

The Quest for Better Care of Hypothyroidism Patients

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Patients with hypothyroidism typically have a thyroid hormone deficiency and clinically present tiredness, weight gain, dry skin, cold intolerance, constipation, muscle weakness, puffiness around the eyes, hoarse voice, and poor memory. Inadequate thyroid hormone (TH) replacement is associated with an increased risk of cardiovascular events, fractures, dyslipidemia, neurocognitive dysfunction, and diminished energy, motivation, strength, and quality of life (Dew et al., 2017). Patients' emotional, relational, and working life may also suffer. The standard of care for hypothyroidism, levothyroxine (LT4), does not relieve symptoms in one third of patients (Dew et al., 2017), but no alternative non-thyrotoxic drugs have proved more effective. The American Thyroid Association (ATA) reported a doubling in the incidence of hypothyroidism in the U.S. in 20 years, from 4 percent in 1996 to 8 percent in 2016 (ATA, 2020). Hypothyroidism patients whose condition has not responded to medical treatment can nevertheless live rewarding lives.

Wellbeing is characterized by its complex combination of physical, mental, emotional, and social health factors (HHS, 2022). Wellbeing is not dependent solely on physiological health; improvement in any one of these factors can improve wellbeing overall. Patients and caregivers who distinguish physiological condition from personal wellbeing can therefore promote wellbeing despite the burdens of a serious medical condition. In innumerable ways, caregivers and patients have found means of cultivating patient wellbeing. Relative success depends upon the patient's emotional resources and personal network, which are variable and interdependent. But patients are also distinct individuals; optimal care for one may not be optimal for another. Patients and caregivers who recognize that personal wellbeing is not entirely dependent upon physiological condition and who suit the wellbeing care to the particular patient can sometimes

make life with hypothyroidism more bearable than a conventional medical assessment alone would suggest.

Literature Review

Researchers have demonstrated the deficiencies of LT4 therapy and proposed alternatives. Seeking to improve communication between physicians and patients and their relatives, Jaeschke and colleagues (1994) evaluated patients' response to LT4 therapy through a health-related quality of life (HRQOL) survey.

Mayor (2018), through a systematic review and meta-analysis, found that thyroid hormone therapy is not correlated to the improvement in symptoms or the general quality of life in patients with subclinical hypothyroidism. The meta-analysis references four studies reported to JAMA, consisting of 858 participants who were allocated either TH therapy or placebo (Feller et al., 2018). It showed no benefits in depressive symptoms, cognitive function, muscle strength, and tiredness. In another study, Mayor (2017), revealed LT4 is not beneficial for elderly patients with subclinical hypothyroidism by assigning 737 participants aged over 65 with subclinical hypothyroidism LT4 or placebo. In the LT4 group, patients reported no significant relief of symptoms, and only a small increase in Thyroid Quality of Life Patient Reported Outcome (ThyPRO). For the treatment of patients who do not respond to LT4 therapy, Thung, Funai, and Grobman (2009) recommend a decision analysis model comparing the cost effectiveness of routine screening of serum TSH levels. The model predicts that universal screening is the dominant strategy with a 589.3 marginal cost per quality-adjusted life year (QUALY) gain for every 100,000 pregnant women screened.

Some medical professionals have called for efforts to improve care for hypothyroidism patients. Such advocacy is consistent with ATA's official mission: "Transforming thyroid care through clinical excellence, scientific delivery and advocacy in a collaborative community" (ATA, 2022). The Substance Abuse and Mental Health Services Administration (SAMHSA) concurs with the advocates: "physical diseases can also present with or mimic mental disorders (e.g. hypothyroidism presenting with or like depression) and need to be identified and treated accordingly" (SAMHSA, 2020). The American College of Thyroidology (ACT) agrees that "thyroid care needs to improve." ACT's mission "is for people to have the chance to fully recover from thyroid illness" (ACT, 2022).

Some medical professionals favor the development of new hormone replacement drugs and delivery systems and optimization of the current LT4 therapy. Kent Holtorf, M.D. (2014) emphasizes, "timed-released T3 supplementation should be considered in all depressed and bipolar patients... (and) straight T4 should be considered inappropriate." The Institute of Medical Education (IME) at Jinnah Sindh Medical University and the Jinnah Postgraduate Medical Center's (JPMC) department of internal medicine are advocating to improve the wellbeing of hypothyroid patients by evaluating the environmental trends contributing to adherence and efficacy of LT4 treatments (Kumar & Shaukat, 2019). They attribute low drug adherence to the "need for assistance in taking medication, avoidance of medication with symptomatic relief and busy work schedule." Conversely, they found that regular endocrinologist visits and knowledge about medication contribute to high drug adherence.

Griffiths (2020) interviewed endocrinologists to learn how clinics adopt hypothyroidism initiatives, finding that with will, skill, and confidence, physicians can meet patients' diverse psychosocial and self-management needs. Physicians were reluctant to abandon drug therapies in

favor of alternatives such as self-management support, citing patients' tendency to adopt non-standard drug treatments and insufficient referral services. To adopt patient-centered care, physicians said they needed more support in the form of research, funding, and infrastructure (Griffiths, 2020).

Chronic diseases, including Hypothyroidism, bequeaths patients demanding physical, emotional, and social challenges that require lifestyle behavioral changes, such as improved nutrition, stress management, exercise, and coping skills, to improve quality of life and wellbeing (Elliott-Wherry et al., 2022). Numerous studies on environmental factors involved with chronic disorder, multiple sclerosis (MS), suggest behavior choices have a greater impact on MS severity than genetics (Lauer, 2010). Bisht (2014, 2015, 2017) and Lee (2017) further exemplified the positive effects of lifestyle behavioral changes on the wellbeing of people with MS. The initiation of a combination treatment of diet, exercise, stress management, and neuromuscular electrical stimulation, resulted in significant improvement in fatigue, quality of life, walking performance and balance, mood, and cognitive symptoms of participants (Bisht et al., 2014, 2015, 2017; Lee et al., 2017).

Bandura (2001) and his Social Cognitive Theory (SCT) reemphasizes patients' capacity to exercise control over their own wellbeing and quality of life. SCT explains human behavior through three modes of agency that are in continual interaction: personal agency (personal), proxy agency (environmental), and collective agency (behavior) (Bandura, 2001). Sebastian (2021) assessed the role of personal and environmental factors in an individual's health behavior to further understand chronic diseases and wellbeing factors by investigating the influence of social cognitive domains, self-efficacy, self-regulation, social support, and outcome expectancy, on physical activity and dietary behavior of patients with type-2 diabetes. All of SCT domains

were significantly correlated with physical activity, and domains, self-regulation, social support, and outcome expectancy had a significant correlation to dietary behavior. Self-regulation and self-efficacy were deemed the greatest predictors of physical activity behaviors, whereas social support and self-regulation were the greatest predictors of dietary behavior (Sebastian et al., n.d.). Bandura (2001) asserts that the, “Social cognitive theory, in its totality, specifies factors governing the acquisition of competencies that can profoundly affect physical and emotional well-being as well as the self-regulation of health habits.” Self-efficacy equates to the personal belief that a task can be achieved, self-regulation describes the management of behavior through planning, goal setting, and self-monitoring, and social support refers to the behavior assistance one receives.

Hypothyroidism truly is not a condition with a one-size fits all treatment. Broadening the understanding of alternative or combinations of approaches may reverse the sense of learned helplessness that hypothyroidism patients incurred after repeated inadequate relief of symptoms from standards of care treatments. I aim to elucidate the lifestyle behavioral changes have an impact on physical, emotional, mental, and social factors that contribute to overall hypothyroidism patient wellbeing. The goal is to shift the locus of control to the patient, using the results of the social cognitive theory on other chronic diseases as proof of efficacy, where the acquisition of competencies that can profoundly affect physical and emotional well-being as well as the self-regulation of health habits. A majority of persistent hypothyroidism symptoms are related to mood, motivation, fatigue, which may be improved through diet, exercise, social interaction, and management of stress. Finding the optimized and patient specific behavior change model and modes of lifestyle changes does not undermine the pathological significance of hypothyroidism, but may have a significant impact on patient wellbeing.

Patients, caregivers, associations of medical professionals, advocacies, and others are working to promote lifestyle behavior changes, such as increased activity, improved nutrition, social interaction, and reduced stress, that can profoundly affect overall wellbeing despite the inadequacies of clinical therapies. Holistic, and naturopathic physicians and their respective associations are exploring non-prescriptive treatments. Hypothyroidism patients are testing new modes of exercise and diet, as well as increasing the use of social interaction to improve their wellbeing. Allopathic physicians and psychosocial professionals are implementing various behavior change models to increase participation in lifestyle interventions.

Exercise

Regular physical activity is one of the most effective manners of improving health and initiating the trend to an improved wellbeing for all people, regardless of disease state. The Center for Disease Control and Prevention (CDC) (2022) declared, “Being physically active can improve your brain health, help manage weight, reduce the risk of disease, strengthen bones and muscles, and improve your ability to do everyday activities” (CDC, 2022). In addition to the physical health benefits of exercise, physical activity has many well-established mental health benefits. The U.S. Department of Health and Human Services (2021) disclosed the benefits of “improved brain health and cognitive function (the ability to think, if you will), a reduced risk of anxiety and depression, and improved sleep and overall quality of life” in their *Physical Activity Guidelines for Americans*, concluding the direct contribution physical activity has on improved mental health and better overall health and well-being (HHS, 2021). Likewise, The National Health Service (2021) postulated, physical activity can also boost self-esteem, mood, sleep

quality and energy, as well as reducing your risk of stress, and clinical depression (*Benefits of Exercise, 2022*).

The management of lifelong conditions like hypothyroidism is a demanding task, often contributing to emotions of anger, frustration, or sadness that are only exacerbated by the physical stressors of the disease, insufficient sleep and nutritional deficiencies. Avoiding a sedentary lifestyle can have extraordinary beneficial effects on a patient's emotional status and wellbeing. Daily exercise can help raise your metabolism, reduce your fatigue and muscle pain, curb your appetite, lower blood glucose levels, increase your serotonin levels, and lower your cortisol levels, optimizing thyroid health and managing hypothyroidism weight stressors (Verywell Health, 2022). Patients and researchers are testing new modes of exercise in an attempt to find the paradigmatic regimen of hypothyroidism physical activity. One challenge of sustaining regular exercise in hypothyroidism patients is the delayed results due to the disease's metabolic hindering effects. Effective approach is shown to be choosing a form of exercise the patient enjoys like dancing, gardening, hiking, or swimming (Verywell Health, 2022). Another effective incentivization strategies are easy-to-do and effective overall fitness programs. One favorite amongst hypothyroidism patients is T-Tapp. A program that combines aerobic and muscle-building routines in gentle, short sequences. Yoga has also shown to have positive healing and wellbeing effects on hypothyroidism patients (Bhavanani & Madanmohan, 2011; Nanduri et al., 2020; Singh et al., 2011).

In a case study, Nanduri (2020) reviewed cases of hypothyroidism healed successfully using Yoga Prana Vidya (YPV) Healing system working as complementary medicine and reported positive improvement results from methods by healers and also use of some self-healing techniques by the patients, enabling them to have controlled level of hypothyroidism and overall

health. YPV is a non-touch non-drug bio-energy healing method that has been used successfully to heal patients with diabetes and difficult and multiple medical conditions. It is a holistic approach that integrates a set of simple physical exercises, fruit and saltless vegetarian diet, Rhythmic Yogic Breathing (RYB), Superbrain Asana (SBA) and meditation to address various ailments in the body at the same time (Nanduri et al., 2020). Nanduri (2020) presents two cases (one female and one male) as prima facie evidence of how Hypothyroidism was successfully healed by Yoga Prana Vidya (YPV) as complementary medicine technique. To produce holistic and optimum results, YPV uses a combination of approaches: physical exercises including rhythmic yogic breathing, Salt free diet; fruit diet, Meditation techniques, healing by trained and experienced healers, patient participation in group healing, self-healing by patients with regular self-practice of some specified techniques (Nanduri et al., 2020).

YPV is an exercise healing technique with proponents of the techniques geared to the science of the healing process based on the basis of healing. Nanduri (2020) synthesis the Basis of Healing as the, “principle that body has an ability to heal or normalize itself. Increasing the energy level accelerates the healing process. Energy follows thought. Therefore, the intention of the healer directs and facilitates the flow of energy, by receiving and sending Prana/energy to the person being healed. Also receptivity or willingness of the patient makes him or her to absorb the energy easily and facilitates the healing process.” The concepts elucidated by the authors are in accordance with social cognitive theory domains, self-efficacy, self-regulation, and social support, indicating that this method of exercise may have a direct influence on hypothyroidism patient emotional wellbeing, in addition to the physical healing effects (Nanduri et al., 2020).

In another case report, Bhavanani and Madanmohan (2011) assessed the effect of yoga on subclinical hypothyroidism. This study concluded that after one year of yoga therapy, there was a

fall in TSH (2.66 mIU/L) and a normalization of free T4 values (8.98pmol/L). Proving yoga can be an effective adjunct therapy in thyroid conditions, and further studies in larger samples are needed to better understand the mechanisms behind such beneficial effects in patients of thyroid disorders (Bhavanani & Madanmohan, 2011). Singh (2011) studied the effect of yoga on the quality of life and wellbeing of female hypothyroid patients. Through the WHO Quality of Life Scale, the study assessed the quality of life of 20 female hypothyroid patients that attended a one hour yoga session daily for one month. Using a pretest-posttest design, it was found that patients' quality of life scores following the yoga program were greater than scores obtained prior to undertaking yoga, and significant improvement in their perception of the overall quality of life and of their health post yoga intervention (Singh et al., 2011). These findings imply, yoga is a valuable tool to help hypothyroid patients to manage disease-related symptoms, further emphasizing the beneficial effects of exercise on the hypothyroidism patient's wellbeing.

Nutrition

Hypothyroidism is a metabolic disorder that affects a multitude of systems in the human body, suggesting one mode of therapy, e.g. medication, may not be effective in relieving symptoms and improving the wellbeing and quality of life of the diseased person. In response, many medical professionals have turned to the utilization of a holistic or naturopathic approach to thyroid disease. Holistic, and naturopathic physicians and their respective associations are exploring non-prescriptive treatments.

Holistic health nurse practitioners, Marcy Holmes and Marcelle Pick (2014), defend their choice by explaining, “healthy hormone function doesn’t come in a pill — it requires holistic support”, and expanding that, “the bottom line is that nutrition, stress management, and exercise

are the keys to your well-being — and optimal thyroid function is not likely without them”(Holmes & Pick, 2014). The Care Group, P.C., also implements a holistic approach to hypothyroidism through the determination of the underlying cause of symptoms, then the creation of a plan that may include prescription thyroid hormone, nutritional supplements, and dietary changes (thecaregroupcc, 2017). Hypothyroidism is associated with many nutritional deficiencies that contribute to the symptoms, and this group uses both mineral therapies and dietary changes to mitigate deficiencies, effectually decreasing hypothyroidism symptoms and improving their patients wellbeing.

Iodine, selenium, and vitamin A deficiencies are all related to hypothyroidism and boosting these nutrients can have direct effects on wellbeing. Iodine is a mineral that is required for the production of thyroid hormone, and is an essential nutrient (thecaregroupcc, 2017). This means that your body cannot make it on its own, and therefore you must get it from food. Selenium is required for the conversion of T4 to the more active T3, and is also an essential mineral that must be provided by the diet (thecaregroupcc, 2017). The incorporation of brazil nuts into a patients diet will increase the necessary selenium. Turker (2001), showed that selenium supplementation improves thyroid function and reduces antibody production in patients with Hashimoto’s thyroiditis (Turker et al., 2006). Vitamin A has a synergistic relationship with the thyroid where it regulates thyroid hormone metabolism, and synthesis of vitamin A requires the thyroid hormone. Vitamin A is in beta carotene in foods like carrots and sweet potatoes (thecaregroupcc, 2017). Farhangi (2012) studied the effects of vitamin A in hypothyroidism, and showed supplementation improves thyroid function and might reduce the risk of subclinical hypothyroidism (Farhangi et al., 2012) .

A Gluten-free diet has also been shown to improve the wellbeing of hypothyroidism patients. Diamanti (2016) found that people who have a severe reaction to gluten also have a greater risk for the autoimmune form of hypothyroidism, Hashimoto's thyroiditis (Diamanti et al., 2016). Less severe gluten sensitivities also create inflammation in the body. This inflammation results in less control over the autoimmune disease, and in the case of Hashimoto's thyroiditis, increased hypothyroidism symptoms (thecaregroup, 2017). Under-going a gluten-free diet can lessen symptoms and improve Hashimoto's thyroiditis hypothyroidism patients wellbeing.

The Institute for Natural Medicine and American association of Naturopathic physicians (AANP) also acknowledge, "Regulation of thyroid function can be tricky and requires a whole-person approach" and therefore, "NDs [Naturopathic physicians] lead with natural therapies that address underlying causes and support the body to restore healthy function"(INM & AANP, 2022). Naturopathic doctors rarely use medication as a standalone treatment, instead individualizing hypothyroid treatment by combining diet, supplementation, botanical medicine, and conventional pharmaceuticals as needed. They report that conventional standard of care medical treatments for hypothyroidism, such as LT4, LT3, NDT, may be effective for some patients, but others with Hashimoto's taking thyroid hormone alone does not fully address the underlying cause of dysfunction. In this case, NDs control inflammation and eliminate autoimmune triggers by addressing lifestyle and environmental factors that contribute to low production (INM & AANP, 2022). Like holistic health physicians, NDs emphasize the importance of Diet to prevent and manage conditions that can accompany thyroid disease. They also acknowledge the chronic persistent microbiome imbalance and inflammation in the gut, associated with autoimmune hypothyroidism. NDs address microbiome dysfunction with

probiotics, cultured food, and diets lower in sugar, starch, and carbs to decrease inflammation and balance immunity (INM & AANP, 2022).

Gamification

While social interaction and stress management have shown to enhance quality (wellbeing) and quantity of life in patients with chronic diseases and its associated physical, emotional, and social challenges, the lifestyle behavior changes required to achieve these factors is challenging. Kemp (2022) presents an argument that an integrated, holistic approach to wellbeing within a biopsychosocial framework is connected to the wider sociostructural and cultural context (Kemp et al., 2022). To circumvent these sociostructural and cultural challenges, clinicians and psychosocial professionals are implementing various behavior change models to increase participation in lifestyle interventions. The use of behavioral change models (BCM) has proven important in developing successful health solutions, but engaging patients is a challenge.

In an attempt to incentivize self-management of chronic illnesses, AlMarshedi (2016), a validated framework for gamifying the self-management that effectively enhanced social interaction among participants. Gamification takes advantage of the innate urge for recognition and instant positive feedback as a mode of driving user engagement and therefore, promoting change in behavior. Moreover, rewards typically leave people feeling happy, improving wellbeing and efficacy (AlMarshedi et al., 2016). Their uses of gamification turned self-management into an engaging and enjoyable experience. Their hope is for mobile technologies to incorporate the framework to facilitate change in health provision. In combination with their framework, mobile apps can be used to track medication, manage illness, monitor health, and provide online communities that can provide patients with the emotional and

psychological support they need (AlMarshedi et al., 2016). The incorporation of the principles of engagement, reward, and incentive into certain tasks, encourage changes in behavior or motivate users to learn new skills, proving its efficacy as a behavioral change model.

In addition to its effects of encouraging adherence to medication and self-management that are crucial for the health of chronic illnesses, it also promotes social interaction that correlates to improved wellbeing. The framework, Wheel of Sukr, that turns the self-management tasks into fun and rewarding activities, is composed of 28 elements organized under eight different themes: self-management, socializing, self-representation, fun, esteem, growth, sustainability, and motivation. The socializing facet of the design, which is characterized as being part of a group of people that shares the same situation, offering social and emotional support, adds to the value of rewards, proved to be a major impact on wellbeing. 25 million Americans have been involved in support groups and that positive outcomes have been demonstrated with traditional groups that address chronic illness (Wituk et al., 2000). A reviewer of the framework expressed, “In today’s world, the effects of social media on young and early adolescents is very big. In fact, it could leave a stronger impact on the patient than that of the doctor.” Therefore, the social and community aspect of the framework can be essential in providing support for chronic disease users and in all the other themes of the framework. Another facet of the framework self-representation, tailoring the experience to the user to create a bond with the user, increasing engagement and resulting in a meaningful experience, showed to improve wellbeing by shifting the locus of control to the patient (AlMarshedi et al., 2016). This aspect is in accordance with the social cognitive theory domain, self-efficacy, that has shown to profoundly affect physical and emotional wellbeing (Bandura, 2001). Expert #6 reviewing the study stated, “If the user has a sense of control of what they are doing, they will feel that things

are not imposed on them and they are the actors” (AlMarshedi et al., 2016). Therefore, a gamified self-management app that provides an environment where patients feel represented and in control will empower patients to improve other factors contributing to wellbeing despite poor physical states.

Conclusion

Through the review of the factors contributing to wellbeing and the effectual discovery of lifestyle behavior change’s profound effect on overall wellbeing; exercise, nutrition, and gamification of behavioral change models should be the avenue for patients, caregivers, associations of medical professionals, advocacies, and others to promote the wellbeing of hypothyroid patients. The improvement of each of these aspects of life, have shown to improve wellbeing despite the inadequacies of clinical therapies. This study of initiatives to improve the wellbeing and quality of life of hypothyroidism patients may be applied to other chronic metabolic diseases, such as diabetes. Future work is needed to quantify the improvements of the initiatives, and a study implementing gamification as a self-management method for hypothyroidism.

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