

AN OBSERVATIONAL STUDY OF HISTOPATHOLOGICAL CHANGES IN TAMRA TWACHA WITH SPECIAL REFERENCE TO SHWITRA (VITILIGO)

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ABSTRACT

Background: *Shwitra*, described in Ayurveda, is correlated with vitiligo, a chronic depigmentary disorder characterized by the loss of melanocytes. According to Ayurvedic literature, *Tamra Twacha* is considered the *Adhithana* (site) of *Shwitra* and is correlated with the stratum granulosum of the epidermis. Histopathological evaluation helps to understand the structural changes occurring in this layer. **Aim:** To observe the histopathological changes in *Tamra Twacha* (stratum granulosum) with special reference to *Shwitra* (Vitiligo). **Materials and Methods:** An observational study was conducted on 43 clinically diagnosed patients of *Shwitra* aged 20–50 years attending the OPD and IPD of Shri Ayurved Mahavidyalaya, Nagpur. After obtaining informed consent, punch biopsy specimens were collected from representative untreated lesions and subjected to histopathological

examination. Clinical assessment included *Twak Shweta Varni*, *Twak Rukshata*, *Kandu*, *Daha*, *Rom Vivarnata*, and number of patches. **Results:** The majority of patients presented

with white depigmented patches (67%), absence of dryness (84%), absence of itching (89%), absence of burning sensation (88%), white hair discoloration (74%), and more than ten lesions (46%). Histopathological examination revealed complete absence of melanocytes in all cases (100%), keratinocyte alterations in 82% of patients, and inflammatory changes in 23% of cases. **Conclusion:** The study demonstrated significant histopathological changes in the stratum granulosum (*Tamra Twacha*) in patients with *Shwitra* (Vitiligo). The findings support the Ayurvedic concept that *Tamra Twacha* is the site of *Shwitra* and correlate well with the modern histopathological features of vitiligo. The study also emphasizes the importance of histopathological evaluation in understanding the disease and provides a basis for future research integrating Ayurvedic principles with modern dermatopathology.

KEYWORDS: *Shwitra*, Vitiligo, *Tamra Twacha*, Stratum Granulosum, Melanocytes, Keratinocytes.

INTRODUCTION

Ayurveda, known as the "science of life," is an ancient holistic medical system from India that emphasizes prevention and treatment.^[1] It covers topics like body, senses, soul, and mind, with key texts being the *Brihatrayee* and *Laghutrayee*. Ayurveda defines health in a multifaceted way and consists of eight branches: Kaya (general medicine), Bala (pediatrics), *Graha* (spiritual medicine), Shalya (surgery), Shalakya (ENT and ophthalmology), Agada (toxicology), Vajikarana (aphrodisiacs), and Rasayana (rejuvenation therapy). The system focuses on understanding the human body intricately, as detailed by ancient scholars through dissections. They pioneered anatomical knowledge, crucial for treating diseases effectively. Skin health is particularly significant, given the rising incidence of skin disorders due to diet, environment, and stress. Skin, being the largest organ, is vital for protection and sensation. Ayurveda categorizes skin diseases under Kushta, or Ayurvedic Dermatology, encompassing 18 subtypes that address various dermatological issues.^[2]

Shwitra is the most common skin disease worldwide. It can be linked to vitiligo, which is one of the dermatological diseases prevalent in India, with a prevalence of 4% in the country.^[3] Depigmentation of the skin and/or mucous membranes is a common inherited disorder. It does not affect physical health, but it can be stressful. It can cause serious psychological, social, and emotional problems, and has a significant impact on quality of life.^[4]

Shwitra is caused by the imbalance of *Tridosha* (*Vata*, *Pitta*, *Kapha*) and *Dhatu* (*Rakta*, *Mamsa* and *Medo Dhatus*). Various *hetu* of *Shwitra* mentioned in *Charak Samhita* are *Asatyavachan*, *Krutagnabhava*, *Ninda of Devatas* *Guru Apaman*, *Paapkriya*, *Purvajanma karma* and intake of *Viruddha-Aahara*.^[5]

In *Ayurveda*, there are five *Indriya*, one of which is *Sparshana*. Skin is an *adhithana* of the *sparshana indriya*. In *Sushrut Samhita* '*Kilas*' is a synonym of *Shwitra*, and it only involves the involvement of '*Twak*' (Skin).^[6]

Skin is the outer layer of the body. It is the interface between the body and the environment. It plays an important role in the immune system and protects the body from pathogens and excess water loss.

The *Tamra* layer of the skin is the *Adhithan* layer of the *Shwitra*. It is closely related to the stratum granulosum epidermis layer of the skin.^[7]

Ayurvedic texts provide a detailed description of *twacha* (skin) and its associated diseases (*twak rogas*). This study aims to explore the concept of *twacha sharir*, including the layers of skin and their related ailments. In contemporary practice, *Shwitra* (vitiligo) is frequently encountered. This condition can negatively impact a person's emotional and psychological well-being. Previous studies have not reported any histopathological changes occurring in the *tamra* layer of *twacha* in relation to *Shwitra*. For these reasons, the present study is being undertaken.

AIM & OBJECTIVES

AIM

Observation of Histopathological Changes in *Tamra Twacha* with Special Reference to *Shwitra* (Vitiligo)

OBJECTIVES

Primary Objective

1. To Study anatomical changes in *Tamra Twacha* (Stratum Granulosum) in *Shwitra* (Vitiligo) assessed by histopathology.

Secondary Objective

1. To review the literature about *Twacha* (Skin) according to *Ayurveda* and Modern

Science.

2. To review the literature about any anatomical changes found in *Shwitra* (Vitiligo).

MATERIALS AND METHODS

Source of Data: OPD and IPD of Shri Ayurved Mahavidyalaya, Nagpur, Camp, and periphery were enrolled for this study.

Study design: Observational Study

Duration of study- 18 months

Inclusion criteria

- Patient of age group 20 to 50 years, irrespective of gender, religion, occupation, casts etc.
- Diagnosed patient of *Shwitra*.

Exclusion criteria

- Patients have other skin diseases (*kushtha*) like *Shwitra*, *Dadru*, *Vyang* etc.
- Any other major systemic illness
- Pregnant women and lactating mothers.

Operational definition

Twacha

As per *charak Acharya twacha* envelops *Shadanga sharir*. The organ that covers the body from the outside is called *twacha*. A type of *indriya* that envelops the body is called *twagindriya* or *sparshanendriya*.

Shwitra

Bhavprakash describes *Shwitra* as having clinical features characterized by white coloration, with Tamra-colored patches referred to as *Kilas*.^[8] According to Madhav Nidan, *Shwitra* is identified as a hereditary condition, with disturbances observed in Rakta, Mansa, Meda, Shukra, and Artav.^[9]

Vitiligo

Vitiligo is characterized by the selective destruction of melanocytes in the skin, leading to the formation of conspicuous depigmented patches. This condition can be classified into segmental and non-segmental types. Non-segmental vitiligo is predominantly associated with an

autoimmune etiology. In contrast, segmental vitiligo may result from the release of certain chemical mediators from peripheral nerve endings, which subsequently reduces melanin production.^[10]

Study Population

All the patients of *Shwitra* coming from camp to OPD & IPD of our institute.

Sample Size

$n = 4 p q / e^2$ (p=prevalence of previous study, q=1-p, e=precision, n=sample size)

P=Prevalence of Vitiligo is 4%. $n = 4 \times 4 \times 100 / 6^2$

$n = 4 \times 4 \times 96 / 36$

$n = 1536 / 36$

$n = 42.66$

Subjective Criteria

Shown in Table No. 1.

Table No. 1: Gradation of *Lakshana* of *Shwitra*.

Sr. No.	Lakshan of Shwitra Kushtha	0	1	2	3
1	<i>Twak Shweta varni</i> (Hypopigmented patches)	Normal	Skin Color	Erythematous / Reddish	White
2	<i>Twak Rukshta</i> (Dryness of skin)	No Dryness	Slight Flaking	Moderate Flaking	Marked Scaling
3	<i>Kandu</i> (Itching)	No	Mild	Moderate	Severe
4	<i>Daha</i> (Burning sensation)	No	Mild	Moderate	Severe
5	<i>Rom Vivarnata</i> (Discolouration of hair)	No	Black	Brown	White
6	No. of Patches	No	< 5	5 – 10	>10

OBJECTIVE CRITERIA

- Histopathological examination of punch biopsy specimen (assessment of melanocytes, keratinocytes, and inflammatory changes in the stratum granulosum/Tamra Twacha)
- Histopathological report
- Case Record Form (CRF) for documentation of clinical findings and patient details. Methods for Data collection relevant to objectives

Procedure of Punch Biopsy

A skin biopsy is a minor surgical procedure performed under local anesthesia to obtain a tissue sample for histopathological examination. Among the different biopsy techniques, punch biopsy is preferred for evaluating skin layers, particularly the stratum granulosum (Tamra Twacha). A disposable 1.5–3.5 mm punch biopsy instrument was used to collect tissue from an untreated representative lesion of *Shwitra* (Vitiligo). After obtaining written informed consent, the biopsy site was cleaned with spirit and Betadine, followed by infiltration of 2% lignocaine for local anesthesia. The tissue specimen was collected using the punch, preserved in 10% neutral buffered formalin, and sent to the pathology laboratory for histopathological processing and microscopic examination. (Figure 1)

Instruments used: Disposable punch biopsy (4 mm), scissors, forceps, syringe with needle, 2% xylocaine (lignocaine), cotton, plain bulb, and 10% neutral buffered formalin.

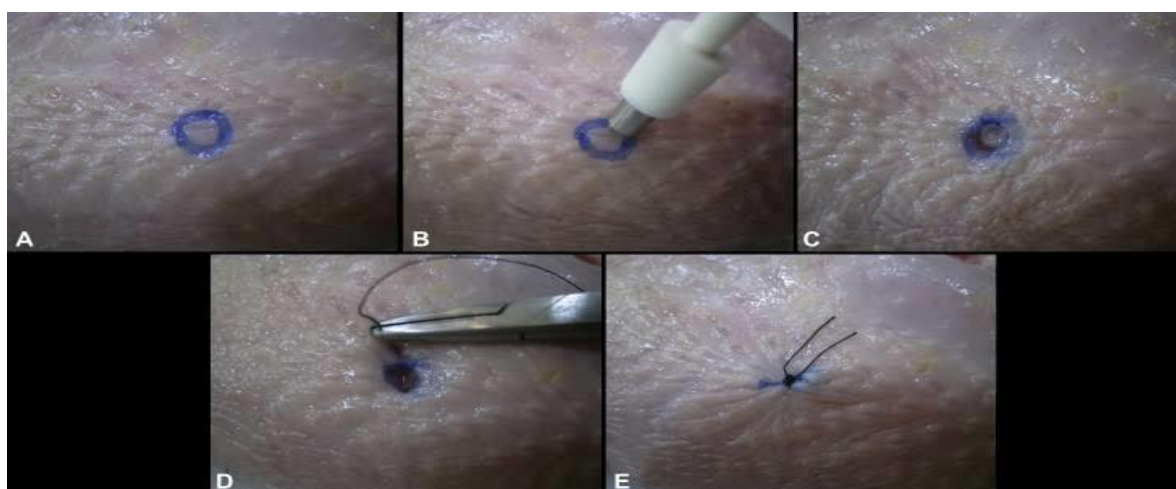


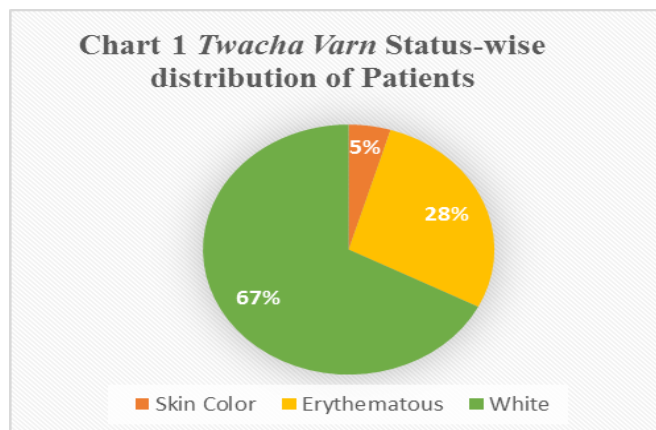
Fig. 1: Disposable Biopsy Punch.

OBSERVATIONS AND RESULTS

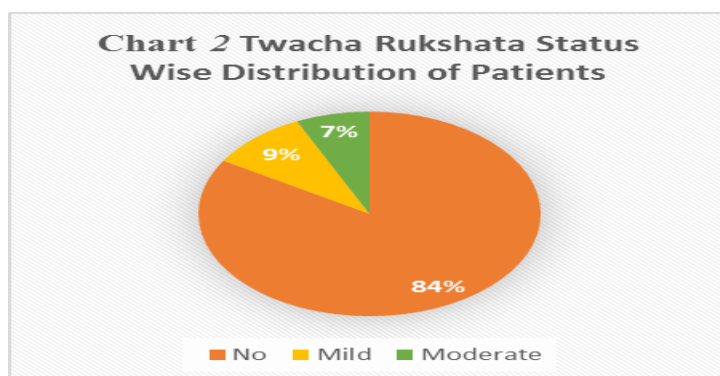
In the present study, demographic data showed that the disease was prevalent in the age group of 31- 40 yrs of age, more in males (60%). were male, and 40% were female. In this study, the ratio of married and unmarried patients was 58% and 42%, respectively. Regarding occupation, this study showed that 35% were labourers, 25% were housewives, 21% were working class, and 19% were students consuming a non-vegetarian diet (53%). Most patients were Hindu (58%), belonging to middle socio-economic status (49%), 39% were low socio-economic, 12% were high socio-economic. patients had no addiction (58%).

Table No. 2: *Twacha Varn* Status wise distribution of Patients.

<i>Twacha Varn</i> (Skin Colour)	No. of Patients	%
Normal	0	0
Skin Color	2	5
Erythematous	12	28
White	29	67
Total	43	100

Table No. 3: *Twacha Rukshata* Status-wise Distribution of Patients.

<i>Twak Rukshata</i> (Dryness of Skin)	No. of Patients	%
No	36	84
Mild	4	9
Moderate	3	7
Sever	0	0
Total	43	100

Table No. 4: *Rom Vivarnata* Status wise distribution of Patients.

<i>Rom Vivarnata</i>	No. of Patients	%
No	0	0
Reddish	3	7
Brown	8	19
White	32	74
Total	43	100

Chart 3 Rom Vivarnata Status wise distribution of Patients

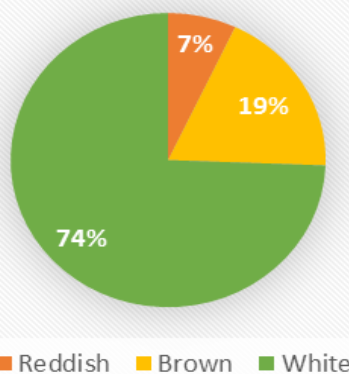


Table No. 5. *Kandu* Status-wise distribution of Patients.

<i>Kandu</i>	No. of Patients	%
No	38	89
Mild	4	9
Moderate	1	2
Sever	0	0
Total	43	100

Chart 4 *Kandu* Status wise distribution of Patients

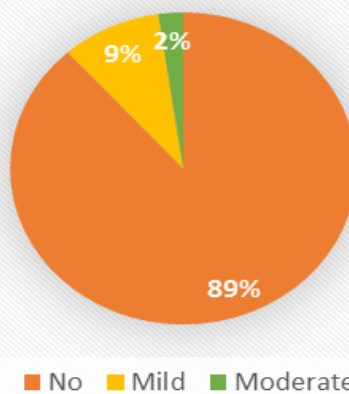
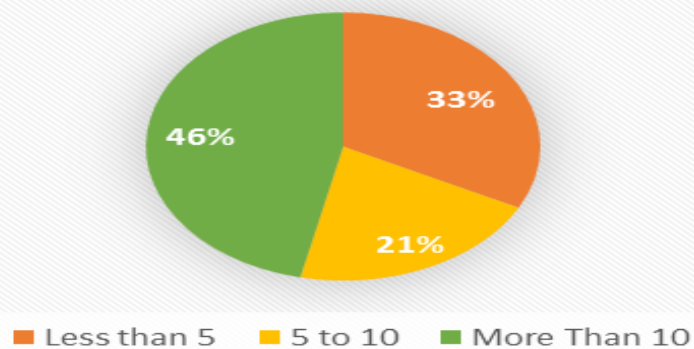
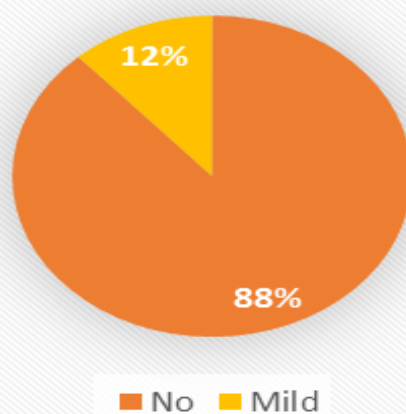


Table no.6. No. of Patches Wise distribution of Patients.

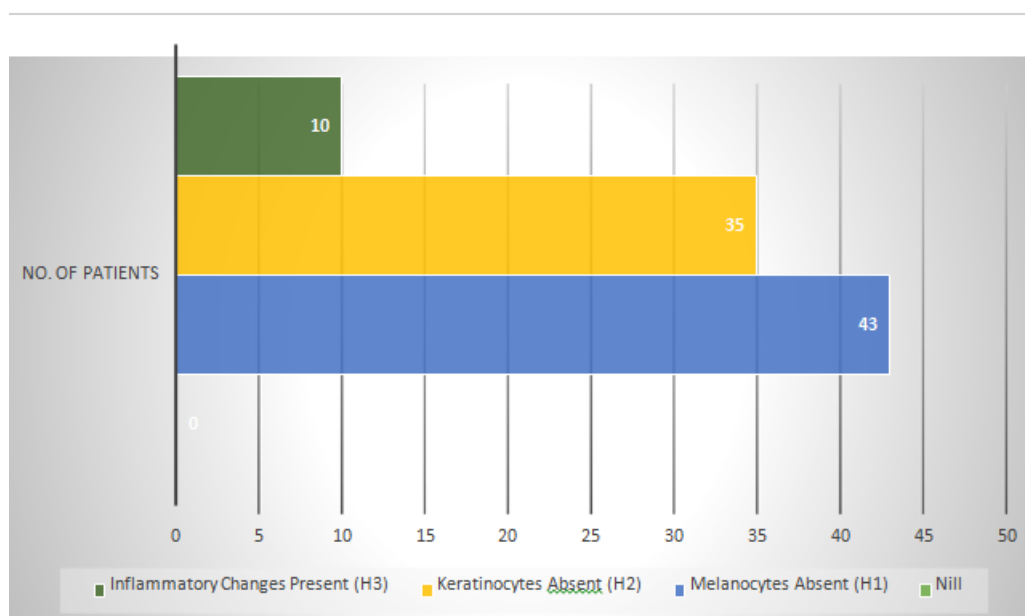
No. of Patches	No. of Patients	%
No	0	0
Less than 5	14	33
5 to 10	9	21
More Than 10	20	46
Total	43	100

Chart 5. No. of Patches Wise distribution of Patients**Table no. 7. *Daha* Wise distribution of Patients.**

<i>Daha</i>	No. of Patients	%
No	38	88
Mild	5	12
Moderate	0	0
Sever	0	0
Total	43	100

Chart 6 *Daha* Wise distribution of Patients**Table no. 8. Histopathological Changes Wise distribution of Patients.**

Histopathological Changes	No. of Patients	%
Nil	0	0
Melanocytes Absent (H1)	43	100
Keratinocytes Absent (H2)	35	82
Inflammatory Changes Present (H3)	10	23

Chart 7: Histopathological Changes Wise distribution of Patients.

DISCUSSION

Twacha is the external covering of the body. It is also known as *sparshanendriya* since it encompasses all other *Indriyas*. There are differences in the number of *Twacha* in different manuscripts. Seven layers of *Twacha* were described by Acharya Sushruta and Laghu Vagbhata, whereas Acharya Charaka and Vriddha Vagbhata described 6 layers of *Twacha*. Also, different Acharyas have different points of view on *Vyadhis* that occur in different skin layers.

Acharya Ghanekar has compared *Twacha Stara* with modern skin layers.

1. *Avabhasini*-Stratum corneum
2. *Lohita*-Stratum lucidum
3. *Shweta*-Stratum malpighii
4. *Tamra* –Stratum granulosum
5. *Vedini*- Papillary layer
6. *Rohini* – Reticular layer
7. *Mansadhara*-Subcutaneous layer

Tamra Twacha's function is the same as that of the stratum granulosum layer of the skin. So, we can compare *Tamra Twacha* with the stratum granulosum layer in modern science. According to Acharya Sushrut *Shwitra* Occurs in *Tamra. Twak Shweta Varni* is linked to hypopigmented patches from absent melanocytes. *Twak Rukshta* relates to dry skin, *Kandu*

indicates itching, Daha signifies burning, and *Rom Vivarnata* points to discoloration. Overall, the signs and symptoms of *Shwitra* closely resemble those of *Vitiligo*.

The present observational study was conducted on 43 pre-diagnosed patients of *Shwitra*, correlating Ayurvedic concepts of *Tamra Twacha* with the *stratum granulosum* of modern anatomy.

Demographically, the maximum incidence in our study occurred in the age group 31–40 years (56 %), followed by 21–30 years (30 %), with a slight male predominance (60 %). Similar age and sex distributions were reported by Sharma et al.^[11] and Nagaral et al.^[12] who found peak incidence in the third to fourth decades and higher male representation in hospital-based cohorts. Such patterns may reflect occupational sun exposure and healthcare-seeking bias rather than a true gender difference in prevalence. Furthermore, the predominance among middle and lower socioeconomic groups in our series parallels findings by Patil et al.^[13] suggesting that environmental and nutritional factors could influence disease susceptibility.

Clinically, the majority of patients presented with white depigmented patches (67%), (Table no. 2 chart no. 1), absence of dryness (84%) (Table no. 3, chart no. 2), absence of itching (89%) (Table no. 5, chart no. 4), absence of burning sensation (88%) (Table no. 7, chart no. 6), white hair discolouration (74%), and more than ten lesions (46%) (Table no. 6, chart no. 5). These findings are consistent with the clinical manifestations of vitiligo described in previous dermatological studies. Leukotrichia (white hair) has been recognized by Nagaral et al. and Le Poole et al.^[14] both emphasized that leukotrichia and perilesional erythema are markers of chronic or active lesions, consistent with the 74 % of patients in our study who showed whitish *Rom Vivarnata* (table no. 4, chart no.3)

The most significant finding of the present study was the complete absence of melanocytes in all biopsy specimens. This finding is in agreement with the observations of Le Poole et al., who demonstrated complete depletion of melanocytes in established vitiligo lesions using immunohistochemical markers such as HMB-45 and MART-1. Similarly, Nagaral et al. reported marked reduction or complete absence of melanocytes in histopathological examination of vitiligo lesions. The present findings therefore reinforce the concept that melanocyte destruction is the principal pathological event responsible for depigmentation in vitiligo.

Keratinocyte alterations were observed in 82% of patients. Although routine hematoxylin and eosin staining may not accurately distinguish complete keratinocyte loss from degenerative changes, previous studies have established that keratinocytes actively contribute to vitiligo pathogenesis. Lee et al.^[15] demonstrated that dysfunctional keratinocytes produce reduced levels of melanocyte growth factors and increased inflammatory cytokines, thereby promoting melanocyte apoptosis. Furthermore, Shiu et al.^[16] identified stress-associated keratinocyte subpopulations in stable vitiligo lesions using single-cell transcriptomic analysis. These findings support the present observation that keratinocyte abnormalities are closely associated with melanocyte loss and disease progression.

Inflammatory changes were present in 23% of biopsy specimens. This finding is comparable with the reports of van den Wijngaard et al.^[17] and Touni et al.^[18] who observed variable lymphocytic infiltration in active vitiligo lesions while minimal inflammation was present in stable lesions. The relatively low percentage of inflammatory infiltrate in the present study suggests that most patients were likely in the stable phase of the disease, whereas the inflammatory cases may represent active lesions undergoing melanocyte destruction.

From an Ayurvedic perspective, Acharya Sushruta described Shwitra as a disorder affecting Tamra Twacha. The present histopathological findings provide anatomical evidence supporting this classical concept by demonstrating significant pathological alterations within the stratum granulosum, which has been correlated with Tamra Twacha. The complete absence of melanocytes together with keratinocyte abnormalities and inflammatory changes indicates that the structural changes in this layer play an important role in the pathogenesis of Shwitra.

Thus, the present study establishes a meaningful correlation between the Ayurvedic description of Tamra Twacha and the modern histopathological features of vitiligo. Studies with a larger sample size can provide more reliable and generalizable results. Advanced histopathological and immunohistochemical techniques may further validate the findings. Similar studies can be conducted on other *Twacha Stara* and related skin disorders described in Ayurveda.

CONCLUSION

The present observational study was undertaken to evaluate the histopathological changes in Tamra Twacha with special reference to Shwitra (Vitiligo). The findings demonstrated complete absence of melanocytes in all biopsy specimens, keratinocyte alterations in the majority of cases, and inflammatory changes in a subset of patients, indicating significant

structural changes within the stratum granulosum.

The clinical features observed in the study closely resembled those of vitiligo described in modern dermatology, supporting the correlation between Shwitra and Vitiligo. Histopathological examination confirmed that melanocyte depletion is the principal pathological feature of the disease, while keratinocyte alterations and inflammatory changes may contribute to disease progression.

The observations of the present study are consistent with previous histopathological and immunological studies on vitiligo, thereby validating the scientific relevance of the findings. Furthermore, the study provides anatomical evidence supporting the Ayurvedic concept that Tamra Twacha is the *Adhithana* (primary site) of Shwitra and can be correlated with the stratum granulosum of modern anatomy.

Although the study was limited by its relatively small sample size, it successfully fulfilled its objectives and demonstrated significant histopathological changes in Tamra Twacha among patients with Shwitra. These findings contribute to bridging Ayurvedic concepts with contemporary dermatopathology and provide a foundation for future research employing advanced diagnostic techniques and larger study populations.

Based on the observations and histopathological evidence, the alternative hypothesis (H_1) stating that histopathological changes are present in Tamra Twacha in patients with Shwitra (Vitiligo) is accepted.

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