Chapter Two

REVIEW OF LITERATURE

As research is a continuous process and it must have some continuity with earlier facts. The knowledge gathered in the past should be consolidated to keep it on record for future use. A review of literature helps us to understand the problem clearly. It also makes the predictions regarding the outcomes of manipulation of hypothesis, therefore; literature from various sources was extensively reviewed and studied in the light of present investigation.

2.1. Health Anxiety

It is widely accepted that anxiety is best understood as response to a perceived threat, with the degree of anxiety experienced being proportional to the importance and imminence of the perceived threat. Thus, issues perceived as central to one’s own welfare naturally form a focal point of problems involving excessive anxiety. Because most people would consider a threat to their own physical health as vitally important, it is not suppressing that health-focused anxiety is a common phenomenon. Thus, it is useful to conceptualized Hypochondriasis (HC) as an extreme manifestation of excessive and persistent anxiety focused on a perceived threat to one’s health. In particular, the central problem is a relatively enduring tendency to misperceive essentially innocuous bodily symptoms as evidence of serious physical illness.

Hadjistavropoulos, Craig and Hadjistavropoulos (1998) proposed the cognitive-behavioral theory of health anxiety which predicts atypical
responses in health anxious individuals when exposed to health related information. Systematic research is still needed to support the theory. The results indicated that health anxious individuals displayed the predicted cognitive (e.g. negatively interpreted information) and behavioral responses (e.g. increased reassurance seeking). Health anxious individuals regard themselves to be at greater risk for disease overall and attached greater accuracy to health related information. Extending the cognitive-behavioral theory, health anxiety was found to be associated with decreased usage of positive somatic monitoring of symptoms, suggesting health anxiety may be associated with a failure to engage in protective strategies. Health anxiety did not result in cognitive or behavioral avoidance of illness information.

Looper and Kirmayer (2001) examined hypochondriasis as an important disorder in clinical population associated with increased health care utilization, disability and psychiatric co-morbidity. This study reported on the border concept of Illness Worry (IW) in 576 subjects. Information was gathered on sociodemographic variables, medical and psychiatric status, health care utilization and disability. Groups with IW with and without the medical conditions to these without IW were compared using Regression Analysis. Only one subject out of 533 met criteria for hypochondriasis and 7 fulfilled abridged criteria (person dose not meet the full DSM-VI criteria for hypochondriasis) 33(6%) of the sample had IW. Of these, 17 had the illness about which they worried. Compared with controls both IW groups had elevated levels of medical illness, psychiatric symptoms help seeking, health care use and disability. In multiple regression
analysis IW was an independent predictor of somatic symptoms, help seeking and disability, when sociodemographic and medical variables were controlled. Hypochondriasis appears to be a rare disorder in the community while IW is relatively common, present in equal numbers of subjects with the illness of concern, as those without. IW was an independent factor contributing to increased levels of distress, health care utilization, and disability, even when medical status was controlled.

Bravo and Silverman (2001) studied the role of anxiety sensitivity (the fear of anxiety symptoms because such symptoms are believed to have harmful consequences), anxiety and depression in 60-92 year olds and their relation to hypochondriacal concerns and medical illness. The sample included 53 clinic-referred and 53 non-clinic-referred subjects. Participants completed the Beck Depression Inventory, Anxiety Sensitivity Inventory, State Trait Anxiety Inventory for adults, and Illness attitude scale. A medical history for each subject was also obtained. Results indicated that anxiety sensitivity was significantly elevated in the clinic-referred group relative to the non-clinic-referred group, was negatively associated with history of medical illness, and was strongly associated with hypochondriacal concerns, and was a better predictor of hypochondriacal concerns, than depression and trait anxiety. The findings are discussed in terms of problem facing older adults as they relate to the constructs of anxiety sensitivity and hypochondriacal concerns.

Zvolensky, Eefret, Feldver and Leen-Feldner (2001) examined the extent to which heart- focused anxiety is associated with the co-occurrence of coronary
artery disease (CAD) and a history of regular smoking in sample of 148 patients. Individuals with CAD who regularly smoked demonstrated significantly greater heart-focused attentions than did nonsmoking persons with CAD and smokers without CAD. It was also found that the evidence of heart-focus attention and fear incrementally predicted (above and beyond demographic variables and body mass index) intensity of average chest pain. Overall, this study provided some of the first empirical evidences that the co-occurrence of regular smoking and CAD is associated with specific health anxiety.

Suzuki and Kasanuki (2004) have investigated the features of the psychosocial aspects of patients with arterial fibrillation and to explore the influences subjective symptoms of attack, perceived psychosocial inducers of attack, and anxiety on the quality of life (QOL). The participants were 240 patients with paroxysmal arterial fibrillation (57.89 ± 13.78 years old). They were requested to complete questionnaires on the subjective symptoms of attack, perceived psychosocial inducers of attack anxiety symptoms, and QOL. The results indicated that 29.5% patients met the criteria of agoraphobia of Diagnostic and Statistical Manual of Mental Disorder (4th edition DSM-IV, American Psychiatric Association 1994). The percentage of prevalence was higher than the general prevalence of DSM-IV data. The subjective symptoms of attack intensify their fear of attack and agoraphobic symptoms, which worsen their QOL. Psychosocial stress is the main perceived inducers in daily life, and an attack induced by psychological stress affects their anxiety symptoms and QOL.
Noyes, Woodman, Bodkin, Alexander and Yagla (2004) in a study make a comparison between hypochondriacal concerns in panic disorder and major depressive disorder and, was compared patients who participated in separate drug treatment trials were assessed at baseline and eight weeks using the Whitely Index of hypochondriasis. Results: At baseline, the Whitely Index score was found to be greater for patients with panic disorder than for those with major depressive disorder. At eight weeks, a statistical significant reduction in the mean hypochondriasis score was observed in panic patients who had improved but not in major depressive patients who had improved. Modest correlations were observed between hypochondriasis and symptoms of ‘panic and major depressive disorders, but in depressed patients, hypochondriasis was positively correlated with anxiety symptoms as well. A unique correlation was found between hypochondriasis and panic disorder.

According to Avia and Ruiz (2005), it is a costly problem for the health care system whose treatment has not received systematic attention until recently. Although based on few control studies, results indicated that various brief cognitive behavioral techniques produced significant changes in illness fears and attitudes. People who are anxious about their health are more likely to misinterpret health information as personally threatening and less likely to be reassured by medical investigations that show they are free from disease. Consequently, health anxious people would be expected to react more adversely to cancer screening, but this possibility has rarely been explored.
Miles and Wardle (2006) examined the role of health anxiety on the psychological impact of participating in colorectal cancer screening. It was predicted that health anxiety would be associated with more worry about cancer before screening, a greater increase in worry if polyps were detected and less reassurance after a clear result. As expected, health anxious participants were more anxious and more worried about bowel cancer both before and after screening.

Carleton, Abrams, Asmundson, Gordon, Antony and McCabe (2009) in a study of pain related anxiety and anxiety sensitivity across anxiety and depressive disorders. On the basis of results it is suggested that pain-related anxiety is generally comparable across anxiety and depressive disorders; however, pain-related anxiety was typically higher (p < .01) in individuals with anxiety and depressive disorders relative to a community sample, but comparable to or lower than a chronic pain sample. Results implied that pain-related anxiety may indeed be a construct independent of other fundamental fears, warranting subsequent hierarchical investigations and consideration for inclusion in treatments of anxiety disorders.

2.2. Stress-Related Symptoms

Physiological stress could influence the onset and/or progression of conditions that involve excessive inflammation, like allergic, autoimmune, cardiovascular, infectious and rheumatologic illness (Miller, Cohen, & Ritchey, 2002). Myocardial infarction (MI or Heart attack) is the best known example of an acute heart problem that is usually precipitated by both acute and chronic
physical or psychological stress. Stress increases catecholamine and the increases the plasma catecholamine enhances platelet aggression, lowers the threshold to cardiac arrhythmia, induces narrowing of the blood vessels and suppresses insulin secretion (McEwen & Stellar, 1993). Diabetes mellitus, the most common form of diabetes, is also significantly affected by stress. Children who had stressful life events stemming from actual or threatened losses within the family, occurring between ages 5 and 9 had a significant higher risk of Type I diabetes (McEwen & Stellar, 1993). Gastrointestinal disease such as peptic ulcers and ulcerative colitis are known to be greatly influenced by stress.

Desheilds, Jenkins and Tait (1989) compared 19 hypertensive patients to a chronic disease control group of 12 diabetics and 11 non-patients controls on measures of anger expression, assertiveness and perception of health status. All subjects were 50-70 years old. The chronic patient group differs significantly from the non-patients controls in reporting more anger more outwardly. The chronic patients group also reported greater severity of health problems. Comparison between the hypertensive and diabetics revealed a greater level of current anger among diabetics. Investigators are of the opinion that psychological distress may be a natural consequence of a disruptive medical condition rather than the cause of it.

Eysenck (1991) argues that there is sufficient evidence with regards to psychological variables (i.e. personality and stress) as important risk factors for cancer and coronary heart disease (CHD), equal in importance to smoking, heredity, cholesterol level, blood pressure, and other physical variables. Both
types of factors act synergistically; that is, each by itself is relatively benign, but their effects multiply to produce high levels of disease. The evidence showed that psychological treatment can modify a person’s reaction to stress, so that risk of cancer and CHD can be greatly diminished, and duration of survival significantly increased in those terminally ill with cancer. He says that psychological influences on physical diseases appear to be much greater than suspected in the past.

Markowitz and Mathews (1991) reviewed clinical role of platelet activation in atherosclerosis and acute coronary events. Because epinephrine and possibly shear stress are clinically important activators of platelets, it is proposed that platelet reactivity to psychological stress may be a major mechanism in coronary events. The literature supports the hypothesis that platelet activity is increased by emotional stress.

Yeung, Ganz and Selwyn (1992-1993) reviewed studies to develop a new understanding of the pathogenic relationship between stress, coronary atherosclerosis (AR) and the clinical problem of the ischemia. It was found that myocardial ischemia caused by mental stress seem to involve disturbances of myocardial oxygen supply and demand. Mental stress produces increased in blood pressure and heart rate, thus, raising the myocardial oxygen demand via the cardiac sympathetic system and adrenal system. Stress also increases the total coronary vascular resistance in coronary artery disease (CAD) patients. Investigators have discussed the mechanisms behind the decrease in blood supply in term of dysfunction of vascular endothelium and biochemical changes.
in AR. They have also presented the contribution of mental stress to more pronounced vasoconstriction in AR and the effect of this response on endothelial vasodilator function.

Marusic (2000) in a study of psychological factors associated with coronary heart disease reviewed the literature to classify all possible mechanisms of potentiating of CHD by psychological factors. A MEDLINE search was conducted by selecting literature on both standard biological risk factors (e.g., dyslipidaemia, hypertension, and smoking) and psychological risk factors (e.g., personality traits, behavioral characteristics, and coping with stress) for CHD. He suggested that 6 biological mechanisms could mediate psychological influence specifically for CHD of course, together with the 7th mechanism of general alterations in health related behaviors. These are increased oxygen demand the heart muscles, decreased blood supply to the heart muscle, increased concentration of blood, enhanced blood clotting, increased in cholesterol and other plasma lipids disturbance of blood sugar level, and alternations in health-related behavior.

O’Malley, Jones, Feuerstein and Taylor (2000) studied the relation between multiple psychological variables and sub clinical coronary artery disease (CAD) to assess the possible role of such variables in atherogenesis. The authors conducted a prospective study of 630 consecutive consenting, active-duty U.S. Army personnel, aged 39-45 years, without known coronary artery disease. Each participant was assessed for depression, anxiety, a somatization, hostility and stress. Sub clinical coronary artery disease was identified by electron-beam
computed tomography. The prevalence of coronary-artery classification was 17.6%. The prevalence of prior or current psychiatric disorders was 12.7%.

Wickrama, Lorenz, Wallace, Elbert and Peiris et al. (2001) investigated (a) change in hazard rates and survival probabilities with age for the onset of hypertension and (b) the influences of stressful material and parental relationship on the hazard rates and survival probabilities of hypertension. The data was collected using survival analysis for 367 married women and 340 married men. Hazard and survival plots showed that the risk for hypertension increased during the middle years of maximum, than decreased with age for both men and women logistic survival models demonstrated that although material stress significantly increased the likelihood of earlier hypertension only for women. These models control for the effects of stressful work condition health behavior. The findings demonstrated that stressful close relationship may be more important determinants of physical health than is generally assumed.

Spangler, Summerson, Bell, and Konen. (2001) examined stress affects and locus of control by smoking status in 83 patients (mean age 33.3years) with type I diabetes mellitus. Subjects completed a clinical examination, smoking status questionnaire symptoms checklist and instruments of psychosocial variables. Results indicated that current smokers reported significantly higher levels of perceived stress a more negative effect, and higher powerful others locus of control compared with nonsmokers. These findings indicated that those patients who have diabetes and who smoke are at greater risk for depressive symptoms.
Denollet and van Heck (2001) examined the relationship between Type D personality and vital exhaustion in patients with angioraphically documented coronary artery disease. Type D represented a personality profile characterized by both the tendency to experience negative emotions and the propensity to inhibit self-expression in social interaction and nonfatal cardiac events in patients with documented coronary heart disease.

MacLeod, Davey, Heslop and Metaelffe (2002) investigated the relation between reporting tendency, perceived stress, incident angina, incident ECG ischemia (new angina or ischemia at second screening), and mortality. The number of symptoms endorsed by subjects out of 5 specific symptoms that showed no relation to mortality was taken as a measure of the tendency to over report physical symptoms. Results showed high stress was strongly associated with risk of angina, although not with ischemia or subsequent CHD mortality. Ischemia and angina were often present together and both were predictive of CHD mortality. Results suggested that subjects with a greater tendency to report their lives as stressful were also more inclined to report physical symptoms.

Vitaliano, Scanlan, Jianping and Savage et al. (2002) examined relationship of Coronary Heart Disease (CHD) with 1. Chronic stress caring for a spouse with Alzheimer disease and patient functioning, 2. Vulnerability (anger and hostility), 3. Social resources (supports), 4. Psychological distress (burden, sleep problems, and low uplifts), 5. Poor health habits (high caloric, high-fat diet limited exercise), and 6. the metabolic syndrome (blood pressure, obesity, insulin, glucose, and lipids). This was influenced by pathway form care giving to distress
to the MS (metabolic syndrome), and the MS to CHD. In men, poor health habits predicted the MS 15 to 18 months later, and the MS predicted new CHD cases over 27 to 30 months.

Brummett, Babyak, Mark and Clapp-Channing et al. (2004) evaluated demographic, clinical, social and personality variables as predictors of nine repeated assessments of stress over a 2 year period in 32 CAD patients (33.2% female). At baseline, perceived social support, coping style, and social conflict were associated with stress ratings. Mixed model were used to evaluate predictors of reported stress during the subsequent 2 years. The results showed higher stress was presented in patients who were female and young. Follow-up stress was also found in patients with moderating income, congestive heart failure, high social conflict, low social support and negative coping style. These findings may help clinicians to identify patients who are likely to experience higher levels of stress over a prolonged period following a diagnosis of CAD and may benefit most from stress reduction invitation.

Stanley and Burrows (2008) have reported that ‘stress’ is accepted by the general population and patients with cardiac disease as a contributor to acute cardiac events and to the disease itself, this has not been universally accepted by the scientific community over the last century. Historically, research is not always helpful because it is unclear whether what is being researched is the cause of the cardiac event (e.g. myocardial infarction) or the underlying disease. A great deal of effort had been put into researching the concept of the coronary prone personality (i.e. Type A) with somewhat modest results. The shift in focus to the
involvement of negative effect in cardiac disease has moved the field forward significantly. Recently, research has advanced their understanding of the mechanisms whereby stressful life experiences may interact with predispositions to experience the negative effects of anxiety, anger and depression (i.e. a feature of personality) and inherited cardiac disease proneness to result in both disease and acute events.

Worcester and Le Grande (2008) advocated that anxiety and depression are common after acute cardiac events. They can have a major adverse impact upon outcomes, although past studies report conflicting results regarding the relationships between anxiety, depression and outcomes such as mortality. Depression has been shown to be associated with non-adherence of patients. Cardiac rehabilitation programmes conducted during early convalescence provide a valuable opportunity to identify and support patients who experience anxiety and depression, and encourage adherence to advice. Clinical data support the positive effects upon patients' psychological outcomes of cardiac rehabilitation programmes offering group exercise, education and behavioral interventions. However, more rigorous research is required to confirm such benefits. Systematic screening of patients should be undertaken on entry to cardiac rehabilitation to identify high-risk patients and to assist them.

Wiltink, Michal, Subic-Wrana, Eckhardt-Henn, Dieterich and Beutel (2009) studied dizziness: anxiety health care utilization and health behavior-result from a representative German survey. Symptoms of dizziness were reported by 15.8% of the participants. Of the participants with dizziness,
28.3% reported symptoms of at least one anxiety disorder (generalized anxiety, social phobia, panic). Persons with dizziness reported more somatic problems such as hypertension, migraine, diabetes, etc. Co-morbid anxiety was associated with increased health care use and impairment. It was concluded that dizziness is a highly prevalent symptom in the general population. A subgroup with co-morbid anxiety is characterized by an increased subjective impairment and health care utilization due to their dizziness. Because treatment options for distinct neurotologic disorders are also known to reduce psychological symptoms, and in order to avoid unnecessary medical treatment, early neurologic and psychiatric/psychotherapeutic referral may be indicated.

The constant stress that many are exposed to in our modern society may be taking a heavy toll: Anxiety disorders and depression, as well as metabolic (substance exchange) disorders, including obesity, type 2 diabetes and arteriosclerosis, have all been linked to stress. These problems are reaching epidemic proportions: Diabetes, alone, is expected to affect some 360 million people worldwide by the year 2030.

Dr. Alon Chen of the Weizmann Institute's Neurobiology Department and his research team have now discovered that changes in the activity of a single gene in the brain not only cause mice to exhibit anxious behavior, but also lead to metabolic changes that cause the mice to develop symptoms associated with type 2 diabetes. These findings were published in the Proceedings of the National Academy of Sciences (PNAS 20th April, 2010).
Dr. Alon Chen showed that the actions of single gene in just one part of the brain can have profound effects on the metabolism of the whole body. This mechanism, which appears to be a 'smoking gun' tying stress levels to metabolic disease, might, in the future, point the way toward the treatment or prevention of a number of stress-related diseases.

2.3. Diabetes

Recent investigations reported an increased prevalence of psychiatric illness, especially affected disorders and anxiety state among patients with Diabetes. Patients with psychiatric illness, particularly depression had shown evidence that tend to have poorer glucose regulation than did patients who had no psychiatric diagnosis (Lustman & Clouse, 2002; Sridhar, 2007). These findings appeared similarly true for patients with either insulin dependent Diabetes Mellitus or non-insulin dependent Diabetes Mellitus.

Diabetes is a disease that results from either in pancreatic (beta cell) failure (Type I Diabetes) or insulin resistance (Type II Diabetes). In 1995, an estimated 135 million people worldwide had Diabetes. Subramanian and Nithyanandan (2009) reported that people with Diabetes were twice as likely to have depression compared to those without Diabetes and also found to have more complexities in management of Diabetes or neuro-hormonal abnormalities (Gonzalez, Safren Caglierio, Wexler, Delahanty, Wittenberg, Blais, Meigs and Grant 2007; Sridhar, 2007). Anxiety or stress precipitates into a series of disorders like almost all psychosomatic disease viz., hypertension, Diabetes and even cancer.
Talbot, Mouwen, Gringas and Belanger et al. (1999) tested the generalizability of a model linking illness characteristics to psychological well-being in cross-sectional study of 237 adults with type II diabetes. It was hypothesized that diabetes complications increase illness intrusiveness which in turn increases depressive symptomology either directly or indirectly by reducing personal control over health outcomes. Illness intrusiveness was defined as the result of disruptions of valued activities and interests due to constraints imposed by the illness. An excellent fit of this model to the data was found using structural equation modeling. The model explained 65% of the variance in depressive symptomatology. Assessment of an alternative model excluding personal control suggested that the extent to which diabetes intrudes in life, rather than diabetes complication in relation to depressive symptomology in individuals with diabetes.

In a review, Lustman and Clouse (2002) critically examined the efficacy of depressive treatment in diabetic patients, the effects of depression treatment on the medical condition, methodological issues important in the performance of treatment traits in the patient population. Depression is prevalent as a co-morbid condition in diabetes. The efficacy of depression treatment with either pharmacological agents or psychotherapy has been demonstrated in the few available controlled trials. Depression has been associated with poor glycemic control and with accelerated rates of coronary heart disease in diabetic patients. Reported depression treatment trials demonstrate benefits of depression remission on glycemic control as well as mood and potential for improvement in the course and outcome of diabetes. Because adverse effects of pharmacological agents on
glycemic control have been observed, optimal therapies that improve both depression and measures of diabetes are still being sought.

Clause, Lustman, Freedland and Griffith et al. (2003) examined the protective effects of female gender on the appearance and course of coronary heart disease (CHD) in no diabetic subjects are diminished in the presence of diabetes. Clause hypothesized that the double rates of depression in female diabetic patients could help to explain the high prevalence of CHD in women with diabetes. Method-76 female type 1 and 2 diabetic patients with (N=16) or without (N=60) active major depression (DSM-III) any index evaluation underwent systematic annual investigation of diabetes and its complications were examined in relation to depression status using survival analysis statistics. A multivariate model incorporating other CHD risk factors (age, duration of diabetes body mass index, glycosylated hemoglobin and presence of hypertension, hyperlipidemia, or tobacco use) was used to determine independent effects of depression on outcome. Results indicate that development of CHD was significantly more rapid in the depressed subset (p<0.01 between 10 year curves) an effect that persisted after controlling for base-line differences in body mass index.

Ciechanowski, Katon, Russo and Hirch (2003) predicted that: (1) there would be a significant association between depressive symptoms and diabetes symptoms burden, physical functioning, diabetes self-care, and diabetes symptom burden, physical functioning, diabetes self-care and HbA1c levels and (2) that the association between depressive symptoms and HbA1c would be significantly greater in Type 1 vs Type 2 diabetic patients. Subjects were 276 Type1 and 199
Type2 diabetes patients. Ciechanowski et. al. collected self reported data on depressive symptoms, complications, medical comorbidity, diabetes symptoms diabetes self-care behavior, physical functioning and demographics. From automated data they determined mean HbA1c levels over the prior year. Linear regression analyses were performed to assess the association between depressive symptoms and diabetes symptoms perception, diabetes self-care behavior, physical function and glycemic control. Among patients with Type 1 and Type 2 diabetes, depressive symptoms were associated with greater diabetes symptoms reporting, poorer physical exercise regimens and diet. There was a significant association between depressive symptoms and HbA1c levels in Type 1 but not Type 2 diabetic patients.

Dantzer, Swendsrn, Maurice-Tison and Salamon (2003) presented a critical examination of the recent literature on anxiety and depression in juvenile diabetes. The objectives of this review were: (1) to determine the association of psychological factors, especially anxiety and depression, with diabetes, (2) to examine the specific association of anxiety and depression with metabolic control, and (3) to propose methodological changes that are needed to advance future research in this field. To conclude they supported the notion of a general association of psychological disorders with juvenile diabetes. However, while anxiety and depression appear to play an important and complex role in determining adaptation of the disease, their relation to metabolic control does not yet appear clear. Additional prospective and controlled studies as well as multivariate models of chronic disease are now necessary to more fully
understand the etiology and impact of these disorders in the adolescent population.

Farrell, Hains, Davies and Smith et al (2003) investigated the role of cognitive distortion in the relationship between adherence behavior, diabetes-specific stress, general stress and metabolic control. Farrell obtained questionnaire data, glucometer readings, and glycosylated hemoglobin (HbgA1c) from 143 youths (11-18 years old with Type I diabetes. They examined path model of relationship between cognitive distortions, stress adherence behavior and metabolic control. Data were analyzed using path analysis. Results indicated higher levels of negative distortion associated with more stress (both diabetes specific and general). Higher levels of general stress led to less adherent behavior and subsequently poorer metabolic control (higher HbgA1c). More diabetes-specific stress also led to poorer metabolic control, as well as general stress. The findings indicated an indirect role of negative cognitive distortions in metabolic control. The current findings suggested that instead of the proposed direct link adherence behavior, and indirect relationship may exist through stress.

Williams, Clouse, Rubin and Lustman (2004) reviewed the prevalence of depression in patients with diabetes and explained the bidirectional instruction of depression and diabetes. Treatment of depression in patients with diabetes demanded a multifaceted approach to both disease processes. Diabetes education, physical activity, and optimization of glycemic control are an integral to depression treatment as psychotherapy and pharmacotherapy. It is important to recognize late-life depression in diabetes as a chronic illness. Long-term
maintenance pharmacotherapy is often required to achieve lasting remission. Response to therapy and reassessment for evidence of relapse or recurrence are essential as depression in diabetes tends to be resistant and prone to recurrence. Interventions that address acceptance of depression therapy are crucial to improving treatment of late life depression and diabetes.

Karlsen, Idsoc, Dirdal and Rokne et al. (2004) determined whether participation in a group-based counseling programme would result in reduced diabetes-related stress, improved coping and psychological well-being as well as achieving glycemic control closer to an acceptable level. Effects of the program were evaluated implementing an experimental design with a sample comprising 63 Norwegian adults with both type of diabetes aged between 25 that the group based counseling program has the potential to reduce diabetes-related stress and self blame as well as to improve coping in adults with diabetes. Moreover, results suggested that the programme can help participants to achieve more acceptable HbA1c levels as well. The present study indicated that group-based counseling program is feasible in the sense of suggesting that cognitive restructuring and problem-solving approaches in groups may be useful in helping people adjust to diabetes.

Strine, Blackles, Okoro and Balluz et al. (2004) conducted a study to determine whether mental distress among diabetics is associated with various CVD risk factors. Behavioral risk factors such as Surveillance System, an ongoing, state–based, random-digit-dialed telephone survey of the non-institutionalized US adult population was done. Results suggested diabetic
persons with mental distress were more likely than those without mental distress to smoke to have hypercholesterolemia and hypertension and not to engage in leisure-time physical activity. On the basis of this study it was concluded that mental health professionals need to be involved in the care of diabetic persons, so they can recognize and treat symptoms of mental distress and participate in research to identify interventions that can reduce mental distress and reinforce healthy behaviors.

Jill (2005) in an article attempted to raise awareness of the association between diabetic and depression particularly in the adolescent population. It also discusses treatment techniques for the same population. Several treatment techniques have proved successful in this population. Psychiatric nurse practitioners and advanced practiced nurse are poised to implements and interventions.

Ciechanowski, Katon and Russo (2005) using an instrument assessing interpersonal relationships in patients with diabetes. It was hypothesized that a change in depression would be associated with a change in patients’ perceptions of themselves and others in relationships. Instruments assessing attachment, depression and demographics were administered twice to 367 patients with diabetes in HMO primary care settings, 10 month apart. Change was assessed in capacity to rely on others (model of other) and to feel worthy of attention (model of self) according to depression change categories (unchanged, decreased and increased depression). Results indicated that the degree to which patients reported being able to rely on others increased with a reduction in depressive symptoms.
(P=.02). The degree to which patients endorsed a sense that they were not worthy of attention in relationship increased with an increased in depressive symptoms (P=.02). A change in depressive symptoms is associated with a change in perception of interpersonal relationships in patients with diabetes.

Channon, Huws-Thomas, Gregory and Rollnick (2005) diabetes is a chronic condition with a significant impact on short and long-term health. In adolescence, diabetes management is further complicated by a complex interaction of physical and psychosocial factors which teenagers, parents and health care professionals often find difficult to manage. There are few indicators of practical and effective psychosocial interventions; however motivational interviewing has been shown to be effective in a range of healthcare setting.

DeVon, Penckofer and Zerwic (2005) examined the symptoms differences in patients with and without diabetes during an episode of Unstable Angina (UA). A convenience sample of 50 women and 50 men were recruited. Patients with diabetes were more likely to have a history of hypercholesterolemia (83% Vs 60%), prior history of heart disease (85% Vs 65%), and prior angiogram (85% Vs 67%). Patients with diabetes reported having less nausea (20% Vs 40 %) less squeezing (25% Vs 48% ) and less aching (25% Vs 45%) type pain , and more , hyperventilation (27.5% Vs 11.7%). Other cardiac symptoms we similar between the groups. Further study of symptoms presentation in patients with diabetes is warranted given their high levels of morbidity and mortality from cardiac disease.
Peterson, Losifescu, Papakostas, Shear, et al. (2006) have made an attempt to characterize depressive characteristics in depressed patient with and without co-morbid diabetes. Seventeen patients with Type 1 and 2 diabetes were drawn from outpatients’ clinical traits. Depressed patients without diabetes were identified from the same studies. Unpaired t-test and multiple chi-square analyses were used to compare demographic and clinical characteristics between the samples. Diabetes patients in the sample were more depressed and reported lower level of somatic well-being and contentment compared to non-diabetic patients. The samples did not differ significantly along with dimensions of depression, including course of illness, response to previous treatments and co-morbid conditions. These findings suggested that depressed diabetic patients were more similar than non-diabetic patients, although important differences existed.

Daniels, Goldberg, Jacobsen and Welty (2006) conducted a study to determine if psychological distress increases the risk of Type 2 diabetes in American Indians. A prospective cohort study of 919 individuals free of diabetes from 13 Native Communities was conducted to determine who developed diabetes. Psychological distress was assessed as baseline (1993-1995) by the Mental Component Summary (MCS) of the Short Form-36. The risk of diabetes was estimated to follow-up (1997-1999), according to qualities of the MCS scores. There was no evidence of a trend between psychological distress and development of diabetes (P trend= .73). The risk of diabetes in individuals in highest quartile (17.5%) was nearly identical to that in the lowest quartile (16.5%)
(Odds ratio=1.1, 95% confidence interval 0.7-1.7). The absence of association was found to be persisted even after adjustment for known risk factors for diabetes. Thus, the study concludes that psychological distress was not found to be related to the incidence of diabetes in American Indians.

Chouhan and Shalini (2006) examined the role of stress and adjustment in diabetics (high and low blood sugar) and suggesting some coping strategies. Stress and adjustment does not depend upon any single aspects of individual’s personality but upon the total organization and integration of traits within the individual. The study also emphasizes the comparison with the normal individuals. The sample comprised of 90 individuals. Both male and female within the age group of 35 to 45 years (n=30 in each group). Mean scores revealed that level of all the four above mentioned stresses was high for both high and low blood sugar groups and average for normal respondents. Adjustment levels were also better in normal respondents as compared to the diabetes patients. The computed F-ratio was also found to be significant which indicates that diabetes significantly affect the adjustment and stress levels of individuals.

Deborah, Chyun, Melkus and Deborah (2006) determine the relationship of sociodemographics; diabetes-related factors, including diabetes-related microvascular complications; cardiac risk factors; and psychological factors with quality of life (QOL). These findings suggested that anxiety, depressive symptoms, and neuropathy were prevalent in older adults with Type 2 diabetes. In addition, potentially important correlations were demonstrated between psychological factors, neuropathy, body mass index, and physical inactivity.
Sue Penckofer, Ferrans, Velsor-Friedrich and Savoy (2007) investigated the psychological impact of living with diabetes. The purpose of this study was to understand the feelings of depression, anxiety, and anger experienced by women with Type 2 diabetes and the impact of these feelings have on their overall quality of life. It was concluded that Women with Type 2 diabetes experienced feelings of depression, anxiety, and anger, which affect their health and overall quality of life.

Trief (2007) examined the impact of depression in elderly diabetes patients. He found that depression has negative effects on diabetes outcomes, diabetes complicates depression, and these problems are both worse and growing in the elderly population. Whatever the underlying cause for the connection, the evidence for the relationship is quite strong.

Paschalides, Wearden, Dunkerley, Bundy and Dickens (2007) examined the interrelationships of anxiety, depression and personal illness representations with glycaemic control and health-related quality of life in adults with Type 2 diabetes. One hundred eighty-four consecutive patients with Type 2 diabetes mellitus completed the Illness Perception Questionnaire (IPQ), the Well-Being Scale (WBQ) and the Short Form 36 Health Survey Questionnaire (SF-36). Demographic characteristics, details of diabetes status (duration of diabetes, treatments and complications) and glycosylated haemoglobin (HbA1c) were recorded. It was concluded that anxiety, depression and negative beliefs about illness influence physical and mental functioning, but not metabolic control in patients with diabetes.
Menzuk, Eaton, Albrecht and Golden (2008) argued that the relationship between depression and diabetes is bi-directional, but this hypothesis has not been explicitly tested. This systematic review examines the bi-directional prospective relationships between depression and Type 2 diabetes. 42 full-text publications reviewed, 13 met eligibility for depression predicting onset of diabetes, representing 6,916 incident cases. 7 met criteria for diabetes predicting onset of depression, representing 6,414 incident cases. The pooled relative risk (RR) for incident depression associated with baseline diabetes was 1.15 (95% CI 1.02–1.30). The RR for incident diabetes associated with baseline depression was 1.60 (1.37–1.88). This was concluded that depression is associated with a 60% increased risk of Type 2 diabetes. Type 2 diabetes is associated with only modest increased risk of depression. Future research should focus on identifying mechanisms linking these conditions.

Clarke and Goosen (2009) investigated the mediating effects of coping strategies in the relationship between autonomic negative thoughts and depression in a clinical sample of diabetes patients. High level of depression has been found among diabetes patients, but few studies have examined the influence of coping strategies in the relationship between diabetics’ negative thoughts and their depression. Autonomic negative thoughts, emotion-focused coping and depression, but no problem-focused coping, were significantly correlated, after controlling for relevant demographic and diabetes variables. Hierarchical linear regression analysis of data showed that emotion-focused coping functioned as a partial mediator between negative thoughts and depression.
According to the American Diabetes Association (ADA, 2010) stress can affect patients with diabetes in 2 ways:

- Stress hormones may change blood glucose levels directly.
- When under stress, individuals may drink more alcohol or exercise less, and may forget or no time to monitor glucose levels or adhere to diet plans.

2.4. **Hypertension**

Hypertension is high blood pressure. Blood pressure is the force of blood pushing against the walls of arteries as it flows through them. Arteries are the blood vessels that carry oxygenated blood from the heart to the body's tissues. As blood flows through arteries it pushes against the inside of the artery walls. The more pressure the blood exerts on the artery walls, the higher the blood pressure will be. The size of small arteries also affects the blood pressure. When the muscular walls of arteries are relaxed, or dilated, the pressure of the blood flowing through them is lower than when the artery walls narrow, or constrict.

Pressure is highest when the heart beats to push blood out into the arteries. When the heart relaxes to fill with blood again, the pressure is at its lowest point. Blood pressure when the heart beats is called systolic pressure. Blood pressure when the heart is at rest is called diastolic pressure. When blood pressure is measured, the systolic pressure is stated first and the diastolic pressure second. Blood pressure is measured in millimeters of mercury (mm Hg). For example, if a person's systolic pressure is 120 and diastolic pressure is 80, it is written as 120/80 mm Hg. The American Heart Association considers blood pressure less than 140 over 90 normal for adults.
Hypertension is a major health problem, especially because it has no symptoms. Many people have hypertension without knowing it. In the United States, about 50 million people age six and older have high blood pressure. Hypertension is more common in men than women and in people over the age of 65 than in younger persons. Hypertension is serious because people with the condition have a higher risk for heart disease and other medical problems than people with normal blood pressure. Serious complications can be avoided by getting regular blood pressure checks and treating hypertension as soon as it is diagnosed.

Ames Jones, Howe and Brantley (2001) examined the impact of stress on quality of life: An investigation of low-income individuals with hypertension. They revealed that major and minor stress is significant predictors of all measured domains of quality of life, even after age and number of chronic illness were statistically controlled. Minor stress contributed uniquely to the prediction of each dimension of quality of life even when age number of chronic illness and major life events were accounted for. Findings suggested that stress has a significant, persistent impact on the quality of life of low-income patients with established hypertension.

Rutledge and Hogan (2002) found moderated support for psychological factors as predictors of hypertension development, with the strongest support for anger, anxiety, and depression variables.

Bosworth, Bartash, Olsen and Steffens (2003) examined the relationship between depression and hypertension in an elderly population and how
psychological variables influence this relationship. Cross-sectional analysis of baseline data showed that hypertensive patients were more likely to be depressed and of non-white race. Bivariate analysis provided evidences that hypertension was associated with higher amounts of total stressors and lower social support. No differences in the prevalence of hypertension were found between men and women. Finally, they concluded that patients especially minorities, who experience depression, stress, or a lack of social support, are at increased likelihood of having hypertension.

Lalone, O’Connor, Joseph and Grover et al. (2004) examined the hypertension with lower health-related quality of life (HRQOL). In this cross-sectional study, 284 cardiac patients related their HRQOL using Health Survey (SF-36) and their preference-based measures (Rating Scale, Time Trade-off and Standard Gamble). In the result: compared to those without dyslipidemia those with dyslipidemia reported better HROQL on all preference-based measures and most SF-36 scales particularly on the physical health scales. It was concluded that cardiac patients with hypertension reported lower physical health than those without hypertension while cardiac patients with dyslipidemia reported better physical health than those without dyslipidemia.

Karen, Girdler, Hinderliter and Light (2004) investigated whether parental history of hypertension (FH+) enhances the impact of depressed mood, indexed by Beck Depression Inventory (BDI), on Ambulatory Blood Pressure (ABP). Subjects with a positive family history of hypertension (N= 177) exhibited significantly greater mean body mass index (BMI) and AMP compared with Ss
without (N=137). Relationships were found significantly stronger in those with two hypertensive parents Vs. those with one Vs. those with no hypertensive parents. These findings suggested that depressed mood may be reliably associated with higher blood pressure only among with an underlying susceptibility to hypertension.

Sumiyoshi, Roy, Jayathilake and Meltzer (2004) studied the “effect of hypertension and obesity on the development of diabetes mellitus in patients treated with atypical antipsychotic drugs” the result indicated significant effects of baseline and current Body Mass Index (BMI), as well as marginal influence of baseline and current weight, on the development of Diabetes (DM). On the other hand, change in weight or BMI was not found to be associated with the development of DM. The result of this study provided the first suggestion that individuals with hypertension are at an increased risk for the development of new-onset DM during treatment with atypical antipsychotic compared to those without hypertension.

Hypertensives have consistently been found to have more reactive cardiovascular system than normotensives. Nyklicek, Bosch and Amerongen (2005) examined whether this enhanced cardiovascular stress reactivity generalize to the Hypothalamus-Pituitary-Adrenal (HPA) axis and the immune system. Correlations were found between blood pressure responses and task related cortisol activity and between baseline blood pressure levels and task induced S-IgA levels. These results indicated that hypertensive not only have hyper reactive cardiovascular system, but also an enhanced HPA and immune system reactivity.
to stress. A central stress mechanism may be responsible for the heightened generalized stress response in hypertensive.

Rueda and Ana Maria (2006) found the influence of perceived health competence and coping strategies in hypertension. Depressive mood state and dimensions of quality of life (social support, satisfactory, well-being and free time) were also considered. The data suggest that, in hypertension, PHC constitutes an important resource, where as depressive mood state deteriorates quality of life.

Delayed poststress cardiovascular recovery has been associated with cardiovascular disease risk. Steptoe and Marmot (2006) in a study assessed relationships between systolic blood pressure (BP) recovery, psychosocial risk factors, and delayed recovery of inflammatory and haemostatic variables. Results showed that Systolic BP was on average 6.19 ± 9.6 mm Hg higher on recovery than baseline. Delayed BP recovery was associated with lower grade of employment, lower education and lower income independently of age, gender, and systolic BP stress reactivity. Delayed BP recovery was related to social isolation and poor mental health independently of age, gender, socioeconomic position, and task reactivity. Delayed systolic BP recovery was also associated with delayed recovery in diastolic BP, heart rate, factor VIII, and plasma viscosity but not delayed heart rate variability recovery, independently of age, gender, body mass, and task reactivity. They concluded that socioeconomic and psychosocial risk factors for cardiovascular disease are related to delays in poststress recovery. Delayed systolic BP recovery may be a marker for prolonged responses in
homeostatic variables that have a direct influence on cardiovascular disease pathogenesis.

Player, King, Mainous and Geesey (2007) explored the influence of trait anger and long-term psychological stress on progression to hypertension and incident coronary heart disease (CHD) in persons with prehypertension. Results concluded that high levels of trait anger in middle-aged prehypertensive men were associated with increased risk of progressing to hypertension and incident CHD. Long-term stress was also associated with increased risk of incident CHD in both men and women.

Licht, de Geus, Seldenrijk, van Hout, Zitman, van Dyck and Penninx (2009) explored the depression is associated with decreased blood pressure, but antidepressant use increases the risk for hypertension. Results showed that depressive disorder is associated with low systolic blood pressure and less hypertension, whereas the use of certain antidepressants is associated with both high diastolic and systolic blood pressure and hypertension.

2.5. Coronary Artery Disease (CAD)

Coronary Artery Disease (CAD) is a most common type heart disease. It is the leading cause of death in the United States in both men and women. CAD happens when the arteries that supply blood to the heart muscles become hardened and narrowed. This is due to the buildup of cholesterol and other materials called plaque on their inner walls. As a result, the heart muscles can’t get the blood or oxygen it needs. This can lead to chest pain (angina) or a heart attack. Most heart attacks happen when the blood clots suddenly cut off the hearts ‘blood supply’
causing permanent heart damage. Over time CAD can also weaken the heart muscles and contribute to heart failure and arrhythmias. Heart failure means the heart can’t pump blood well to the rest of the body. Arrhythmias are changed in the normal breathing rhythm of the heart.

Bosworth, Steffens, Kuchibhatta, and Jiang (2000) examined the relationship of social relationships and negative life events with major depressions among 355 patients with coronary artery disease who were free of neurological illnesses. In their examination of the bivariate relationships indicated that being younger having at least one problem with activities of daily living (ADLs) and/or one instrumental ADLs, being nonwhite, experiencing a greater number of negative events, lack of perceived social support and a lack of social interactions were significantly related to an increased likelihood of being depressed. In multivariate analyses depressed Ss were significantly more likely to report a greater number of negative events than non-depressed individuals after adjusting for sociodemographic and ADL measures. A lack of perceived social support and increased number of negative events increased the likelihood of reporting major depressive symptoms among CAD patients.

Barefoot, Brummett, Helmes and Mark et al. (2000) assessed the relative effectiveness of depressive symptoms in predicting survival of patients with coronary artery disease. Results of present study indicated that well-being and somatic symptoms significantly predicted survival. Both the Hopelessness and Negative Affect items remained as independent predictors in the same model. Depressive symptoms differentially predicted survival with depressive affect and
hopelessness being particularly important. These effects were independent of
disease severity and somatic symptoms and may be especially important in younger
patients.

Brummett, Barefoot, Siegler, Clapp-channing et al. (2001) examined the
characteristics of socially isolated patients with coronary artery disease who are at
elevated risk for mortality. Those with three or fewer people in their social support
network had a higher risk for cardiac mortality for all-cause mortality, controlling
for age and disease severity. With the exception of lower income, higher hostility
ratings and higher smoking rates, isolated patients on demographic indicators,
disease severity, physical functioning or psychological distress. Isolated patients
reported less social support and were less pleased with the way they got along with
network members, but they did not report less satisfaction with the amount of
social contact received. It was concluded that patients with small social networks
had an elevated risk of mortality, but this greater risk was not attributable to
confounding with disease severity, demographics or psychosocial distress.

Sheps and Sheffield (2001) observed that up to one fifth of patients with
cardiovascular disease, including those who have experienced a myocardial
infarction may have concomitant major depression. Studies have suggested that the
relative risk for major depression with cardiovascular disease ranges from 1.5-4.5.
Further information is required to establish a dose-response relationship between
depression and coronary artery disease (CAD); however, such a relationship has
been shown between anxiety and CAD. Development of a conceptual model of the
pathophysiologic action of stress in CAD will assist in the understanding of this
relationship. In patients with angiographic evidence of CAD, the presence of major depressive disorder was the best single predictor of cardiac event during the 12 month following diagnosis. Significantly, 6-month cumulative mortality following diagnosis of myocardial infarction has been shown to be higher in depressed patients than in non depressed patients. A decreased in heart rate variability may mediate the deleterious effect of depression on post myocardial infarction prognosis. Other factors such as mental stress and altered platelet function may also predispose depressed patients to a heightened risk of cardiac events.

Sher (2001) observed that some psychological factors promote the development of disorders of the cardiovascular system, and that the same psychological factors decreased immunity and promote infection, and that there is evidence that the infectious process is involved in the pathogenesis of coronary heart disease. It was suggested that the development of infection and inflammation in the atherosclerotic plaque is related to the psychological disorders that suppress the immune system.

Ramsay, McDermott and Bray (2001) investigated the association of component of multiple anger and hostility variables with coronary artery disease (CAD) symptoms. Results were 4-fold: anger hostility variables were relatively unimportant predictors of symptoms compared with anxiety and depression; psychological measures (except for expressed anger) were uncorrelated with CAD severity, though correlate numerously with CAD symptoms; symptoms were not distinguishable empirically in terms of frequency, intensity and duration with regards to type (angina pain, tiredness, and breathlessness’ and restricted
morbidity). It was concluded that component of anger-hostility complex were of limited use for predicting CAD symptoms.

Researches in behavioral science and medicine suggested that psychological and social factors may play a direct role in organic coronary artery disease (CAD) pathology. In this connection, Krantz and McCeney (2002) critically examined the impact of psychological and psychosocial factors on the development and outcome of coronary heart disease, with particular emphasis on studies employing verifiable outcome of CAD morbidity or mortality. Five key variables were identified as possible psychological risk factors for CAD were acute and chronic stress, hostility, depression, social support, and socioeconomic status. It was suggested that as a whole, evidence for a psychological and social impact on CAD morbidity and mortality was convincing.

Rudisch and Charles (2003) reviewed the epidemiology of co-morbid coronary artery disease and unipolar depression. 17% to 27% of patients with coronary artery disease have major depression; a significantly larger percentage has subsyndromal symptoms of depression. Patients with coronary artery disease and depression have a twofold to threefold increased risk for future cardiac events compared to patient without depression. Here the especial attention was paid to the interaction of both gender and age with depression and coronary artery disease risk. Scrutiny of the role of confounding risk factors was presented, such a global burden of co-morbid medical illness and modification of traditional risk factor, which may, in part, mediate the effect of depression on coronary artery disease.
Wulsin and Singal (2003) reviewed the recent studies for the contribution of depression to the onset of coronary artery disease and estimated the magnitude of the risk posed by depression for the onset of coronary disease. The review suggested that depressive symptoms contributed a significant independent risk for the onset of coronary disease.

Rutledge, Reis and Olsen (2003) examined the relationship between socioeconomic status (SES), coronary artery disease (CAD) risk factors and all cause mortality in a cohort of women with chest pain. Results indicated that low SES was associated with CAD risk factors, including higher BMI and waist-hip ratios, cigarette smoking, lower reported activity levels and a greater probability of hypertension. Low income also predicted all-cause mortality (RR= 2.7, 95% CI1.4, 5.2), including after adjusting for proposed psychosocial and behavioral variables (RR=5.9, 95% CI, 1.2-29.7).

Smith and Hopkins (2003) addressed the modifiable psychosocial lifestyle factors associated with development of coronary heart disease. Significant studies point to the contribution of individual and cumulative psychosocial factors in the development of coronary heart disease and the reoccurrence of cardiac events. Secondly, they discussed the psychosocial stressors and emotional factors associated with the development of hypertension. And finally, diagnosis, treatment, and the multiple psychosocial considerations of end-stage renal disease were discussed. Among the issues examined were the identification of variables related to patient compliance and adaptation and the conflicting empirical studies that considered the relationship of depression to decreased life-expectancy.
Over the past decade, evidence has accumulated to suggest that depression may be a risk factor for cardiac mortality in patient CAD. Lesperance and Frasure-Smith (2003) reviewed the various studies that link depression with coronary artery disease (CAD). The results presented at the 2001 American Heart Association Annual Meeting showed that cognitive behavioral psychotherapy was ineffective in reducing mortality from all causes and reoccurrence of nonfatal myocardial infarctions. The independent risk associated with depression in patients with CAD appears to be at least as important as smoking, hypertension or diabetes and, for this reason, may be of enough clinical significance constitute a target for improving prognosis, particularly giving the number of patients with CAD affected by depression. It was concluded that 1 in 3 patients admitted to hospital for CAD shows some degree of depression.

Thomas, Kalaria and O’Brien (2004) reviewing epidemiological, clinical, neuroimaging and neuropathology studies which have reported on the relationship of depression to coronary artery disease, stroke disease, alterations in blood pressure, vascular dementia, diabetes mellitus and cholesterol levels and by reviewing potential mechanisms by which depression could be associated with vascular disease. There was abundant and increasing evidence from these different lines of research that depression has a bidirectional association with vascular diseases and plausible mechanism exist which explain how depression might increase these vascular disease and vice versa? Depression has a clear bidirectional relationship with vascular disease.
Lett, Blumenhal, Babyak and Sherwood et al. (2004) reviewed the evidence that depression is a risk factor for the development and progression of coronary artery disease (CAD). Depression confers a relative risk between 1.5 and 2.0 for the onset of CAD in healthy individuals, whereas depression in patients with existing CAD confers a relative risk between 1.5 and 2.5 for cardiac morbidity and mortality. A number of plausible biobehavioral mechanisms linking depression and CAD have been identified, including treatment adherence, lifestyle factors, traditional risk factors, alterations in autonomic nervous system (ANS) and hypothalamic pituitary adrenal (HPA) axis functioning, platelet activation, and inflammation. There was substantial evidence for a relationship between depression and adverse clinical outcomes.

Llano and Robert (2004) presented a case of a patient with long-standing severe depression who shows with bilateral pulmonary emboli without risk factor other than his depression and inactivity. There was increasing epidemiological evidence that depressive disorder was an independent risk factor for coronary artery disease and recent studies have demonstrated that platelets in depressed patients are hyperaggreable.

The co-occurrence of two highly common disorders, depression and coronary heart disease (CHD), has been the focus of research for several decades. Sayers (2004) addressed the interrelationship of depression and cardiovascular disease, with an emphasis on CHD and congestive heart failure (CHF). Also addressed the role of depression in hypertension, which is associated with the development of CHF. Thus, depression and heart disease were highly intertwined,
requiring a careful conceptualization when comorbid. The implication of depression for heart disease in older adults was especially important, giving that older adults have an ever-increasing risk of heart disease and cardiac death.

Chin and Balon (2004) investigated that depression is very common and as an independent risk factor associated with increased cardiac mortality. The complex interplay of depression and cardiovascular disease following the onset of acute coronary event can often prevent patients from complying with treatment regimens and disease modifying behaviors.

Kop and Gottdiener (2005) investigated the relationship between depressive symptoms and coronary artery disease (CAD) which was mediated in part by immune system parameters. It was described that research on the psychoneuroimmunological pathways accounting for association between depression and CAD and addresses conceptual and methodological issues. Relationship between central nervous system parameters are bidirectional and are mediated via neurohormonal and parasympathetic pathways. Evidence suggested that these associations can be affected by (a) the clinical characteristics of depression (e.g. typical depression versus atypical depression and exhaustion), (b) the duration and severity of depressive symptoms, and (c) the stage of underlying CAD. Depressive symptoms are hypothesized to affect primarily the transition from stable CAD to acute coronary syndromes via plaque activation and prothrombotic processes, and play an addition role in the response to injury at early stages of coronary atherosclerosis.
Hofer Benzer, Alber and Ruttmann et al (2005) used structural equation modeling to test a conceptual model of Health-Related Quality of Life (HRQL) in coronary artery disease. The model, which included biomedical factors and individual and environmental characteristics, was tested in a multicenter group of 465 patients at three time points (baseline evaluation of chest pain and 1 and 3 month follow ups). A satisfactory fit was obtained for the model over time. Depression and anxiety symptoms exerted the most significant influence on HRQL. HRQL and the mediating factors were found to be distinct phenomena. It was concluded that mediating factors, especially depression and anxiety symptoms, should be taken into consideration in clinical routine if HRQL is regarded as a clinical outcome.

Carney and Fresdland (2005) examined that depression is a risk factor for medical morbidity and mortality in patients with Coronary Heart Disease (CHD). Deregulation of the Autonomic Nervous System (ANS) may explain why depressed patients are at increased risk. Studies of medically well, depressed psychiatric patients have found elevated level of plasma catecholamine and other markers of altered ANS function compared with controls. Studies of depressed patients with CAD have also uncovered evidences of ANS dysfunction, including elevated heart rate, low heart rate variability, exaggerated heart rate responses to physical stressors, high variability in ventricular depolarization, and low bar receptor sensitivity. All of these indicators of ANS dysfunctions have been associated with increased risks of mortality and cardiac morbidity in patients with CHD. Further research will determine whether ANS dysfunction mediates the effects of
depression on the course and outcomes of CHD, and to develop clinical interventions that improve cardiovascular autonomic regulation while relieving depression in patients with CHD.

Kubazansky, Davidson and Rozanski (2005) examined the ‘Clinical Impact of Negative Psychological States: Expanding the Spectrum of Risk for Coronary Artery Disease’. This research has demonstrated a gradient relationship between depression and the risk of adverse cardiovascular events among both initially healthy individuals and those with known cardiac disease. Moreover, recent investigators have demonstrated that adverse outcomes are even associated with the presence of relatively mild symptoms, as measured by self-report scales like the Beck Depression Inventory. They reviewed the literature that has focused on effects of other negative psychological states on cardiovascular health. Results indicated that negative states have been linked in varying degrees to cardiovascular disease or disturbances are identified, including hopelessness, pessimism, rumination, anxiety and anger. Considering a broader spectrum of risk may help to understand more fully the mechanism by which depression and other negative affective states influenced coronary heart disease risk.

Shimbo, Davidson, Haas, Fuster and Badimon (2007) investigated the negative impact of depression on outcomes in patients in coronary artery diseases. They found depressive symptoms are common in coronary artery disease (CAD) patients, and are associated with increased cardiac risk. Although an important relation exists between depression and CAD prognosis, the underlying pathophysiological mechanisms are poorly understood. Additionally, evidence
including the recently published ENRICHD (Enhancing Recovery in Coronary Heart Disease Patients) trial suggests that depression treatments do not lower recurrent cardiac risk.

Psychological variables, such as depression and anxiety, are known as independent risk factors for Coronary Artery Disease (CAD), suggesting the interaction of psychological and physiological factors in the development of CAD. Vural, Satiroglu, Akbas, Goksel and Karabay (2007) analyzed the possible association between depressive and anxiety symptoms and major atherosclerotic risk factors in the patients with chest pain warranting coronary angiography. The patients without CAD (n=159) and those with CAD (n =155) were evaluated for the severity of depression and anxiety by symptoms. Age, male/female ratio, prevalence of diabetes mellitus (DM), and depression level were significantly higher in CAD group. Among a total of 314 patients with chest pain the mean depression score was higher in patients with DM (16.01+ 8.12 Vs 13.01 +9.6, p = 0.01) and those with hypercholesterolemia (15.43 +9.61 Vs 12.53 +9.61, p = 0.02). The mean anxiety score was also higher in patient with DM (20.81+ 12.85 Vs 16.51 + 12.09, p = 0.08), hypercholesterolemia (20.67 + 13.11 Vs 15.29 + 11.36, p = 0.002), or hypertension (20.74 + 12.94 Vs, 14.1+ 10.8, p = 0.001). Thus, DM and hypercholesterolemia are associated with depression and anxiety, while hypertension is only related to anxiety. These results suggested that depression and anxiety symptoms may contribute to development and progression of CAD, especially in patients with DM and hypercholesterolemia.
Are illness perceptions about coronary artery disease predictive of depression and quality of life outcomes? To answer this question Stafford, Berk and Jackson (2009) investigated the impact of potentially modifiable illness beliefs about CAD on depressive symptomatology. They also examined the association between these beliefs and health-related quality of life (HRQOL) and socio-demographic variations in illness beliefs. A prospective study of 193 recently hospitalized CAD patients was conducted. Data were collected from medical records and by self-report 03 and 09 months post-discharge. Socio-demographic differences were analyzed with independent sample t-tests. Predictive models were tested in a series of hierarchical linear regression equations that controlled for known clinical, psychosocial, and demographic correlates of outcome. Negative illness beliefs, particularly those associated with the consequences of CAD, were significantly predictive of higher levels of depressive symptomatology at 03 and 09 months. Positive illness perceptions were significantly associated with better HRQOL outcomes. Older and less socially advantaged patients demonstrated more negative illness beliefs. Illness beliefs are significantly associated with depressive symptomatology and HRQOL in CAD patients. These beliefs can be easily identified and constitute a meaningful and clinically accessible avenue for improving psychological morbidity and HRQOL in CAD patients. Older and more socially vulnerable patients may require heightened monitoring of their illness beliefs.

Despite the broad range of previous works on health anxiety as an independent construct from generalized anxiety, few studies have examined the
relationship between health anxiety and stress-related disorders. The present research departs from earlier researches in terms of gaining better understanding of health anxiety and stress-related symptoms among diabetic, hypertensive, and coronary artery disease patients.