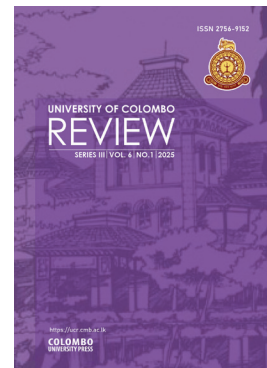


DOI: <https://doi.org/10.4038/ucr.v6i1.242>

University of Colombo Review (Series III),
Vol.6, No.1, 2025



A comprehensive review of Vitiligo: Integrating modern medical insights with Ayurvedic concepts

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ABSTRACT

Vitiligo is a skin condition in which white patches form on the skin. It has significant psychological and social impacts. While modern medicine explains it as an autoimmune condition, Ayurveda views it as a *Tridōshaja* condition caused by *Doṣa* imbalance and dietary incompatibilities. This review aims to compare the understanding, etiology, and management of Vitiligo according to Ayurvedic perspectives, with those of modern medical perspectives. A comprehensive literature review was conducted using classical Ayurvedic texts and modern scientific databases such as PubMed, Scopus, and Google Scholar. Keywords like “Vitiligo”, “*Śvitra*”, “Ayurveda”, “autoimmune depigmentation”, and “herbal treatment” were used. Relevant peer-reviewed articles, clinical studies, and Ayurvedic *Samhitā* (Ayurveda classical texts) were reviewed to compare traditional Ayurvedic and contemporary medical perspectives on Vitiligo. The study shows that modern treatments like corticosteroids and immune modulators provide limited symptomatic relief, with frequent relapses and side effects such as skin thinning. Modern approaches often neglect the psychological burden of Vitiligo, despite evidence linking stress to disease progression. Taking part in yoga and meditation, and using Ayurvedic herbs like *Bakuchi* and *Ashwagandha*, have been shown to reduce oxidative stress and help the patient feel more balanced emotionally. In modern medicine, treatments are based on genetic profiling for personalized therapies, but in Ayurveda, practitioners depend on *Prakriti* and *Doṣa* imbalances. Combining modern medicine and Ayurveda can address the physical, emotional, and systemic challenges of Vitiligo, providing targeted interventions and holistic strategies for long-term balance. Further interdisciplinary research is needed to validate and refine these integrative methods. Clinical trials and cooperative research are the future paths for validating Ayurvedic treatments.

KEYWORDS:

Vitiligo, White patches, *Śvitra*, Ayurveda, Modern medicine

Suggested Citation: Hazari, S & Jayakody, J.A.D.P. P. (2025). A comprehensive review of Vitiligo: Integrating modern medical insights with Ayurvedic concepts. *University of Colombo Review* (New Series III), 6(1), 68-83.

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Introduction

The skin is the largest organ of the body. It serves as a covering and a protective layer and keeps the internal organs intact (Sehgal, 2004). The attractiveness and beauty of a person depend on the condition of their skin as well as their physical and mental well-being (Laverde et al., 2020). Community prevalence surveys in the modern world have shown that most of the global population has various skin problems that need attention: for example, Eltaher and Araby (2015) reported high prevalence rates of conditions such as acne, eczema, and fungal infections among different age groups in Egypt. The long-term dermatological condition Vitiligo is characterized by the loss of melanin, the pigment that gives color to the skin, hair and eyes. This occurs when melanocytes, the cells responsible for producing melanin, are destroyed or stop functioning. As a result, milky white macules or patches of skin appear on various parts of the body, and may spread over time (Sehgal & Srivastava, 2004).

Vitiligo is a depigmentation disease with a prevalence of 0.5-2% worldwide but with significant interstate and interethnic variability (Bergqvist & Ezzedine, 2020). Research also shows that it is visually more obvious in regions with people of darker complexions/skin tones (Nazar & Kamran, 2022). The prevalence rates of Vitiligo vary by region, with estimates ranging from approximately 1–4% in countries such as India and parts of Africa, while lower rates (around 0.5–1%) have been documented in Western countries (Krüger & Schallreuter, 2012; Ezzedine et al., 2015). Vitiligo can occur in individuals of any age, though the disease is most prevalent among people between 10 and 30 years of age (Bergqvist & Ezzedine, 2020). Vitiligo is classified into two categories: early onset, which constitutes between 25%–50% of cases, and cases acquired later in childhood. No significant gender bias has been observed; however, a slightly higher incidence in females has been reported, which may be attributed to greater concern for cosmetic appearance among women (Al Hammadi et al., 2024).

Due to the psychological challenges associated with the condition, Vitiligo significantly impairs the quality of life of patients and their families, particularly when it affects children (Nazar, Kamran, & Masood, 2021). Patients with various skin diseases continue to face significant psychosocial challenges, even after their skin condition has shown noticeable improvement. Additionally, psychological stress related to body image and appearance concerns can contribute to poor mental health, reduced quality of life, and may even exacerbate skin conditions (Gianfaldoni et al., 2018).

A synergistic approach that is a key component of an integrated model combining modern medicine and Ayurveda provides a systematic framework for managing Vitiligo. It emphasizes treatment and psychosocial support to provide holistic care that specifically addresses Vitiligo and enhances the quality of life

of patients. Therefore, the aim of this study was to compare modern medical understanding with Ayurvedic concepts and explore their synergy. The literature review was conducted using Ayurveda classical texts such as *Charaka Samhitā*, *Suśruta Samhitā* and *Aṣṭāṅga Hṛdaya*. For the modern medical perspective, searches in PubMed, Scopus and Google Scholar were done using terms including “Vitiligo”, “autoimmune depigmentation”, “Ayurveda”, “*Śvitra*” “Herbal medicine for Vitiligo”. Only articles published between 2004 and 2024 were part of this analysis. This review has been limited to peer-reviewed journals, clinical studies and systematic reviews, including medical causes, immune response and ways to treat Vitiligo. Data were categorized to compare what each framework has in common and where they differ.

Modern perspectives on Vitiligo

Etiology/pathophysiology

The word Vitiligo comes from the Latin word *vitellus*, which means veal (pale, pink flesh). It is an acquired circumscribed depigmentation, found in all races; its prevalence may be as high as 0.5-1%; its inheritance is polygenic (Blackwell, 2015). Vitiligo is a common, acquired, idiopathic discoloration of the skin characterized by well circumscribed, ivory/chalky white colored macules flush with the skin surface. This differs from other types of skin depigmentation where the cause of the discoloration is known. The lesions may be surrounded by a tan or intermediate-colored ring, known as the ‘trichrome’ phenomenon, around which is normal skin. The hair over the patch may be either normal or white. Occasionally, Vitiligo may be associated with autoimmune disorders like thyroid disease, diabetes mellitus, and pernicious anemia (Sehgal, 2004).

Modern medicine takes the view that the etiology of Vitiligo is still not definitive (Innes, 2013). Even though other explanations have been developed, new evidence suggests that Vitiligo is an autoimmune disease mediated by T cells and initiated by oxidative stress (Innes, 2013). Reactive oxygen species (ROS) are highly reactive molecules containing oxygen that are naturally produced in the body during metabolic processes. ROS damage DNA and lead to lipid and protein peroxidation in melanocytes as a result of their gradual buildup. Several of the changed proteins exhibit a partial or whole loss of functionality (Jimbow et al., 2001). The high hydrogen peroxide concentrations are shown to block some amino acids, most notably tyrosine. Moreover, oxidative stress drastically alters keratinocytes, depriving melanocytes of their trophic support (Boniface et al., 2018). In modern science, it is generally recognized that Vitiligo has a non-mendelian, multifactorial, and polygenic pattern of inheritance. Recent studies show a strong association between Vitiligo and specific HLA haplotypes (HLAs-A2, -DR4, -DR7, and -DQB1) as well as other genes involved in both cellular and humoral immunity, with the exception of genes

encoding molecules important for normal melanogenesis (e.g., TYR which encode for Tyrosinase) (Henning et al., 2018). Genetic testing, which is already available, may be beneficial in the future for identifying possible comorbidities and guiding individualized targeted therapy, especially due to the known association with various autoimmune diseases (Henning et al., 2018). Various triggers may contribute to the onset of Vitiligo, including physical strain such as serious sickness, surgery, accidents, frequent antibiotic use, recurrent illnesses, Ultra Violet rays (UV), burns, chemical components like thiols, phenols, catechols, mercaptoamines, and quinones, as well as their derivatives; endocrine factors such as pregnancy; malnutrition resulting from poor eating practices and consumption of old or stored foods; and psychological or social stressors (Bergqvist & Ezzedine, 2020).

Place of origin

In modern medical science, white, concentric patches of skin can develop on the face, limbs, chest, groin, and mucous membranes. Hair on the scalp and beard may also experience de-pigmentation. The spots of de-pigmentation are clearly visible. Sometimes, a few patchy Peri-follicular pigments that are visible inside the de-pigmented patches may be the initial sign of re-pigmentation (Innes 2013). The feeling of the de-pigmented areas is normal (in contrast to tuberculoid leprosy), meaning that sensations such as touch, temperature, and pain in these areas remain intact. There is considerable uncertainty regarding the course of the condition, as patches may remain stable, enlarge over time, or, in some cases, re-pigment spontaneously (Blackwell, 2015).

Clinical classification

Vitiligo is classified on the basis of the distribution of the disease and its clinical features. On the basis of disease distribution, Vitiligo is classified as localized, generalized, and universalized. Based on the clinical features and the natural history of the disease, Vitiligo can be divided into Segmental Vitiligo (SV) and non-segmental Vitiligo (NSV). Segmental Vitiligo is characterized by one or more Vitiliginous patches arranged in a linear or flag-like pattern of mosaicism, usually with a unilateral dermatomal distribution, and can be further subdivided into uni-segmental, bi-segmental, and multi-segmental. Non-segmental Vitiligo is a heterogeneous group of pigmentary disorders that typically affect the skin in a symmetric pattern and includes subtypes such as acrofacial, mucosal (affecting more than one side), generalized, universal, and mixed types (associated with segmental Vitiligo). There are also rare forms that are unclassified or indeterminate, as well as focal mucosal (affecting only one side) (Innes 2013; Sehgal 2004). The preceding classification not only helps in diagnosis, but also has prognostic significance (Sehgal, 2004).

Vitiligo can be further classified with several clinical features. Punctata Vitiligo presents as small, punctate-like de-pigmented macules scattered across the skin, Follicular Vitiligo involves the follicular reservoir with minimal cutaneous lesions. Inflammatory Vitiligo is characterized by an erythematous halo surrounding the white patches, while in trichrome Vitiligo, a hypopigmented area is seen between the central amelanotic zone and the peripheral normal skin, resulting in three distinct shades. A variant of this, quadrichrome Vitiligo, exhibits foci of re-pigmentation at the follicular ostia, producing four color shades. Pentachrome Vitiligo lesions show five different shades ranging from white to black. Blue Vitiligo displays a bluish appearance of the affected skin (Gianfaldoni et al., 2018).

Diagnosis

The increased risk of Vitiligo patients developing autoimmune diseases is well-known. Common autoimmune diseases associated with Vitiligo include Alopecia areata, Atopic dermatitis, Autoimmune hemolytic anemia, Autoimmune thyroid disease, Diabetes mellitus, Inflammatory bowel disease, Morphea, Multiple sclerosis, Pemphigus vulgaris, Pernicious anemia, Psoriasis, Rheumatoid arthritis, and Systemic lupus erythematosus (Blackwell, 2015). Recent studies underline the possible association of Vitiligo with different diseases, such as endocrine illnesses (e.g. hypo-parathyroidism) and systemic inflammatory disorders (e.g. obesity, metabolic syndrome) (Sehgal, 2004).

Prognosis

As per the modern view, recognizing the type of Vitiligo has important implications for the management of the patient, because for each type there is a different prognosis. The prognosis of Vitiligo varies by type: localized Vitiligo is often stable or may regress; generalized Vitiligo tends to be progressive and may be associated with systemic involvement and other autoimmune diseases; Vitiligo universalis is commonly linked with multiple comorbidities (Blackwell, 2015). A shorter duration of the disease (typically less than 2 years) is associated with better prognosis, as is a younger age at onset. The presence of leukotrichia (white or de-pigmented hair within the lesions) is considered a sign of poor prognosis. Additionally, macules located over fleshy areas of the body tend to have a better chance of re-pigmentation compared to those over bony prominences. Certain clinical types, such as Vitiligo areata and zosteriform Vitiligo, typically respond more favorably to treatment (Sehgal, 2004).

Current treatment approaches

There are three categories of common therapies: the topical use of strong corticosteroids, Psoralen photochemotherapy (PUVA), and surgical treatments.

Systemic medicine, based on weight, that includes PUVA therapy and surgical management is the main treatment for Vitiligo (Sehgal & Srivastava, 2004). Allopathic care of this condition offers two strategies: stabilization of de-pigmented patches and re-pigmentation treatments. Due to the absence of melanocytes in de-pigmented skin, the body is unable to provide adequate Ultra violet (UV) light shielding from the harmful rays of the sun; thus protection of de-pigmented patches is of paramount importance (Blackwell, 2015). To minimize exposure to UV concentrated light, protective measures are encouraged, such as the application of Sunscreen 15-30 SPF or the use of protective clothing. In addition to protecting Vitiligo patches, many cosmetic products are available that act to camouflage the affected skin (Sehgal 2004; Sehgal & Srivastava, 2004). The second method of treating Vitiligo is by using re-pigmentation treatments. Although complete re-pigmentation occurs in only 15–20% of patients receiving PUVA therapy, it has been regarded as one of the most effective available treatments for Vitiligo in the United States, particularly in clinical guidelines such as those published by the American Academy of Dermatology (AAD) (Smith et al., 2016). However, general treatment requires a prolonged treatment duration and is often associated with notable side effects, such as photo toxicity, hyperpigmentation, and an increased risk of skin aging or cancer with long-term use (Innes, 2013).

Limitations of modern treatments and challenges

Vitiligo is a complex and multifactorial autoimmune condition characterized by individual variability in presentation and progression. The main goals of treatment are to restore pigmentation, stop disease progression, and improve quality of life. However, despite advancements, modern treatments for Vitiligo still face several limitations and challenges, including inconsistent results, limited effectiveness in certain types of Vitiligo, partial or incomplete re-pigmentation, the need for lifelong management, high costs, limited accessibility, and notable side effects such as skin thinning, irritation, and hyperpigmentation. Surgical treatments are available but may not be suitable or accessible for all patients. Further, the condition's pathogenesis remains poorly understood, and reliable predictive biomarkers are currently lacking, hindering early diagnosis and targeted therapy. The condition can lead to both cosmetic and functional limitations.

Vitiligo has significant psychological effects, including anxiety, despair, and social stigma. These impacts can negatively affect patient compliance, leading to poor adherence to treatment plans, especially when therapeutic effects are slow to appear. Predictive biomarkers are needed to enable personalized treatment approaches; however, currently, no biomarkers reliably forecast an individual patient's response to therapy. Segmental Vitiligo, a distinct subtype characterized by unilateral or segmental distribution and believed to involve neural factors, is typically less

responsive to standard therapies. This illustrates the challenges in treating Vitiligo, where different subtypes may require tailored therapeutic approaches.

While treatments like biologics, cell based therapies and precision medicine are in their infancy, they involve challenges such as cost, extensive clinical validation, and limited long term safety data. Finally, the Vitiligo treatment limitations and challenges stress the importance of consistently engaging with cutting-edge research, ensuring comprehensive care, and rapidly implementing effective treatment options. There is significant potential in modern treatments, but a definitive cure remains elusive, and long-term treatment strategies have yet to be fully established.

Ayurvedic perspectives on Vitiligo

Historical review of Śvitra

Vitiligo in modern medicine closely resembles the Ayurvedic condition known as Śvitra, both in terms of clinical presentation and depigmentation pattern. The description of Śvitra (Vitiligo) dates back thousands of years in *Vedas* (scriptures). It is mentioned in Vedic texts like *Atharvavedā* (1500 BC) and *Manu-Smṛiti* (c. 1250 -1000 BC) (Tawde, Jangid, & Wane, 2019). In the *Ātharva* literature, Śvitra appears for the first time in the commentary of *Dārila* (commentator) on *Kāu Sūtra* (ritual text). References to *Kilāsa* (synonym for Śvitra) are found in *Atharvavedā* in two hymns (A.V. 1.23 and 1.24). References to Śvitra can be found in the *Rig-Vedā* (V.53.1) as well as in other ancient texts such as the *Vajaseneji Saṃhitā*, *Kathaka Saṃhitā*, *Taittiriya Brāhmaṇa* and *Tandya Mahābrāhmaṇa*. Additionally, the disease is described in *Panini Vyakarana* (Barman, 1995).

Concepts of Vitiligo in Ayurveda

In Ayurveda there are 18 types of *Kushta Roga* (skin diseases). They have been sub-grouped into seven types of *Māha Kushtās* (major skin ailments) and 11 types of *Kshudra Kushtās* (minor skin ailments) depending on the nature of manifestation and severity of presentation (in terms of signs and symptoms) (Jayasinghe, 1990). The three main classical Ayurvedic texts *Charaka Saṃhitā*, *Suśruta Saṃhitā*, and *Aṣṭāṅga Hṛdaya* do not classify Śvitra under the general category of *Kuṣṭha* (skin diseases). Instead, they discuss Śvitra in separate chapters, suggesting a distinct understanding of the condition. In *Charaka Saṃhitā*, Śvitra is classified based on *Doṣa* (bodily humors) predominance. It states that the *Pitta*-dominant type is particularly incurable, especially when it affects the deeper tissues like *Rakta* (blood). *Charaka* also notes that when the vitiated *Doṣas* penetrate deeper *Dhātus* (tissues), the disease becomes more difficult to treat (Sharma, 1981). Moreover, *Charaka* identifies various causative factors such as improper diet and lifestyle (*Āhāraja* and *Vihāraja*), internal or spiritual causes (*Adhyātmika*) like emotional disturbances and karmic

influences, and genetic predisposition (*Bīja-doṣa*). The text also emphasizes moral and behavioral factors such as lying, ingratitude, disrespect to gods and teachers, and sinful actions as contributors. Consuming mutually contradictory foods, such as milk with sour or salty items, fish with milk, or heated honey, is also cited as a major cause (Sharma, 1981).

In contrast, the *Suśruta Saṃhitā* uses the term *Kilāsa* instead of *Śvitra* (Murthy, 2000). While it does not categorize *Śvitra* under *Kuṣṭha*, it still treats the condition as a serious skin disorder. Additionally, in *Kalpa Sthāna* (Chapter 2), *Suśruta* describes the concept of *Dūṣṭi Viśa* (cumulative or subclinical toxicity). Some scholars, including Murthy (2000), interpret this as a possible early conceptual explanation of the pathogenesis of *Śvitra*.

The *Aṣṭāṅga Hrdaya*, while similarly not placing *Śvitra* under the main category of *Kuṣṭha*, devotes separate discussion to it, reinforcing its distinct status in classical nosology. In contrast to these three texts, the *Kāśyapa Saṃhitā* does include *Śvitra* under the category of *Mahākuṣṭha*, indicating a more inclusive classification (Tewari, 2008). It also describes *Śvitra* as a reflection of white color emphasizing its visible depigmentation (Tewari, 2008).

Additionally, the *Bhoja Saṃhitā*, an Ayurvedic treatise attributed to King *Bhoja*, discusses *Śvitra* and its treatment approaches. It also elaborates on contagious diseases, mentioning certain types of infections that spread from person to person (Jayasinghe, 1990). Finally, the condition has been referred to by various names in different texts, such as *Dārūna*, *Āruna*, and *Kilāsa*, reflecting its varied clinical interpretation and presentation across traditions (Sharma, 1981).

Ayurveda pathophysiology

Due to *Atisevana of Asamyak Āhara Vihāra* (excessive intake of unhealthy foods and regime), vitiation of *Tridōshas* (*Vāta*, *Pitta*, and *Kapha*¹) occurs in association with *Twakchagat* (skin), *Pitta Doṣa* and *Rasa* (plasma), *Rakta* (blood tissue), *Māmsa* (muscular tissue), *Udaka Dhātu* (bodily fluid; secondary tissue). According to Ayurvedic understanding, when the vitiation of *Doṣas* primarily affects the *Rasa* and *Rakta Dhātus*, it can lead to the manifestation of *Śvitra* (Murthy 2000; Sharma 1981). According to Vāgbhaṭa, vitiated *Doṣa* circulate in *Śīrās* and *Dhamanīs* (blood vessels). These *Doṣas* become lodged in *Dūṣyas* (affected tissues), leading to *Srotorodha* (blockage of vessels) This pathological process results in early clinical features such as “*Vaivarnya*” (skin discoloration) and “*Mandala*” (circular or ring-shaped lesions), which are characteristic signs of *Śvitra* as described in Ayurvedic texts (Murthy, 1998).

¹ In Ayurveda, *Vāta* governs movement and the nervous system (air + ether), *Pitta* governs digestion and metabolism (fire + water), and *Kapha* governs structure and lubrication (water + earth). An imbalance in any or all of these *Doṣa* can lead to disease.

Place of origin

According to *Charaka Saṃhitā*, the manifestation of *Śvitra* occurs at the 3rd layer of *Tvaka* (skin). In contrast, *Suśruta* identifies the site of manifestation as *Tāmra Tvaka* (copper-colored fourth layer of skin) (Murthy 1986; Sharma 1981).

Ayurvedic classification of *Śvitra*

According to the *Aṣṭāṅga Hṛdaya*, *Śvitra* originates from three *Doṣas* and three *Dhātu*, *Rakta*, *Māmsa* and *Meda*. There are three types of this skin disease due to separate vitiation of *Doṣas* and *Tridhātu*. *Vātaja Śvitra* with dry and light red patches due to *Vāta Doṣa* predominance in *Rakta Dhātu*, *Pittaja Śvitra* characterized by itching and loss of hair. *Tāmra* patches due to *Pitta Doṣa* predominance in *Māmsa Dhātu*, *Kaphaja Śvitra* with itching present in white patches due to aggravated *Kapha Doṣa* localized in *Meda Dhātu* (Murthy, 1998). Three types of *Śvitra* are described in *Madawa Nidāna* similar to *Aṣṭāṅga Hṛdaya* (Murthy, 1986).

According to the *Charaka Saṃhitā* three subtypes of *Śvitra* are due to vitiated *Doṣa* and *Dātu* (tissue). All three *Doṣas* (*Vāta*, *Pitta*, and *Kapha*) are vitiated in the three subtypes of *Śvitra*. Red patches are due to vitiation of *Doṣa* reaching into the *Rakta Dātu*, coppery patches are due to vitiation of *Doṣa* reaching the level of *Māmsa Dhātu*, white patches are due to vitiation of *Doṣas* reaching the level of *Meda Dhātu* (Sharma, 1981). According to the *Ācharya Suśruta*, on dominance of a single *Doṣa*, *Śvitra* has three sub-types: *Vātaja*, *Pittaja* and *Kaphaja*. *Vātaja Śvitra* is described as rough, coppery color, and round patches, *Pittaja Śvitra* patches resemble color of lotus petal (pink or reddish) with burning sensation, *Kaphaja Kilāsa* is described as large smooth white patches with itching (Murthy, 2000).

Prognosis

According to Murthy (1986), the three types of *Śvitra*, *Rakta*, *Tāmra*, and *Śveta* (white) correspond to stages of increasing treatment difficulty, with the white variety (*Śveta Kilāsa*) being the most challenging. This classification aligns with *Kaphaja Śvitra*, and Murthy's commentary refers to the *Suśruta Saṃhitā*, where *Śvitra* is termed *Kilāsa*. *Suśruta Saṃhitā* and the works of Vāgbhaṭa further elaborate on the prognosis of *Śvitra*. They describe certain features that indicate incurability: when the white patches are knotted together in complex formations (*Parsparta-Abhinna*), when the hair within the lesion turns red, when the condition has persisted for more than one year, when the patches have developed due to burns, or when the lesions appear at the distal parts of the body (*Ante-jāta*), such as the fingers, lips, and toes. The prognosis also depends on the dominant *Doṣa* involved. *Śvitra* with *Vāta* predominance is considered difficult to cure; *Pitta*-predominant *Śvitra* is more difficult to treat; and *Kapha*-predominant *Śvitra* is regarded as incurable (Murthy, 1998; 2000).

Ayurvedic treatment approaches

According to Ayurveda, management of the *Śvitra* is similar to the *Kushta* management. *Śodhana* (purification) and *Shamana* (pacifying) are the mainstays for the treatment of *Śvitra*. After the purification, sunlight therapy, local ointments and Ayurvedic formulations are used for *Shamana* therapy. In Ayurvedic texts, many formulations are given for the management of *Śvitra* (Jayasinghe 1990; Sharma 1981). Traditional medicine in Sri Lanka uses plant, animal, mineral, and metallic ingredients to make different medications. Particularly the skin and eyes of a leopard, horns of a deer, pita (yellow color digested food part) of a peacock, are ground with the aid of cow urine, elephant urine, a sort of curd (*Dikiri*), and honey (Talpathe Piliyam, 1993). These ingredients are definitely not common or everyday ingredients. They belong to the category of rare and exotic substances often mentioned in classical Ayurvedic texts, especially in traditional formulations. Such ingredients are typically symbolic, highly specific, and sometimes used in alchemical or specialized treatments rather than common everyday herbal remedies. In modern practice, they are rarely used due to ethical, legal, and conservation concerns.

Plant crude extracts, decoctions, porridge, syrup, oil are commonly used. They frequently have *Tridōsha Shāmaka*, *Rakata Śodhana*, *Kushta Nāshaka* (alleviation of skin disease), and *Varnaka* (pigment) (*Ayurveda Pharmacopoeia*, 1979).

Comparative analysis

Both ancient Ayurvedic classics and modern western approaches recognize Vitiligo as a long-term dermatological disorder with multiple etiological factors. While western medicine focuses on genetic, immunological, and environmental causes, Ayurveda emphasizes diet and lifestyle as important contributors to the disease's development. Incompatible diet is mentioned as the prime causative factor of *Kushta* in general and *Śvitra* in particular. These incompatible foods are responsible for the formation of *Āma* (endogenous antigen source) (Sharma, 1981). *Charaka* also opines that the sinful acts, misdeeds of past lives, unlawful acts are also causes of *Śvitra*. Further described in *Dūshii Visha* are the causative factors of *Śvitra* (Murthy, 2000).

According to modern medicine, Vitiligo is related to both genetic and non-genetic factors. Researchers have suggested an auto-immunological, neurological or auto-cytotoxic origin of Vitiligo. Several definitive theories have been proposed about the pathogenesis of Vitiligo, but the main cause remains unknown.

According to Ayurvedic principles, the vitiated *Doṣa* circulate through blood vessels and become lodged in affected tissues, leading to obstruction of channels, which results in the manifestation of symptoms. In contrast, in modern medicine the exact pathobiology of Vitiligo remains unclear, although several theories including

autoimmune, neural, oxidative stress and genetic mechanisms have been proposed. Clinically, Vitiligo is classified into different variants based on the distribution pattern of the de-pigmented lesions. Ayurveda classification is based on types of bodily humors and body tissues.

The important classical texts of Ayurveda such as *Charaka Samhitā*, *Suśruta Samhitā*, *Aṣṭāṅga Hṛdaya* clearly mention the treatment of Śvitra along with its classification and prognosis. Vitiligo is a disease of autoimmune pathology so both systemic and local treatments are essential. Ayurvedic treatments, especially when combining internal medicines with external therapies, offer a structured approach aligned with the chronic and multifactorial nature of Vitiligo. This integrated understanding provides a broader perspective for developing a comprehensive treatment plan grounded in traditional systems.

Evidence from research

Psoralen, the main active compound studied in *Bakuchi* (*Psoralea corylifolia*), an Ayurvedic herb, has a photosensitizing effect that increases melanin production when exposed to ultraviolet light (Singh et al., 2010). This property underlies its traditional use in treating Vitiligo. Data indicate efficacy in stimulating melanocyte proliferation and migration, which can help re-pigmentation in Vitiligo (Shingadiya et al., 2018). *Bakuchi* oil and UV light therapy helped patients with Vitiligo with de-pigmented lesions. Additionally, the oil seems to possess antioxidant properties that can decrease oxidative stress, a prime factor in Vitiligo pathology (Rathnayake & Dahanayake 2024). Among common used herbal treatments in Vitiligo, *Haridra* (*Curcuma longa*) has immunomodulatory and antioxidant effects containing curcumin. *Guduchi* (*Tinospora cordifolia*) is a known adaptogenic and detoxifying support for immune balance (Management et al., 2020). Neem (*Azadirachta indica*) inhibits inflammatory and depigmentation preventive activities *in vitro* and in animal studies (Roga et al., 2020).

Like most treatments for Vitiligo, narrowband UVB phototherapy is a standard modern treatment. Research indicates that combining Ayurvedic preparations like *Bakuchi* oil with phototherapy results in faster and more effective re-pigmentation compared to phototherapy alone. Furthermore, most studies report a lower recurrence rate when Ayurvedic treatments are integrated with modern therapies (Mandloi & Dash, 2023; Luo et al., 2025). While corticosteroids are effective for calming inflammation, the side effects include skin thinning (Rathnayake & Dahanayake, 2024). However, there are traditional and integrative healing methods in Ayurveda such as Śodhana and Rasāyana (rejuvenation), which aim to restore systemic balance rather than merely providing symptomatic relief (Sharma, 1981).

However, combining these two systems presents certain challenges. For instance, the preparation methods, dosages, and quantification of bioactive compounds

in Ayurvedic formulations often lack standardization. Moreover, many Ayurvedic studies rely on anecdotal evidence or small sample sizes, which do not always meet the rigorous standards of modern evidence-based medicine. These factors complicate efforts to evaluate and integrate Ayurvedic treatments within contemporary clinical frameworks. The integration of both Ayurvedic and modern approaches demands a great deal of interdisciplinary collaboration, which is not well developed. The results of Ayurvedic herbs like *Bakuchi* and *Guduchi* show promising potential in vitiligo management; however, more rigorous and standardized research is needed to validate their efficacy. Combining such traditional remedies with modern medical treatments, such as phototherapy or corticosteroids, may offer a more comprehensive and effective approach, highlighting the benefit of integrating both systems in patient care. Interdisciplinary clinical trials and comparative studies are essential to fully evaluate the effectiveness of integrative strategies in Vitiligo treatment.

Discussion

Symptomatic treatments with corticosteroids or immune-modulators provide only limited relief and the disease tends to relapse. Topical steroid use and phototherapy can thin the skin, create a burning sensation and make the skin more susceptible to skin cancer. The therapies on the market are expensive and not available to most people (Lotti et al., 2020). The preparation and dosage of Ayurvedic formulations however varies to a great extent, leading to inconsistent effects. Herbal and holistic approaches often require longer treatment durations, which may discourage patients seeking immediate results. Additionally, the limited number of large-scale clinical trials has contributed to lack of widespread acceptance and credibility of these methods within the global medical community (Shingadiya et al., 2018).

The psychological element is often overlooked by modern medicine, which seems to focus more on physical symptoms (Nazar & Kamran, 2022). Studies indicate that stress-induced oxidative damage exacerbated disease progression via these mental health problems. Yoga and meditation are the Ayurvedic practices that have been shown to lower oxidative stress and improve emotional well-being. Combining Ayurveda's emphasis on mental balance with a modern psychotherapeutic approach can offer a more comprehensive strategy to address the emotional burden associated with Vitiligo (Tawde, Jangid, & Wane, 2019). Ayurvedic herbs like *Ashwagandha* as well as *Bakuchi* as adaptogens can reduce stress hormones, thereby lowering oxidative damage (Mikulska et al., 2023). In modern precision medicine, genetic profiling and biomarker analysis enable tailored treatments for Vitiligo, such as immune-modulators targeting specific pathways (Hamzavi et al., 2004). Ayurveda customizes treatments based on an individual's *Prakriti* (constitution) and *Doṣa* imbalances (Sharma, 1981). For instance, in the case of *Pitta* imbalance,

cooling herbs such as Neem are recommended, while for *Vāta* imbalance, nourishing therapies like *Basti* (oil enemas) are utilized to restore balance. Combining these paradigms allows hyper-personalized care that addresses both the molecular and systemic imbalances of Vitiligo (Shingadiya et al., 2018).

There is a need for a holistic focus on diet, lifestyle, and mental health. Modern insights into antioxidants align with Ayurvedic dietary principles emphasizing anti-inflammatory foods, for instance, foods rich in melanin-boosting nutrients like zinc and copper. Ayurveda recommends avoiding sour and spicy foods to reduce *Pitta* aggravation (Ingle, 2019). Ayurveda emphasizes lifestyle practices like regular detoxification (*Panchakarma*) and daily routines (*Dinacharya*) to maintain skin health (Murthy, 1998). Modern lifestyle modifications, such as using sunscreen protection and limiting sun exposure, along with avoiding skin irritants, complement Ayurvedic recommendations. Ayurveda's holistic approach integrates emotional balance through *Sattvic* (pure) food, *Pranayama* (breathing exercises), and *Dhyana* (meditation). Combining these with modern psychological counseling can address the stress Vitiligo cycle effectively. Integrating modern medicine and Ayurveda can address the physical, emotional, and systemic challenges of Vitiligo. Modern treatments provide targeted interventions, while Ayurveda contributes holistic strategies for long-term balance. This synergy offers a comprehensive, patient-centered approach that considers not just the symptoms but the overall well-being of individuals with Vitiligo. Further interdisciplinary research is essential to validate and refine these integrative methods.

Conclusion

In conclusion, Vitiligo may be better described as a condition with several clinical subtypes, each with distinct presentations but sharing a common underlying pathology. This study strongly affirms the importance of improving knowledge of the etio-pathobiology and clinical aspects of the disease to enhance patient management. Many Vitiligo patients feel distressed and stigmatized by their condition. Therefore, early intervention should be implemented for better results. The scientific rationale behind the use of all the medications in Ayurvedic texts needs to be further explored with modern methods and research too. Though *Śvitra* is explained as being difficult to cure/incurable and often requiring a long treatment period, it can be effectively managed with consistent practice of *Śodhana*, *Shaman* and external application, following *Pathya Sevana* (proper lifestyle) as important preventive measures to improve immunity. Clinical trials and cooperative research are future paths for validating Ayurvedic treatments.

Conflict of interest

The authors declare that they have no conflicts of interest.

References

- Department of Ayurveda, Ministry of Health, Sri Lanka. (1979). *Ayurveda Pharmacopoeia* (Vols. 1–2, pp. 262–263). Colombo: Department of Ayurveda.
- Al Hammadi, A., de Castro, C. C. S., Parmar, N. V., Ubogui, J., Hatatah, N., Ahmed, H. M., & Llamado, L. (2024). Prevalence and burden of vitiligo in Africa, the Middle East and Latin America. *Skin Health and Disease*, 4(1), 1–18. <https://doi.org/10.1002/ski2.317>
- Bergqvist, C., & Ezzedine, K. (2020). Vitiligo: A review. *Dermatology*, 236(6), 571–592. <https://doi.org/10.1159/000506103>
- Blackwell, W. (2015). *Clinical dermatology* (5th ed.). Markono Print Media Pte Ltd.
- Boniface, K., Jacquemin, C., Darrigade, A. S., Dessarthe, B., Martins, C., Boukhedouni, N., Vernisse, C., et al. (2018). Vitiligo skin is imprinted with resident memory CD8 T cells expressing CXCR3. *Journal of Investigative Dermatology*, 138(2), 355–364. <https://doi.org/10.1016/j.jid.2017.08.038>
- Eltaher, S. M., & Araby, E. M. (2015). Health-related quality of life in patients with vitiligo. *The Egyptian Journal of Community Medicine*, 33(2), 77–83. <https://doi.org/10.21608/ejcm.2015.710>
- Ezzedine, K., Lim, H. W., Suzuki, T., Katayama, I., Hamzavi, I., Lan, C. C. (2015). Classification/nomenclature of vitiligo and related issues: The Vitiligo Global Issues Consensus Conference. *Pigment Cell & Melanoma Research*, 28(3), 302–307. <https://doi.org/10.1111/pcmr.12339>
- Gianfaldoni, S., Tchernev, G., Wollina, U., Lotti, J., Satolli, F., França, K., Rovesti, M., & Lotti, T. (2018). Vitiligo in children: A better understanding of the disease. *Journal of Medical Sciences*, 6(1), 181–184. <https://doi.org/10.3889/oamjms.2018.040>
- Hamzavi, I., Jain, H., McLean, D., Shapiro, J., Zeng, H., & Lui, H. (2004). Parametric modeling of narrowband UV-B phototherapy for vitiligo, using a novel quantitative tool: The Vitiligo Area Scoring Index. *Archives of Dermatology*, 140(6), 677–683. <https://doi.org/10.1001/archderm.140.6.677>
- Henning, S. W., Fernandez, M. F., Mahon, J. P., Duff, R., Azarafrooz, F., Guevara-Patiño, J. A., Rademaker, A. W., Salzman, A. L., & Le Poole, I. C. (2018). HSP70iQ435A-encoding DNA repigments vitiligo lesions in Sinclair swine. *Journal of Investigative Dermatology*, 138(12), 2531–2539. <https://doi.org/10.1016/j.jid.2018.06.186>
- Ingle, K. S., & Pawar, J. J. (2019). An Ayurvedic view on vitiligo (Shwitra) - an autoimmune disorder. *World Journal of Pharmaceutical and Medical Research*, 5(11), 76–78.
- Innes, J. A. (Ed.). (2013). *Davidson's principles and practice of medicine* (20th ed.). Elsevier.

- Jayasinghe, D. M. (1990). *Charmaroga Nidana Cikitsa Sangrahaya* (1st ed). Department of Ayurveda, Sri Lanka. pp. 98–99
- Kamble, A. D., Rathod, S. N., & Kulkarni, R. B. (2020). Ayurvedic management of Kushta (vitiligo). *International Journal of Research in Indian Medicine*, 4(3), 1–6.
- Krüger, C., & Schallreuter, K. U. (2012). A review of the worldwide prevalence of vitiligo in children/adolescents and adults. *International Journal of Dermatology*, 51(10), 1206–1212. <https://doi.org/10.1111/j.1365-4632.2011.05377.x>
- Laverde-Walter, A., Maya-Rico, A. M., Londoño-García, Á. M., Arango, A., & Vásquez-Trespalcios, E. M. (2020). Quality of life in Colombian patients with vitiligo. *Dermatología Revista Mexicana*, 64(3), 239–247.
- Luo, L., Huang, J., Fu, C., Hu, Y., Chen, J., Jiang, L., Zeng, Q. (2025). The efficacy of combined phototherapy with topical therapy in vitiligo: a network meta-analysis. *Journal of Dermatological Treatment*, 36(1): 2483808. <https://doi.org/10.1080/09546634.2025.2483808>
- Mandloi, A., & Dash, B. (2023). A clinical evaluation of Bakuchi Hartal Lepa and Amalaki Khadir Kashayam in the management of Switra (Vitiligo): A pilot study. *Journal of Ayurveda and Integrated Medical Sciences*, 8(9), 40–45. <https://doi.org/10.21760/jaims.8.9.7>
- Mikulska, P., Malinowska, M., Ignacyk, M., Szustowski, P., Nowak, J., Pesta, K., Szelağ, M., Szklanny, D., Judasz, E., Kaczmarek, G., Ejiohuo, O. P., Paczkowska-Walendowska, M., Gościński, A., & Cielecka-Piontek, J. (2023). Ashwagandha (*Withania somnifera*)—Current research on the health-promoting activities: A narrative review. *Pharmaceutics*, 15(4), 1057. <https://doi.org/10.3390/pharmaceutics15041057>.
- Murthy, K. R. S. (Ed.). (2000). *Sushruta Samhita* (Vol. 3, Uttara Tantra). Chaukhambha Orientalia. pp. 811–813
- Murthy, K. R. S. (Ed.). (1986). *Madhava Nidanam*. Varanasi, India: Chaukhambha Orientalia. pp. 273–275.
- Murthy, K. R. S. (Ed.). (1998). *Ashtanga Samgraha* (Vol. 3, Uttara Tantra). Varanasi, India: Chaukhambha Orientalia. pp. 627–629.
- Nazar, I., & Kamran, F. (2022). Sociodemographic and clinical factors of perceived quality of life in individuals with vitiligo. *Journal of Behavioural Sciences*, 32(1), 310. <https://www.proquest.com/scholarly-journals/sociodemographic-clinical-factors-perceived/docview/2627931785/se-2?accountid=48149>
- Nazar, I., Kamran, F., & Masood, A. (2021). Psychosocial predictors of quality of life in patients with vitiligo. *Pakistan Journal of Psychological Research*, 36(1), 19–36. <https://doi.org/10.33824/PJPR.2021.36.1.02>

- Shingadiya, R., K, Gohel, J.K., Chaudhary, S.A., Bedarkar, P., Patgiri, B.J, Prajapati, P.K. (2018). Ayurvedic Management of chronic Vitiligo (Shvitra): A case study. *Journal of Ayurvedic and Herbal Medicine*, 4(2), 57-59.
- Rathnayake, R. M. D. S., & Dahanayake D. (2024). “Impact of Herbal Treatments for Vitiligo Disease.” *University of Colombo Review* 5(1), 145–68. <https://doi.org/10.4038/ucr.v5i1.85>
- Sehgal, N. V. (2004). *Textbook of clinical dermatology* (4th ed.). New Delhi, India: Jaypee Brothers Medical Publishers Ltd.
- Sharma, P. V. (Ed.). (1981). *Charaka Samhitā*. Varanasi, India: Chaukhambha Orientalia. pp 531–532.
- Department of Ayurveda. (1993). *Talpathe Piliyam* (Vol. 9). Colombo: Department of Ayurveda, Ministry of Health, Sri Lanka.
- Tawde, K., Jangid, S. K., Wane, Y., & Joshi, P. (2019). Switra and its management through Ayurvedic treatment and cupping therapy w.s.r. to vitiligo. *International Journal of Health Sciences & Research*, 9(11), 168–171.
- Tewari, P. V. (Ed.). (2008). *Kāśyapa Saayapa* (1st ed). Varanasi, India: Chaukhambha Vishwabharati. pp. 200–215.
- Sehgal, V. N., & Srivastava, G. (2004). *Diagnosis and treatment of common skin diseases* (2nd ed.). Jaypee Brothers Medical Publishers.