

EFFICACY OF THE NATURAL CURE IN VITILIGO MANAGEMENT

A dissertation submitted to the Indian Institute of Public Administration (IIPA), New Delhi for the award of Master's Diploma in Public Administration (MDPA) in partial fulfilment the requirement for the Advanced Professional Programme in Public Administration (APPPA)

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CERTIFICATE

I have the pleasure to certify that Shri Akhilesh Kumar Mishra has pursued his research work and prepared the present dissertation titled “Efficacy of the Natural Cure in Vitiligo Management” under my guidance and supervision. The dissertation is the result of his own research and to the best of my knowledge, no part of it has earlier comprised any other monograph, dissertation or book. This is being submitted to Indian Institute of Public Administration (IIPA), for the purpose of Master’s Diploma in Public Administration (MDPA) in partial fulfilment the requirement for the Advanced Professional Programme in Public Administration (APPPA)

I recommend that the dissertation of Shri Akhilesh Kumar Mishra is worthy of consideration for the award of Master’s Diploma in Public Administration (MDPA).

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PREFACE

Vitiligo condition is nowadays abundantly prevalent worldwide, it is widely considered as an autoimmune condition affecting approximately 1-2 % of global & 2-3% of Indian population. Rapid urbanisation and growing adoption of western lifestyle & diet like high-fat and cholesterol, high-protein, high-sugar, excessive salt intake, fizzy drinks as well as frequent consumption of processed and fast foods along with irregular routine will continue to increase cases of autoimmune diseases like Vitiligo. Vitiligo is neither contagious nor infectious condition; it is also not life-threatening. But, it is more of a social stigma than a disease, which has heavy psychosocial impact on the quality of life of patients, particularly when visible areas, such as face and hands, are affected by this condition. The exact cause of Vitiligo is unknown; Vitiligo treatments are on the whole unsatisfactory as there are no known methods which lead to complete repigmentation of the depigmented lesions, though there are many modalities which may cause partial response.

I have chosen topic “Efficacy of the Natural Cure in Vitiligo Management” for my research report because, I have been seeing many people are suffering with Vitiligo condition, people at large have least or no awareness/misconception about Vitiligo condition. Due to this, patients often face social discrimination and isolation, moreover there is no complete cure available for the Vitiligo treatment in any of the therapies. The best one can do to take the precautions in the form of natural cure to avoid the further progression of the Vitiligo white spots as soon as white spots are observed of body. The report evaluates such methods of natural cure for Vitiligo patients.

In the report, findings are based on the two case studies; one each from primary and secondary data sources and primary survey of 10 Vitiligo patients. Finding of this study indicates the efficacy of various diets and lifestyle changes on Vitiligo management.

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CHAPTER - I

INTRODUCTION TO VITILIGO

Vitiligo or Leucoderma is a long-term skin condition in which skin fades/loses melanin, the pigment that determines the colour of skin, hair and eyes.

Vitiligo occurs when pigment-producing cells (melanocytes) die or stop producing melanin. The involved patches of skin become lighter or white.

The World Vitiligo Day is observed every year on June 25th to develop global awareness on it.

1.1.1 Difference between Vitiligo and Leucoderma:

There is small difference between Vitiligo and Leucoderma stems from their cause. The exact cause of Vitiligo is unknown. Most doctors and scientists believe that the Vitiligo is mainly caused by autoimmune conditions, hormonal changes, acute emotional trauma, recurrent episodes of diseases like Jaundice or Typhoid fever, prolonged antibiotic treatments or corticosteroid treatment and heredity, whereas Leucoderma will strictly occur following a physical trauma.

1.1.2 Symptoms of Vitiligo:

Symptoms of Vitiligo include loss of skin colour in the form of depigmented or white patches of skin in any part on the

body. Initially, it appears as single or multiple depigmented patches on any part of the body. These patches gradually increase in size and eventually, spread to the whole body of the patient.

1.1.3 Statistics and facts²:

Statistics:

- Vitiligo is prevalent worldwide. It is estimated that about 1 - 2 percent of world population suffer from this condition.
- The prevalence in different countries ranges from less than 0.1% to more than 8% of the general population.
- In India, an estimated 2-3 percent of the population suffer from this condition. The rate is higher in coastal areas like Andhra Pradesh, West Bengal and Kerala.

Facts:

- Vitiligo is neither contagious nor infectious condition. It is more of a social stigma than a disease.
- Vitiligo is not life-threatening; it has heavy psychosocial impact on the quality of life, particularly when visible areas, such as face and hands, are affected.
- There is no racial or gender bias for this condition.
- The exact cause of Vitiligo is unknown
- Vitiligo treatment is on the whole unsatisfactory as there are no known methods which lead to complete repigmentation of the depigmented lesions, though

there are many modalities which may cause partial response.

1.1.4 Causes of Vitiligo: Human skin is composed of three layers - the epidermis, the dermis and the subcutaneous tissue. The outermost layer of skin is the epidermis. Melanin, the pigment that determines the colour of skin, hair and eyes, is produced in the epidermis. Melanin provides the colouring of skin and helps protect skin from damaging skin from ultraviolet light.

People of all races are born with approximately the same number of pigment cells (melanocytes). The rate at which melanin granules are formed in these cells and their concentration in the epidermis are inherited characteristics and major factors in skin colour differences. When no melanin is produced, the involved patch of skin becomes white. When a white patch grows or spreads, the cause may be Vitiligo.

The exact cause of Vitiligo is unknown³. Most Doctors and scientists have theories about what causes the disorder. It may be due to following reasons:

- i). An immune system disorder.
- ii). Heredity may be a factor because there's an increased incidence of Vitiligo in some families.
- iii). A single event, such as sunburn or emotional distress has also been reported in some people the cause of Vitiligo.

iv).Vitiligo is sometimes associated with other medical conditions, including thyroid dysfunction.

However, none of these theories have been proved to be a definite cause of Vitiligo.

In Ayurveda, the reason behind Vitiligo is mostly virudh-aahar sevan, that is, eating foods that are opposite in nature (such as eating fish and milk together). These results in toxin formation inside the body, which ultimately disturbs the immune system due to which the pigment producing melanocytes cells get degenerated, causing Vitiligo.

1.1.5 Types of Vitiligo:

There are primarily two types of Vitiligo:

- Non-segmental Vitiligo
- Segmental Vitiligo

In rare cases, it's possible for Vitiligo to affect whole body of the patient. This is known as universal or complete Vitiligo.

Non-segmental Vitiligo: In non-segmental Vitiligo (also called bilateral or generalised Vitiligo), the symptoms often appear on both sides of body as symmetrical white patches. Non-segmental Vitiligo is the most common type of Vitiligo, affecting around 90% people with the condition. Symmetrical patches can appear on hands, arms, around eyes, knees, elbows, feet.



Fig. 1: Pictures of non-segmental Vitiligo (source: <https://in.pinterest.com/vitiligo24/vitiligo-skin-surgery/>)

Segmental Vitiligo:

In segmental Vitiligo (also known as unilateral or localised Vitiligo), the white patches only affect one area of body.

Segmental Vitiligo is less common than non-segmental Vitiligo, although it's more common in children. It usually starts earlier and affects around 30% children with Vitiligo.



Fig. 2 : Pictures of segmental Vitiligo (source : <https://www.flickr.com>, www.pinterest.com)

1.1.6 Vitiligo treatments^{xiii} & ^{xiv}:

i). Topical Medicine (applied to the skin):

Topical medicine is prescribed for small affected areas of body. This option works best in people with darkly pigmented skin. These medicines are most effective on certain areas of the body, such as the face. They are least effective on the hands and feet.

The most commonly prescribed medicine is a potent or super-potent corticosteroid that is applied to affected skin. About half, of the patients regain at least some skin color after 4 to 6 months of treatment.

Shortcomings & Risks:

These medicines have possible side effects, so patients must be carefully monitored. A possible serious side effect of using topical corticosteroid for a year or longer is skin atrophy. This means the skin becomes paper thin, very dry, and fragile.

ii). Light treatment:

Uses light to restore lost color to the skin. Patient may sit in a light box or receive excimer laser treatments. Light boxes are used to treat widespread Vitiligo; lasers are used to treat a small area.

May be combined with another treatment such as a corticosteroid that is applied to affected skin.

Shortcomings & Risks:

- Works best on the face; least effective on hands and feet. Effective for many patients; about 70% see results with an excimer laser.
- Results can disappear. About half of the patients, see results disappear within 1 year of stopping treatment. After 4 years, about 86% lose some color restored by treatment.
- May cause patients with darkly pigmented skin to see areas of darker skin after treatment, but treated skin usually matches untreated skin within a few months.
- Requires a time commitment. Patients need 2 to 3 treatments per week for several weeks.

iii). PUVA light therapy:

Can treat widespread Vitiligo. Uses UVA light and a medicine called psoralen to restore skin color. Psoralen may be applied to the skin or taken as a pill.

About 50% to 75% effective in restoring pigment to the face, trunk, upper arms, and upper legs.

To help prevent serious side effects, patients are carefully monitored.

Shortcomings & Risks:

- Not very effective for the hands or feet.

- Time-consuming, requiring treatment at a hospital or PUVA centre twice a week for about 1 year.
- Psoralen can affect the eyes, so this treatment requires an eye exam before and after finishing treatment.

iv). Surgical treatments:

May be an option when light therapy and medicines applied to the skin do not work and for adults whose Vitiligo has been stable (not changed) for at least 6 months. Can be effective for 90% to 95% of patients.

Different surgical procedures are available. Most involve removing skin with your natural color or skin cells and placing these where you need color.

Autologous skin grafts: This type of skin grafting uses patient's own tissues (autologous). Doctor removes tiny pieces of skin from one area of body and attaches them to affected area. This procedure is sometimes used if one has small patches of Vitiligo. Doctor removes sections of normal, pigmented skin (donor sites) and places them on the depigmented areas (recipient sites).

Possible complications of this procedure include infection at the donor or recipient site. The recipient and donor sites may develop scarring, a cobblestone appearance, spotty pigmentation, or may fail to repigment at all.

Blister grafting: In this procedure, doctor creates blisters on pigmented skin primarily by using suction. The tops of the

blisters are then cut out and transplanted to a depigmented skin area where a blister of equal size has been created and removed. The risks of blister grafting include the development of a cobblestone appearance, scarring and lack of repigmentation. However, there's less risk of scarring with this procedure than with other types of skin grafting.

Experimental Therapies: In a procedure called an autologous melanocyte transplant, doctor takes a sample of normal pigmented skin and places it in a laboratory dish containing a special cell culture solution to grow melanocytes. When the melanocytes in the culture solution have multiplied, they're transplanted to depigmented skin patches.

This procedure is experimental and performed only in a few institutions where Vitiligo research is conducted.

Shortcomings & Risks:

- Not for children.
- Not for people who scar easily or develop keloids (scars that rise above the skin).
- Possible side effects include failure to work, cobblestone-like skin, and infection.

v). Depigmentation:

It may be an option for an adult who has little pigment left and other treatment has not worked. Depigmentation involves fading the rest of the skin on body to match the

already-white areas. If patient has Vitiligo on more than 50 percent of the body, depigmentation may be the best treatment option. In this procedure, the drug monobenzone (Benoquin) is applied twice a day to the pigmented areas of skin until they match the already-depigmented areas. Avoiding direct skin-to-skin contact with others for at least two hours after applying the drug is recommended.

Shortcomings & Risks:

- Removing the rest of the pigment leaves a person with completely white skin.
- Depigmentation can take 1 to 4 years.
- Once treatment is finished, some people see spots of pigment on their skin from being out in the sun. To get rid of these spots, patient can use the cream to remove this color.

1.2 Statement of the problem: About 1-2 percent of world population and 2-3 percent of the Indian population suffer from Vitiligo. In India, the rate is higher in coastal areas like Andhra Pradesh, West Bengal and Kerala². Vitiligo treatment is on the whole unsatisfactory as there are no known methods which lead to complete repigmentation of the depigmented area of body, however there are many treatments such as different topical (applied to the skin) medicines, Phototherapy [use of ultraviolet (UV) light], Vitiligo surgery (skin grafting, melanocyte transplants) etc. which may cause partial relieve to the patient. Moreover these

treatments attract lot of health hazards, like use of topical medicines and phototherapy may lead to potential side effects and skin cancer respectively. These treatments are either costly with very low efficacy, take lot of time, ranging from six months to few years and are not permanently stable i.e. Vitiligo spots can remain dormant after treatment for some time and resurface again at a later time.

In India, Vitiligo is traditionally regarded as "white leprosy." The late Prime Minister Jawaharlal Nehru ranked Vitiligo as one of three major medical problems in India, alongside malaria and leprosy. A woman cannot marry if she has even single spot of Vitiligo, and if she develops Vitiligo after marriage it may form grounds for divorce.

Vitiligo is often called a disease instead of a disorder and that can have a significantly negative social and/or psychological impact on patients, because of numerous misconceptions still present in large parts of the world therefore the Vitiligo patients often experience emotional stress, feel embarrassed, low self-esteem, severe depression, or worried about social interaction/ acceptance especially when spots develop on visible areas of the body like face, hand, lips etc. This effect is significantly higher in women and children.

Vitiligo is often a lifelong condition; therefore Vitiligo on its onset itself should be treated for further progression. Reversal of the white spots and restoration of normal skin colour is therefore utmost important for all the Vitiligo patients.

1.3 Objectives:

The main objectives of this study are as follow:

- i) To examine the effectiveness of foods & vitamins and eating habits on Vitiligo patients.
- ii) To examine the implications of stress management & life style changes on Vitiligo patients.

1.4 Research Design:

The research design of the study is exploratory & descriptive in nature.

1.5 Rationale:

This study will help patients particularly who have been diagnosed with Vitiligo in its initial stage. Vitiligo is often a lifelong condition. It cannot be fully cured once it has sufficiently progressed, therefore Vitiligo on its onset itself should be treated for further progression, by using natural cure inclusive of following specific diet, meditation and lifestyle changes to improve immune system. Specific diet and lifestyle management may stop progression of white spots and simultaneously, available existing treatments can be taken to potentially treat Vitiligo.

Vitiligo is often called a disease instead of a disorder and that can have a significantly negative social and/or psychological impact on patients, because of numerous misconceptions still present in large parts of the world therefore the Vitiligo

patients often experience emotional stress, feel embarrassed, low self-esteem, severe depression, or worried about social interaction/ acceptance. This study will help social isolation of the patients and thus alleviate psychological impact on the patients.

1.6. Research Questions:

- i. What is effectiveness of foods & eating habits on Vitiligo Management?
- ii. What are implications of life style changes on Vitiligo Management?

1.7 Limitations of the study:

- i. To distinguish between rural versus urban versus tribal patients or geographical location (different races) of the patients was not part of this study.
- ii. Study was not carried out on any particular type of Vitiligo & it was broad based.
- iii. Survey size was limited to smaller number of patients (10 patients) owing to the fact that the Vitiligo patients normally don't come for survey due social embarrassment factor.

1.8. Review of literature:

Though there is scarcity of quality literature availability on Vitiligo in general but there are few good websites, articles and research papers which have been published in past on various aspects of Vitiligo. From these resources relevant information has been collated and illustrated in following paras:

1). Process of melanin formation⁴: The word 'melanin' is derived from the Greek melas, meaning black. It is used to denote various shades of brown and black pigments found in mammals, insects, plants and marine animals. Melanins are a group of natural pigments found in humans and animals. Melanin is derived from tyrosine, and more directly from Dihydroxyphenylalanine (DOPA). DOPA is the product of the enzyme, tyrosinase (diphenol oxidase). Tyrosinase, is a copper-containing enzyme present in plant and animal tissues, uses molecular oxygen directly to form DOPA from tyrosine by oxidation (of DOPA compounds). The synthesis of melanin occurs in the melanocyte, and the reactions starting with tyrosine are shown in Fig. below:

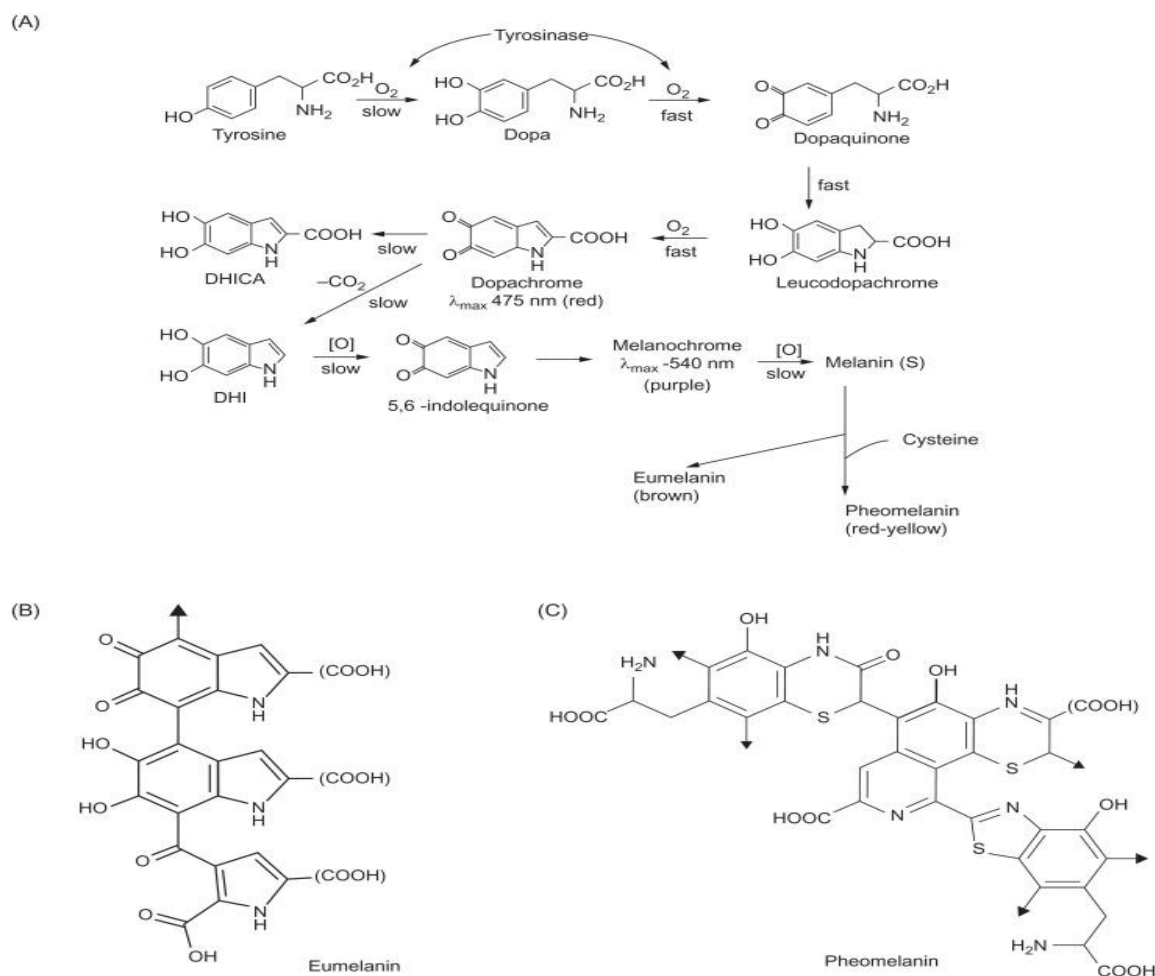


Fig. 3: synthesis of melanin

After the formation of DOPA from tyrosine, the further conversion of DOPA to DOPAquinone follows. Then, a number of intermediates are formed ending in indolequinone that polymerizes to form melanin.

2). Role of copper in Vitiligo Management:

i). VIRENDRA N. SEHGAL & GOVIND SRIVASTAVA⁵ in their report titled “Vitiligo treatment options: An evolving scenario” published in Journal of Dermatological Treatment. 2006; 17: 262–275 stated that:

The role of copper has been mooted. Behl PN. Copper therapy in Vitiligo – current status. Asian Clin Dermatol. 1994;1:39–41 studied that the level of serum copper, and found low serum copper levels in 60% of Vitiligo cases. Copper is an essential constituent of tyrosinase, a catalytic enzyme, **known to play a pre-eminent role in the process of melanogenesis.**

J Invest Dermatol. 1959;32:645–49 observed that there was a mobilization of copper from the liver following the administration of ammoidin (8-methoxypsoralen), causing rise in enzyme by ferrous ions **may augment the process of pigmentation.**

ii). Research has revealed⁶ that copper is vital for the optimal health of the human body, along with other mineral micronutrients such as iron, calcium and zinc.

The human body contains around 2 mg of copper per kilogram of body mass. While copper is found throughout the body, it is concentrated in organs with high metabolic activity, such as the liver, kidneys, heart and brain. This tiny amount is enough to provide copper ions for billions of protein molecules, in particular enzymes, where the copper ions are essential cofactors. Without cofactors, the enzymes could not work.

Copper is an essential trace mineral that cannot be formed by the human body **so must be ingested from dietary sources every day**. According to the World Health Organisation, 1–3 milligrams per day of copper are required to prevent any symptoms of deficit. Various health and nutrition organisations around the world have set dietary reference values, highlighting the importance of copper as part of a balanced diet.

Table 1: Adequate Copper Intakes (mg/day)

Age	Female	Male
7–11 months	0.4	0.4
1 – <3 years	0.7	0.7
3 – <10 years	1.0	1.0
10 – <18 years	1.1	1.3
≥18 years	1.3	1.6
Pregnancy	1.5	-
Lactation	1.5	-

iii). Copper and the immune system⁶:

Copper is necessary for the maintenance of a healthy white blood cell count; many of these white cells are phagocytes which engulf and destroy microorganisms. **Copper deficiency can lead to a depressed immune system**, reduced white cell count and increased incidence of pneumonia.

iv). Vitamin C or Ascorbic acid and copper⁷ :

A high intake of Vitamin C or Ascorbic acid (over 1,500 mg a day) may induce copper deficiency by competing with copper for absorption in the intestine.

v). Excessive copper intake⁸ :

Copper is LIKELY SAFE when taken by mouth in amounts no greater than 10 mg daily.

Copper is possibly unsafe when taken by mouth in large amounts. Adults should consume no more than 10 mg of copper per day. Kidney failure and death can occur with as little as 1 gram of copper sulphate. Symptoms of copper overdose include nausea, vomiting, bloody diarrhoea, fever, stomach pain, and low blood pressure, anaemia, and heart problems.

Summary:

- a) Copper alone do not produce pigmentation however it plays an important role in re-pigmentation as it may augment the process of pigmentation.**
- b) A high intake of Vitamin C or Ascorbic acid (over 1,500 mg a day) may induce copper deficiency thereby slowing process of pigmentation**
- c) Copper deficiency can lead to a depressed immune system**

3). Role of zinc in Vitiligo Management:

Nooshin Bagherani, Reza Yaghoobi, and Mohammad Omidian in their paper titled⁹ “Hypothesis: Zinc Can Be Effective In Treatment Of Vitiligo” published in Indian J Dermatol. 2011 Sep-Oct; 56(5): 480–484 stated that :

It appears zinc is important in preventing and treatment of Vitiligo with following mechanisms:

- a) Zinc is a potential antiapoptotic factor. On the other hand, based on histological and some laboratory data, apoptosis of melanocytes has been suggested as a probable mechanism of Vitiligo. Hence, **zinc, via preventing apoptosis of melanocytes may be able to control Vitiligo.**
- b) Zinc and other trace elements are linked together in cytosolic antioxidant-defense system against reactive oxygen species. One of the theories regarding to pathogenesis of Vitiligo is oxidative stress leading to destruction of melanocytes. **Hence, zinc can control Vitiligo through inhibiting production of free radicals.**
- c) Zinc is one of trace elements that play an important role in the process of melanogenesis. **Hence, zinc may be effective in melanogenesis in vitiliginous lesions.**
- d) Some study, revealed significant increase in the percentage of apoptotic peripheral blood mononuclear cells in Vitiligo. On the hand, accumulation of toxic compounds, altered cellular environment and infection can all contribute to Vitiligo. Zinc may affect in

preventing Vitiligo via destructing these probable environmental factors through prevention of these immunity-related cells.

- e) Zinc deficiency is one of the many factors involved in the nonspecific suppression of cell-mediated immunity. Hence, **zinc may stimulate cell-mediated immunity against probable infective** and other factors contributing in Vitiligo development.
- f) Zinc has a role in the synthesis and release of α -melanocyte stimulating hormone in bovine. Hence, zinc may be effective in melanogenesis in human via release of this hormone.
- g) ZAG regulates melanin production by normal and malignant melanocytes. We proposed that zinc via precipitating the ZAG in site of Vitiligo patches may be effective in the treatment of Vitiligo.

Summary:

Zinc is one of trace elements that play an important role in the process of melanogenesis. Hence, zinc may be effective in melanogenesis in vitiliginous lesions.

4). Role of Gluten free diet in Vitiligo management:

Pearl E. Grimes, Rama Nashawati and others in their study¹⁰ titled “The Role of Diet and Supplements in Vitiligo Management” (2017) mentioned that Dietary choices are also relevant in avoiding foods that could lead to allergic reactions

or irritation that could trigger or worsen Vitiligo. Celiac disease (CD) is frequently comorbid with myriad other autoimmune diseases, including Vitiligo. This disorder is characterized by a general gluten intolerance, whereby gluten ingestion leads to inflammation in the small intestine and malabsorption over time. In a case control study of 64 patients with Vitiligo and 64 controls, immunoglobulin (Ig)A anti-endomysial antibodies and IgA antiglutaminase antibodies, which are diagnostic markers for CD, were measured. Two female subjects with Vitiligo were found to be seropositive for these antibodies versus none of the controls. The investigators suggest that both CD and **Vitiligo may be triggered by a common immune system signal associated with a high-gluten diet.** Alternatively, both diseases may share similar genetic risks. The author is observing an increasing frequency of CD in her Vitiligo patient population at the Vitiligo and Pigmentation Institute of Southern California. Two case reports in patients with Vitiligo who had not responded to topical agents and phototherapy **showed some degree of repigmentation with a gluten-free diet.** In one patient, who continued on oral dapsone, it was noted that significant repigmentation began within 1 month after initiation of a gluten-free diet. Maximal improvement was achieved by 3 months.¹⁵ In the other study, there was progressive repigmentation over 3 years despite no conventional therapy. **Pigmentation was maintained with the gluten-free diet at 7-year follow-up.**

Summary:

Vitiligo may be triggered by a common immune system signal associated with a high-gluten diet. Gluten free diet may help in repigmentation.

5). Role of Vitamin B12 and folic acid along with sun exposure in Vitiligo management:

Pearl E. Grimes, Rama Nashawati and others in their study¹⁰ titled “The Role of Diet and Supplements in Vitiligo Management” (2017) explained that Vitamin B12, also known as cobalamin, is a water-soluble vitamin that exerts haematological and neurologic effects. It is 1 of 8 B vitamins. Folic acid (vitamin B9) is the synthetic form of B9 where folate occurs naturally in food. Humans cannot synthesize folates; hence it must be obtained via diet. Folates are needed for DNA repair, synthesis, and methylation of DNA. They are crucial for cell growth, division, and brain function. Montes and colleagues reported diminished blood levels of vitamin B12, folic acid, and ascorbic acid in a group of 15 patients with Vitiligo. Prolonged supplementation with oral folic acid, parental B12, and oral ascorbic acid was associated with repigmentation of vitiliginous patches. Evidence for vitamin B12 and/or folic acid supplementation, either alone or as an adjuvant to light therapy, is mixed. The rationale for their use is their possible role in melanin synthesis and the possible association of Vitiligo and pernicious anaemia in which vitamin B12 is insufficiently absorbed. 20 Several groups

found no association between serum B12 and folate levels and Vitiligo.

In one study, 100 patients with Vitiligo were treated with 1 mg vitamin B12 and 5 mg folic acid twice daily for 3 months.²³ Patients were also encouraged to expose their skin to sunlight or UVB irradiation. **Total repigmentation of sun-exposed skin was achieved in 6 patients. Repigmentation was clearly apparent in 52 patients** and was more common in patients younger than 26 years and those with Vitiligo of less than 10 years’.

2. LENNART JUHLIN and MATS J. OLSSON in their study¹¹ titled “Improvement of Vitiligo after Oral Treatment with Vitamin B12 and Folic Acid and the Importance of Sun Exposure” published in *Acta Derm Venereol* (Stockh) 1997; 77: 460-462 aimed to test the hypothesis that folic acid, vitamin B12 and sun exposure could be helpful in treating Vitiligo. One hundred patients with Vitiligo were treated with oral folic acid and vitamin B12 after being informed that sun exposure might enhance repigmentation. They were requested to keep a record of sun exposure in summer and UVB irradiation in winter. The minimal treatment time suggested was 3-6 months but should be longer if improvement was achieved. Clear repigmentation occurred in 52 patients, including 37 who exposed their skin to summer sun and 6 who used UVB lamps in winter. Repigmentation was most evident on sun-exposed areas, where 38% of the

patients had previously noted repigmentation during summer months. Total repigmentation was seen in 6 patients. The spread of Vitiligo stopped in 64% of the patients after treatment. Folic acid and vitamin B12 supplementation combined with sun exposure can induce repigmentation better than either the vitamins or sun exposure alone. Treatment should continue as long as the white areas continue to repigment. Further studies are needed to determine ideal minimal dosages of vitamins and UV exposure, as well as treatment time.

Patients:

Thirty-three men and 67 women (age 9- 79 years) were treated for Vitiligo from October 1994 to 1996. All but 6 were Caucasians and they had had Vitiligo for 1-43 years, beginning at age 1-65. They were in good general health, although 6 took levothyroxine for thyroid deficiency. In 64 patients the Vitiligo was actively extending, while it had been stable in 31 patients for at least 1 year and uncertain in 5 patients. PUVA treatment had failed in 10 patients, who had used it 4 years earlier. Most patients had previously been advised to avoid sun exposure due to the risk of sunburn and the increased visibility of their white spots with tanning.

Prior to starting treatment, serum levels of vitamin B12 and folic acid were determined in 53 patients and found to be normal. As the study progressed these levels were investigated only in elderly patients.

Treatment and follow-up:

Patients were given tablets containing vitamin B 12 (1 mg cyanocobalamine) and folic acid (5 mg) to be taken twice daily for 3 months. They were also encouraged to expose their skin to the sun in summer and UVB irradiation in winter, to induce a slight reddening of the white areas. They were requested to inform us later about their light exposure.

All patients were seen or contacted after 3 months. If they wished to continue, they were seen again after 6-12 months and answered a questionnaire about repigmentation and UV exposure.

Results:

Repigmentation was clearly noted in 52 patients. It was significantly more common ($p < 0.01$) in those younger than 26 years. Patients with Vitiligo for less than 10 years repigmented significantly more often ($p < 0.01$) than those who had had it for a longer time. Total repigmentation was seen in 6 patients on sun-exposed skin.

Repigmentation was the same in active versus stable Vitiligo. It usually started around hair follicles and then spread. In 54% it was most evident on sun-exposed areas. During the 6-12-month observation period the new pigmentation remained in all patients except in 2, who were treated for only 1-2 months.

Of the 52 patients repigmenting, 37 had been exposed to sunlight from April to September in Sweden, and 6 had been exposed to UVB lamps once or twice weekly in the winter. A history of prior repigmentation in the summer sun was

obtained from 20 (38%) of those who repigmented with sun exposure in this study, compared to only 6 (15%) of those not repigmenting. Successful repigmentation was seen in 9 of 36 patients with no UV exposure, with another 5 being uncertain. None of them had previously seen any repigmentation of their Vitiligo.

In 64% of the patients, Vitiligo stopped spreading after treatment, the inhibition of spread was most marked ($p < 0.05$) in patients who had been exposed to UV irradiation. No increase in Vitiligo was seen in the 31 patients with stable Vitiligo or in 4 of the 5 patients with initial uncertain activity.

Summary:

Folic acid, vitamin B12 along with sun exposure could be helpful in treating Vitiligo.

6). Role of Hydroquinone in Vitiligo management:

What is Hydroquinone?

Hydroquinone is a depigmenting agent used to lighten areas of darkened skin such as freckles, age spots, chloasma, and melisma caused by pregnancy, birth control pills, hormone medicine, or injury to the skin. Hydroquinone decreases/slows the formation of melanin in the skin. Hydroquinone (HQ) is both a naturally occurring and synthetically produced chemical.

i). Human exposure to synthetically produced Hydroquinone¹²:

Hydroquinone (HQ) is a non-volatile chemical used in the photographic, rubber, chemical, and cosmetic industries. Hydroquinone is a common active ingredient that is found in a number of skin care products that are designed specifically to lighten or bleach the skin.

Hydroquinone has been used for decades as a skin lightening agent. In Europe, the use of Hydroquinone has been banned for use in skin lightening products since January 2001. Its use in skin lightening has been associated with leukoderma-en-confetti, a condition that is characterized by confetti like depigmented areas of the skin, and ochronosis.

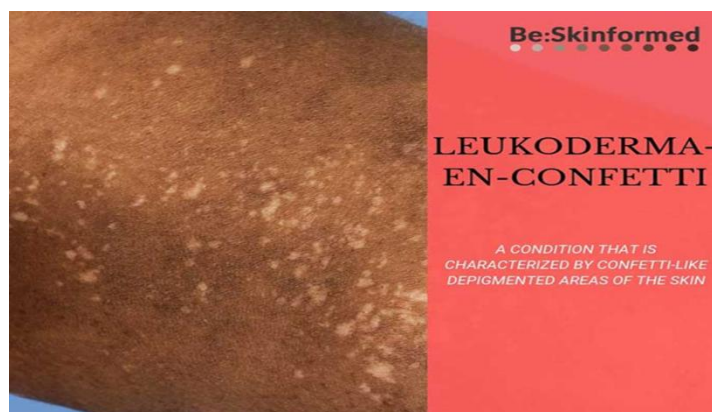


Fig.4: patient suffering from leukoderma-en-confetti consition (source: Human exposure to synthetically produced Hydroquinone <https://www.beskinformed.com/skin-whitening/countries-and-regions-where-skin-lightening-products-are-banned/>)

Prior to the ban, Hydroquinone was the most common ingredient in skin lighteners. However, its use was limited to

localised areas of the skin such as age spots under the European Cosmetic Regulation. Eventually, it became evident that it was being used on larger areas and that its use was linked to the above conditions plus other possible health risks.

As it turns out, numerous articles about the carcinogenicity of hydroquinone and possible long-term effects have been published since 1996. It was these findings that led to the ban in 2000. The ban took effect beginning January 2001. On the other hand, Hydroquinone is allowed for use in other cosmetic products such as artificial nails and hair colorants.

Africa is well known for its wide usage of skin lightening products. Some countries have however put measures in place to shield their populations from dangers that are associated with some ingredients in skin lightening products. These measures include either banning or putting restrictions on the ingredients.

In **Kenya**, the Kenya Bureau of Standards (KEBS) banned the use of cosmetic products containing ingredients considered harmful. The ban was gazetted on 14th August 1998.

In **Tanzania** use of skin care products which contain mercury and hydroquinone are however banned for import

but they still find their way into the country through smuggling.

Ghana and Nigeria have also banned the use of such products. Use of skin lighteners containing mercury, hydroquinone and corticosteroids has been banned in Nigeria.

Most countries have actually gone a little further and banned all cosmetics containing any lightening ingredients. One such country is Ivory Coast which passed laws to that effect in 2015.

Rwanda also joins the list of African countries which have put measures in place to curb the use of toxic skin lighteners. South Africa is among those that have banned toxic-level hydroquinone and mercury use in skin lighteners.

There are calls in most parts of Africa to ban the use of hydroquinone and other skin lightening ingredients which are considered harmful.

In the UAE, cosmetic products that contain hydroquinone can only be sold with a prescription. Cambodia has banned the use of specific skin whitening creams that were believed to come from Vietnam. Another country in the region which has banned use of these ingredients is Thailand.

The sultanate of Brunei, a southeast-Asian country has also banned use of toxic ingredients in cosmetics products. Same goes for Japan who's Standards for Cosmetics banned the use of hydroquinone and mercury in April 1, 2001.

In August 2006, the FDA proposed a ban on non-prescription sales (OTC) of products containing the lightening agent '**Hydroquinone**', which is marketed by more than 60 companies in the United States. Under the proposal, all skin-bleaching products, both prescription and over-the-counter, would be considered "new drugs," and manufacturers would be required to have an FDA-approved new drug application (NDA) to continue selling them. a change to over-the-counter (1.5%-2% concentrations) hydroquinone's previous status as generally recognized as safe and effective (grase) and recommended that the drug be studied further by the National Toxicology Program (NTP). One of the primary concerns with relation to the topical application of hydroquinone is depigmentation.

Summary:

Chemicals, rubber products, and cosmetic products etc containing Hydroquinone (HQ) etc slow/stop the process of re-pigmentation.

ii) Human exposure to naturally occurring Hydroquinone:
Human exposure to naturally occurring hydroquinone by Peter J. Deisinger Published online: 30 Nov 2010¹³.

HYDROQUINONE (HQ) is known to occur naturally in plants as the glucose conjugate 4-hydroxyphenyl-β-D-glucopyranoside (arbutin). Arbutin has also been identified in several other types of plants including cranberry, blueberry, and pear (Harborne & Simmonds, 1964; Grayson, 1981). Arbutin is found mainly in the leaves and bark of these plants, but little is known about the arbutin content of their fruit. HQ is known to be present in considerable quantities in the particulate fraction of cigarette smoke (IARC, 1985), which may result in pulmonary exposure. The aroma of roasted coffee has been shown to contain hundreds of organic compounds including phenols, furans, and pyrroles (Stoffelsma et al., 1968), and tea is known to contain catechins and other polyphenols; thus the presence of naturally occurring HQ may be suspected in these common beverages. Analysis of possible food sources of HQ by GC indicated significant amounts of arbutin in wheat products (1–10 ppm), pears (4–15 ppm), and coffee and tea (0.1 ppm). Free HQ was found in coffee (0.2 ppm), red wine (0.5 ppm), wheat cereals (0.2–0.4 ppm), and broccoli (0.1 ppm).

The authors carried out the experiments. The levels of HQ, arbutin, and phenol foods and beverages were determined in an initial phase of the experiment. As a result of the experiment it was concluded that the most frequent exposure to dietary HQ probably occurs from consumption of wheat-derived foods that, in Western cultures, are found in a

majority of meals. All wheat-containing foods assayed (wheat germ, whole wheat bread, wheat and oat/wheat cereals, contained appreciable amounts of HQ. The highest arbutin levels were found in wheat germ, with lesser amounts of arbutin but greater amounts of free HQ in the more highly processed wheat products during the results. Coffee and tea, which are consumed worldwide, both contain measurable amounts of HQ and/or arbutin. A typical single serving consisting of 200– 300 ml of the beverages at HQ concentrations of 0.1– 0.3 µg/g would contain 20– 90 µg. The highest levels of arbutin were detected in pears. In contrast to pear, minimal amounts of HQ or arbutin were found in cranberries (whole cran-berry sauce) and blueberries despite their occurrence in other parts of these plants.

Summary:

Fruits, foods and beverages with natural Hydroquinone (HQ) i.e. highly processed wheat-derived foods, Coffee and tea, Red wine, pears, cranberries, blueberries etc slow/stop the process of re-pigmentation.

7). Inhibitors to the formation of the pigments/melanin:

Research paper¹⁴ titled “Biochemistry of Melanin Formation” By Aaron Bunsen Lerner and Thomas B. Fitzpatrick ,Department of Dermatology and Syphilology University of Michigan School of Medicine published in 1950.

Inhibitors of formation of Melanin:

As per the paper **Ascorbic Acid and Hydroquinone are some of the know inhibitors of formation of Melanin** and removal of these substances from the diet results in a return of pigmentation.

Substances that Prolong the Induction Period:

Since there is an induction period in the tyrosine-tyrosinase reaction, a delay in the formation of melanin will occur if the induction period is prolonged. In this sense, substances or factors that lengthen the induction period may be considered to be inhibitors of pigment production.

If the Ph of a tyrosinase reaction mixture is increased to more than 7.5 Ph or decreased to less than 6.5 Ph the induction period is markedly increased. No adequate explanation of this phenomenon is known at present.

Copper and Melanin:

Evidence from many different types of experimental work shows conclusively that copper is essential for normal pigmentation in mammals. Copper-deficient diets invariably result in depigmentation in rats, cats, rabbits, and cattle. Addition of trace amounts of copper salts to the deficient diet restores pigmentation.

8). **10 Strategies to Reverse Autoimmune Disease: by Mark Hyman, MD¹⁵**

Vitiligo is generally considered to be an autoimmune disorder. Autoimmune disorders occur when the immune system attacks the body's own tissues and organs. Autoimmune diseases, when taken all together, become a HUGE health burden. Over 80 diseases have been classified as autoimmune and the list is growing. Autoimmune disease now affects over five percent of the population in Western countries.

Human immune system is a defense against invaders which may be imagined as an army that must clearly distinguish friend from foe.

Put another way, human body is always fighting something, whether it's battling infections, toxins, allergens, or a response to stress. Sometimes, your immune army redirects its hostile attack against you. Joints, brain, skin, and sometimes whole body become casualties.

This whole concept is called molecular mimicry. Conventional medicine accepts this problem, but they stop there and no one looks for what might be creating the problem. They don't dig to find out which molecule body cells are MIMICKING.

Using anti-inflammatories like Advil, or steroids, or immune suppressants like methotrexate, or TNF alpha blockers like Enbrel can lead to intestinal bleeding, kidney failure, depression, psychosis, osteoporosis, muscle loss, diabetes, not to mention overwhelming infection and cancer.

There is a new approach to medicine that is beginning to ask these questions. A Functional Medicine Approach to Autoimmune Disease

Conventional medicine often addresses autoimmune disease by prescribing powerful immune-suppressing medication rather than searching for the cause. Conventional approaches don't have a method for finding the insult causing the problem.

Functional Medicine provides a map to find out which molecule the cells are mimicking. It looks at the root cause of the inflammation and asks why that inflammation exists.

If we can identify the underlying sources of inflammation, we can heal the body. The underlying causes may include stress, hidden infections, food allergies or sensitivities, toxic exposure, genetic predisposition, nutrient deficiencies, and leaky gut.

Functional Medicine is a hidden movement sweeping across the globe, and it is based on a different method of diagnosing and treating disease — one that focuses on causes not symptoms, one that is based on an understanding of the dynamic way our genes interact with our environment, one that goes beyond simply treating diseases based on their label.

Functional Medicine teaches practitioners to understand the body as a system; to seek the causes of illness; to understand the body's basic functional systems, where they go awry, and how to restore balance; to understand the interconnections between symptoms and organs rather than segregate diseases into specialties.

This approach is a fundamentally different way of solving medical problems, one that allows us to decipher the origins of illness and identify the disturbances in biology that lead to symptoms.

If patient has an autoimmune disease, I strongly encourage him to work with a Functional Medicine practitioner to identify and eliminate the root cause(s). **Sometimes this requires detective work, trial and error, and patience, but the results are worth it.**

When patients visit me to determine the root of their problem, I often implement following 10 strategies and the patient typically sees vast improvement:

- I. Eat a whole food, anti-inflammatory diet:** Focus on anti-inflammatory foods including wild fish and other sources of omega-3 fats, red and purple berries (these are rich in polyphenols), dark green leafy vegetables, orange sweet potatoes, and nuts. Add anti-inflammatory herbs, including turmeric (a source of curcumin),

ginger, and rosemary, to your diet daily. Eliminate inflammatory foods such as refined, omega-6, and inflammatory oils, including corn, soy, and safflower oils.

- II. Check for hidden infections:** These include yeast, viruses, bacteria, and Lyme. You will want to work with a Functional Medicine practitioner to identify and eliminate these infections.
- III. Check for hidden food allergies:** Functional Medicine practitioner can do this with IgG food testing. Alternately, option to try the Blood Sugar Solution 10-Day Detox Diet, which is designed to eliminate most food allergens.
- IV. Test for Celiac Disease:** This is a blood test any doctor can do.
- V. Test for heavy metal toxicity:** Mercury and other metals can cause autoimmunity.
- VI. Fix your gut:** About 60 percent of your immune system lies right under the single-cell-layer lining of your gut. If this surface breaks down, your immune system will get activated and start reacting to foods, toxins, and bugs in your gut. The easiest way to begin healing your gut involves eating a whole food, anti-inflammatory diet and **removing gluten** and other food sensitivities.
- VII. Implement supplements:** Nutrients like fish oil, vitamin C, vitamin D, and probiotics can help calm your immune response naturally. Also consider anti-inflammatory nutrients like quercetin, grape seed

extract, and rutin. Using UltraInflamX PLUS 360 as a meal replacement also helps many of patients with inflammation.

VIII. Exercise regularly: Regular exercise is a natural anti-inflammatory. You don't have to go to the gym, run on a treadmill, and pump iron to stay in shape. Just start moving around more. Go for walks with your friends or family. Go out and do some gardening. Play Frisbee in the park with your kids. Pick up a tennis racket and just knock a tennis ball around. Anything you can do to get out and move your body can be considered exercise. So don't think that you absolutely have to go to the gym to get fit. Just use your body more.

IX. Practice deep relaxation: Stress worsens your immune response. Calming techniques including yoga, deep breathing, biofeedback, massage, or my UltraCalm CD can reduce stress and anxiety to promote relaxation.

X. Sleep for 8 hours every night: The research is clear: Lack of sleep or poor sleep damages your metabolism, causes cravings for sugar and carbs, makes you eat more, and drives up your risk of numerous conditions from diabetes to autoimmune disease. Getting enough sleep and sleeping well are essential for vibrant health and reversing inflammation.

1.9. Methods applied and data source:

Qualitative, case studies from primary and secondary data sources and data from Indian and international Medical Journals/Research Reports, relevant topics in newspapers / websites etc.

1.10. Chapterisation scheme:

The overall chronology of the chapters will follow the systematic order of the understanding the problem, the remedies, case studies based on primary and secondary data source, feedback from survey and analysis of the responses on questionnaire, analysis of case studies based on primary and secondary data sources, conclusion and recommendations.

CHAPTER - II

IMPACT OF NATURAL CURE ON VITILIGO PATIENTS: EMPIRICAL RESULTS

2.1 Survey of the Vitiligo patients:

An offline survey was conducted on total 10 Vitiligo male/female patients out of which 09 patients were from one of the premier Government Ayurveda Institute (Hospital) in New Delhi and one other individual in the age group of 15 years to 60 years. These patients were suffering Vitiligo from less than 6 months to fifteen years. Primary aim of the survey was to identify the impact of the diet and lifestyle changes on Vitiligo management. The questionnaire which was circulated to the patients of the survey has been appended as Annex “A” of the report. Summary of the feedback on questionnaire is tabulated in table 2 at Para 2.2 and detailed analysis of the feedback on questionnaire is done at Para 2.3.

2.2 Perception of Vitiligo Patients on Natural Cure:

Male or Female	what is your age	At what AGE did you first notice signs of Vitiligo?	How long you have been suffering from Vitiligo?	How did your Vitiligo progress ? select one	In your opinion, what CAUSED your Vitiligo? (select all if applicable):	In your opinion, what diet CAUSED your Vitiligo spread/ increase the most? (select all if applicable)	In your opinion, what condition CAUSED your Vitiligo spread/ increases the most? (select all if applicable)	In your opinion, what diet CAUSED reduction/stop further progression of your Vitiligo the most? (select all if applicable)	Did you notice if, Yoga/Meditation helps reducing progression of Vitiligo ?	How many doctors did you visit for Allopathic treatment of Vitiligo?	As a RESULT of the Allopathic treatment, your Vitiligo (select one)	How many doctors did you visit for Ayurvedic /Natural treatment of Vitiligo?	As a RESULT of the Ayurvedic treatment, your Vitiligo (select one)	How long Vitiligo took to get cured / Partly cured? (Please specify Cured/Partly cured)
M	19-39	40-59	< 6 months	Quick, short burst, then limited spreading	Medication side-effect	All of the above	Upset Stomach	All of the Above	no	Only one	Completely stopped, but patches still remain	only one	Continued, or new white patches appeared	>24 months
F	< 18	40-59	> 1 year	Quick, short burst, then limited spreading	Physical skin damage	Citrus fruits	Upset Stomach	All of the Above	Not experienced	More than two	Completely stopped, but patches still remain	more than two	None	>12 months
F	19-39	40-59	< 6 months	Quick, short burst, then limited spreading	Deodorant or perfume Sunburn or prolonged	Citrus fruits	Stress	All of the Above	Not experienced	Only one	Completely stopped, but patches still remain	only one	Almost or completely disappeared	>24 months
M	19-39	19-39	> 6 Months	Quick, short burst, then limited spreading	Physical skin damage	All of the above	Stress	Non citrus fruits	Not experienced	More than two	Continued, or new white patches appeared	only one	None	>12 months
M	40-59	18	> 6 Months	Slow, progressive spreading over several	Exposure to hazardous materials (what was	Acidic diets like Lemon / Curd/ Raw Tomato/	Untimely lifestyle	All of the Above	yes	More than five	Continued, but slowed significantly	more than five	None	>6 months
F	19-39	19-39	< 6 months	Slow, progressive spreading over several	Emotional distress	Citrus fruits	Stress	Non acidic	yes	More than five	Continued, but slowed significantly	more than two	Continued, but slowed significantly	>12 months
M	>59	> 59	> 6 Months	Slow, progressive spreading over several	Medication side-effect (name of the	Acidic diets like Lemon / Curd/ Raw Tomato/	Untimely lifestyle	Non citrus fruits	no	Only one	Almost or completely disappeared	more than two	Almost or completely disappeared	>6 months
F	40-59	19-39	> 1 year	Slow, progressive spreading over several	Emotional distress	All of the above	Stress	Nuts and dry fruits	Not experienced	Only one	Continued, or new white patches appeared	more than two	None	>24 months
F	> 59	19-39	> 1 year	Slow, progressive spreading over several	Physical skin damage	All of the above	Upset Stomach	Non acidic	yes	Only one	Continued, but slowed significantly	only one	Completely stopped, but patches still remain	>6 months
F	< 18	> 59	> 1 year	Quick, short burst, then limited spreading	Medication side-effect (name of the	All of the above	Upset Stomach	All of the Above	Not experienced	More than two	Almost or completely disappeared	more than two	None	>3 months

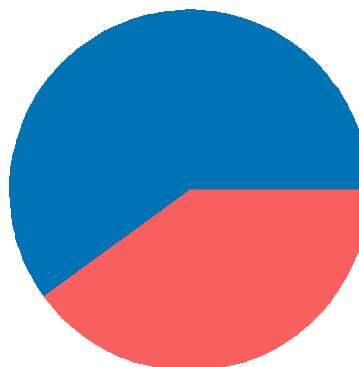
Table 2: Summary of the feedbacks from Primary Survey

2.3 Empirical Findings (DETAILED ANALYSIS OF THE FEEDBACKS)

Q 01 Male or Female

ANSWERED: 10

SKIPPED: 0



F M

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
F	6	60.00%
M	4	40.00%

Q 02 what is your age

ANSWERED: 10

SKIPPED: 0



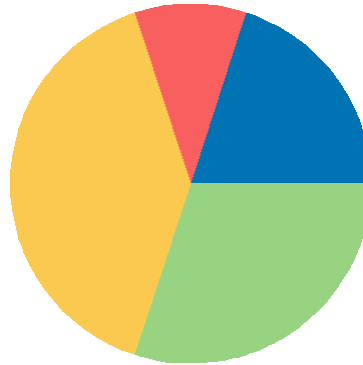
■ < 18 ■ > 59 ■ 19-39 ■ 40-59

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
< 18	2	20.00%
> 59	2	20.00%
19-39	4	40.00%
40-59	2	20.00%

Q 03 At what AGE did you first notice signs of Vitiligo?

ANSWERED: 10

SKIPPED: 0



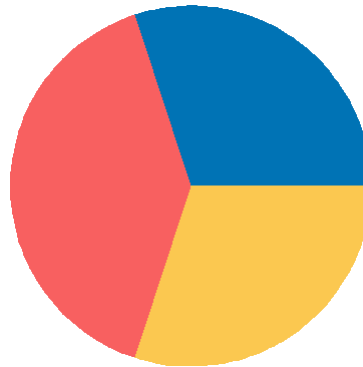
■ > 59 ■ 18 ■ 19-39 ■ 40-59

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
> 59	2	20.00%
18	1	10.00%
19-39	4	40.00%
40-59	3	30.00%

Q 04 How long you have been suffering from Vitiligo?

ANSWERED: 10

SKIPPED: 0



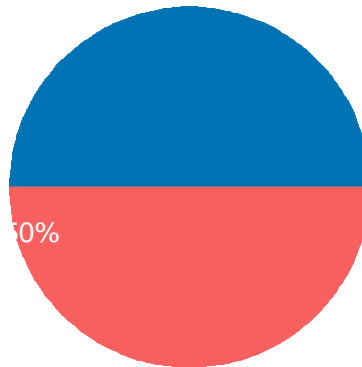
■ < 6 months ■ > 1 year ■ > 6 Months

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
< 6 months	3	30.00%
> 1 year	4	40.00%
> 6 Months	3	30.00%

Q 05 How did your Vitiligo progress? Select one

ANSWERED: 10

SKIPPED: 0



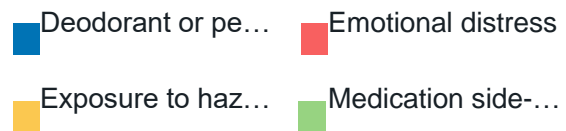
■ Quick, short bur... ■ Slow, progressiv...

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
Quick, short burst, then limited spreading	5	50.00%
Slow, progressive spreading over several years	5	50.00%

Q 06 In your opinion, what caused your Vitiligo? (select all if applicable):

ANSWERED: 10

SKIPPED: 0

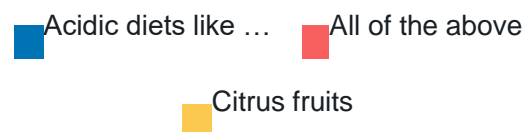
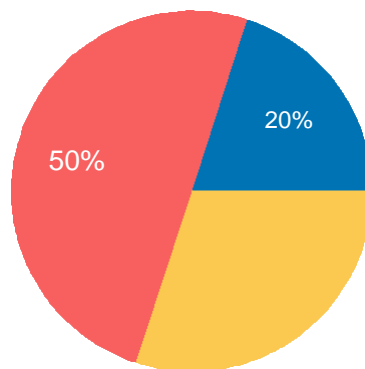


ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
Deodorant or perfume Sunburn or prolonged sun exposure Rubber product (i.e. gloves):	1	10.00%
Emotional distress	2	20.00%
Exposure to hazardous materials (what was it?)	1	10.00%
Medication side-effect (name of the drug)	2	20.00%
Physical skin damage	3	30.00%
Vaccination (name of vaccine)	1	10.00%

Q 07 In your opinion, what diet caused your Vitiligo spread/ increases the most? (Select all if applicable)

ANSWERED: 10

SKIPPED: 0

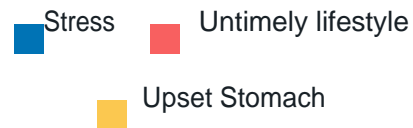
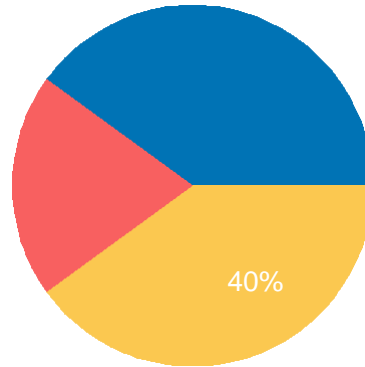


ANSWER CHOICES	RESPONSES	RESPONSE PERCENT
Acidic diets like Lemon / Curd/ Raw Tomato/	2	20.00%
All of the above	5	50.00%
Citrus fruits	3	30.00%

Q 08 In your opinion, what condition caused your Vitiligo spread/ increases the most? (Select all if applicable)

ANSWERED: 10

SKIPPED: 0

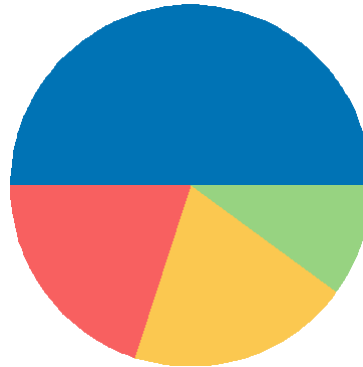


ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
Stress	4	40.00%
Untimely lifestyle	2	20.00%
Upset Stomach	4	40.00%

Q 09 In your opinion, what diet caused reduction/stop further progression of your Vitiligo the most? (Select all if applicable)

ANSWERED: 10

SKIPPED: 0

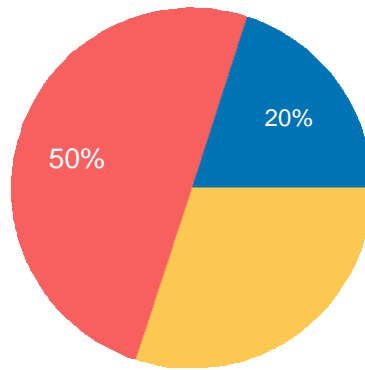


ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
All of the Above	5	50.00%
Non acidic	2	20.00%
Non citrus fruits	2	20.00%
Nuts and dry fruits	1	10.00%

Q 10 Did you notice if, Yoga/Meditation helps reducing progression of Vitiligo ?

ANSWERED: 10

SKIPPED: 0



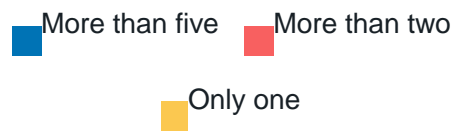
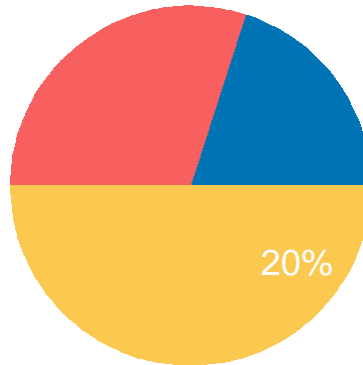
no Not experienced yes

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
no	2	20.00%
Not experienced	5	50.00%
yes	3	30.00%

Q 11 How many doctors did you visit for Allopathic treatment of Vitiligo?

ANSWERED: 10

SKIPPED: 0

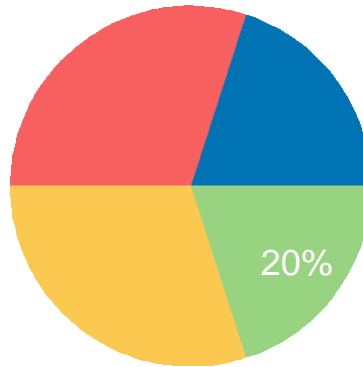


ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
More than five	2	20.00%
More than two	3	30.00%
Only one	5	50.00%

Q 12 As a result of the Allopathic treatment, your Vitiligo (select one)

ANSWERED: 10

SKIPPED: 0

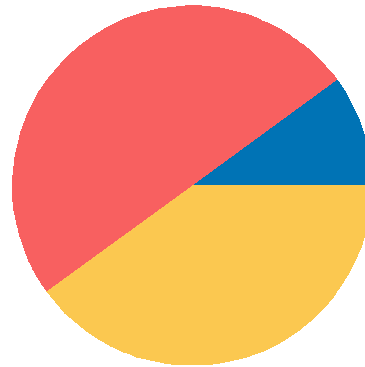


ANSWER CHOICES	RESPONSES	RESPONSE PERCENT
Almost or completely disappeared	2	20.00%
Completely stopped, but patches still remain	3	30.00%
Continued, but slowed significantly	3	30.00%
Continued, or new white patches appeared	2	20.00%

Q 13 How many doctors did you visit for Ayurvedic /Natural treatment of Vitiligo?

ANSWERED: 10

SKIPPED: 0



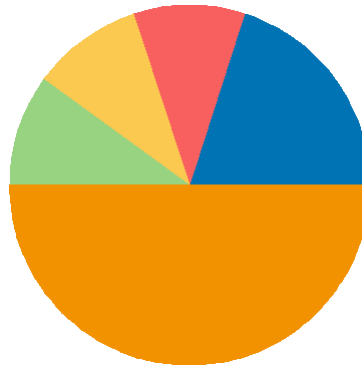
more than five more than two
only one

ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
more than five	1	10.00%
more than two	5	50.00%
only one	4	40.00%

Q 14 As a result of the Ayurvedic treatment, your Vitiligo (select one)

ANSWERED: 10

SKIPPED: 0

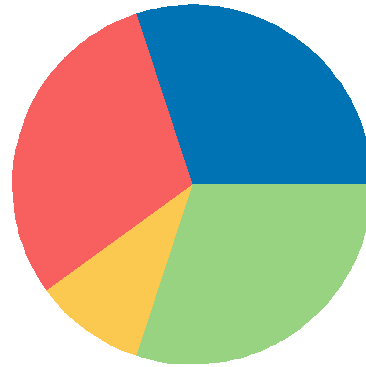


ANSWER CHOICES	RESPONSES	RESPONSE PERCENT
Almost or completely disappeared	2	20.00%
Completely stopped, but patches still remain	1	10.00%
Continued, but slowed significantly	1	10.00%
Continued, or new white patches appeared	1	10.00%
None	5	50.00%

Q 15 How long Vitiligo took to get cured / partly cured? (Please specify Cured/Partly cured)

ANSWERED: 10

SKIPPED: 0



ANSWER CHOICES	RESPONSES	RESPONSE PERCENTAGE
>12 months	3	30.00%
>24 months	3	30.00%
>3 months	1	10.00%
>6 months	3	30.00%

2.4 Summary: Emotional distress, physical skin damage, medication side-effect, deodorant or perfume, sunburn or prolonged sun exposure, rubber products and vaccination were among the identified causes of Vitiligo in Patients. Neither Allopathic nor Ayurvedic treatment gave them full recovery from Vitiligo, however significant improvement was observed in white spots from treatments which normally took longer time up to two years or more.

Specific diets and lifestyle played a significant role in Vitiligo management acidic diets like Lemon/Curd/ raw tomato, citrus fruits, excessive sweet (sugar) consumption, faulty diet in form of milk with meal containing salt regularly caused Vitiligo spread/ increase the most whereas non acidic foods, non-citrus fruits, nuts and dry fruits diet caused reduction/stop further progression of Vitiligo the most.

Higher level of stress, untimely lifestyle and upset stomach were found the main reasons for spread/increase of the white spots of the Vitiligo patients. Few, respondents' opined positive impact of yoga on Vitiligo management as a result their Vitiligo progression stopped/reduced from yoga.

CHAPTER-III

CASE STUDIES

3.1 Case study 1 (based on secondary data source):

A case study by Rahul K Shingadiya, Jasmin K Gohel, Suhas A Chaudhary, Prashant Bedarkar, BJ Patgiri & PK Prajapati¹⁶ Published on October, 2018 titled “Ayurvedic Management of chronic Vitiligo (Shvitra) stated how a patient suffering from Vitiligo for more than a decade had successfully got cured from disease. Summary of the case report from the above article is as under:

50 years old female was presented with history of white patches on hands, abdomen, back and chest, with mild itching over affected area and gradual increment since 10 years. The disease was in active stage and new spots were increasing gradually. Family history in first degree relation was negative. There was no personal history of autoimmune disorders (like Atopic dermatitis, psoriasis, Asthma, etc.). There was no personal history of trauma or surgery, any major psychological disorder, endocrinal disorder (Diabetes), or any history of treatment from psychiatrist. She had menopausal history for last 3 years.

She had allopathic medication history for last five year including corticosteroid, and multivitamins internal and PUVA and external applications. She had found some improvement in starting phase of the treatment, but then

there was no progress in that condition for last three years. Hence, on the advice of her neighbour, she had come for Ayurvedic medication.

There were white patch measuring about 3x2 cm, 3x2 cm and 4x3 cm on left arm posterior region, left forearm posterior region and left carpus anterior region respectively. There were multiple small spots on hands, neck, abdomen and back. The spots and patches were asymmetric, well defined whitish and without scaling. The patient was clinically diagnosed as case of Shvitra (Vitiligo) and planned to enrol in clinical trial of Savarnkara yoga ointment.

a). Diagnosis and Advice:

Diagnosis	Advise
Patient was taking excessive sweet & sour food which was heavy to digest	to avoid these things
Patient was having the habits of day sleep (2 and ½ hrs after meal) and night awakening.	to stop these things
The patient was taking faulty diet in form of milk with meal containing salt at morning and at night regularly	Stopped during the study.

Mental affliction was found inform of anxiety and depression.	Proper psychological counselling was carried out and advised for <i>Yoga</i> and <i>Pranayama</i> .
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b). Treatment:

The patient was prescribed *Savarnakara Yoga* in ointment form once in a morning followed by sun exposure for 15 to 30 minutes.

Internally, *Kanakabindwarishta* was prescribed in dose of 10ml twice a day after meal with equal quantity of water.

After two months, skinny spots were found appeared between the white patches of hands, back and abdomen and small spots were become slight pink. *Savaranakara Yoga* and *Kanakabindwarishta* were stopped and *Rasayana Churna* (2gm) was started for one month as follow up period. No recurrent patches were observed in this period and pink colour was persisting in the spots and patches.

After completion of three month study period of clinical trial, it was planned to continue the medication for getting complete relief. Hence, *Savaranakara Yoga* was started again for local application and internally, combination of *Arogyavardhini rasa* (250mg), *Rasayana Churna* (2gm) and *Vindanga Churna* (*Embelia ribes* Burm. (1gm) was

prescribed with honey before meal twice a day. *Manjishthadi Kwatha* (20ml) was prescribed twice a day.

After six months, patches decreased to almost half of the initial and some of the spots found disappeared.

After 10 months, patches of left arm and forearm decreased to 1x1 cm and on corpus, it was found decreased to 2x1 cm.

After 12 months, small spots were found almost decreased,

After 16 month, patches of left arm and forearm disappeared and patches of left corpus remained 1x1 cm.

Patient was followed for next six months and found no any recurrence.(i.e. total 22 months)

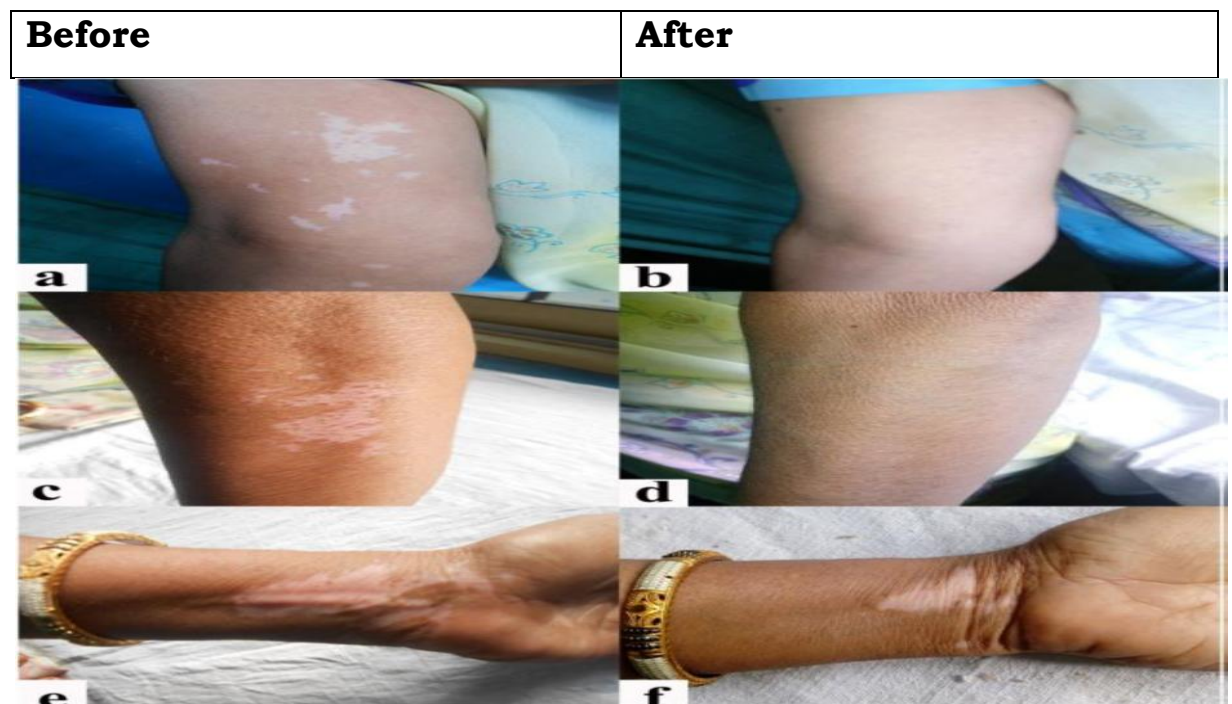


Fig 5: Patient's before and after pictures after treatment for 22 months. (Source: A case study by Rahul K Shingadiya, Jasmin K

3.2 Case study 2 (based on primary data source):

A male patient aged 43 from New Delhi in January 2017 observed that few small white spots started coming out around hand fingertips and foot which were growing rapidly. After two months patient had shown these white spots to three-four allopathic doctors and taken their treatments but of no avail. Subsequently, he had visited one of the leading Ayurvedic hospitals in NCR in August 2017 where high level of stress, less sleeping hours, upset stomach, high intake of acidic diet like Lemon/Curd/Tomato etc. were identified as key reasons for the onset of Vitiligo and he was advised to stop/eliminate these food intake from diet and to follow recommended dietary control strictly during treatment period and was also advised to apply a liquid solution of 'Bakuchi oil' on white spots and simultaneously take sun light for 15-30 minutes every day.

Initially on following above treatment for three to four months some deceleration in growth of white spots was observed which encouraged patient to further study the effects of various diets on Vitiligo management. Based on study of various documents/reports and websites patient started taking following diets on regular basis:

1.1 He has taken only two meals a day i.e. Breakfast and lunch were taken. Dinner was either skipped or vegetable soup/coconut water taken.

1.2 Vegetable juice having combination of Spinach/Bottle gourd/Carrot and Bee-root was taken every day in morning.

1.3 Dry-fruits combination of Almond, Walnut, Dry Apricot and figs were taken every day.

1.4 Sprouts of Moon/Bengal gram taken every day.

1.5 Water kept in Copper vessel at least for 8 hrs. instead of normal water was taken every day.

2.0 Dietary changes: Following set of foods were avoided or taken:

Foods Avoided	Foods taken
Table salt	Black salt (in moderation)
Refined oil	Physically refined oil/Desi Ghee (homemade)
Wheat and its products	Ragi/Jowar/Chana/Soya /Millet
Refined sugar	Jaggery (in moderation)
Sour foods/citrus fruits e.g. Pickles , Lemon, Curd, Orange, Grapes etc.	Non sour fruits like Banana etc. Green and leafy vegetables
Vegetables that worsen	i.e. Bottle gourd, bitter

flatulence like Tomato, Onion, Garlic, Potato, Peas, Cauliflower, Brinjal (eggplant) and lady finger.	gourd, spinach, Mushroom Green Salads Sprouts (Moong/Chana) Dry fruits e.g. Almonds, figs, Dry Apricot, Walnuts and Pistachio.
White rice	Brown rice
Pulses like Corn, Tur (Pigeon pea) , Urad, Masur, Dal Makhni etc	Moong (Mung bean)/ Chana(Bengal gram)
Fridge/ Micro Wave oven items	-
Tea/coffee, Alcohol, Cold drinks or packaged juices.	Green Tea Vegetable (spinach/Bottle gourd/ Carrot) juices coconut water
Incompatible food combinations: i). Milk with salt, bananas, cherries, melons, sour fruits etc. ii). Radish with milk, bananas etc.	-
Normal RO and cold water	Water kept in Copper vessel at least for 8 hrs. @ room temperature

3. Lifestyle changes: following lifestyle changes were made and followed on regular basis:

- Use of chemicals and plastics like hair oil, shampoo and soap with chemicals, plastic sleeper etc. were completely avoided.
- Use of Deodorants and Agarbatti (joss stick) and any other inhaler with chemicals was completely avoided.

After following above diet strictly for about five-six months', small white patches started gradually diminishing and bigger white spots on hand finger tips and feet stopped growing further. Since the ayurvedic doctor had also suggested to apply liquid solution of 'Bakuchi oil' on affected white spots and take exposure of sun light for 15-30 minutes every day on regular basis, but on account of the office schedule it was not possible to follow this advice completely and this part of treatment could be followed intermittently.

Subsequently, patient decided to search for other alternative options to sun exposure and therefore discussed matter with one of the renowned doctor in NCR in Jan 2018, upon discussion doctor had suggested using Narrowband UV-B (NB-UVB) on white spots with certain precautions.

The patient purchased and started using portable Narrowband UV-B (NB-UVB) light instrument intermittently only on the larger white spots of the body

from July 2018 onwards while following the above mentioned diet schedule regularly.

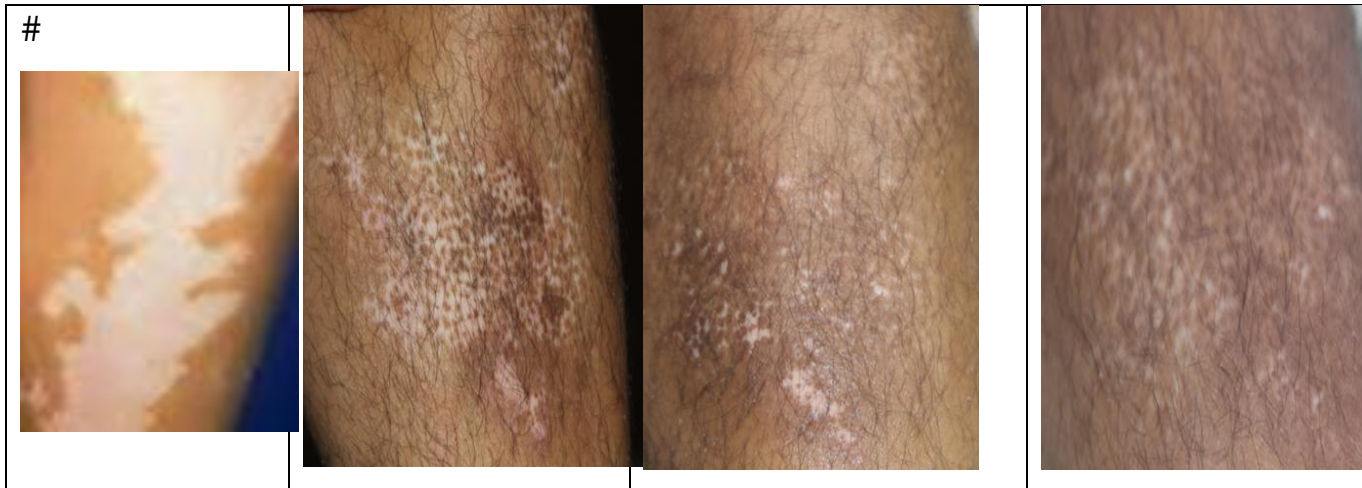
After four months of intermittent use of portable Narrowband UV-B (NB-UVB) light instrument repigmentation started appearing on the broader white spots in the form of small dots. However the rate of repigmentation on finger trips was very slow compared to repigmentation of white spots on the feet.

Narrowband UV-B (NB-UVB) treatment was not applied on the smaller white spots and these smaller spots disappeared automatically by around December 2018 and further, no new white spot appeared anywhere on the body, primarily on account of the positive impact of the dietary and lifestyle changes.

Patient continued to follow above diet and lifestyle while reducing the use of Narrowband UV-B (NB-UVB) treatment. Recovery of melanin in the bigger white spots of Vitiligo was observed to the tune of approximately 90% by February 2020 which has been depicted in the following before and after images:

January 2018	July 2019	Oct 2019	February 2020
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 <p>January 2018</p>			
 <p>January 2018</p>	 <p>February 2020</p>		
<p>N.A.</p>			
<p>#</p> 			



Actual pictures during the period are not available hence indicative images have been shown.

Fig. 5: Before and after images of case study 2

CHAPTER - IV

DATA ANALYSIS AND INTERPRETATION

4.1 Analysis of case study 1(Based on secondary data source):

A case study authored by Rahul K Shingadiya, Jasmin K Gohel, Suhas A Chaudhary, Prashant Bedarkar, BJ Patgiri & PK Prajapati¹⁶ published in October,2018 titled “Ayurvedic Management of chronic Vitiligo (*Shvitra*) stated how a patient suffering from Vitiligo for more than a decade had successfully got cured from disease. Analysis of the study fetches following salient points:

- a) There was no family history of Vitiligo, no personal history of autoimmune disorders (like Atopic dermatitis, psoriasis, Asthma, etc.), trauma/surgery and no other major psychological/endocrinal disorder (Diabetes), or any history of treatment from psychiatrist.
- b) Patient had been taking allopathic medication for last five year including corticosteroid, and multivitamins internal and PUVA and external applications. She had found some improvement in starting phase of the treatment, but then there was no improvement in that condition for last three years.

c) Identified causes of Vitiligo:

- Excessive sweet & sour food consumption.
- Habits of day sleep & night awakening.
- Faulty diet in form of milk with meal containing salt at morning and at night regularly.
- Mental affliction in form of anxiety and depression.

d). Treatment & time of recovery:

- Patient followed strict diet as prescribed by doctor and avoided the diet as mentioned at Para c) above.
- *Savarnakara Yoga* in ointment form once in a morning followed by sun exposure for 15 to 30 minutes.
- Internally, *Kanakabindwarishta* was prescribed in dose of 10ml twice a day after meal with equal quantity of water.
- Patient recovered substantially in about total 22 months' time from the treatment and no further recurrence of new white spots was found.

4.3 Analysis of case study 2 (Based on primary data source) :

In this case a male patient aged 43 had developed Vitiligo white spots around hand fingertips and foot which were growing rapidly. Analysis of the study from primary data fetches following salient points:

- a) Allopathic treatment taken for around six months didn't give any satisfactory results in neither stopping in progression nor reduction of Vitiligo white patches.
- b) **Identified causes of Vitiligo:** On showing to one of the Ayurvedic hospitals following causes of Vitiligo were identified:
- High level of stress
 - Less sleeping hours
 - Upset stomach
 - High intake of acidic diet like Lemon/Curd/Tomato .
- c) After stopping/eliminating above identified reasons and by following strict dietary control, Vitiligo progression and generation of new white spots stopped in about six months.
- d) Simultaneous application of a liquid solution of 'Bakuchi oil' on white spots and sun light for 15-30 minutes every day/ use of Narrowband UV-B (NB-UVB) on white spots with certain precautions when sun light was not available resulted in significant re-pigmentation on white spots in about 18 months' time.
- e) However the rate of re-pigmentation on finger trips was very slow compared to re-pigmentation of white spots on the feet.

- f) No new white spot appeared anywhere on the body during this time.

4.3 Analysis of feedback of offline survey from the Vitiligo patients:

An offline survey was conducted on the total 10 Vitiligo male/female in the age group of 15 years to 60 years suffering Vitiligo for less than 6 months to fifteen years. Following are the salient points from the analysis of feedbacks on questionnaire:

- a) Patients have taken both Allopathic and Ayurvedic treatment for Vitiligo.
- b) **Identified causes of Vitiligo:** Patients had opined one of the followings as one of the causes of the Vitiligo:
- Emotional distress
 - Physical skin damage
 - Medication side-effect
 - Deodorant or perfume Sunburn or prolonged sun exposure Rubber product.
 - Vaccination
- c) As a result of Allopathic treatment growth of patches either slowed or stopped completely but patches remained. In 20% cases there was significant improvement in Vitiligo treatment.

- d) As a result of Ayurvedic treatment growth of patches either slowed or stopped completely but patches remained. In one case (10%) there was no improvement on white spots of Ayurvedic treatment. Results from treatment took longer time in most of the cases ranging from one year to more than two year.
- e) Diet plays a significant role in Vitiligo management as :
- Acidic diets like Lemon/Curd/Raw Tomato and Citrus fruits caused Vitiligo spread/ increase the most.
 - Non acidic foods, Non citrus fruits and Nuts and dry fruits diet caused reduction/stop further progression of Vitiligo the most
- f) Life style plays a significant role in Vitiligo management as :
- Stress, untimely lifestyle and upset stomach caused spread/increase the most.
 - 3 out of 5 respondents opined positive impact of yoga on Vitiligo management and their Vitiligo progression reduced from yoga.

CHAPTER - V

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion:

Vitiligo is widely considered as an autoimmune condition affecting, 1-2 % of global & 2-3% of Indian population. Rapid urbanisation and growing adoption of western lifestyle, “Western diet” i.e. high-fat and cholesterol, high-protein, high-sugar, excessive salt intake, fizzy drinks as well as frequent consumption of processed and ‘fast foods’ along with irregular routine will continue to increase occurrence of autoimmune diseases like Vitiligo. This study indicates the efficacy of various diets and lifestyle changes on Vitiligo management. Results of the report show encouraging sign from specified diet and lifestyle changes in controlling the growth of white spots of the Vitiligo, however due to limitations of study further investigation is warranted.

5.1.1 Results:

i) Effectiveness of foods & vitamins and eating habits on Vitiligo patients:

Results from both primary and secondary data source studies and feedback from Vitiligo patients indicated that certain set of diets plays a significant role in Vitiligo management i.e. acidic diets like Lemon/Curd/raw tomato, citrus fruits, excessive sweet(sugar) consumption, faulty

diet in form of milk with meal containing salt taken regularly causes Vitiligo spread/ increase the most whereas non acidic foods, non-citrus fruits, nuts and dry fruits diet causes reduction/stop further progression of Vitiligo the most.

Results from both primary and secondary data source studies indicated that consumption of copper rich water and use of specific topical creams/oil with moderate sun rays exposure to patients also has positive impact on reduction in white spots.

ii). Implications of stress management & life style changes on Vitiligo patients:

Results from both primary and secondary data source studies and feedback from Vitiligo patients also indicated that life style plays a significant role in Vitiligo management as higher level of stress; untimely lifestyle and upset stomach were found the main causes for spread/increase of the white spots of the Vitiligo patients. Further, 3 out of 5 Vitiligo respondents opined positive impact of yoga on Vitiligo management and their Vitiligo progression stopped/reduced after practising yoga.

5.2 Recommendations:

- a) Vitiligo being an autoimmune disease, a Vitiligo patient should visit to a Functional Medicine practitioner to identify and eliminate the root cause(s) of the problem.

- b) Vitiligo patient on its very first observance must take proper precautions and get it cured before it gets worse. Vitiligo cure is very difficult once it spread to larger area of the body.
- c) Certain diets when taken regularly for longer time along with change of life style have positive impact in stopping/slowing progression of white spots. Some of the broad suggestions for a Vitiligo patients are as under:

1) Managing a healthy lifestyle:

- Eat a whole food, anti-inflammatory diet, fruits, nuts and green vegetables.
- Avoid exposure/consumption of heavy metals, chemicals, processed foods and junk foods.
- Fix all your stomach related problems.
- Exercise regularly.
- Practice deep relaxation/yoga /meditation to reduce/avoid stress.
- Take sound sleep at least for 8 hours every night.

2) Recommendatory diet :

Foods Avoided	Foods taken
Table salt	Black salt (in moderation)
Refined oil	Physically refined oil/Desi Ghee (homemade)
Wheat and its products	Ragi/Jowar/Chana/Soya /Millet
Refined sugar	Jaggery (in moderation)
Sour foods/citrus fruits e.g. Pickles , Lemon, Curd, Orange, Grapes etc.	Non sour fruits like Banana etc. Green and leafy vegetables i.e. Bottle gourd, bitter gourd, spinach, Mushroom
Vegetables that worsen flatulence like Tomato, Onion, Garlic, Potato, Peas, Cauliflower, Brinjal (eggplant) and lady finger.	Green Salads Sprouts (Moong/Chana) Dry fruits e.g. Almonds, figs, Dry Apricot, Walnuts and Pistachio.
White rice	Brown rice
Pulses like Corn, Tur (Pigeon pea) , Urad, Masur, Dal Makhni etc.	Moong (Mung bean)/ Chana(Bengal gram)
Fridge/ Micro Wave oven items	-
Tea/coffee, Alcohol, Cold drinks or packaged juices.	Green Tea Vegetable (spinach/Bottle gourd/ Carrot) juices coconut water
Incompatible food combinations: i). Milk with salt, bananas, cherries, melons, sour fruits etc. ii). Radish with milk, bananas etc.	-
Normal RO and cold water	Water kept in Copper vessel at least for 8 hrs. @ room temperature

d). Above steps can be catalyst for stopping/slowing progression of smaller white spots and also further generation of new white spots but to cure the larger white spots which have already there on body, patient must consult a good doctor.

REFERENCES:

- 1) "VITILIGO", retrieved from American Academy of Dermatology/ Association <https://www.aad.org/public/diseases/a-z/Vitiligo-overview>
- 2) Article "Bars (Vitiligo/Leucoderma)" retrieved from Indian journals of dermatology (2015) https://www.nhp.gov.in/bars-Vitiligo-Leucoderma_mtl
- 3) "Vitiligo" retrieved from <http://www.avrf.org/facts/cause-of-Vitiligo.html>
- 4) "Process of melanin formation" accessed at <https://www.sciencedirect.com/topics/neuroscience/melanin>
- 5) Virendra N. Sehgal & Govind Srivastava "Vitiligo treatment options: An evolving scenario", Journal of Dermatological Treatment (2006)
- 6) Role of copper for the optimal health of the human body accessed at <https://copperalliance.org.uk/knowledge-base/education/education-resources/copper-essential-human-health/>
- 7) Health benefits and risks of copper retrieved from <https://www.medicalnewstoday.com/articles/288165#deficiency>
- 8) Vitamins & Supplements "COPPER" retrieved from <https://www.webmd.com/vitamins/ai/ingredientmono-902/copper>
- 9) Nooshin Bagherani, Reza Yaghoobi, and Mohammad Omidian "Hypothesis: Zinc Can Be Effective In Treatment Of Vitiligo" Indian J Dermatol. (2011)

- 10) Pearl E. Grimes, Rama Nashawati and others “The Role of Diet and Supplements in Vitiligo Management” (2017)
- 11) Lennart Juhlin And Mats J. Olsson “Improvement of Vitiligo after Oral Treatment with Vitamin B12 and Folic Acid and the Importance of Sun Exposure” Acta Derm Venereol (Stockh) (1997)
- 12) Human exposure to synthetically produced Hydroquinone: accessed at <https://www.beskinformed.com/skin-whitening/countries-and-regions-where-skin-lightening-products-are-banned/>
- 13) Peter J. Deisinger “Human exposure to naturally occurring hydroquinone” (30 Nov 2010)
- 14) Aaron Bunsen Lerner and Thomas B. Fitzpatrick ,Department of Dermatology and Syphilology University of Michigan School of Medicine “Biochemistry of Melanin Formation” (1950)
- 15) Mark Hyman, MD , “10 Strategies to Reverse Autoimmune Disease” retrieved from <https://drhyman.com/blog/2015/07/24/10-strategies-to-reverse-autoimmune-disease/>
- 16) A case study by Rahul K Shingadiya, Jasmin K Gohel, Suhas A Chaudhary, Prashant Bedarkar, BJ Patgiri & PK Prajapati (October,2018)

List of Additional readings:

- i). Lukoskin : A great research breakthrough from DRDO retrieved from <https://www.aimilpharmaceuticals.com/product/lukoskin/>
- ii). N Rezaei ,NG Gavalas, AP Weetman, EH Kemp, “Autoimmunity as an aetiological factor in Vitiligo(2007)” retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/17658994>
- iii). Ayurvedic treatment of Vitiligo retrieved from <https://www.jiva.com/diseases/Vitiligo/>
- iv). Topics on Vitiligo retrieved from <https://www.lybrate.com/>
- v). <https://www.clinuvel.com/photomedicine/physics-optics-skin/skin-physiology/melanin-and-human-evolution>
- vi). Akrem Jalel, Gaigi Siala Soumaya, and Mohamed Hédi Hamdaoui “VITILIGO TREATMENT WITH VITAMINS, MINERALS AND POLYPHENOL SUPPLEMENTATION” retrieved from Indian journals of dermatology <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2807713/>
- vii). Shakthisri Kandaswamy, Nahid Akhtar, Surya Ravindran, Smitha Prabhu, and Shrutakirthi D Shenoi, “Phototherapy in Vitiligo: Assessing the Compliance, Response and Patient's Perception about Disease and Treatment”. retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3726895/>
- viii) Vitiligo (Skin Fading) retrieved from <https://www.medicinenet.com/Vitiligo/article.html>
- ix). Rita V. Vora, Bhumi B. Patel, Arvind H. Chaudhary, Malay J. Mehta, and Abhishek P. Pilani, “A Clinical Study of Vitiligo in a Rural Set up of Gujarat” (2014) retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4134529/>
- x). Topics on Vitiligo retrieved from US national library of Medicines on <https://ghr.nlm.nih.gov/condition/Vitiligo>

xi). Topics on Vitiligo retrieved from <https://www.nhs.uk/conditions/Vitiligo/>

xii) Hypothesis: zinc can be effective in treatment of vitiligo retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/pmc3221203/>

xiii) Vitiligo: diagnosis and treatment retrieved from <https://www.aad.org/public/diseases/a-z/vitiligo-treatment>

xiv) Vitiligo: diagnosis and treatment retrieved from <https://www.mayoclinic.org/diseases-conditions/vitiligo/diagnosis-treatment/drc-20355916>

Annex “A” : Questionnaire for feedback from patients



भारतीय लोक प्रशासन संस्थान
INDIAN INSTITUTE OF PUBLIC ADMINISTRATION
Building Capacity for Good Governance

Dear Friends,

My name is Akhilesh Kumar Mishra presently posted as Director at Department of Economic Affairs (DEA) in the Ministry of Finance, Government of India, New Delhi. I am currently undergoing a long term course namely **Advanced Professional Program in Public Administration (APPPA)** at Indian Institute of Public Administration (IIPA), New Delhi.

As a part of my dissertation in the foregoing training I have undertaken a research project on **“Effectiveness of alternative medical methods in treatment of Vitiligo”** as part of my program on APPPA. I need your help and support in answering the questions as given below in order to finalise the research topic which will help the patients suffering from ‘Vitiligo’. Information being collected will be treated confidential and will only be used for the research purpose and it will not be used for any other purpose.

Kindly indicate your most appropriate response while answering the questions and email to me. If you have any questions, kindly feel free to contact me on akhileshk.mishra@nic.in.

Best regards

Akhilesh Kumar Mishra

09411106170

Feedback Form “Effectiveness of alternative medical methods in treatment of Vitiligo”

Sl. No.	Parameters	Options	Response
1.	Name	Optional	
2.	Sex	<ul style="list-style-type: none"> • Male • Female 	
3.	Age	<ul style="list-style-type: none"> • < 18 • 19-39 • 40-59 • > 59 	
4.	At what AGE did you first notice signs of Vitiligo?	<ul style="list-style-type: none"> • < 18 • 19-30 • 31-45 • 45-59 • 59 	
5.	How long you have been suffering from Vitiligo ?	<ul style="list-style-type: none"> • <6 months • > 6 Months • >1 years • >2 years 	
6.	How did your Vitiligo progress ?	<ul style="list-style-type: none"> • It was: (select one) Quick, short burst, then limited spreading • Slow, progressive spreading over several years 	
7.	In your opinion, what CAUSED your Vitiligo? (select all if applicable):	<ul style="list-style-type: none"> • Emotional distress • Physical skin damage • Medication side-effect (name of the drug) • Cosmetic or Hair product (what was it?) • Deodorant or perfume • Sunburn or prolonged sun exposure • Rubber product (i.e. gloves): • Exposure to hazardous materials (what was it?) • Vaccination (name of vaccine) • Other (please explain) 	
8.	In your opinion, what diet CAUSED your Vitiligo spread/increase the most? (select all if applicable)	<ul style="list-style-type: none"> • Acidic diets like Lemon / Curd/ Raw Tomato/ • Citrus fruits • All of the above 	

9.	In your opinion, what condition CAUSED your Vitiligo spread/ increases the most? (select all if applicable)	<ul style="list-style-type: none"> • Less sleep • Stress • Untimely lifestyle • Upset Stomach • All of the above 	
10.	In your opinion, what diet CAUSED reduction/stop further progression of your Vitiligo the most? (select all if applicable)	<ul style="list-style-type: none"> • Non acidic • Nuts and dry fruits • Non citrus fruits • All of the Above 	
11.	Did you notice if, Yoga/Meditation helps reducing progression of Vitiligo ?	<ul style="list-style-type: none"> • Yes • No • Not experienced 	
12.	How many doctors did you visit for Allopathic treatment of Vitiligo?	<ul style="list-style-type: none"> • Only one • More than two • More than five 	
13.	As a RESULT of the Allopathic treatment, your Vitiligo (select one)	<ul style="list-style-type: none"> • Continued, or new white patches appeared • Continued, but slowed significantly • Completely stopped, but patches still remain • Almost or completely disappeared • None 	
14.	How many doctors did you visit for Ayurvedic /Natural treatment of Vitiligo?	<ul style="list-style-type: none"> • Only one • More than two • More than five 	
15.	As a RESULT of the Ayurvedic treatment, your Vitiligo (select one)	<ul style="list-style-type: none"> • Continued, or new white patches appeared • Continued, but slowed significantly • Completely stopped, but patches still remain • Almost or completely disappeared • None 	
16.	How long Vitiligo took to get cured / Partly cured ? (Please specify Cured/Partly cured)	<ul style="list-style-type: none"> • >3 months • >6 months • >12 months • >24 months 	
17.	Any other relevant point you wish to mention?		