CHAPTER-2

REVIEW OF LITERATURE

A research is part of a collective venture of researchers in quest of truth. It cannot be an isolated effort, as one research paves the way for another endeavour. It is very important if previous viewpoints and findings be taken into consideration so that the issues and problems related with the phenomenon could be clarified and highlighted. Therefore, literature search should reflect relevant information pertaining to the topic being studied. The information provided should put forward empirical evidences and theoretical formulations emerging thereof in such a way that rationale for conducting research work is clearly projected and argued.

Having given a detailed explanation about the theory and practice of hypothyroidism in the previous chapter, it is now indispensable to present a description of relevant survey of literature about our problem. Here it is worthwhile to point out that a large number of studies on the hypothyroidism, its causes and likely consequences have been done by psycho-somatic’s point of view. The review of literature has impressed us with the fact that psychological factors play a role in hypothyroidism too. Therefore, in the present work an attempt is made to identify psychological determinants of hypothyroidism and to analyze the hypothyroidism women’s condition from the psychological perspective. A couple of significant studies in this regards are summarized in the following paragraphs:

STUDIES RELATED TO LIFE STYLE

The phenomenon of life-style has a strong notion of coping style and strategies, which a person in general and hypothyroidism in particular adopt in living a healthy life with utmost adjustment. Hence, both life-style and coping strategies are being viewed as synonyms to each other so far as their meaning in the present context is concerned. The literature on the subjective is very scarce and some of the relevant studies are being mentioned in the following paragraphs:
Dietary habits or food intake behavior, hunger and disinhibition; and dietary cognitive restraint (CR) are some type of consumption behaviours that effect energy level in young and older adults facing hypothyroidism. As the incidence of obesity as well as overweight within population is steady growing. So it’s essential to recognize the eating behaviour adaptation that enable to individuals to maintain keep a healthy body weight in hypothyroidism with growing age.

Wardle (1995) surveyed the dietary habits of 16000 subjects, including their efforts to avoid animal fat, salt, sugar, and food additives; to emphasize fibre and fruit in their nutrition; and to never skip breakfast. The disappointing result revealed only modest compliance; surprisingly, the subjects reported significantly fewer health habits. Those who valued health highly, believed in the importance of diet in determining health, and felt responsible for determining their health most often practiced healthy dietary practices.

Bindels et al. (1999) reported that overall prevalence of subclinical hypothyroidism was 1.9% in men and 7.6% in women of middle age. In women the prevalence of subclinical hypothyroidism increased from 4.0% in the lowest to 10.3 % in the highest cholesterol stratum (p=0.02). In men, the mean prevalence was 1.8 %.

Knudsen et al. (2005) investigated the "association between thyroid function and body mass index (BMI) and found a positive association between BMI and serum TSH (P<0.001) and a negative association between BMI and serum free T4 (P < 0.001). Further, Iacobellis et al. (2005) studied relationship of thyroid function with body mass index (BMI) in obese women. They found that obese women with BMI > 40 kg/m2 showed higher serum TSH than obese subjects with BMI<40 kg/m2 (P < 0.01). TSH was positively correlated with BMI (r = 0.44, P = 0.01). TSH could represent a marker of altered energy balance in obese women."

In a study, Meunier et al. (2005) measured "basal metabolic rate in a subsample of 70 middle-aged volunteers (35 men and 35 women) and 108 old volunteers (56 men and 52 women). They found that older volunteers had a significantly lower fat-free mass (FFM) than middle aged volunteers (-
A negative correlation between BMR and age (men, $r=-0.64$; women, $r=-0.62$, both $P<0.0001$) was observed, BMR was significantly ($P<0.00001$) lower in elderly volunteers than in middle aged volunteers. Total T4 concentration was lowest in middle aged population.

Kelsey et al. (2008) examined the "association of age with habitual dietary intake, dietary CR, disinhibition and hunger in 30 older (60-72 years) and 30 younger (18-25 years) non-obese, weight stable, nondieting healthy adults pair-matched by age group for gender, physical activity level ($>150$ minute/per week to $<150$ minute/activity per week) and Basal Metabolic Index (BMI). Dietary CR was significantly greater and hunger was significantly less in older compared to young adults (both $p <0.05$). Disinhibition scores, habitual energy and macronutrient intake did not differ between age groups. Results indicate that weight management in older, nonobese adults may be facilitated by increased dietary CR and decreased susceptibility to hunger with age. Additionally, changes in energy and macronutrient intake may not be necessary for successful weight management with advancing age."

Lin, Tsan, and Chen (1992) conducted a study on 65 patients with proven OSAS (apnea index [AI] $> 5$) and 20 hypothyroid patients "to evaluate the prevalence of obstructive sleep apnea syndrome (OSAS) in patients with hypothyroidism, the prevalence of hypothyroidism in patients with OSAS, the possible factors predisposing to sleep-related breathing disorder in hypothyroid patients, and the effect of thyroid hormone in treating hypothyroidism associated with OSAS. All patients were monitored for one overnight sleep study using polysomnography (Grass 78). They found only two (3.1 percent) of 65 OSAS patients had thyroid hypofunction. Of 20 patients with hypothyroidism, two showed moderate to severe OSAS and three had mild OSAS. Patients with both hypothyroidism and OSAS had impaired respiratory drive, but this was corrected by thyroid hormone therapy. Patients with hypothyroidism without OSAS were younger and had a lower percentage of ideal body weight than those with both hypothyroidism and OSAS. All hypothyroid patients were snorers. Thyroid
hormone replacement was effective in correcting snoring only after one year of therapy. They concluded that: (1) an overnight sleep study is not necessary in every case of hypothyroidism; (2) thyroid function studies need not be done routinely for every OSAS patient; (3) thyroid hormone therapy is effective for OSAS but it takes longer to correct the snore than respiratory drive; and (4) age and body weight are related to the development of OSAS."

Akerstedt and Wright (2004) conducted a study "to evaluate the multivariate association among mental fatigue; different work related background (work load, work hours) and lifestyle factors, as well as a disturbed sleep. A total of 5720 healthy employed men and women. Result showed that fatigue was predicted by disturbed sleep, high immersion in work, high work demands, social support, being a female, being a supervisor and high age. Shift work, work hours (including overtime) and influence at work did not become significant predictors. With control for work demands a high number of work hours were associated with lower fatigue."

"Life satisfaction and quality of sleep are important, related components of subjective well being and general health. However, no earlier investigation is known to have tested the direction of the temporal relation between poor sleep and diminished life satisfaction, including simultaneous examination of shared genetic influences. These features were examined in the present study of a nationwide cohort of 18,631 same-sex Finnish twins with repeated measurements of life satisfaction, sleep quality, and several potential confounders within an interval of 6 years (1975 to 1981). Most individuals (59%) with new on-set life dissatisfaction had experienced suboptimal sleep at baseline. Poor sleep predicted a consistent pattern of life dissatisfaction (odds ratio =2.1, 95% confidence interval: 1.7, 5.3 from conditional logistic regression on twin pairs discordant for life dissatisfaction), whereas life dissatisfaction did not consistently predict poor sleep. There was substantial heritability for both traits, but their shared genetic component was relatively weak, as indicated by genetic correlations of 0.21 for men and 0.27 for women in a multivariate genetic model. This finding is
consistent with the hypothesis that poor sleep may have direct effects on the brain, emotions and mood." (Paunio et al., 2009)

A research conducted by Cappuccio, Elia, & Strazzullo, et al. (2010) assesses the "association among habitual sleep disturbances and the occurrence of endocrine disease and to obtain an estimate of the risk. Results showed that quantity and quality of sleep persistently and significantly predict the possibility of the occurrence of endocrine diseases. The mechanisms underlying this relation may differ between short and long sleepers."

Salman, Munir, Anwar, and Ahmed (2011) aimed to "determine the prevalence of thyroid disease among Saudi (Arab) patients with laboratory-diagnosed obstructive sleep apnea (OSA) and the characteristics and predictors of thyroid disease associated with OSA. Serum thyroid-stimulating hormone (TSH) and free-thyroxine (FT4) levels were measured in all patients referred to the sleep disorders center for an overnight sleep study. The levels were measured within 4 weeks of the sleep study. Type I attended polysomnography (PSG) was performed for all patients. Results revealed that in the OSA patients, the prevalence of newly diagnosed clinical hypothyroidism was 0.4%, and the prevalence of newly diagnosed subclinical hypothyroidism was 11.1%. In the non-OSA patients, the prevalence of newly diagnosed clinical hypothyroidism was 1.4%, and the prevalence of newly diagnosed subclinical hypothyroidism was 4%. There were no cases of clinical or subclinical hyperthyroidism in the studied group. Female gender was the only predictor of clinical hypothyroidism. They conclude that in the OSA patients, the prevalence of newly diagnosed clinical hypothyroidism was low; however, subclinical hypothyroidism was common among patients with OSA."

Berkman and Syme (1979) conducted a study on the US population, to investigate the association between social support and well-being. At the outset a survey assessed the presence and the extent of four types of social ties-marriage, contact with extended family and membership, church membership and other formal and informal group affiliations. Results revealed the importance of social networks
for wellbeing. This provided perspective evidence that a lack of social relationship was a risk factor for health.

"It has been suggested that meditation leads to a metamorphosis of brain structure to emit positive emotions. The EEG records indicate that meditation can even tame amygdale enabling the individual to be less shocked, flustered, or angry. Transcendental meditating promotes increasing degrees of orderliness, integration, and coherence in the brain leading to a unique style of brain functioning. While a relative excitement is continuously present in the brains of non-enlightened subjects, the enlightened people maintain a low level of excitation, which has a pervasive calming effect on the mind (Travis, 2001)."

"In recent past, several neurocognitive researches have been attempted to comprehend the impact of spiritual activities on human brain. It has been found that prefrontal lobes of monks are lit even when they are not meditating and this area is responsible for positive emotions". (Davidson, Kabat-Zim, & Schumacher, et al. 2003)

"Evidence is presented that bears on 9 hypotheses about the link between religion or spirituality and mortality, morbidity, disability, or recovery from illness. In healthy participants, there is a strong, consistent, prospective, and often graded reduction in risk of mortality in church/service attenders. This reduction is approximately 25% after adjustment for confounders. Religion or spirituality protects against severe autoimmune disease. Largely mediated by the healthy lifestyle it encourages. Evidence fails to support a link between depth of religiousness and physical health. In patients, there are consistent failures to support the hypotheses that religion or spirituality slows the progression of cancer or improves recovery from acute illness but some evidence that religion or spirituality impedes recovery from acute illness. It is concluded that church/service attendance protects healthy people against death." (Lynda, et al. 2003)
In another study Hill and Pargament (2003) have identified "significant links between religion and spirituality and health. The reasons for these associations, however, are unclear. Typically, religion and spirituality have been measured by global indices (e.g. frequency of church attendance, self-rated religiousness and spirituality) that do not specify how religion and spirituality affect health. The authors highlight recent advances in the delineation of religion and spirituality concepts and measures theoretically and functionally connected to health. They also point to areas for growth in religion and spirituality conceptualization and measurement. Through measures of religion and spirituality, it is found that both are more conceptually related to physical and mental health (e.g., closeness to God, religious orientation and motivation, religious support, religious struggle), psychologists are discovering more about the distinctive contributions of religiousness and spirituality to health and well-being."

"The most intriguing area of research has been perhaps the intercessory prayers, which involve praying for the benefit of others. In a study it has been found that even when the subjects and researchers were unaware that someone was praying for them, the physical and mental health of experimental group subjects improved significantly than the control group." (Byrd, 2008)

Altmaier et al. (2008) explored "the relationship among between religion/spirituality, physical health and mental health in 122 patients with chronic musculoskeletal pain. The current study conceptualized religion/spirituality as a multidimensional factor, and measured it with a new measure of religion/spirituality for research on health outcomes (Brief Multidimensional Measure of Religion/Spirituality). Pain patients’ religious and spiritual beliefs appear different than the general population (e.g. pain patients feel less desire to reduce pain in the world and feel more abandoned by God). Hierarchical multiple regression analyses revealed significant associations between components
of religion/spirituality and physical and mental health. Private religious practice (e.g. prayer, meditation of religious media) was inversely related to physical health outcomes, indication that who were experiencing worse physical health were more likely to engage in private religious activities, perhaps as a way to cope with their poor health. Forgiveness, negative religious coping, daily spiritual experiences, religious support, and self-rankings of religious/spiritual intensity significantly predicted mental health status. Religion/spirituality was unrelated to pain intensity and life interference due to pain. This study establishes relationships between religion/spirituality and health in a chronic pain population, and emphasizes that religion/spirituality may have both costs and benefits for the health of those with chronic pain."

Thus, the literature survey depicts that spirituality is an important aspect of well being in people with chronic diseases.

Ramachandran et al. (2002) assessed "the physical activity behavior of subjects from Chennai. Results revealed that the total activity level considering the activity at work and during leisure time was very low, especially in women. The activity score was inversely related to the affluence or wealth score and low activity score showed adverse effects on glucose intolerance. The affluence was calculated using a wealth score system and a significant correlation was seen between increasing wealth score and decreasing total activity. Sedentary life style was one of the significant factors associated with endocrine diseases."

Caulkins (2007), determined "if increasing physical activity levels, through a 10 week walking intervention program, had any impact on the health of current and retired male (n=18) and female (n=75) educators, age 40 to 70 years. The mean age of the sample group was 54 years (females=53.4; males=56.9), the single group pre test, post test format was conducted over a ten week period (1st week: pre-test and baseline measure, 2nd to 10th week: 10 intervention programs, followed by post-test). Result showed that dependent test should a significant increase in the average daily step totals"
and significant improvement in health for all six of the health measures (6 minute walk, resting heart rate and blood pressure, BMI, waist girth, and the sit and reach flexibility test). However, findings of the stepwise Regression should a significant, positive relationship between increased activity levels and 3 of the 6 health measures (diastolic blood pressure, waist girth, and the sit and reach flexibility test). This finding suggests that there is a significant relationship between increasing physical activity levels and improved health for educators. Results of this study also suggest that it is possible to increase physical activity levels using pedometers at little or no expense to school systems, which is particularly relevant for school districts under continued budgetary constraints and rising costs."

"Vigorous exercise and fasting are commonly used compensatory behaviours. However, it is unknown how non-clinical individuals who engage in one or both of these compensatory behaviours differ from one another. This research compared women who engaged in both fasting and vigorous exercise as compensatory strategies (n=76) with women who engaged in either fasting (n=56) or excessive exercise (n=82) and women who employed no compensatory strategies (n=113) on body image/eating and psychological symptomatology. Participants completed questionnaires assessing body dissatisfaction, restrained eating, thin-ideal internalization, depression, self-esteem, and general psychological distress. Women who utilize any compensatory strategies report significantly greater body dissatisfaction and restrained eating than women who use no compensatory strategies at all. Moreover, fasting as a compensatory behaviour is associated with more significant psychological and behavioural symptoms than vigorous exercise as a compensatory behaviour." (Marie, Jains, Ellen & Patricia, 2008)

Miilunpalo (2001) proposed that "physical activities appear to improve health-related quality of life by enhancing psychological well being and by improving physical functioning, particularly in persons compromised by poor health. Health enhancing physical activity (HEPA) can be in addition to and instead of, structured and planned exercise and sports comprise other forms of physical activity, such as occupational activities, lifestyle activities and recreational activities. However, wide range and
long term population strategies are needed for promotion of physical activity in each of the categories of HEPA. It is necessary to create realistic opportunities for different population groups and individuals. The theoretical knowledge of the determinants of the target behavior has to be translated into a practical form. On the basis of available empirical studies, the predisposing, enabling and reinforcing factors in the Precede-Proceed model for health promotion are all relevant and important for the adoption and maintenance of physical activity. In the end, promotional activities are needed where people live and work, i.e. at local level."

**STUDIES RELATED TO STRESS**

Wynne and Salomon (1955) found that sympathectomy-destruction of the sympathetic nervous system-retarded the learning of escape and avoidance responses. However, this system may become less important once the animal has learned an avoidance response, because sympathectomy and destruction of the adrenal medulla do not appear to affect avoidance performance once initial learning has taken place (Moyer & Brunell, 1959; Moyer & Korn, 1965).

DiGiusto and his associates (1971), studied the hormonal effects on fear responding and suggest that the fast-acting sympathetic-adrenal medulla system may facilitate the initial acquisition of appropriate responses to fearful situations.

"In an animal study by McGaugh (1998), rats were stressed by an electrical shock, and then made to go through a maze that they were already familiar with. When the shock was given either four hours before or two minutes before navigating the maze, the rats had no problem. But, when they were stressed by a shock 30 minutes before, the rats were unable to remember their way through the maze. This time-dependent effect on memory performance correlates with the levels of circulating cortisol, which are highest at 30 minutes. The same thing happened when non-stressed rats were injected with cortisol. In contrast, when cortisol production was chemically suppressed, then there were no stress-induced effects on memory retrieval. According to McGaugh, this effect only lasts for
a couple of hours, so that the impairing effect in this case is a temporary impairment of retrieval. The memory is not lost. It is just inaccessible or less accessible for a period of time."

Vos et al. (2009) carried out a cross sectional multicentric study on 263 consecutive patients of Grave’s hyperthyroidism. "They opined that advancing age was associated with less severe Graves’ hyperthyroidism and lower serum free T3-index and free T4- index (P<0.01), Free T3- index and free T4- index were directly associated with hyperthyroidism symptom scores (P<0.01). Stress scores were associated with hyperthyroidism symptom scores (P<0.01) but not with biochemical severity of Grave’s hyperthyroidism."

**STUDIES RELATED TO PERSONALITY**

Personality traits play a distinct role in determining how healthy individuals are, and how they interact with the world? These are contingent in large part on individual’s personality style and have an enormous impact on person’s health. In 1940s Dunbar (1942; 1946) reviewed psychological data about patients with diseases such as hypertension, endocrine disorders (i.e. diabetes, thyroid diseases), rheumatoid arthritis, and myocardial infarction and formulated the typical behavior patterns, families’ histories, and patterns of onset of illness that seemed to be associated. On the basis of data, Dunbar developed a *Personality Profile* of specific diseases. Dunbar’s idea of a specific personality may be associated with a certain diseases is most evident in current research into the behavior of people with different disease. She suggested that people with myocardial infarction (coronary disease) tend to be compulsive and to overworked and that the infarction tends to follow exposure to shock, particularly at work. Later on, Friedman and Rosenman (1974) labeled the behavior of these types of patients *Type-A personality.*

Alexander (1950), postulate that psychosomatic diseases developed out of *visceral neurosis.* Physiological changes accompanied unresolved emotional conflicts and eventually resulted in
pathological derangements in the organ system. Alexander advanced the theory of psychosomatic medicine significantly by abandoning a model of disease based on unitary, direct causation. Many researchers tend to confirm some of the Dunbar’s and Alexander’s ideas but many question were left unanswered. Although, Dunbar’s and Alexander’s theories suffered because it was based on retrospective analyses but their studies opened a new area to research personality causes of psychosomatic disease.

Two broad categories of personality viz., *Type A* and *Type B* are regarded as behavior pattern/types of personality. *Type A* personality is regarded as competitive who always live under constant pressure, they take multiple activities at a time and remain alert most of the time, they are competent and efficient who get their work done on time. During stressful conditions they become anxious, helpless and impatient. In comparison to *Type A* personality pattern, *Type B* personalities are quite opposite as *Type B* people, are easy going and non-competitive. Empirical evidences also reveal than Type ‘B’ personalities are supposed to live much longer than people possessing *Type A* personality pattern.

In a study, Cohen, Eisdorfer, Vitaliano, and Bloom (1980) reported that "high trait anxiety was associated with augmentation of performance in younger patients on a test of reasoning; higher level of trait anxiety was associated with poorer performance on the same test in an older group”. Further, Cohen et al. concluded that older persons may be more vulnerable than the young to the deleterious effects of ‘negative’ emotional states on performance."

Deptula et al. (1993) conducted a study "to find out the relation between emotional states (self-rated depression, anxiety, and withdrawal) and performance on a memory task in groups of normal young adults and normal older individuals. It was hypothesized that the older adults would exhibit a stronger relation between rating of negative emotional states and performance than the young adults, and that the older adults would have a steeper drop-off in performance associated with increasing levels of such negative emotions. Results indicated that the older group, but not the younger group, consistently exhibited significant negative correlations between their performance on verbal recall
measures and their ratings of anxiety, depression, and withdrawal. Deptula et al. concluded that negative affect modulates the relation between emotional states and memory functions of individuals."

"The relationship between six facets of extraversion (activity, assertiveness, excitement seeking, gregariousness, positive emotion, warmth) and life satisfaction was studied in a sample of 162 university students. Positive emotion and assertiveness showed the strongest relationships, followed by gregariousness and warmth. Separating the data by gender indicated that life satisfaction for women was primarily related to levels of positive emotion and warmth, while for men the most important facets were assertiveness and gregariousness. Regression analyses indicated that the only significant predictor of life satisfaction for males was assertiveness, and the only such predictor for females was positive emotion. The results underscore the importance of gender as a context for trait expression, and the consequences of this for life satisfaction." (Herringer, 1998)

Jason et al. (2004) investigated "the association among the personality variables of the five-factor model and close relationship variables (relationship satisfaction, intimacy, and love style). Total 196 participants who had committed relationships administered the NEO Personality Inventory–Revised (NEO PI-R), the Love Attitudes Scale-short form, the Relationship Assessment Scale, the personal assessment of intimacy in relationship and a demographic questionnaire. Correlation and regression analyses revealed that neuroticism was negatively associated with and predictive of satisfaction and intimacy. The association between neuroticism and relationship satisfaction was completely mediated by possessive, dependent love for females. Extraversion and agreeableness were positively associated with relationship satisfaction and intimacy, especially for males. Conscientiousness was positively correlated with intimacy for males."

In an article, Schimmack and Oishi (2004) discussed at "the global level of the big five, Extraversion and Neuroticism are the strongest predictors of life satisfaction. However, Extraversion and Neuroticism are multifaceted constructs that combine more specific traits. This article examined the
contribution of facets of Extraversion and Neuroticism to life satisfaction in four studies. The depression facet of Neuroticism and positive emotion /cheerfulness facet of Extraversion were the strongest and most consistent predictors of life satisfaction. These two facets often accounted for more variance in life satisfaction than Neuroticism and Extraversion. The findings suggest that measures of depression and positive emotion/cheerfulness are necessary and sufficient to predict life satisfaction from personality traits. The result also leads to a more refined understanding of the specific personality traits that influence life satisfaction: depression is more than anxiety or anger and a cheerful temperament is more important being active or sociable."

Veronique and Catherine (2008) aimed at assessing "the extent to which personality traits are related to body mass index (BMI) and eating behaviours in 154 overweight and obese women who had mean BMI of 30.5± 3.0 kg/m²). The NEO Five-Factor Inventory was used to capture the five dimensions of personality (neuroticism, extraversion, openness to experience, agreeableness and conscientiousness). Anthropometric measurements (weight, height, and BMI) were performed and eating behaviours (cognitive dietary restraint, disinhibition, and susceptibility to hunger) were measured by the Three-Factor Eating Questionnaire. Regression analyses showed that higher level of neuroticism was identified as a significant predictor of higher scores for cognitive dietary restraint, disinhibition and susceptibility to hunger. Only conscientiousness was positively related to BMI. Conscientiousness was also found to be a positive determinant of cognitive dietary restraint and a higher level of agreeableness predicted a lower score of susceptibility to hunger, Results also underline the presence of other psychological factors, i.e. dysphoria and body esteem, involved in the associations between personality traits and some eating behaviours. These findings suggest that particular dimensions of personality may contribute, either directly or through their association with other psychological factors, to a better understanding of weight and eating behaviours in overweight and obese women."
Lockenhoff et al. (2008) carried out a study "to examine the association between personality traits and longevity, conducted a longitudinal study, using the Guilford-Zimmerman Temperament Survey. Personality traits were assessed in 2359 participants (women age range from 17 to 98 years) taken from the Baltimore Longitudinal Study of Aging. Over the duration of the study, 40% participants (N=943 women) died, on average 18 years after their personality assessment. The association of each trait with longevity was examined by Cox regression controlling for demographic variables. Result showed that preliminary analyses among the deceased, those who scored 1σ (Standard Deviation/SD) above the mean on General Activity (a facet of Extraversion), Emotional Stability (low Neuroticism) and Conscientiousness lived on average 2 to 3 years longer than those scoring 1σ below the mean. Survival analyses on the full sample confirmed the association of General Activity, Emotional Stability, and Conscientiousness with lower risk of death, such that increment in every 1σ was related to about 13%, 15% and 27% risk reduction, respectively. The association of personality predictors of longevity did not differ by sex, except for Ascendance (a facet of Extraversion). Emotional stability was a significant predictor when the analyses were limited to deaths due to cardiovascular disease, with comparable effect sizes for General Activity and Conscientiousness. Result also reveals that in a large sample of generally healthy individuals followed for almost five decades. Longevity was associated with being conscientious, emotionally stable, and active."

James et al. (2000) had conducted a longitudinal cohort study using NEO Personality Inventory "to determine whether traits of normal personality are associated with variations in glycemic control in patients. Results from 105 patients in a clinical trial of a stress management intervention found that lower average blood glucose values at baseline were associated with higher scores for the personality domain of neuroticism and several specific traits including anxiety, anger, hostility, depression, self-consciousness, and vulnerability but were associated with lower scores for the trait of altruism. Findings revealed that personality traits may offer new insights into variations in glycemic control in patients with endocrine disorder."
In an investigation Kotov et al. (2010) found "that common mental disorders are strongly linked to personality and have similar trait profiles, neuroticism was the strongest correlate across the board but several other traits showed substantial effects independent of neuroticism."

"While personality traits have been linked concurrently to health status and prospectively to outcomes such as mortality, it is currently unknown whether traits predict the diagnosis of a number of specific diseases that may account for their mortality effects more generally. A sample (N = 6,904) of participants from the Health and Retirement Study, a longitudinal study of older adults, completed personality measures and reported on current health conditions. Four years later, participants were followed up to see if they developed a new disease. Initial cross-sectional analyses replicated past findings that personality traits differ across disease groups. Longitudinal logistic regression analyses predicting new disease diagnosis suggest that traits are associated with the risk of developing disease—most notably the traits of conscientiousness, neuroticism, and openness. Findings are discussed as a means to identify pathways between personality and health." (Weston, Hill, & Jackson, 2014)

Certainly personality information has been on fore front of current efforts to advance the current diagnostic classification system. Moreover, personality dimensions have shown recent promise in the prediction of differential treatment outcome. For example, neuroticism is associated with preferential response to pharmacotherapy rather than psychotherapy, considerations of personality features is critical to the understanding and management of hypothyroidism.

STUDIES RELATED TO BRAIN DYSFUNCTION
To understand what relationship exists between hypothyroidism and cognitive functioning, it is essential to take a look on previous literature.

Dubey and Sharma (1978) studied three groups of subjects: high, medium and low manifest anxiety groups. They measured the estimated time subjects spent in multiplications tasks which lasted for 20, 40, and 60 seconds. Results revealed that high anxiety group over estimated the time. They conclude that high anxiety have an adverse effect on various cognitive functions (e.g., estimation of time).

Prasher et al. (1993) presented the case of 55 yrs-old women with Down’ syndrome (DS), who become forgetful, confused, and rapidly lost several of her skills. Thyroid function tests revealed her original diagnosis of dementia was change to hypothyroidism. She regained most of her skills following treatment with thyroxin medication.

Haggerty et al. (1995) studied the subclinical, or borderline hypothyroidism (SCHT) is a possibility for depression. The association between SCHT and unipolar depression, bipolar depression and cognitive dysfunction is also addressed. The influence of patient’s thyroid function on their response to depression treatment is considered, and recommendation for assessment and treatment of depressed patient with SCHT are given.

Mann et al. (1996) stated that normal subjects exhibit a variety of behavioral and psychological differences across seasons. Previous study have revealed contrasting seasonal patterns of thyroid axis hormone levels between women treated for hypothyroidism and healthy controls, and small changes in thyroid hormone level are known as to affect neuropsychological and affective function. Therefore, the present study evaluated. Seasonal change in mood, cognition and endocrine status in 15 treated hypothyroid women and 21 healthy controls, aged 25-26 years using a between group (hypothyroid vs. control), repeated measures (summers vs. winter) crossover design. Subjects were evaluated on two occasions in January & February, 1994 and in July & August, 1994. Measures assessed indices of mood, neuropsychological function (Digit Span, & Digit Symbol). Significant
effects of season and health status were detected for measure of mood state in that depression and anxiety were higher in winter and in hypothyroid subjects. A health states main effect was also observed for seasonality scores which were significantly higher in hypothyroid subject than in controls. A seasonal main effect was observed for verbal memory; in that subject demonstrated better recall summer than in the winter.

Grahm (2003) found that mental health provider may be the first provider to see patients with undiagnosed thyroid dysfunction, because psychological symptoms are often the most prominent and earliest manifestation of thyroid hormone imbalance.

Lambert (2003) stated that clinical presentation of common disorder can be significantly influenced by the presence of a second active disease process. Occasionally, two disorder interact in a manner that alerts expected presentation and make detection of either difficult. Results suggested that autonomic sign and symptoms of alcohol withdrawal delirium were obscured and delayed with undetected severe hypothyroidism.

Michael and Martin (2003) focused on laboratory evaluations of thyroid disorders and emphasized psychiatric responses to therapeutic endocrine correction. In addition to describing the psychiatric comorbidity of thyroid diseases, they reported that delineates psychiatric syndromes are seen in patients with hyperthyroidism or hypothyroidism.

Hepworth and Lorraine (2005) stated that working memory is a cognitive system comprised of both short-term memory and controlled attention components. Because the working memory system is critical in many other cognitive abilities, the working memory deficit is believed to reflect primarily deficits in controlled attention. However, working memory deficits can also arise from deficits in short term memory. Research has suggested that patients with hypothyroidism have short-term memory difficulties.
Maria, Melick, and Wilting, (2005), suggested that "presence of thyroid disorders was determined on the index date defined as the date of the first available thyroid-stimulating hormone in 2005. The presence of thyroid disorder was diagnosed according to defined criteria and in case of a previous diagnosis, confirmed by researching the medical files. In a subgroup of 45 lithium patients, thyroperoxidase-and thyroglobulin antibodies were determined. Result suggested that prevalence of hypothyroidism during lithium treatment was very high in the elderly, especially in women. Autoimmunity did not seem to play a major part in lithium-associated hypothyroidism in this age group. The timeframe between start of lithium and diagnosis of hypothyroidism suggests an individual susceptibility. The prevalence of hypothyroidism in non-lithium patients with affective disorders was not very different from the general population."

Adam et al. (2006) stated about "the possible link between the cognitive disorders associated functions as well as the intensity of anxiety and depression and the possible link with hypothyroid disorder and those encounter in depression. They examined the executive and attentional differences between these symptoms in hypothyroidism, major depression; and the possible link between these symptoms and cognitive disturbances. Results revealed that the existence of psychomotor slowing associated with attentional and executive disturbances in major depression as well as hypothyroidism."

Liappas et al. (2006) made a study "to assess the association of quetiapine treatment with thyroid dysfunction has been reported in clinical trial and in product labeling for the drug. Which show small dose-related decreases in thyroid hormone level and reported, a case of a depressed patients on quetiapine who developed hypothyroidism that remitted after drug discontinuation. A 49 yrs old woman diagnosed with a 20-29 yrs lasting dysthymia and 2 major depressive episodes 14 and 15 yrs ago was admitted to hospital for treatment of persistant disabling dysthymic symptoms and impaired functioning."
A study done by, Miller et al. (2006) "to examine inadequate thyroid hormone availability to the brain and treatment effects of levothyroxine on cognitive function are still poorly understood. The study prospectively assessed the effect between the untreated hypothyroid group and the control groups were limited to verbal memory retrieval. When assessing the effects of 3 months treatment, results revealed that the treated hypothyroid group had significantly increased verbal memory retrieval. Results depicted that specific memory retrieval deficits associated with hypothyroidism can resolve after replacement therapy with levothyroxine."

Turner and Cecile (2006) stated that hypothyroidism and depression are two disorders that are associated much common symptomlogy, fatigue, mental and physical slowing forgetfulness, attention and concentration difficulties and mood disturbances are characteristic of both condition. Women have a 10:1 increased incidence of hypothyroidism relative to men. This rate compress to women’s 2:1 increased risk of depression. Moreover, both of these conditions have some symptoms, making it difficult at times to identify which symptoms are related to which condition. During midlife, the incidence of hypothyroidism increases significantly. The baby boom cohort is rapidly reaching this midpoint in life. With this stage, it is expected that many thousands of women will be at risk for hypothyroidism. As a cohort, these women are better educated; more financially secure, and take a greater responsibility for being important about matters of health than have previous cohorts, while also expecting extended lifespan. It is not likely that they will approach the later half of their lives without efforts to secure the best treatment available for conditions that could affect their future cognitive capability and emotional well being. Because of its often insidious onset and documented deleterious effects on life functioning, hypothyroidism, even in its milder forms, would seem to be an area of interest to health practitioners generally, including psychologists, behaviouring them to gain the information and skills to help treat these persons effectively, Results suggested that a glimpse of understanding regarding women’s experience of hypothyroidism and its effects on their quality of life.
In other study, Caroline (2009) opined that "overt hypothyroidism is associated with cognitive impairment, which can be reversed if treated early adequately and appropriately and compared cognitive function (CF) of euthyroid older adults with those who had long-term hypothyroidism. Result showed that long-term treated hypothyroidism is not associated with impaired CF or depressed mood in old age. The lack of association with CF is reassuring with regard to long-term of thyroid hormone therapy."

Victor & Luc (2010) conducted a study "to examine the relationship between autoimmune thyroid disease and depression in 583 premenopausal women (age range from 47 to 54 yrs). These women were randomly selected from a community cohort of 6846 women. Thyroid function (TSH free T4 and thyroid peroxides antibodies) and depression (using the Edinburgh Depression Scale) was assessed cross-sectionally together with other department of depression. The main outcome measures were the occurrence of thyroid dysfunction (abnormal free T4 and/or TSH or elevated levels of Tpo-Ab) and the concomitant presence of depression according to the Edinburgh Depression Scale. Results revealed that neither biochemical thyroid dysfunction nor menopausal status was related to depression. Apart from several psycho-social determinants (the occurrences of a major life events, a previous episode of depression, or financial problems), an elevated levels of Tpo-Ab (> 1.00U/ml) was significantly associated with depression (odds ratio, 3.0, 95% confidence interval, 1, 3-6, 8). It was found that women with elevated Tpo-Ab levels are whereas post menopausal status does not increase the risk of depression."

According to various studies it has been found that many psychological factors influence health and well-being. Though the different psycho-social predictors have been studied separately, there are rare studies which have investigated the relative contribution of different psychological factors in hypothyroidism. Therefore in the present study the investigator has tried to investigate the role of psychological predictors in determining hypothyroidism among women.