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PSYCHOSOCIAL FACTORS OF THYROID DISORDERS

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ABSTRACT

Thyroid disorders are caused by deficiency or oversecretion of the thyroxine hormone. The burden of thyroid disorders is increasing in the general population today as evident by the epidemiological studies. Researches in the field of thyroid disorders examine many psychosocial factors that have a cause and effect role on overall health and well being of thyroid patients. The review indicates that lot of themes like personality characteristics of thyroid patients, quality of life, stress, adjustment and emotional factors have attracted attention of the researchers. Review also indicates that biopsychosocial management is required to be given more attention to improve the quality of life and well being of thyroid patients.

Keywords: Hypothyroidism, hyperthyroidism, personality, quality of life, life events* stress, psychosocial factors

INTRODUCTION

Until a little more than one hundred years ago, the nervous system was thought to be the single controlling force for all of the complex processes that go on in the human body. But when carefully analyzed, many phenomena, seemed to be important like the endocrine glands. The thyroid, one of the endocrine glands, is a butterfly shaped gland that is normally located in the lower front of the neck and produces thyroxin hormone. Thyroxin regulates the rate at which the body utilizes oxygen, controls the rate at which various organs function and controls the speed of metabolism. The influence of thyroid secretion on the body processes and other organs is incredibly widespread and important. The degree of severity of symptoms in the adult range from mild deficiency states (sub clinical hypothyroidism) to severe deficiency states which can be life threatening (myxedema). The clinical spectrum of hyperthyroidism varies from asymptomatic, sub clinical hyperthyroidism to the life threatening *thyroid storm*[1]. There may be other disorders also like thyroid eye disease, thyroid cancer etc.

The influence of mind on health has been recognized by medicine since its beginnings. Although it may have been underestimated at times, but it has never been ignored. In the forth century B.C. Hippocrates equated health to a harmonious balance of mind, body and environment. Literature is replete with studies relating to the significance of emotional or environmental phenomena being held responsible for psychosomatic disorders[2, 3]. The most classical formulation of emotional specificity was developed by Alexander, French and Pollock (1968)[4]. They saw all the psychosomatic disorders including thyrotoxicosis as embodying a psycho physiological expression of chronic dammed up emotions.

Epidemiological studies for relationships between psychosocial factors and patterns of illness in large population date back to the early 1960s. A study done for the U.S. Navy showed that men who had gone through serious life changes- a divorce, move, job loss or the like- had an increased chance of becoming seriously ill within the months following those upsets. A more recent and very significant series of studies covering thousands of people has shown that men and women with few social ties are significantly more likely to become ill and die than people with a rich network of family, friends and other social involvements. Dongier, Wittkower, Stephens-Newsham and Hoffman (1956)[5] found that there is no positive correlation between the degree of anxiety and the rate of thyroid secretion, but a

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family history of thyrotoxicosis was found to be an important determinant in the occurrence, even in the absence of clinical signs of hyperthyroidism.

Disease from a biomedical perspective was described in somatic parameters alone; there was little or no room for psychological, social and behavioral dimensions of illness within this model. In 1977, Engel[6] tried to develop a new framework that would account for the biological, psychological and social dimensions of illness and disease. This represented the development of the biopsychosocial model, which provide a basis for the understanding and treatment of disease, while taking into account the patient, his/her social context and the impact of illness on that individual from a societal perspective. There exists a considerable amount of data on the psychosocial factors related to thyroid disorders.

To determine the incidence and natural history of thyroid diseases Vanderpump, Tunbridge, French, Appleton, Bates, Clark, Grimley, Hasan, Rodgers and Tunbridge (1995)[7] did a survey for 20 years of a randomly selected sample and found that the incidence of spontaneous hypothyroidism in women was 3.5/1000 survivors/year rising to 4.1/1000/survivors/year and was negligible in men. The hazard rate, showed an increase with age in hypothyroidism but not in hyperthyroidism. A positive family history of any form of thyroid disease was not associated with increased risk of developing hypothyroidism.

The burden of thyroid disease in the general population is enormous. As many as 50% of people in the community have microscopic nodules, 3.5% have occult papillary carcinoma, 15% have palpable goiters, 10% demonstrate an abnormal thyroid stimulating hormone level, and 5% of women have overt hypothyroidism or hyperthyroidism[8].

Swain, Swain and Mohanty (2005)[9] reported that autoimmune thyroid disease is seen mostly in women between 30-50 years of age. Thyroid autoimmunity can cause several forms of thyroiditis ranging from hypothyroidism (Hashimoto*s thyroiditis) to hyperthyroidism (Graves* disease). Prevalence rate of autoimmune mediated hypothyroidism is about 0.8 per 100 and 95% among them are women. Graves* disease is about one tenth as common as hypothyroidism and tends to occur more in younger individuals.

According to[10] autoimmune thyroid diseases (AITD) are the far most common autoimmune disorders, their prevalence in Western countries exceeding 5% of the general population. In the large majority of individual cases the clinical impact of AITD is not severe; however, their widespread diffusion renders them a significant health problem. AITD are heterogeneous in their clinical presentation: the two main forms are autoimmune thyroiditis (AT) and Graves' disease (GD). Dogra, Dua and Singh (2006)[11] found gain in weight (71.85%) and lethargy (65.62%) to be the most common complaints. Dry course texture of the skin, pigmentary disorders and telogen effluvium were the most common findings. Other associated disorders were vitiligo, melasma, pemphigus, alopecia areata etc. Both hypothyroid and hyperthyroid disorders are known to cause these changes. Klecha, Brreiro, Frick, Genero and Cremaschi (2008)[12] also reported that in genetically predisposed individuals, the disruption of neuroendocrine-immune interactions by environmental factors results in thyroid autoimmune dysfunction.

Prevalence of subclinical hypothyroidism among pregnant women is fairly high among Indians and they have high rates of thyroid microsomal and peroxidase antibodies (TPO antibodies) positivity. Screening for hypothyroidism was recommended to be included as a routine screening test to improve maternal and fetal outcomes[13].

PERSONALITY STUDIES

One set of theories which began to gain currency in the 1950s, held that people with *disease prone personalities* were especially likely to develop specific illnesses. Coronary heart disease is especially common in people with a specific hostile and angry personality type (Type A). But with that exception, the notion that specific personality types are linked to specific illnesses has not been proven. There may be such a thing as a general disease prone personality type, one that gives the individual an overall higher risk of becoming ill. Numerous studies have emphasized the finding of a common personality pattern in patients who become hyperthyroid [14, 15, 16]. Most of these studies were done with a psychoanalytic orientation and emphasized the element of unresolved dependency needs in these patients. The persistence of unsatisfied dependency motivation makes them

particularly vulnerable to separation experiences, and such events are thought to precipitate symptoms of hyperthyroidism. Brown and Gildea (1937)[17] demonstrated the presence of deep seated personality disturbances in Graves* disease. Ruesch, Christiansen, Patterson, Dewees and Jacobson (1947)[18] studied hyperthyroid patients, who had been subjected to a sub total thyroidectomy. The personality profile of the thyroid group was found to be less abnormal than the chronic disease patients. It indicated that severe psychopathology in terms of behavior disorders and psychoses were not represented in this group of patients. Patients with delayed recovery from thyroidectomy had abnormal profiles, characterized by higher scores on the neurotic scales, on the psychopathic deviate and psychasthenia scales. Patients with normal recovery were also found to be more intelligent. In short, the patients affected by thyroid disease certainly are not entirely normal as far as sociopsychological aspects are concerned. Gildea (1949)[19] presented a summary of the distinctive personality features of hyperthyroid patients. The features of hyperthyroid patients were strong attachment to parents or surrogate, strong sense of insecurity but compelling sense of responsibility, inability to find outward path for expression of emotional experience and low degree of awareness of bodily disorders. Concerning the frequency of personality maladjustment the investigators agreed upon high incidence of depression, inward expression of emotions, and low awareness of body symptoms. Significantly frequent incidence was noted of insecure feelings and inferiority, temporal relation to stress and dependent needs. They were also found to be competent workers, sociable and well liked. Kleinschmidt (1956)[20] pointed out that experience of deprivation and frustrated dependency needs, including actual abandonment in childhood were common features in the histories of these patients. Jones (1959)[21] reported similar results. Hermann and Quarton (1965)[22] could not get specific personality and family patterns in the etiology of hyperthyroidism.

In an Indian study Sethi, Prasad, Manchanda and Prakash (1977)[23], used the Eysenck*s PEN inventory on psychosomatic patients and found that patients were lower on extraversion dimension and high on neuroticism dimension as compared to the normal group. Friedman and Booth-Kewley (1987)[24] analyzed the results of more than 200 studies purporting to link specific personality types to different psychosomatic disorders. Although they found little evidence for such specific linkages, they found a *generic *disease prone* personality that involves depression, anger/hostility, anxiety and possibly other aspects of personality.* These character traits, they found, seemed to raise the overall risk of disease. Precisely what disease an individual develops may depend largely on his or her specific vulnerabilities determined by family history, health related habits (smoking, drinking, and diet), environmental exposures, socioeconomic status, racial and ethnic background, as well as medical care. In a study by Draganic-Gajic, Lecic-Tosevski, Svrakic, Paunovic, Cvejic and Cloninger (2008)[25] participants were evaluated for personality and temperament characteristics and for platelet MAO activity. The results provide support for the psychosomatic concept of Graves' disease. Personality features, temperament traits, and platelet MAO activity of hyperthyroid individuals are different from those in normal controls and correspond to those observed in anxiety disorders. So it was proposed that the observed behavioral and biochemical similarities between hyperthyroid and anxiety disorder patients represent an equicausality phenomenon, where the same underlying heritable factors, such as variable central monoaminergic activity coupled with temperament-related susceptibility to stress, facilitate phenotypic manifestation of a number of psychosomatic and psychiatric disorders--including Graves* disease. The observed correlations between personality traits and MAO activity provide support for the hypothesized functional relationship between these.

Sinai, Hirvikoski, Vansvik, Nordstrom, Linder, Nordstrom and Jokinen (2009)[26] reported that high scores on aggressiveness and low scores on detachment were associated with a low T3/ T4 ratio.

QUALITY OF LIFE

People*s quality of life has become a significant issue in medical care because: it is reduced by becoming sick and by staying sick; it is an important consideration in prevention efforts before and after an illness occurs. Bianchi, Zaccheroni, Solaroli, Vescini, Cerutti, Zoli and Marchesini (2004)[27] found that all domains of health related quality of life (SF-36) except bodily pain were reduced in thyroid disease. Elberling, Rasmussen, Feldt-Rasmussen, Hording, Perrild and Waldemar (2004)[28] examined

the potential influence of thyroid hormones and psychiatric symptoms on the impairment of HRQOL in the thyrotoxic phase and HRQOL was found to be significantly impaired, in physical, mental and social dimensions. However, in some patients, HRQOL continues to be impaired even 1 year after initiation of treatment. The reduced HRQOL in the acute phase of Graves' disease was correlated to depressive and anxiety symptoms, but thyroid-associated orbitopathy also influenced HLQOL. McMillan, Bradley, Woodcock, Razvi and Weaver (2004)[29] found that despite thyroxin treatment, most thyroid patients report negative impact of hypothyroidism on quality of life, particularly on energy, physical capabilities, motivation, physical appearance and weight. Park, Sullivan, Mortimer, Waqenaar and Perry-Keene (2004)[30] indicated that Graves* Opthalmopathy profoundly affects quality of life and adequate education and counseling are essential for helping patients to cope with their illness. Wiersinga, Prummel and Terwee (2004)[31]; Kahaly, Petrak, Hardt, Pitz and Egle (2005)[32] found low quality of life in thyroid patient*s groups. Giusti, Sibilla, Cappi, Dellepiane, Tombesi, Ceresola, Augeri, Rasore and Minuto (2005)[33] found that differentiated thyroid carcinoma patients suffer an impairment of their quality of life, but longitudinal evaluation indicated a slight improvement. Suwalska, Lacka, Lojko and Rybakowski (2005)[34] found that hyperthyroid patients show decreased quality of life and health state (specifically on physical domain) and there was an association between quality of life and anxiety level. Depressive symptoms were also found to be frequent in hyperthyroidism. Davids, Witterick, Eski, Wallfish and Freeman (2006)[35] reported a very small reduction in the quality of life of thyroid cancer patients undergoing an induced 3 week hypothyroid state. The reduction was only in the physical well being category. Watt, Groenvold, Rasmussen, Bonnema, Hegedus, Bjorner and Feldt- Rasmussen (2006)[36] reviewed studies reporting on consequences of thyroid disorders and presented the frequency of identified aspects. According to the studies, patients with untreated thyroid disease suffer from a wide range of symptoms and have major impairment in most areas of HRQL. Furthermore, the studies indicate that impairments in HRQL are also frequent in the long term.

Watt, Hegedus, Rasmussen, Groenvold, Bonnema, Bjorner and Feldt-Rasmussen (2007)[37] interviewed thyroid experts and thyroid outpatients about which domains of quality of life are most relevant. Patients rated the issues about psychosocial problems and impact on daily life as more relevant, whereas clinicians focused on thyroid-characteristic issues.

McMillan, Bradley, Razvi and Weaver (2008)[38] used an 18-item under active thyroid dependent quality of life questionnaire (ThyDQoL) on 110 adults with overt and subclinical hypothyroidism. All 18 domains of ThyDQoL were rated as negatively impacted by hypothyroidism. Hoftijzer, Heemstra, Corssmit, Romijn and Smit (2008)[39] assessed quality of life in cured Differentiated Thyroid Carcinoma patients who had significantly decreased quality of life in most of the subscales when compared with control group. Quality-of-life parameters were not influenced by serum TSH levels both measured at the time of quality-of-life assessment and measured over time since initial therapy. It was concluded that patients cured for Differentiated Thyroid Carcinoma have impaired quality of life, independently of TSH level. Quality-of-life may be restored after prolonged follow-up. Sato, Nakamura, Harada, Kakee and Sasaki (2009)[40] found that mean WHO Quality Of Life scores were 3.51 +/- 0.43 for male patients and 3.59 +/- 0.42 for female patients, and there were no significant differences between them and healthy individuals (men, 3.32 +/- 0.42; women, 3.35 +/- 0.49). No significant difference was observed between patients and healthy individuals on any domain of the WHO/QOL. Women patients with subclinical hypothyroidism indicated great dissatisfaction with health status with the exception on role-emotional and bodily pain domains. Overt hypothyroidism was associated with worse perception of health status[41]. Lee, Roh, Yoon and Lee (2010)[42]; Ponto & Kahaly (2010)[43] and Watt, Rasmussen, Hegeds, Bonnema, Groenvold, Bjorner and Feldt- Rasmussen (2011)[44] reported differences between thyroid patient groups in almost all of the quality of life scales and they found thyroid associated opthalmopathy patients to be most severely impacted.

STUDIES RELATED TO STRESS

There are many studies which show that psychological and physiological stressors induce various immunological changes. Stress affects the immune system either directly or indirectly through the nervous and endocrine systems. These immune

modulations may contribute to the development of autoimmunity as well as the susceptibility to autoimmune disease in genetically predisposed individuals. There are many evidences of relationship between the onset of Graves* hyperthyroidism and major stress, and most of the recent case control studies have supported stress as one of the environmental factors for thyroid autoimmunity

Lidz (1955)[45] carried out a study to show that pregnancy is a period of particular vulnerability because it is a time of marked physiologic alteration in thyroid activity. The findings support the probability that emotional disturbances play an essential role in the etiology of hyperthyroidism. Kleinschmidt (1956)[20] found that a traumatic event was chronologically related to the onset of thyrotoxicosis in 85% of a large series of cases. Similar findings have also been reported by Nemeth and Ruttkay-Nedecky (1958)[46].

Hinman (1957)[47] emphasized traumatic experiences of loss or separation in the etiology of hyperthyroidism. He also noted an increased incidence of such experiences (for ex. the death of a sibling) in the early years of the patient*s lives. They suggested that hyperthyroid patients regress to an earlier stage of fixation when faced with a separation trauma, and that the hyperactivity of the thyroid in childhood is reactivated. Vinokur and Selzer (1975)[48] found that accumulation of life events was correlated with self reported tension and distress with emotional disturbances. These relationships did not hold for desirable life events, but did for undesirable events. In a study Makosky (1980)[49] found that women experience more life event changes than men, interpret the same changes as more stress producing, and are affected more strongly by events which they can not control. Examining the stress on women Nelson and Quick (1985)[50] found that certain events such as marriage, separation, divorce and death of close friends and relatives are more stressful for women. Although women tend to have better established social support networks, which may buffer the individual from stress, they also tend to be less active in coping with the source of the stress event. Gray and Hoffenberg (1985)[51] discussed that there may be a slight excess of stressful events in the histories of the thyrotoxic patients but their timing in relation to the onset of symptoms did not support a causal relationship.

Kua, Tsoi, Cheah, Thai and Yeo (1987)[52] found that patients, who had been treated previously for hyperthyroidism but relapsed, seemed to have encountered more stressful life events in the past 12 months, when compared to patients with first occurrence of the illness. Physical fitness and social support moderate the relationship between stress and illness[53]. Winsa, Adami and Bergstrom (1991)[54], Harris, Creed and Brugha (1992)[55] found that in comparison with controls, patients claimed to have had more negative life events in the 12 months preceding the diagnosis, and negative life-event scores were also significantly higher. Individuals who had relatives with thyroid disease (especially first-degree and second-degree relatives) were more likely to have Graves' disease. These findings indicate that negative life events and hereditary factors may be risk factors for Graves' disease. Sonino, Girreli, Boscaro, Fallo, Busnardo and Fava (1993)[56] reported an excess of life events in Graves* disease which had a negative impact, even when rated by an independent rater. Bauer, Priebe, Kurten, Graf and Baumgartner (1993)[57] researched the effects of chronic stress on hormone secretion in human subjects and demonstrated reductions in both TSH and thyroid hormone concentrations. Rosengren, Orth-Gomer, Wedel and Wilhelmsen (1993)[58] found that stressful life events are associated with high mortality in middle aged men but men with adequate emotional support seem to be protected. Ptacek, Smith, Dodge and Kenneth (1994)[59] in an attempt to control for the effects of event type on sex differences in coping, men and women responded to an identical achievement-related stressor under controlled laboratory conditions. Although men and women were similar in their cognitive appraisal of the situation, they nonetheless reported differences in preparatory coping. Women reported seeking social support and using emotion-focused coping to a greater extent than men, whereas men reported using relatively more problem-focused coping than women. The masculinity and femininity of respondents failed to moderate the relation between sex and coping. These results are inconsistent with a purely situational explanation of sex differences in coping but are consistent with the notion that men and women are socialized to cope with stress in different ways. Stress can take its toll in many ways,

producing both biological and psychological consequences. On a short term basis, stress responses can be adaptive because they produce an *emergency reaction* in which the body prepares to defend itself through activation of the sympathetic nervous system. These responses can allow more effective coping with the stressful situation[60, 61]. However continued exposure to stress results in a decline in the body*s overall level of biological functioning due to the constant secretion of stress related hormones. Overtime, Stressful reactions can promote deterioration of bodily tissues and thus, we become more susceptible to disease as our ability to fight off infection is lowered[62, 63, 64].

Jankovic, Radosavljevic and Marinkovic (1997)[65] associated following factors with the occurrence of Graves* disease * change in time spent on work, much overtime work, second job, much less work than usual, lack of readiness of relatives and friends to help the subject, increased arguments with spouse, unemployment for at least one month and family history of Graves* disease in the first degree of relation.

Yoshiuchi, Kumano, Nomura, Yoshimura, Ito, Kanaji, Ohashi, Kuboki and Suematsu (1998)[66] reported that psychological strss and smoking were associated with Graves* disease in women but not in men. Ehlert and Straub (1998)[67] in a review discussed that stressors in humans induce emotional arousal, which leads to physiological activation of the central nervous system, an increase of hormones of the HPA axis and coping reactions on the psychological and behavioral level. Depending on the type, intensity, and duration of the stressor on personal and psychosocial resources of the individual, stressful situations may provoke emotional and physical disturbances. These disturbances may result in psychosomatic or psychiatric disorders. In a recent study[68] Graves* patients were found to be under stress. Experts believe that once the stressful period is over and the weakened immune system bounces back to normal again, it may bounce back too aggressively and *attack* normal tissue. Kung (2000)[69] found that more Graves* disease patients than controls reported negative events, whereas the number of subjects reporting positive and neutral events were similar in both groups. Graves* disease patients also experienced more negative events and perceived them with higher ratings. Similarly Graves* disease patients reported more daily hassles and had higher hassle scores. They concluded that as stress may alter the immune system, it could play an important role in precipitating the disease in subjects predisposed to autoimmune thyroid disorders. Matos, Nobre, Costa, Noqueira, Macedo, Galvao, and de Castro (2001)[70] studied Graves* and non autoimmune thyrotoxicosis (toxic nodular goitre) patients and found that stressful life events are a precipitating factor of the onset of Graves* disease but they do not seem to have any conclusive relationship with the onset of toxic nodular goiter. Fukao, Takamatsu, Murakami, Sakane, Miyauchi, Kuma, Hayashi and Hanafusa (2003)[71] evaluated hyperthyroid patients with three questionnaires: MMPI, a general stress inventory and inventory of stress in daily life. The scores for hypochondriasis, depression, paranoia and mental fatigue were higher in the patients who had recurrent hyperthyroidism, as compared with the patients who remained euthyroid. The score for daily hassles was higher in the patients who had recurrent hyperthyroidism. They suggested that escape from life events is virtually impossible, thus coping strategies suggested by the physician may be useful in improving prognosis. Reviewing the association between stress and thyroid autoimmunity Mizokami, Wu, El-Kaissi and Wall (2004)[72] discussed that the best circumstantial evidence for an effect of stress on autoimmune thyroid disease is the well-known relationship between the onset of Graves' hyperthyroidism and major stress and stress can be one of the environmental factors for thyroid autoimmunity. Sonino, Navarrini, Ruini, Ottolini, Paoletta, Fallo, Boscaro and Fava (2004)[73] assessed the frequency and characteristics of psychological distress, after adequate treatment. They found that there were 81% cases who presented with at least 1 psychiatric or psychological diagnosis. The most frequent diagnostic findings were generalized anxiety disorder (29%), major depression (26%), irritable mood (46%), demoralization (34%) and persistent somatization (21%). By self rated instruments, patients with at least 1 diagnosis reported significantly more stressful life circumstances, psychological distress and an impaired quality of life compared to those who had none.

Cropley and Steptoe (2005)[74] found that high life stress was associated with greater symptom reporting. However, perceived social support did

moderate physical symptom reporting in those reporting recent high stress. For chronically high stressed individuals there was no significant difference in physical symptoms between those with high or low social support. It was concluded that social support moderates the impact of recent but not chronic life stress on physical symptom reporting.

STUDIES RELATED TO ADJUSTMENT

Adjustment is continuous, and it also exists on a continuum. At one end there is the so called well adjusted person, who in many respects is ever changing and ever adapting. At the other end is the poorly adjusted person, who may show signs of anxiety, aggression or disordered thinking. These two ends of the continuum, successful adjustment and maladjustment, are both elusive concepts. In fact, the distinction between well-adjusted and poorly adjusted is a difficult one but the validity of these concepts can not be denied. According to a study by Ruesch, Christiansen, Patterson, Dewees and Jacobson (1947)[18] when a change in the environment forces the individual to adjust, break down frequently occurs and inability to adjust appears. For events occurring within one year of the onset of the symptoms, the addition of a person to the family circle by means of birth, marriage or the acquisition of intimate boy or girl friends occurred in one-seventh of the cases. The reverse namely the elimination of a person by means of divorce, forced separation or death, occurred in one-third of the cases. In addition, half of the men were irritated by change of working conditions, involving the wider social environment. The frequency of these environmental changes was about the same as that of the patients with chronic disease and psychological invalidism. It would follow that thyroid patients do not possess the necessary social techniques to adjust to changes of the environment. This may be due either to the fact that thyroid disease impairs the adaptive behavior of the individual, or that the individual who is maladjusted is more susceptible to thyroid disease. Regardless of the conclusion made, the fact was established that onset of thyroid symptoms is frequently associated with maladjustment. These patients had been the older or oldest children in the family. There were 29 per cent oldest and 22 per cent second oldest children in the sample. So it was concluded that these patients had to take premature responsibilities which statement is supported by considering the unusual number of broken homes. When one or two parents die, separate, divorce or are otherwise physically or mentally incapacitated, the responsibility for them, as well as for the younger siblings, frequently rests with the older or oldest children. This in turn deprived these patients of play and social intercourse during adolescence.

EMOTIONAL FACTORS

A survey of the literature shows that a reciprocal relationship between the emotions and the thyroid has been reported for more than a century. Parry (1825)[75] described a case of a young girl whose thyrotoxicosis followed a severe fright. Graves (1835)[76] in his description of his first case, devoted much discussion to the possible role of a hysterical disturbance. Many clinicians have reported striking illustrations of the precipitation of acute thyrotoxicosis by severe emotional traumas. A wide variety of acute psychological traumas have been incriminated as precipitating factors of the disease[77, 78]. It soon became apparent that these observations were of limited value and that it was not the type of experience that mattered, but the individual*s response and the symbolic meaning it had for him in the light of his previous life history and development. Subsequently attention was focused on a dynamic study of thyrotoxic patients. Lewis (1925)[79] expressed the view that physiological changes in the thyroid gland represented a symbolic equivalent of regressively revived infantile impregnation fantasies. Marked abnormalities of the mother-child relationship were noted by Conrad (1934)[80]. Mandelbrote and Wittkower (1955)[81] found high neuroticism in the thyrotoxic group with the emphasis on increased anxiety, subnormal assertiveness and depression and they suggested a comprehensive approach to the management and treatment of thyrotoxicosis. Shirley (1956)[82] found that thyrotoxicosis occurs when psychological defense mechanism failed. For effective treatment, essential for the physician is to understand his patients* life long patterns of reactions, his possible modes of adaptation, and the subjective experience of his illness. Chatterjee and Khandpur (1965)[83] studied emotional disturbances in thyroid disorder patients and found that even if the physical manifestations of thyroid disorder are not present, the psychic symptoms in the mental sphere could be exhibited. These cases had both symptoms of

thyrotoxicosis and psychic equivalents. On getting euthyroid, these patients had a tendency to get to normal behavior. But if there is a tendency to overshoot on hypo side there were frequent relapses with neurotic symptoms. Chao, Yanq, Hsu and Jonq (2009)[84] emphasized that children with congenital hypothyroidism had more problems in emotional-behavioral domains than sibling controls, and caregivers of these children had much parenting stress. So psychological intervention is needed in this subgroup of patients and their parents.

COGNITIVE FACTORS

Overt hypothyroidism is associated with cognitive impairment which can be reversed if treated early and appropriately.

Kramer,von Muhlen, Kritz-Silverstein & Barrett-Connor (2009)[85] found no impairment in cognitive functions or depressed mood in old age with regard to long term use of thyroid hormone therapy. Parle, Roberts, Wilson, Pattison, Roalfe, Haque, Heath, Sheppard, Franklyn and Hobbs (2010)[86] found no evidence for treating elderly subjects with subclinical hypothyroidism with T4 replacement therapy to improve cognitive function.

MANAGEMENT

Thyroid disorers have been treated relatively successfully using pharmacological agents for many years. However, the treatment and management has been approached purely from a biomedical standpoint. Thyroid hormone levels that are considered inappropriate are restored using pharmacological supplementation. This management requires a life long commitment to drug therapy. In addition to this, significant proportions of patients under the current management protocol continue to experience the plethora of signs and symptoms associated with hypothyroidism, even though their thyroid hormone levels are returned to normal. Approximately one fifth of hypothyroid patients are receiving an inadequate thyroxine dose and a fifth is given an excess of the synthetic thyroid hormone. Weetman (1997)[87] states that overzealous supplementation can lead to an increased risk of osteoporosis in postmenopausal women and atrial fibrillation in the elderly. Another important issue that has been raised within the current literature is the suitability of modern treatment strategies for the elderly. Elderly patients often present with an extensive list of different medications that they are taking in combination. In prescribing an additional longterm pharmacological agent to the patient presenting with reduced thyroid hormone levels, practitioners must consider the issue of drug interaction. This debate is especially relevant as this group of patients makes up a substantial proportion of the thyroid population[88]. It is important to provide multidisciplinary care in chronic diseases (eg rheumatoid arthritis) as the implementation of programmes of this nature, may not only improve functioning, but may lead to improvement in disease activity. The World Health Organisations (WHO) International Classification of Functioning, Disability and Health (ICF), describes a framework for understanding and structuring the impact of disease on individuals. A person's functioning and disability is described as a dynamic interaction between health conditions and contextual, environmental and personal factors. Health conditions encompass disease, disorders, injuries and traumas. Contextual, environmental and personal factors describe the psychosocial elements of a person's life[89]. These guidelines align favorably with the biopsychosocial paradigm. Proportion of the hypothyroid population. The biopsychosocial model represents the latest ideas in chronic illness management and compliments recent ideas in pain theory. It states that in order to rationalize and contend with chronic conditions, one must take into account the influence of biological, psychological and social factors. The biopsychosocial model is gaining acceptance within educational institutions and medical fields and is proving very successful in the areas in which it is applied[90]. Hypothyroidism is one chronic condition that may benefit from the application of the biopsychosocial model. Application of biopsychosocial-based interventions/ therapies may help mediate some of the signs and symptoms associated with hypothyroidism. If nothing else this model represents an adjunctive framework that may facilitate a more consistent management of this chronic disease.

However, there is research to suggest that a significant proportion of hypothyroid sufferers are being inadequately managed [91, 92]. Furthermore, hypothyroid patients are more likely to have a decreased sense of well-being and more commonly experience constitutional and neuropsychiatric complaints, even with pharmacological intervention. Little consideration has been given to a

biopsychosocial approach to this condition. There is growing support for the use of a new biopsychosocial-based intervention called Neuro-Emotional Technique (NET) for hypothyroid patients. This technique identifies the psychosocial factors that cause dysfunction and attempt to correct them. The methods used are informing patients of their condition and how psychosocial factors can induce it, and educating patients on the mind-body connection and how this interaction can be not only the *cause* of the condition, but also a therapy. NET therapy also uses cognitive restructuring. Brown, Bonello, Pollard and Graham (2010)[93] are assessing the influence of this technique on the patients with primary overt hypothyroidism. The study will provide information on this technique when added to existing management regimens.

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