Barnes et al., 1999; Touch Research Institute, 2000; Redi, 2001; www.mbmi.org., 2002; Lonsdorf, 2002; Barnes, 2002; Thompson, 2002; and www.users.erols.com, 2002).

2.13. MAJOR TRENDS

In the light of above survey of research review, following major trends evolved.

1. Job stress is the major source of stress. It interferes with the task performance, and physical and mental health of the individuals. Even the most serious and life-threatening ailments like coronary heart disease, elevated blood pressure, ulcers, diabetes etc have their roots in stress.

2. Female teachers are more stressed than the male teachers.

3. Stress and anxiety correlated significantly with increased blood pressure and heart-rate.

4. Overall rate of hypertension varies between 10-15%.

5. Relaxation reduces stress and anxiety, decreases blood pressure level, decreases heart-rate and even reduces or discontinues medication for hypertension.