Vitiligo Regaining Normal Skin Colour from Physics Point of View

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Abstract:-Vitiligoin simple word means the white patches appearing on the skin. This disease causes a great degree of psychological distress. Even though it is not a life threatening disease the social stigma is cause of worry. Particularly female patients are found to suffer psychologically and their social life gets affected. The treatment options are many but all of them are unable to give immediate results. Regaining the lost colour of the skin depends on the melanin formation activity which takes place in melanocytes. The recent treatment modality includes the use of particular wavelength to enhance the repigmentation rate. The phototherapy is now a days treatment of choice and many clinics in our region are providing these facilities. We have studied the skin disorder and its treatment from physics point of view.

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BACKGROUND

Vitiligo is a depigmentation disorder affecting nearly 1% of the world population. Fifty percent of cases appear before the age of 20, with the disfigurement resulting in psychiatric morbidity in 16 to 35% of those affected. Depression, sleep disturbances, suicidal thoughts, suicidal attempts, difficulties in relationships and avoidance of social situations have been reported in individuals afflicted by vitiligo before adulthood. Vitiligo can be confused with leprosy, leading to further stigmatization.

The disease pathogenesis of vitiligo has not been fully elucidated. Autoimmune, biochemical and oxidative stress, genetic, neuronal and environmental factors are thought to interact and contribute to the development of vitiligo[7]. Forschner points to four distinct theories [12]. The first is an "autoimmune hypothesis" supported by the observation that several autoimmune diseases often appear along with vitiligo[8]. In addition, vitiligo sufferers often display elevated levels of serum antibodies to melanocytic antigens (tyrosinase and tyrosinase-related proteins 1 and 2) [11,12]. Second is the "neuronal hypothesis" which states that altered reactions of melanocytes to neuropeptides and catecholamines are responsible for melanocyte destruction [12]. Several studies have found that dopamine can induce apoptosis in human melanocytes [13,14]. The neuronal hypothesis is further supported by the findings that there is close contact between melanocytes and nerve endings in depigmented skin, an observation rarely seen in normal skin [12]. Third is the "self-destruct hypothesis", where melanocytes self-destruct due to defects in protective mechanisms responsible for removing toxic melanin precursors. This is thought to lead to the accumulation of melanotoxicindole derivatives and free radicals. Fourth is the "biochemical hypothesis" which postulates an overproduction of a tyrosine hydroxylase cofactor, hydrobiopterin, resulting in increased catecholamine synthesis. This is thought to result in increased reactive oxygen species that are toxic to melanocytes. This is supported by findings of reduced catalase and higher concentrations of hydrogen peroxide in affected and unaffected skin of vitiligo sufferers [12,15].

METHODS

The study comprised of 4 visits: initial, and 3 follow up visits every 4 weeks. Total length of treatment was 12 weeks for each participant pursuing vitiligo treatment in Phototherapy clinics.

During the initial visit the patients registered with the skin specialist were checked and their data was collected. presence of vitiligo was verified under Wood's lamp. Of the three participants that improved the greatest two had progressive vitiligo, while one had non progressive; two were male, one was female; two had Fitzpatricks skin type 5 and one Fitzpatrick skin type 4. They were 46, 14 and 19 years old, and had suffered with vitiligo for 3, 2 and 1 years and had started treatment between June-July 2015. One had vitiligo on hands, the others did not. Two had vitiligo on the torso and all three had vitiligo on the lower body.

CONCLUSIONS

The methods which are currently used have some common criterion like checking the pathogenesis, tropical treatment creams, oral drugs, diet instructions etc are followed by all the clinics. Participant retention, safety and effectiveness criteria were also met by the clinics. Conventional treatments for vitiligo include photochemotherapy (PUVA), phototherapy (UVB), vitamin D3 analogues, topical corticosteroids, topical immunomodulators, excimer laser, and surgery. These treatment options have limited success [1,7,8], and some present significant risks by PUVA, skin atrophy with

corticosteroids, and skin erythma with UVB therapy [1,7.8]. The therapy with high benefit and low risk is preferred. The psychological impact of vitiligo make the search for a safe and effective alternative approach critical.

A systematic review of *UV radiation* in adults showed promising results with good methodological quality.Most studies of vitiligo treatment with phototherapy set a 75% repigmentation rate as cosmetically acceptable, and are able to achieve it in 12.5 to 75% of patients after one year of treatment [17]. By comparison, other studies have found a 43% improvement with narrow band UVB therapy [18].

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