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**“ONE YEAR HOSPITAL BASED  
OBSERVATIONAL STUDY OF CLINICAL  
AND DERMATOSCOPIC CORRELATION  
IN LICHEN PLANUS”**

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By

REG NO. BT0117001

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**DEPARTMENT OF DERMATOLOGY,  
VENERELOGY AND LEPROSY,  
JAWAHARLAL NEHRU MEDICAL COLLEGE,  
BELAGAVI, KARNATAKA.**

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**KLE ACADEMY OF HIGHER EDUCATION AND RESEARCH,  
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**Endorsement**

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## LIST OF ABBREVIATIONS USED

LP	-	Lichen planus
WS	-	Wickham's Striae
LE	-	Lupus erythematosus
VVG	-	Vulvovaginal gingival syndrome
APC	-	Antigen presenting cells
HLA	-	Human leucocyte antigen
ICAM	-	Intracellular adhesion molecule
CD	-	Cluster of differentiation
MHC	-	Major histocompatibility complex
ICAM	-	Intercellular adhesion molecule
HBV	-	Hepatitis B virus
HHV-6	-	Human herpes virus 6
HHV-7	-	Human herpes virus 7
KP	-	Koebner phenomenon
BP	-	Bullous pemphigoid
Ig	-	Immunoglobulin
CLO	-	Comedone like opening
CVD	-	Cardiovascular disease
T2DM	-	Type 2 Diabetes mellitus
HTN	-	Hypertension
HLP.	-	Hypertrophic lichen planus
LPP	-	Lichen plano pilaris
LPp	-	Lichen planus pigmentosus
OLP	-	Oral lichen planus

DEJ	-	Dermo-epidermal junction
DIF	-	Direct immunofluorescence
CO2	-	Carbon dioxide laser
UL	-	Upper limb
LL	-	Lower limb
H	-	Head
PP	-	Palmo plantar
T	-	Trunk
LLP	-	Linear lichen planus
ALP	-	Actinic lichen planus
CLP	-	Classical lichen planus
LLP	-	Linear lichen planus
LSA	-	Lichen sclerosus et atrophicus
DLE	-	Discoid lupus erythematosus
HIV	-	Human immunodeficiency virus

## **ABSTRACT**

### **Background**

Lichen planus (LP) is an inflammatory mucocutaneous condition that exhibits a distinct morphological and histopathological features. Classically presents as itchy lesions described as “pruritic, purple, polygonal, planar, papules, and plaques” affecting the flexors of extremities. Dermoscopy is a method of visualizing subsurface skin patterns. It is used to study infective as well as inflammatory disorders of skin, hair disorders and diseases of the nails. The patterns of dermoscopic examination of lichen planus helps in clinching the diagnosis and noting the improvement during follow up of patients. Dermoscopy findings in lichen planus consists of variable forms of whitish structures that correlates to Wickham’s Striae (WS) with borders showing vascular structures. We undertook this study to look for the skin structure changes in various morphologic cutaneous LP cases and to correlate them with their dermoscopic features so as to expand our knowledge about lichen planus and avoid the invasive skin biopsy for confirmation of diagnosis.

### **Methodology**

The one year hospital based observational study was done on a total of 70 lichen planus patients who attended KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi from January 2018 to December 2018. A written consent form was obtained. A detailed history regarding the age, sex, duration of the disease and history of other disease associated was taken. Clinical photographs of the lesions were taken. Dermatological and systemic examination was carried out. Diagnosis of lichen planus was made on clinical examination. Dermoscopic examination of the lesions was performed using a videodermatoscope ( Dinolite

2.0 ) providing 50X and 200X magnification and photographs were recorded in nonpolarized as well as polarized mode. The data and photographic record was noted in a pre-designed proforma after taking informed and written consent. An ethical committee clearance was obtained prior to the start of the study. The results were analysed by SPSS software, correlation method, fisher exact test and chi-square test

## **Results**

In our study, 56% patients (39/70) had classical LP, 14% patients (10/70) had hypertrophic LP which were the most common clinical variants of LP. Reticulate pattern of WS was the most common pattern observed in our study 40% (28/70) and a new pattern of WS a rosette/ pettaloid pattern 13% (9/70) was observed in our patients. The occurrence of WS was significantly associated with clinical variants of LP. The nonvascular findings observed on dermoscopy were comedone like openings and grey blue dots which were statistically significant with clinical variants of LP.

Among the pigmentary findings, pepper like pigmentation was mostly seen in the CLP 64% (25/39) and reticulate pattern was statistically significant in LPP 85% (6/7). Perifollicular pigmentation was statistically significant in LPP 100% (2/2)

## **Conclusion**

This study demonstrates the variability of dermoscopy patterns in different clinical variants of LP. The use of dermoscopy helps in best visualization of the characteristic WS, blood vessels and pigmentary changes in cases of LP and aids in reducing unnecessary biopsies required for diagnosing lichen planus. The strength of associations of some dermoscopic features such as red dots, WS, perifollicular pigmentation and reticulate pigmentation in our study have been repeatedly confirmed

by several other observational studies. The limitations of our study includes a smaller sample size, hence to conclude the significance of findings on dermoscopy of lichen planus a study with larger sample size is needed.

**Keywords-** Lichen planus, Dermoscopy, Wickham's striae

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## **INTRODUCTION**

Lichen planus (LP) is an inflammatory mucocutaneous condition that exhibits a distinct morphological and histopathological features.

Classically presents as itchy lesions described as “pruritic, purple, polygonal, planar, papules, and plaques” affecting the flexors of extremities. It can involve skin, mucous membrane, hair, and nail.<sup>[1]</sup>

Dermoscopy is a method of visualizing subsurface skin patterns. It is used to study infective as well as inflammatory disorders of skin, hair disorders and diseases of the nails. The patterns of dermoscopic examination helps clinching the diagnosis and noting the improvement during follow up of patients.<sup>[2,3]</sup>

Dermoscopy findings in lichen planus consists of variable forms of whitish structures that correlates to Wickham’s Striae (WS) with borders showing vascular structures. WS patterns on dermoscopy that are mentioned in literature are:

- a) Reticular (most common)
- b) Circular
- c) Radial streaming
- d) Leaf veination
- e) Starry sky/white dots<sup>[4]</sup>

We undertook this study to look for the skin structure changes in various morphologic cutaneous LP cases and to correlate them with their dermoscopic features so as to expand our knowledge about lichen planus and help avoid the invasive skin biopsy for confirmation of diagnosis.

## **OBJECTIVE**

The objective of study is to establish clinical and dermatoscopic correlation of features in lichen planus.

## **REVIEW OF LITERATURE**

### **HISTORICAL ASPECTS**

Erasmus Wilson described term lichen planus in the year 1869. This dermatosis was earlier described by Hebra as “Leichen Ruber”.<sup>[5]</sup> Hence it is also called as lichen ruber planus. It is named after term leichen - ‘tree moss’ (Greek) and planus - ‘flat’ (Latin). The term lichen was used to describe dermatologic diseases with the flat-topped presentation that suggested similarity to the plant group known as lichens.<sup>[6]</sup>

Louis Frederick Wickham in 1895 described the characteristic appearance of whitish striae and punctations on flat-topped lesions as ‘Wickham Striae’.

Lichen planopilaris term was given by Pringle (1895), and Silver et al. introduced follicular LP and are used in the LP syndromes associated cicatricial alopecia.<sup>[7]</sup>

WS corresponds to hypergranulosis on histopathology was first described by Darier. Graham Little reported the scalp involvement and in 1930 Schreiner divided bullous LP into two groups, the first, lichen planus vesiculosus, and the second as lichen planus pemphigoides.<sup>[8]</sup>

Niles in 1941 introduced actinic LP.<sup>[9]</sup> In 1966 Ryan attributed that the violaceous hue surrounding the pallor area to radially arranged proliferative capillaries.<sup>[11]</sup> In 1969 Mehregan and Pinkus suggested that lichen planus characterized by epidermal basal cell damage.<sup>[11]</sup>

An overlap between lichen planus and lupus erythematosus (LE) was proposed in 1970<sup>[9]</sup> Vulvo vaginal gingival (VVG), an unusual presentation of genital and oral mucosal LP was described by Pelisse et al. in 1982<sup>[12]</sup> Cribier et al (1993) described the male equivalent of VVG syndrome called as peno genital syndrome in lichen planus.<sup>[12]</sup>

Penicillin for the treatment of lichen planus was used by Hard.<sup>[9]</sup> Sehgal et al reported the effectiveness of griseofulvin (1971) and levamisole (1978) for recalcitrant lichen planus.<sup>[9]</sup> Other modalities like isotretinoin (1985), dapsone (1986), antimalarials (1986), phenytoin and cyclosporine (1990) have been tried in lichen planus.<sup>[9]</sup>

## **EPIDEMIOLOGY**

LP is present worldwide and hence incidence of disease varies depending on geographical areas. Lichen planus of higher incidence is seen in Middle East countries. In India, there is also a higher incidence rate. The incidence from India is 0.76% to 1.4%.<sup>[13]</sup>

Lichen planus prevalence is still unknown, with the current estimate place the figure at less than 1% worldwide.<sup>[14]</sup> Prevalence of cutaneous lichen planus to be 0.13 to 0.34%.<sup>[15]</sup>

There is slight predominance of LP in women (M:F- 1:2) as per a few studies from the literature.<sup>[16,17]</sup>

Racial predisposition is not seen. 30 - 60 years is most common age of presentation. LP is rare in both infants and the elderly, with only 1–4% of patients affected are children.<sup>[18]</sup>

The incidence of LP varies seasonally, with the highest occurrence being in summer and spring seasons. Some studies have shown that outbreaks can occur throughout the year. <sup>[9]</sup>

Familial LP is presence of disease among members of same family. It is uncommon and seen in young cases. <sup>[19]</sup> Mucosal changes in LP are directly related to habits of chewing betel nut and pan, smoking, alcohol and poor hygiene. <sup>[20]</sup>

Actinic LP is usually seen during summer and improves during winter. Younger age and men are most commonly affected. <sup>[18]</sup> Lichen planopilaris mostly seen in adults and mostly women. <sup>[21]</sup> Nail LP accounts for about 1% to 16 % of the cases. <sup>[22]</sup>

## **AETIOPATHOGENESIS**

The exact cause in the pathogenesis of LP is unknown. Both genetic and environmental components interact to elicit the disease. LP is characterized by T-cell-mediated damage to keratinocytes of basal layer that leads to expression of self-antigens on to their surface. <sup>[23]</sup>

Immunological, genetic, psychological and infective conditions have been implicated as target factors.

## **I. IMMUNOLOGICAL FACTORS -**

The triggering of the clinical expression of LP is by cell mediated immunity. <sup>[5]</sup> Basal keratinocytes and antigen-presenting cells (APC) are activated by bacterial products, viral infection, trauma or by unknown agent. <sup>[9]</sup>

The activated keratinocyte and APC secrete mediators that inflammatory cells in the lesion. The T cells that are activated secrete Interferon-gamma and Interleukin-2, which helps in modulating the immune function. Interferon-gamma induces the keratinocytes to express HLA DR antigen and basal keratinocytes to express intercellular adhesion molecule -1 (ICAM -1), hence increasing the interaction with T helper cells. These T helper cells stimulate the keratinocytes to produce cytokines. <sup>[9]</sup>

The infiltrate in LP is composed of CD8+ T cells with a significant proportion of - T cells. In LP, dermis consists of both CD4 and CD8 T lymphocytes, whereas CD8 lymphocytes infiltration is seen in epidermis. The multiple theories propose that CD8 cytotoxic lymphocytes will target the antigen associated with MHC class I on involved keratinocytes and causes lysis. <sup>[24 - 28]</sup>

## **II. GENETIC FACTORS**

An increased frequency of HLA -B7, -B18, -AW19 and CW8 haplotypes are noted in familial LP. In non-familial LP HLA -A3, - A5, -B8, -B16 and -BW35 haplotypes are noted. <sup>[5]</sup>

HLA - BW35 is most commonly associated with cutaneous LP. <sup>[29]</sup>

## **III. INFECTIVE FACTORS**

Association of LP with the Hepatitis C virus is more widespread and acts as a triggering factor in the disease. <sup>[30]</sup>.The other viruses that might be implicated in the pathogenesis of LP are the HBV <sup>[31,32]</sup>, HHV-6 and HHV-7 <sup>[33]</sup> and varicella-zoster virus <sup>[34]</sup>. Few vaccines typically, hepatitis B vaccines have shown to trigger LP, usually after the second injection of the vaccine <sup>[35]</sup>.

#### **IV. PSYCHOGENIC FACTORS**

Patients of LP frequently report worsening of lesions during the stressful events. Some studies have shown onset and exacerbation with fatigue. Lesions are usually seen 15 days after emotional stress. <sup>[9]</sup>

#### **CLINICAL FEATURES**

The lichen planus classically presents as plane topped, violaceous polygonal, papule or plaque of varying sizes. A thin translucent scales may be present over the top of the lesion. <sup>[23]</sup> Wickham's striae, a network of fine white lines are present over the lesions and becomes more evident on placing immersion oil over the lesion. <sup>[36]</sup>

The most common initial manifestation is pruritus. The degree of pruritus varies with the extent of involvement. Twenty percent of the patients are asymptomatic. <sup>[37]</sup> The papules are classically distributed over the flexure aspect of the wrist, arms, legs, and lower back. It can also involve scalp, mucosa, and nails. <sup>[9]</sup> Koebner phenomenon (KP) is associated with LP, characterized by the development of lesions on previously uninvolved skin that has been traumatized. KP is mostly seen unstable or acute stage of the disease. <sup>[9]</sup>

The initial lesions are erythematous to violaceous and a lag period of one week approximately occurs between the first appearance of the lesion to generalization. <sup>[36]</sup>

## **CUTANEOUS LICHEN PLANUS SUBTYPES**

The clinical variants of LP are based on morphology or configuration of lesions -

### **1) ACTINIC LICHEN PLANUS**

This variant is known as LP subtrophicus, summertime actinic lichenoid eruption, LP actinicus, and lichenoid melanodermatosis are most common among younger individuals, women and outdoor workers. The lesions are bluish brown well defined measuring approximately 0.25 to 5 cm over the extensor aspect of hands, nape of the neck and lateral aspect of forearm. <sup>[9]</sup>

### **2) ANNULAR LICHEN PLANUS**

It is a rare variant that involves genitalia and sometimes axilla and extremities. This variant is often asymptomatic, especially seen in genital area. The lesions are formed by a group of papules arranged in the ring. <sup>[38]</sup>

### **3) ATROPHIC LICHEN PLANUS**

It is the clinical associated with hypertrophic LP or chronic annular type. <sup>[34]</sup> Diagnosis becomes difficult unless there are signs of classic LP over other sites of body. Topical corticosteroids used for longer duration may predispose to development of atrophic lesions. <sup>[39]</sup>

### **4) GUTTATE LICHEN PLANUS**

This variant is characterized by widely scattered discrete papules ranging from 1mm to 1cm in size. It is mostly seen over the trunk and has a relatively good prognosis.<sup>[40]</sup>

## **5) HYPERTROPHIC LICHEN PLANUS**

The incidence of this variant of LP is 6% to 19%.<sup>[36]</sup> The lesions are characterized by thick pruritic, hyperkeratotic plaques with follicular involvement.<sup>[41]</sup> The lesions presents symmetrically over extensor aspect of lower limb and interphalangeal joints.<sup>[5]</sup> Lesions are similar to igneous rock that helps in distinguishing from other conditions.<sup>[41]</sup>

## **6) VESICOBULLOUS TYPE -**

This clinical variant is uncommon accounting about 3.5% of LP cases. This variant presents with two morphology.

- a) Bullous LP is occurrence of fluid filled lesion on existing LP lesion.<sup>[8, 42]</sup> The histopathologic study revealed features suggestive of classical LP and subepidermal blister.<sup>[43]</sup> Chemicals precipitating bullous LP lesions are tolazamide, chlorpropamide,<sup>[44]</sup> and mercaptopropionyl glycine.<sup>[45]</sup>
- b) In LP pemphigoid, bullae are present on lesional and non-lesional skin.<sup>[8,46,47]</sup> It shows association between LP and BP(Bullous pemphigoid).<sup>[45,48]</sup> Basement membrane deposition of immunoglobulin G and complement 3 is seen indirect immunofluorescence in this condition.<sup>[49]</sup>

## **7) LINEAR LICHEN PLANUS**

The lesions are linearly oriented due to KP, but are not true form. The true linear form follows the Blaschko's lines and is more extensive.<sup>[50]</sup> Zosteriform LP is when it presents along the dermatomal pattern.<sup>[51]</sup> It is seen over the healed sites of herpes zoster (Wolff isotopic response) or can occur de novo over normal skin. The exact pathology is still unknown.<sup>[52]</sup>

## **8) LICHEN PLANUS PIGMENTOSUS**

This variant is seen most commonly in dark skin individuals. They present over sun-exposed areas bilaterally.<sup>[53]</sup> Conversely, LP pigmentosus - inversus is rare condition is reported in light skin affecting flexural areas.<sup>[54]</sup>

## **9) LICHEN PLANO PILARIS (LPP) / FOLLICULAR LP**

This variant is characterized by follicular oriented hyperkeratotic papules over the scalp. It mainly seen over the vertex and other parts of scalp.<sup>[55]</sup> LPP is more common in women and also seen over the nails and mucosa<sup>[7, 56]</sup> Triggering factors are the KP, peri-surgery antigen release.<sup>[57]</sup>

Graham Little -Piccardi -Lassueur syndrome is characterized by a triad consisting of follicular oriented papules over body with cicatricial alopecia of scalp and non cicatricial alopecia of pubic and axillary areas. It is noted to be more common in females.<sup>[58]</sup>

## **10) LICHEN PLANUS ERYTHEMATOSUS (LP - LE OVERLAP)**

This clinical variant presents as asymptomatic deep red, soft papules that are blanchable with pressure appearing on extremities and trunk. It is also called as LP-LE overlap.<sup>[59]</sup>

## **11) PALMO PLANTAR LICHEN PLANUS**

The most common presentation is erythematous scaly form. Lesions are highly pruritic and presents as multiple, bilateral and symmetrical lesions. Internal plantar arch and malleoli are commonly involved.<sup>[60]</sup> Hyperkeratotic plaques are the second common clinical form.<sup>[60]</sup> The least common form of palmoplantar LP is vesiculobullous type.<sup>[61]</sup>

## **12) NAIL LICHEN PLANUS**

Nail LP is seen in 1% -15% patients.<sup>[62]</sup> Nail involvement is usually evident 3 to 4 weeks following the onset of cutaneous LP. Only nail involvement can also be seen in LP.<sup>[63]</sup>

Most of the nail changes occur due to the involvement of the nail matrix.<sup>[63]</sup> Earliest sign, grooving of nail occurs due to focal atrophy of proximal matrix, whereas short and thinned nail plate occurs due to diffuse atrophy. The classical sign in nail LP is pterygium resulting from focal destruction of nail matrix that leads to proximal nailfold growing distally and attaches to nailbed distally.<sup>[9]</sup>

Total nail matrix destruction leads to anonychia.<sup>[9]</sup> LP of the nail bed and hyponychium leads to localized nail plate separation (onycholysis). Subungual hyperkeratosis and hyperpigmentation of nail are also seen.<sup>[9]</sup>

Nail finding is not specific nor pathognomic in LP.

### **13) MUCOSAL LICHEN PLANUS**

Mucosal LP involves the oral cavity and rarely vulval area, esophagus, larynx, and conjunctiva. <sup>[64]</sup>

A) Oral LP includes many clinical variants. Most commonly it involves buccal mucosa in 80 - 90%. Triggering factors are mechanical trauma, smoking, mucosal trauma from lip chewing will trigger OLP. <sup>[65]</sup>

Most common variant is reticular OLP and is asymptomatic in nature. It is characterized by white lace like pattern surrounded by erythema. Papular type shows tiny white papules and is asymptomatic and they are initial and transient phase. <sup>[66]</sup> Plaque variant is characterized by large white patches and leucoplakia needs to be evaluated. <sup>[67]</sup> Its a indicator of poor prognosis. <sup>[66]</sup>

Erosive variant presents as erythematous lesion of the mucosa. The patient complains of discomfort to severe, painful episodes. The erosive LP can also present with atrophic lesions known as atrophic LP. Rarely OLP may present with bullous lesions. Lymphocytic infiltration of salivary glands causes lichen planus sialadenitis <sup>[68]</sup>

### **HISTOPATHOLOGY**

The classical findings seen are -

- Orthokeratosis of compact type
- Hypergranulosis of wedge shaped
- Acanthosis

- Basal cell layer damage
- A band like dermal lymphocytic infiltration in close approximation to epidermis disguising the dermo-epidermal junction (DEJ).<sup>[69]</sup>

LP is a characteristic form of lichenoid interface dermatitis. Epidermal changes seen in LP are irregular acanthosis, orthokeratosis of compact type, focal hypergranulosis, spongiosis in the spinous layer and basal cell degeneration.<sup>[70]</sup>

Civatte or colloid bodies are anucleate pink colored apoptotic cells of basal layer found in dermis.<sup>[69]</sup>

Focal increase in granular layer of epidermis characterizes Wickham's striae.<sup>[69]</sup> Focal subepidermal clefts known as Max Joseph spaces are seen due to degeneration basal layer.<sup>[71]</sup>

The hypertrophic LP is characterized by hyperkeratosis, parakeratosis, increased spinous layer, and thickened collagen bundles.<sup>[69, 72]</sup> Elongated rete ridges representing typical saw-tooth pattern.<sup>[69]</sup>

In atrophic LP, there is absence of rete ridges and there is dermal fibrosis.<sup>[72]</sup>

The resolving LP lesion shows residual hyperpigmentation as the papillary dermis have more number of melanophages.<sup>[69, 73]</sup>

In LPP, infiltrate is around peribulge area consisting of lymphocytes and spares lower segment of the hair follicle with follicular plugging.<sup>[69]</sup> The involvement of hair stem cell in the bulge leads to hair loss.<sup>[73]</sup>

## **Immunofluorescence**

Direct immunofluorescence in LP demonstrates shaggy deposits of fibrinogen at DEJ. Occasionally, granular deposits of Ig M or linear deposits of C3 or both in the BMZ. The necrotic keratinocytes (Civatte bodies) are demonstrated mainly by IgM and are present in the large numbers arranged in clusters, highly suggestive of LP. [74,75]

In lichen plano pilaris, it shows IgM and or IgA, IgG and rarely C3 deposition at the level of isthmus and infundibulum. Fibrinogen deposition in shaggy pattern in the areas surrounding the affected follicle.<sup>[62]</sup>

In lichen planus pemphigoides, DIF shows the deposition of immunoglobulin G and complement 3 in a linear pattern along the DEJ. The immunoelectron microscopic studies reveal that the antigen of LP pemphigoides is deposited at the same site as a BP antigen.<sup>[74]</sup>

## **ASSOCIATED CONDITIONS**

Variety of unrelated disorders are associated with LP. The association of the conditions if present, is causal.

### **(a) Idiopathic conditions - <sup>[9]</sup>**

- |                              |                       |
|------------------------------|-----------------------|
| - Alopecia areata            | - Myasthenia gravis   |
| - Dermatomyositis            | - Pemphigus foliaceus |
| - Dermatitis herpetiformis   | - Pemphigus vulgaris  |
| - Hashimoto's thyroiditis    | - Pernicious anemia   |
| - Keratoconjunctivitis sicca | - Systemic sclerosis  |
| - Morphea                    | - Vitiligo            |

(b) **Gastrointestinal diseases**<sup>[9]</sup>

- Chronic active hepatitis
- Ulcerative colitis

(c) **Malignancy** -<sup>[76]</sup>

- Gastric carcinoma
- Lymphosarcoma
- Neuroblastoma
- Craniopharyngioma

(d) **Miscellaneous**-<sup>[9]</sup> diabetes mellitus , hypertension and folate deficiency

**TREATMENT**

Lichen planus is usually a benign and self-limiting condition.<sup>[9]</sup> Treatment of LP consists of corticosteroids,<sup>[77]</sup> systemic retinoids,<sup>[78]</sup> dapsone,<sup>[9]</sup> photochemotherapy.<sup>[79]</sup> Immunosuppressive agents like cyclosporine, methotrexate, cyclophosphamide, azathioprine, and mycophenolate mofetil and are used most commonly.<sup>[80]</sup>

**General considerations -**

To relieve pruritus, antipruritic drugs are used. Reducing trauma helps in preventing the formation of new lesions. Oral hygiene and regular dental care in cases of oral LP. Patients of actinic LP have advised sun protection. Potentially provocative drugs, unless required need to be avoided.<sup>[9]</sup> In cutaneous LP, the treatment mainly depends on the severity of the disease.

**In mild to moderate disease severity;**

- The treatment consists of topical steroids, tacrolimus, pimecrolimus, tretinoin gel, intralesionalsteroids (5-40mg/ml)
- Photochemotherapy
- Systemic drugs like systemic steroids (30–80 mg/day), acitretin (25–50 mg/day), isotretinoin (20–40 mg/day).

**In severe or recalcitrant cases;**

- Systemic drugs like cyclosporine (3–10 mg/kg/day), dapsone(100–200 mg/day), hydroxychloroquine 200–400 mg/day, azathioprine (75–150 mg/day), mycophenolate mofetil (1,000 mg bid), doxycycline, tetracycline and nicotinamide, interferon- 2b, metronidazole, cyclophosphamide, methotrexate are considered. <sup>[5]</sup>

**Surgical management -**

- Excision and split-thickness skin graft are considered in erosive and hypertrophic type involving palms and soles. <sup>[9]</sup>
- Cryosurgery in recalcitrant oral LP. <sup>[9]</sup>
- The CO2 laser is being used in oral erosive LP, as it causes re-epithelialization with minimal oral contracture. <sup>[9]</sup>

## **DERMATOSCOPY**

Dermoscope helps in visualising the skin lesions with subtle pattern that unaided eye cannot see. Skin surface microscope, dermatoscope, episcope or epiluminescence microscope are the other names. The patterns that are observed consistently with some particular diseases aids in the diagnosis obviating the need for skin biopsy.

Dermoscope is like a magnifying lens but has some added qualities of adjustable higher magnification with inbuilt light emitting feature, assessment of deeper dermal structures and inbuilt ability to record images and videos helpful for followup.<sup>[81]</sup>

## **PRINCIPLE**

Transillumination of the required lesion with high magnification is the basic principle.<sup>[82]</sup> The light incident on skin gets reflected, refracted and absorbed and also gets influenced by skin physical properties. Incident light gets reflected when used over dry skin, but a lesion with a smooth and oily surface allows the light to pass through it and reach the dermis.

The visibility of structures can be improved with application of linkage fluids. Glycerin, mineral oil or immersion oil can be used as linkage fluids. As immersion oil is fetotoxic and teratogenic due to presence of chlorinated paraffin, it is not being used.<sup>[83]</sup> Water or antiseptic solutions evaporates fast, hence oil is preferred. As glass has got a refractive index of 1.52 similar to skin 1.55, so enhances transillumination of lesion.<sup>[84]</sup>

Dermoscopy can be used as a contact or non-contact device, where in former method a glass cap of dermoscope comes in direct contact with lesion. In noncontact device, there is no contact with lesions hence no chance for nosocomial infections.<sup>[85]</sup>

A dermoscope has three different modes -

- Non polarised light
- Polarised light
- Blue light

Polarised light is better for visualisation of deeper skin structures, while non-polarised light provides idea only about superficial skin.<sup>[86]</sup>

The use of dermoscopy in clinical setup requires prior evaluation of patient by adequate history and clinical examination and then parameters in should be considered while using dermoscope are:

- (i) Arrangement of vasculature;
- (ii) Pigmentation; and
- (iii) Follicular findings.<sup>[87]</sup>

### **DERMOSCOPY FINDINGS IN CUTANEOUS LICHEN PLANUS**

The pathognomic signs for LP are violaceous polygonal papules, Wickham's Striae, and pigmented macules. But the clinical diagnosis may not always be easy, prompting the need for biopsy or dermoscopy to differentiate the condition from others like psoriasis, syphilis, lupus erythematosus, lichenoid drug eruption, etc.<sup>[88]</sup>

The dermoscopic findings in LP is divided into vascular, non-vascular and pigmentary findings.<sup>[89]</sup>

## **NON VASCULAR FINDINGS**

### **a) Wickham striae**

Louis Wickham was first to describe WS in 1895. According to him, WS has varied morphological presentation that are seen over the LP lesions. WS is considered as of diagnostic sign of LP.<sup>[90]</sup>

According to Summerly et al, WS occurs due to abnormal keratinocyte functioning, but Darier related WS to hypergranulosis.<sup>[91]</sup>

Dermoscopy helps in observation of WS over LP lesion and hence considered as sensitive and specific criterion in diagnosis of LP.<sup>[92-94]</sup> WS on dermoscopy may present as annular, linear, reticular or radial white structures surrounded by red dots or red lines.<sup>[93,95]</sup> On histopathological examination, it corresponds to orthokeratosis above the wedge-shaped increased in granular layer of epidermis and acanthosis that is centered around acrosyringia and acrotrichia.<sup>[92]</sup>

The different WS dermoscopic patterns observed are

- |                                |                                       |
|--------------------------------|---------------------------------------|
| I} reticular (the most common) | II} circular or annular               |
| III} radial streaming          | IV} leaf venation. <sup>[91,96]</sup> |

- **Central yellow-brown areas** correspond to alteration in basal keratinocytes and also to spongiosis.
- **Comedone like openings** - It is the hyperplastic dilated infundibula with orthokeratosis
- **Milium like cyst** - intra dermal keratins are seen as yellow round globules.<sup>[89]</sup>

## **VASCULAR FINDINGS**

Vascular findings like red dots and red lines are usually paired with WS.

**Red dots**- suggests normal papillary vessels

**Red lines** - linear red structures suggests deeper sub papillary capillaries that lies horizontally.<sup>[89]</sup>

## **PIGMENTORY FINDINGS**

The pigmentary pattern in LP is pepper like pigmentation, grey-blue globules. The presence of pepper-like pigmentation indicates melanophages that are diffusely lying in superficial dermis.<sup>[89]</sup> The disease activity is suggested by observation of red dots, red lines, and WS. Linear WS usually indicates micro Koebner's phenomenon, hence suggesting disease activity.<sup>[97]</sup>

## **DERMOSCOPY IN LICHEN PLANO PILARIS (LPP)**

This condition is characterized by follicular oriented keratotic papules coalescing to form plaques. In the final stage, the scalp shows perifollicular erythema and follicular openings with atrophy<sup>[98]</sup>

Dermoscopic findings in LPP vary according to the degree of disease severity and stage of evolution. In the early stage, perifollicular inflammation is seen as white scales with erythema around the follicles (arboriform vessels).<sup>[99,100]</sup> In the fibrotic stage, classic irregular whitish dot (fibrous tracts due to follicular units loss) with perifollicular pigmentation.<sup>[101]</sup>

## **DERMOSCOPY IN LICHEN PLANUS PIGMENTOSUS**

Dermoscopy of this condition shows an absence of Wickham striae and vascular features.<sup>[102]</sup>

Lichen planus pigmentosus is characterized by the presence of mainly pigment pattern that is slate grey-to-blue dots and globules with perifollicular and peri-eccrine pigment deposition. Hem-like pigment pattern is also seen with brown background<sup>[102-104]</sup>

## **DERMOSCOPY IN HYPERTROPHIC LICHEN PLANUS**

Dermoscopy shows pearly white areas (WS) with greyish peripheral striations. Grey-blue globules and comedo-like openings (CLO) are seen over the lesions. Brown globules are seen in the periphery of lesions. Red dots and red globules are seen at centre and periphery of the lesions.<sup>[105]</sup>

## **DERMOSCOPY IN NAIL LICHEN PLANUS**

Dermoscopy findings of nail LP shows thinning of matrix and fragility of the nail plate with pitting, fissuring and its progression to longitudinal ridging, pterygium, trachyonychia, red lunula, melanonychia and atrophy. Nail bed shows are subungual hyperkeratosis, chromonychia and the onycholysis<sup>[97]</sup>

## **DERMOSCOPY IN ORAL LICHEN PLANUS**

Dermoscopy of oral lichen planus shows tri-colored pattern with structureless veil-like grey-white areas (modified Wickham's striae), well-demarcated red erosions, and brown to violaceous clods over the mucosal areas. Vascular pattern of dotted and curved vessels are seen at borders of erosions. Blunting of lingual papillae over the tongue is also seen.<sup>[106]</sup>

## METHODOLOGY

The details of the study methodology are described below:

- **Study source:** The study was conducted in the Department of Dermatology, Venereology and Leprosy, in a tertiary care hospital as part of MD academic curriculum.
- **Study duration** – The study was conducted between 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018
- **Ethical clearance:** It was granted by Institutional Ethical Committee of Human Subjects Research.
- **Study design:** Hospital based observational study
- **Sample size:** The study was a non randomized single-arm observational study. Hence, based on previous records of patients having lichen planus who had attended the outpatient department of Dermatology, Venereology and Leprosy in the previous year, a sample size of 50 was calculated. However, the total number of patients attending the OPD during the study period were 70, hence a sample size of 70 was studied.
- **Sample selection criteria:** All patients with clinically diagnosed cases of lichen planus who presented to the department of Dermatology, Venereology and Leprosy between 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018 were included in the study.

- ***Inclusion criteria:***

- 1) Patients diagnosed with lichen planus,
- 2) treatment naïve cases,
- 3) irrespective of age and sex,
- 4) consenting for the study

- ***Exclusion criteria:***

- 1) Subjects with lesions involving only the oral or genital mucosa
- 2) Subjects with only nail involvement.

***Data collection*** –A detailed history regarding the age, sex, occupation, family history, personal habits, duration of the disease and history of other disease associated was taken. Clinical photographs of the lesions were taken. Dermatological and systemic examination was carried out. Diagnosis of lichen planus was made on clinical examination. Dermoscopic examination of the lesions was performed using a videodermatoscope ( Dinolite 2.0 ) providing 50X and 200X magnification and photographs were recorded in non polarized as well as polarized mode. To preserve vessel morphology and to ensure the best available projection, minimal pressure was applied over lesions and ultrasound gel was used.

The data and photographic record was noted in a pre-designed proforma after taking informed and written consent.

- ***Statistical Method for Data Analysis:*** SPSS software was used and correlation method, fisher exact test and chi-square test was applied to achieve the study results.

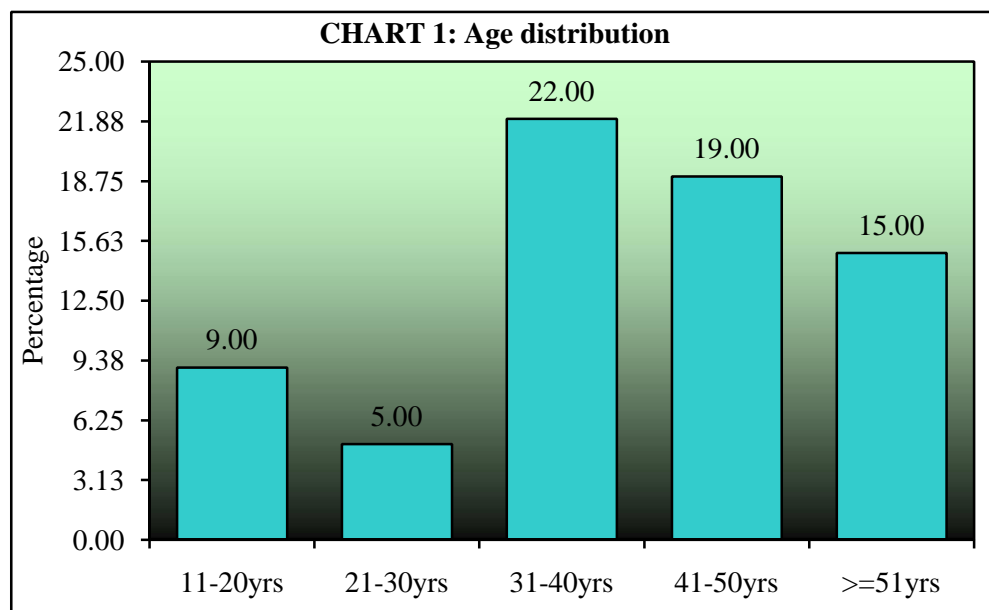
## **RESULTS**

### **1. AGE DISTRIBUTION**

Majority of the population belonged in the age group of 31-40 years [22/70] 31.43% followed by 41-50 years, [19/70] 27.14%,  $\geq 51$  years [15/70] 21.43%, 11-20 years [9/70] 12.86% and the least belonged to the 21-30 years age group. [5/70] 7.14%. Table.1

**Table. 1 (AGE DISTRIBUTION)**

Age groups	Number	Percent
11-20yrs	9	12.86
21-30yrs	5	7.14
31-40yrs	22	31.43
41-50yrs	19	27.14
>=51yrs	15	21.43
Total	70	100.00
Mean	40.33	
SD	14.08	

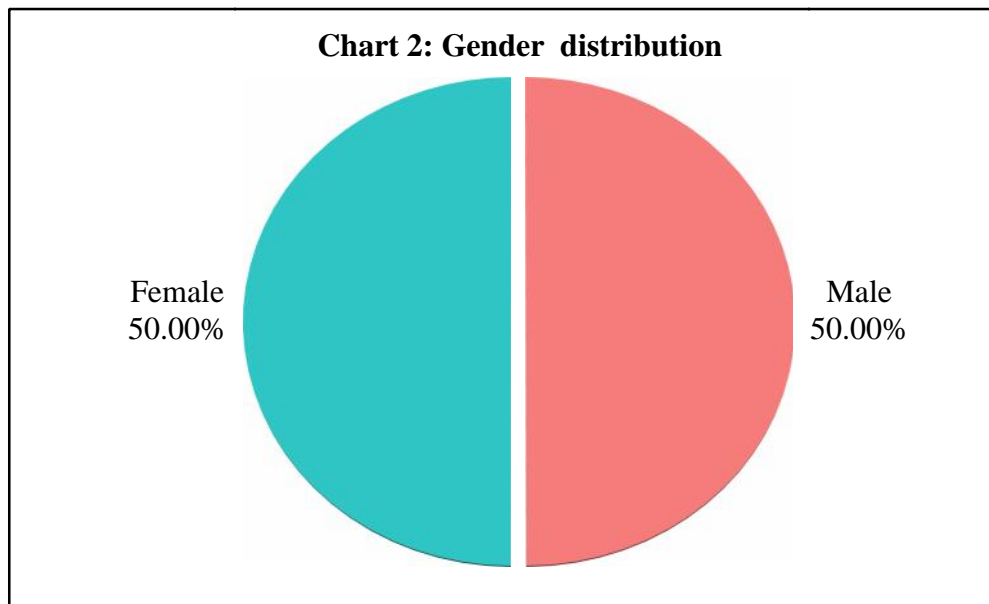


**2. GENDER DISTRIBUTION**

50 % [35/70] of the study population were males whereas, 50 % were females [35/70], no gender predilection was noted in our study.

**Table. 2 (GENDER DISTRIBUTION)**

<b>Gender</b>	<b>Number</b>	<b>Percent</b>
Male	35	50.00
Female	35	50.00
Total	70	100.00

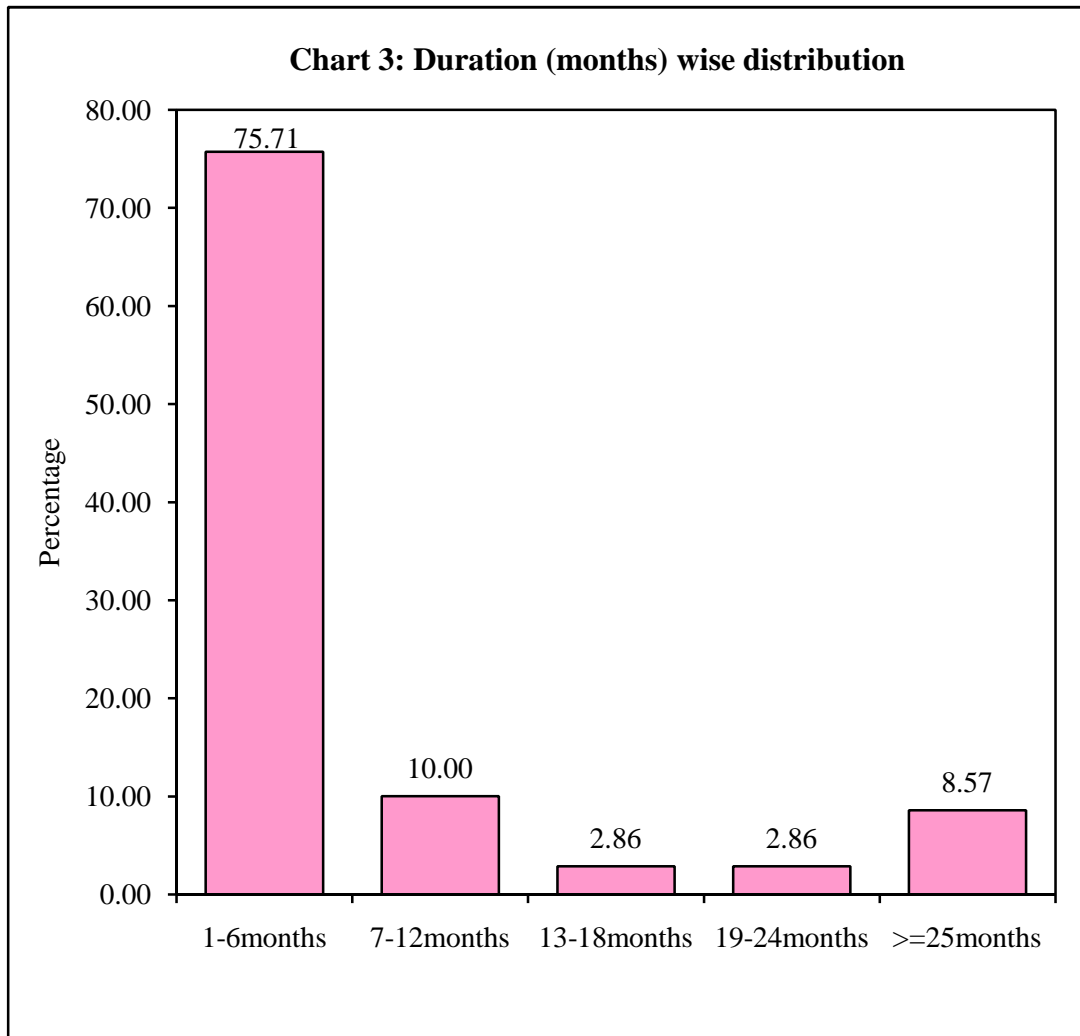


**3. DURATION OF THE DISEASE**

In our study we observed that majority of the patients presented to us within 1-6 months of onset of lesion [53/70] 75.71%, followed by those with lesions since 7-12 months [7/70] 10, an equal number presenting within 13-18 months and 19-24 months duration [2/70] 2.86%, and  $\geq 25$  months in [6/70] 8.57%.

**Table. 3 –(DURATION OF THE DISEASE)**

<b>Duration (months)</b>	<b>Number</b>	<b>Percent</b>
1-6months	53	75.71
7-12months	7	10.00
13-18months	2	2.86
19-24months	2	2.86
$\geq 25$ months	6	8.57
Total	70	100.00
Mean	8.13	
SD	10.96	

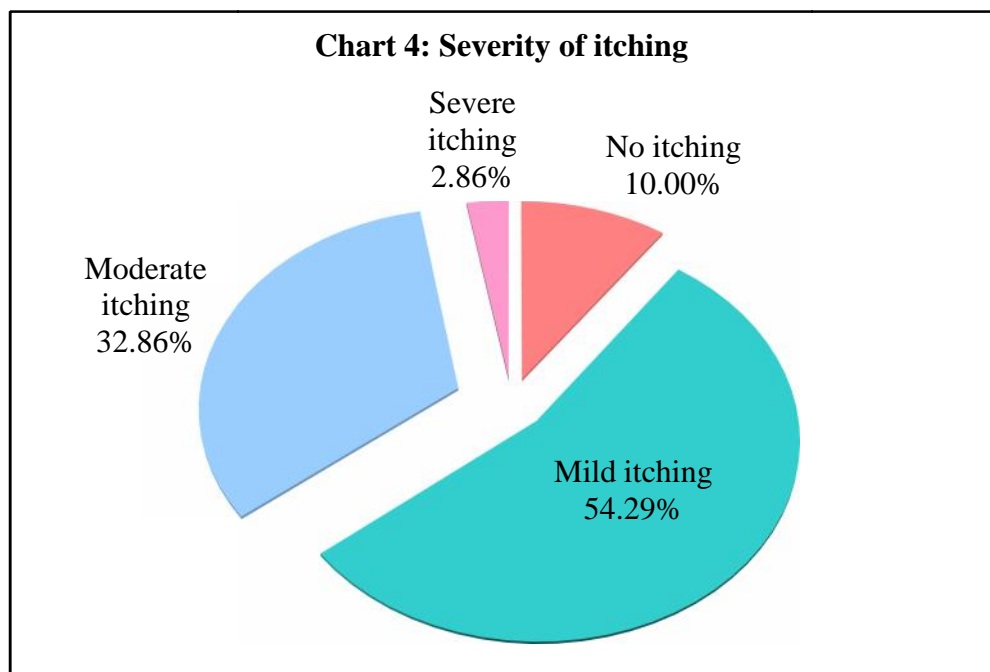


**4. SEVERITY OF ITCHING**

Majority of the subjects complained of mild itching 54.29% (38/70) followed by moderate itching 32.86% (23/70). Only 2.86% (n=2) had severe itching and 10% (7/70) cases reported no itching at the time of presentation.

**Table. 4 (SEVERITY OF ITCHING)**

<b>Itching</b>	<b>Number</b>	<b>Percent</b>
No itching	7	10.00
Mild itching	38	54.29
Moderate itching	23	32.86
Severe itching	2	2.86
Total	70	100.00

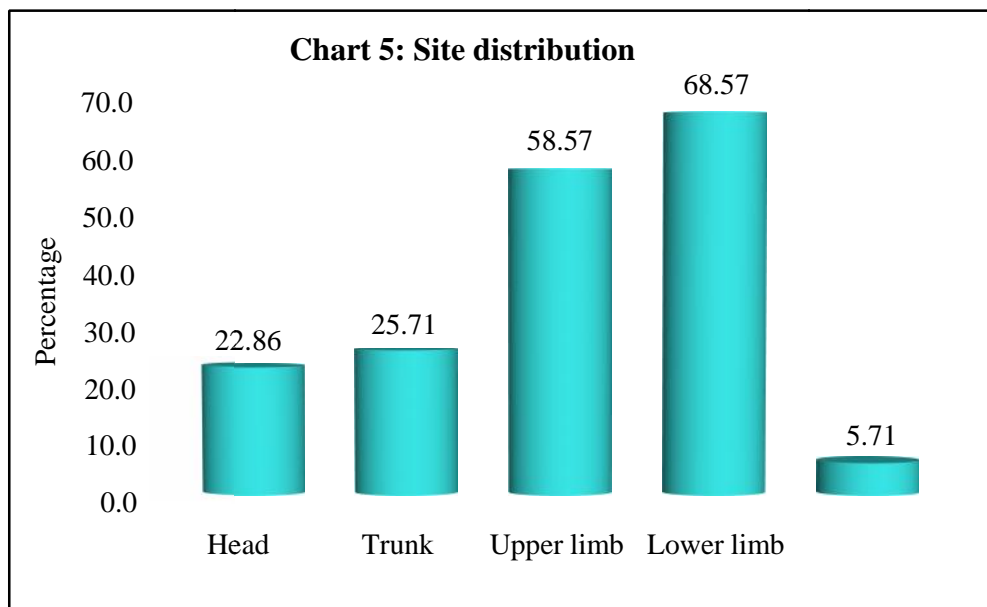


## 5. DISTRIBUTION OF SUBJECTS BY SITE

In our study we observed that a majority of the subject's lichen planus was located over lower limb in 68% (48/70) cases, followed by 58% (41/70) cases upper limb, 25% (18/70) trunk and 22% (16/70) head, whereas it was least commonly seen over 5% (4/70) palmo-plantar areas.

**Table. 5 – (DISTRIBUTION OF SUBJECTS BY SITE)**

Site	Number	Percent
Head (H)	16	22.86
Trunk (T)	18	25.71
Upper limb (U)	41	58.57
Lower limb (L)	48	68.57
Palmo plantar (PP)	4	5.71

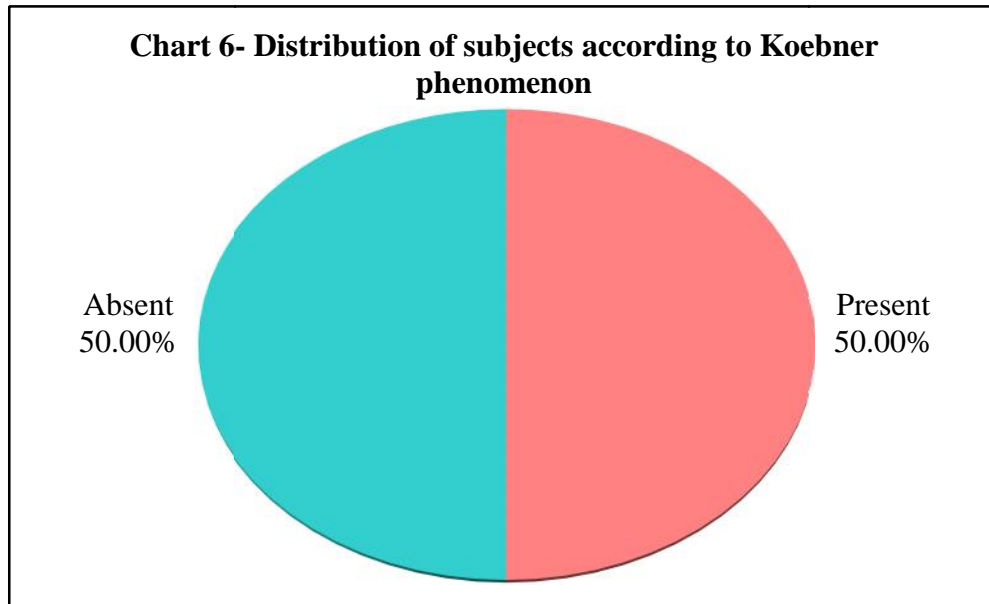


**6 .KOEBCNER’S PHENOMENON (KP)**

In our study we observed that Koebner’s Phenomenon (KP) was present in 50% (35/70) of the cases

**Table 6 – (KOEBCNER’S PHENOMENON)**

Koebner’s Phenomenon	Number	Percent
Present	35	50.00
Absent	35	50.00
Total	70	100.00

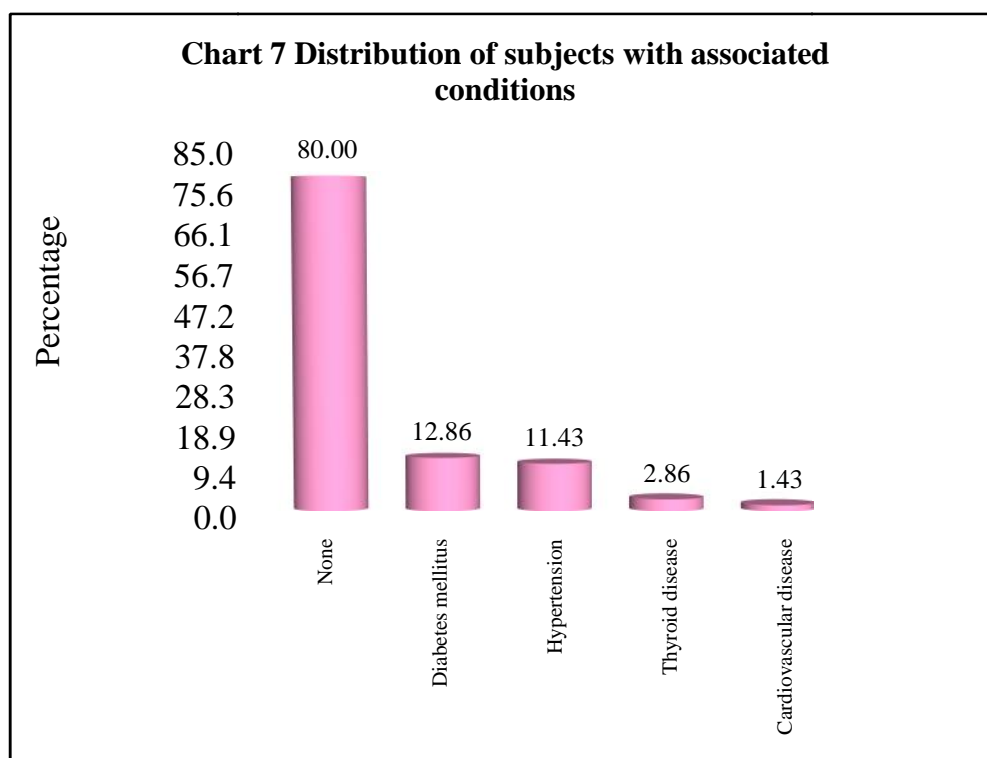


## 7. ASSOCIATED CONDITIONS

Other associated conditions with lichen planus seen in our subjects were (9/70) 12.86% with diabetes, (8/70) 11.43% with hypertension, (2/70) 2.86% with thyroid disease and least (1/70) 1.43% having underlying cardiovascular disease.

**Table 7 – (ASSOCIATED CONDITIONS)**

Associated conditions	Number	Percent
None	56	80.00
Diabetes mellitus	9	12.86
Hypertension	8	11.43
Thyroid disease	2	2.86
Cardiovascular disease	1	1.43

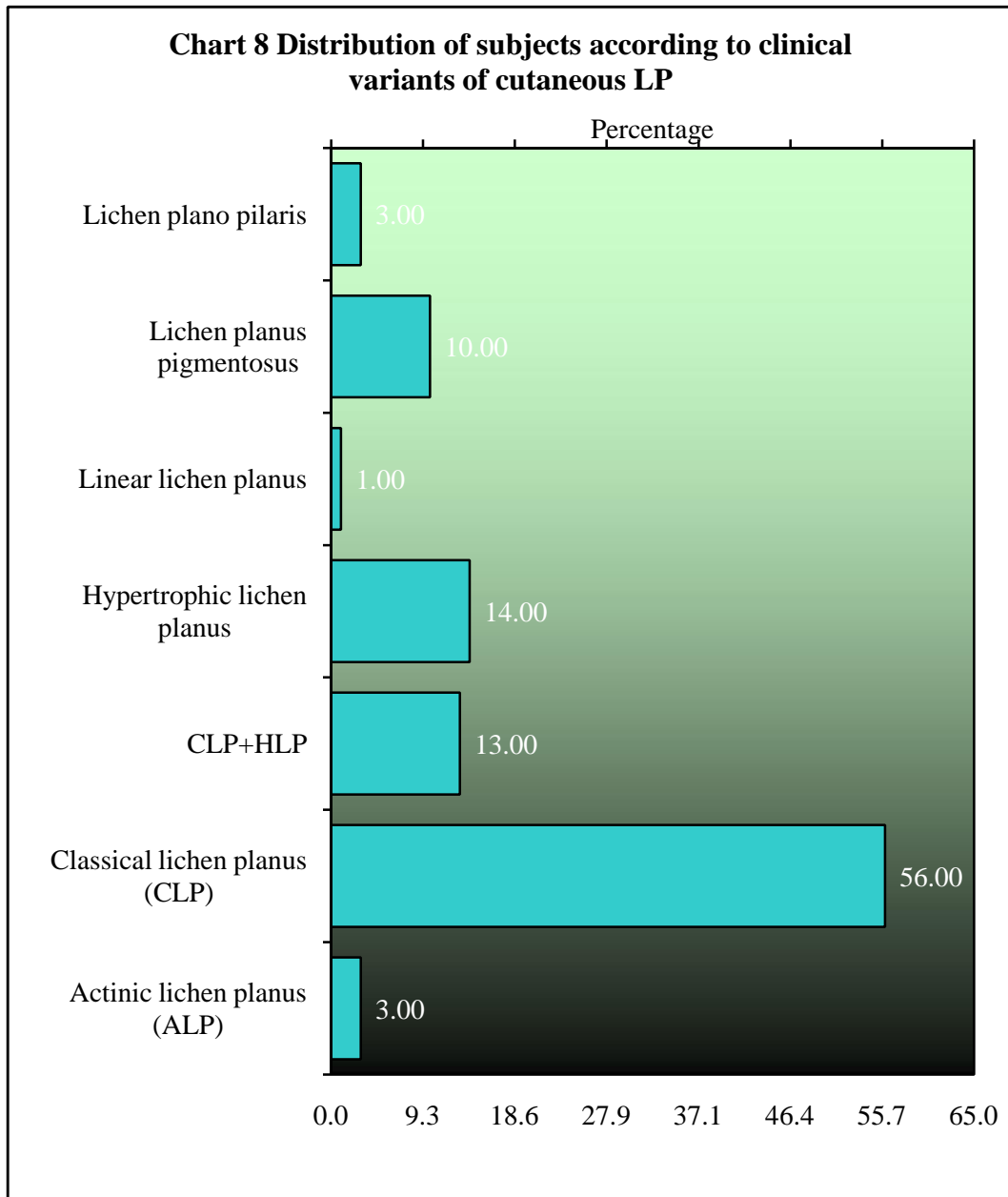


**8. CUTANEOUS VARIANTS OF LP ENCOUNTERED IN OUR STUDY**

From table 8, we observe that classical LP (39/70) 56% was seen in majority of cases followed by hypertrophic LP (10/70) 14%, a combination of CLP and HLP (9/70) 13%, lichen planus pigmentosus (7/70) 10%, lichen plano pilaris and actinic LP (2/70) 3% and least number of cases with linear LP (1/70)1%.

**Table 8 (CUTANEOUS VARIANTS OF LP)**

<b>Diagnosis</b>	<b>Number</b>	<b>Percent</b>
Actinic lichen planus (ALP)	2	2.86
Classical lichen planus (CLP)	39	55.71
CLP+HLP	9	12.86
Hypertrophic lichen planus	10	14.29
Linear lichen planus	1	1.43
Lichen planus pigmentosus	7	10.00
Lichen plano pilaris	2	2.86
Total	70	100.00



**9. DERMOSCOPIC FINDINGS OF LICHEN PLANUS ENCOUNTERED IN OUR STUDY**

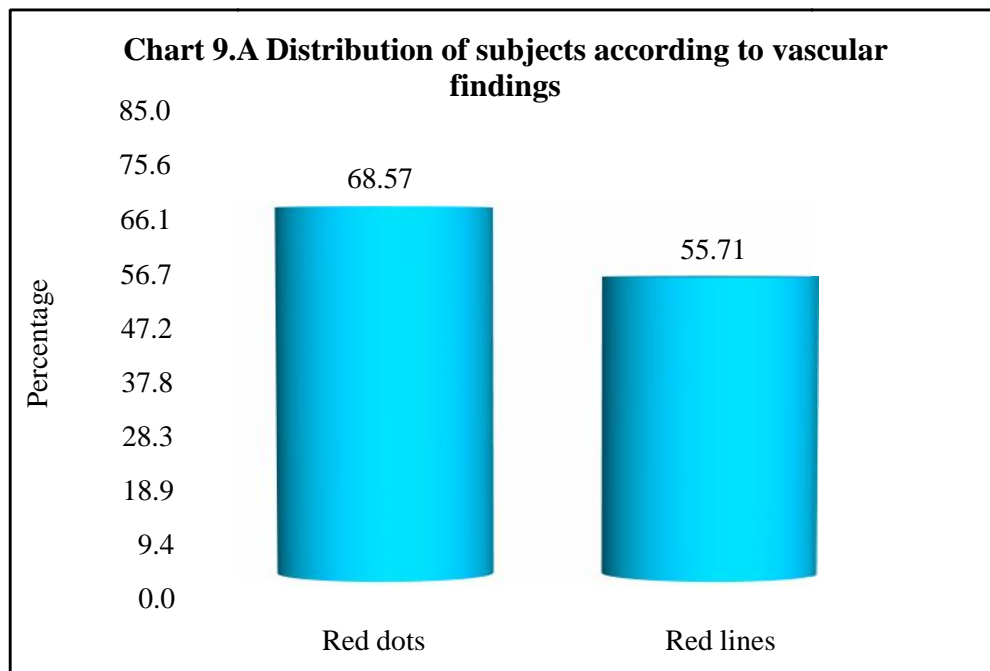
The findings of dermoscopy were recorded in nonpolarized and polarized mode.

**9.A) VASCULAR FINDINGS**

From table 9.A, we observed in polarized mode that red dots were present in (48/70) 68.57% of the total subjects whereas red lines are present in (39/70) 55.71% subjects.

**Table 9.A (VASCULAR FINDINGS)**

<b>Vascular findings</b>	<b>Number</b>	<b>Percent</b>
Red dots	48	68.57
Red lines	39	55.71



## **9.B) NON VASCULAR FINDINGS IN LICHEN PLANUS**

### **I) WICKHAM'S STRIAE**

We observed that, amongst the total of 50/70 subjects, Wickham's Striae was absent in 20/70 (14%) subjects and the proportion of cases with Wickham's striae was significantly more than those without Wickham's striae. ( $p < 0.0001$ )

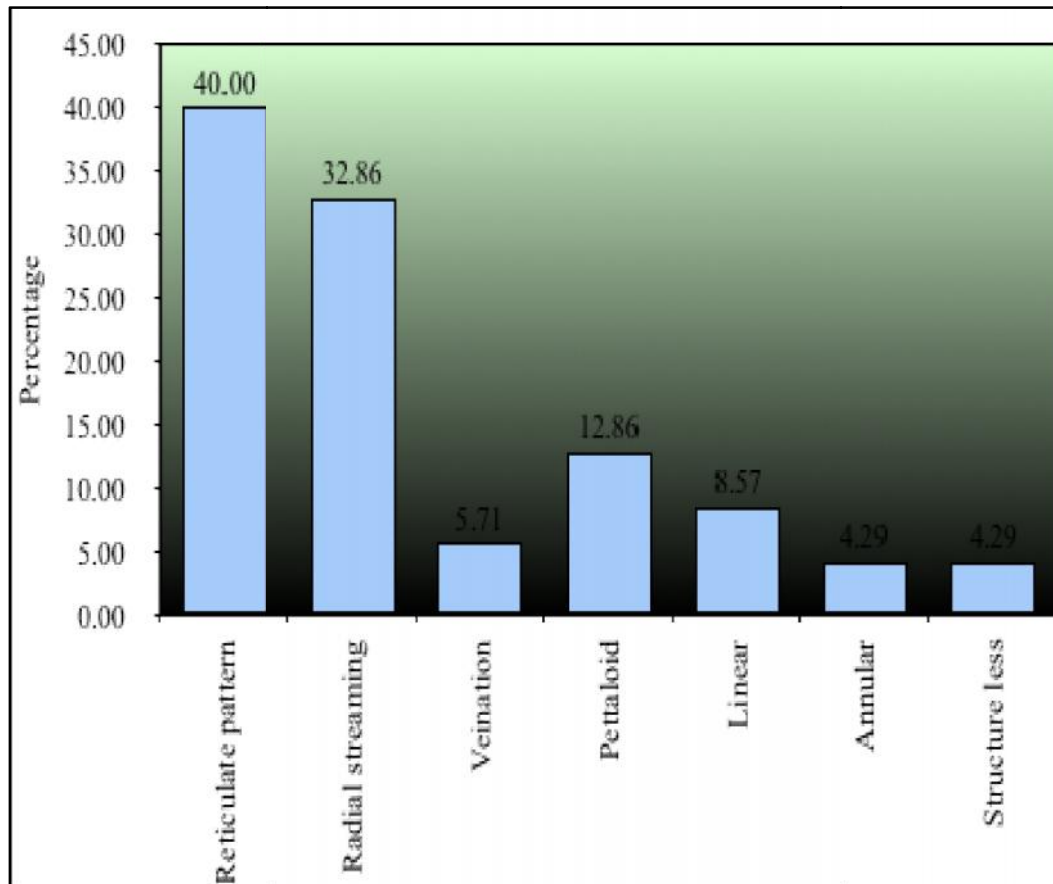
In our study we observed reticulate pattern most commonly 40% (28/70), followed by radial streaming 33% (23/70), linear pattern 9% (6/70), veination pattern 6% (4/70) and a new pattern of WS a rosette/ pettaloid pattern 13% (9/70) was observed in our patient.

Combination of two WS was also seen in our study, radial + rosette pattern was most common 4% (3/70), followed by reticulate + radial pattern 3% (2/70) and reticulate + annular pattern 3% (2/70)

II) TABLE 9.B.I (WICKHAM'S STRIAE)

Factor	Sub-category	Frequency	Percentage
<b>PATTERN OF WICKHAM'S STRIAE</b>	<b>Absent</b>	20	14
	<b>Reticulate</b>	20	29
	<b>Radial</b>	16	23
	<b>Veination</b>	3	4
	<b>Pettaloid/ rosette</b>	2	3
	<b>Linear</b>	4	6
	<b>Annular</b>	2	3
	<b>Radial + Rosette</b>	3	4
	<b>Reticulate + Radial</b>	2	3
	<b>Reticulate + Rosette</b>	1	1
	<b>Reticulate + linear</b>	1	1
	<b>Reticulate + annular</b>	2	3
	<b>Rosette + structureless</b>	1	1
	<b>Reticulate + radial+annular</b>	1	1
	<b>Reticulate + veination+ rosette</b>	1	1
<b>Radial + rosette + Linear</b>	1	1	

Chart 9.B I Distribution of subjects according to patterns of Wickham's Striae

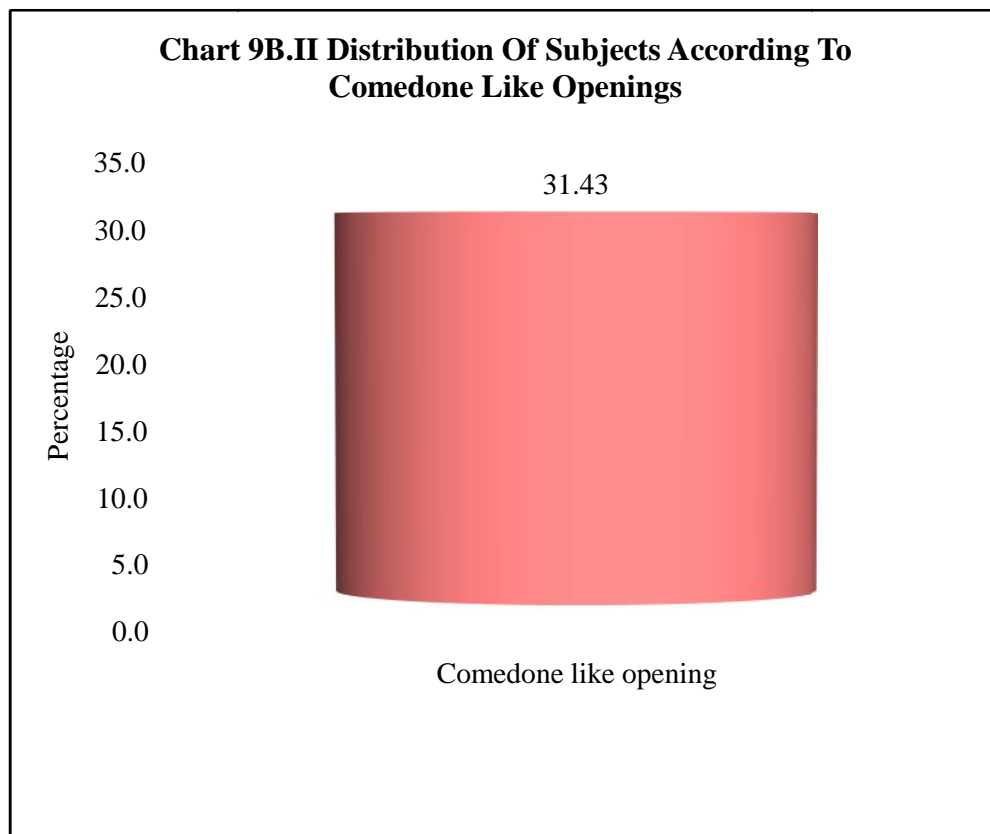


**II) COMEDONE LIKE OPENING**

In our study we observed that 31.43 % (22/70) of subjects had non vascular findings such as comedone like openings

**TABLE 9.B.II**

<b>Come done like opening</b>	<b>Present</b>	22	31
	<b>Absent</b>	48	69

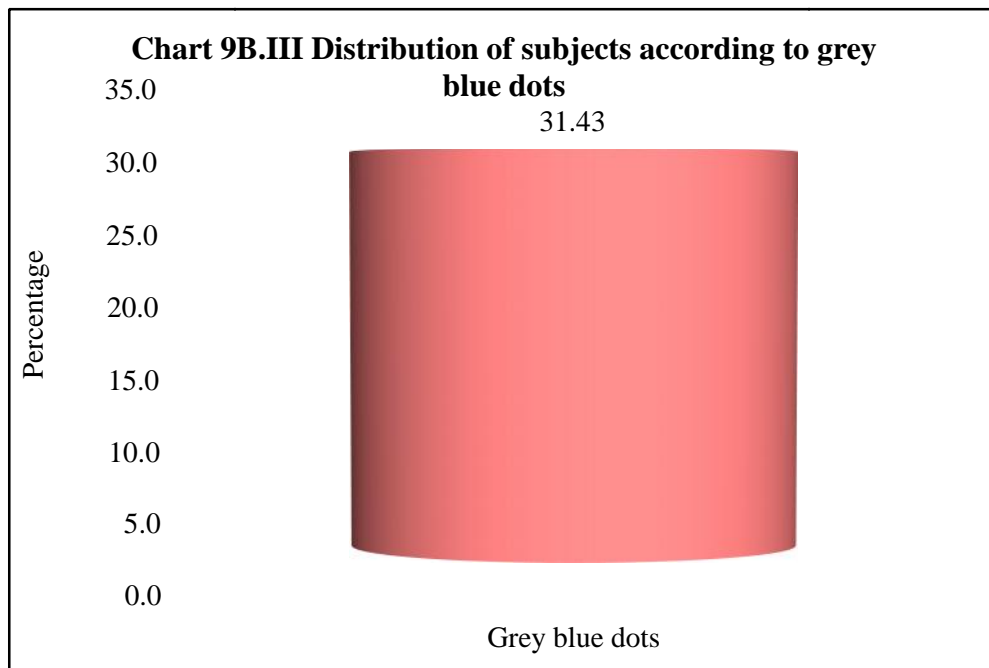


**III) GREY BLUE DOTS**

In our study we observed that 31.43 % (22/70) of subjects had grey blue dots as a non vascular finding.

**IV) TABLE 9.B.III (GREY BLUE DOTS )**

	<b>Present</b>	22	31
<b>Grey blue dots</b>	<b>Absent</b>	48	69

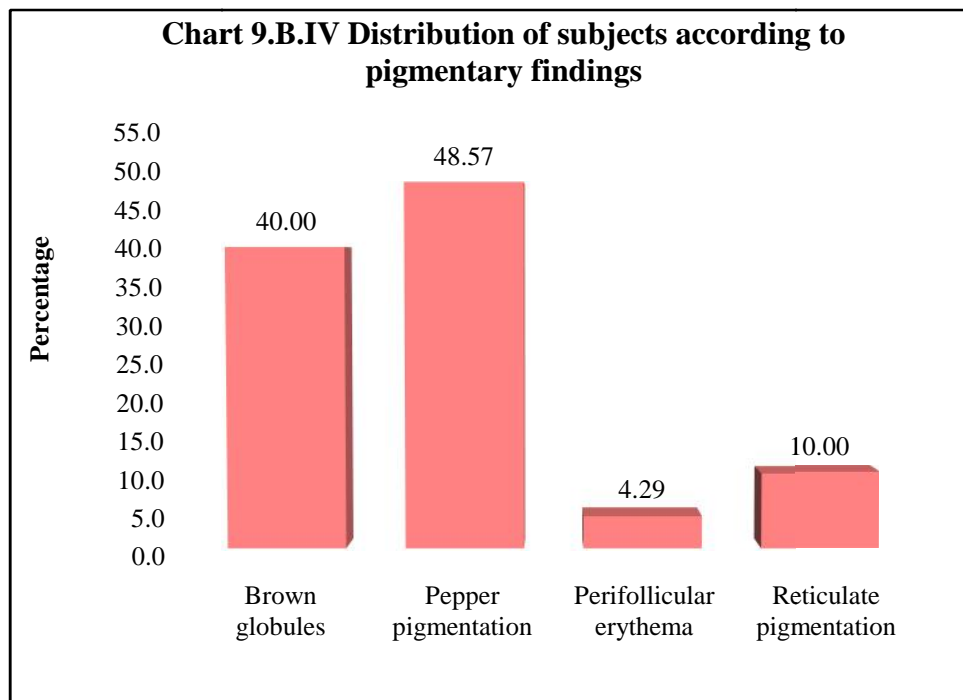


**IV) PIGMENTARY CHANGES -**

We observe that 40% (28/70) subjects had brown globules whereas 48.57 % (34/70) subjects presented with pepper like pigmentation, 10% (7/70) with reticulate pigmentation and 4.29%(3/70) with perifollicular erythema.

**Table 9.B.IV (PIGMENTARY CHANGES)**

<b>Pigmentary findings</b>	<b>Number</b>	<b>Percent</b>
Brown globules	28	40.00
Pepper pigmentation	34	48.57
Perifollicular pigmentation	3	4.29
Reticulate pigmentation	7	10.00



**10. ASSOCIATION BETWEEN ITCHING AND CLINICAL MORPHOLOGY**

Itching was significantly associated with lesions of lichen planus.(p<0.05)

Itching was most commonly associated with CLP (39/70) and HLP (10/70) patients who were clinically active.

**Table 10 -**

<b>Diagnosis</b>	<b>No</b>	<b>%</b>	<b>Mild</b>	<b>%</b>	<b>Moderate</b>	<b>%</b>	<b>Severe</b>	<b>%</b>	<b>Total</b>
Actinic lichen planus (ALP)	1	50.00	1	50.00	0	0.00	0	0.00	2
Classical lichen planus (CLP)	0	0.00	23	58.97	14	35.90	2	5.13	39
CLP+HLP	0	0.00	5	55.56	4	44.44	0	0.00	9
Hypertrophic lichen planus	0	0.00	7	70.00	3	30.00	0	0.00	10
Linear lichen planus	0	0.00	0	0.00	1	100.0	0	0.00	1
Lichen planus pigmentosus	5	71.43	2	28.57	0	0.00	0	0.00	7
Lichen plano pilaris	1	50.00	0	0.00	1	50.00	0	0.00	2
<b>Total</b>	<b>7</b>	<b>10.00</b>	<b>38</b>	<b>54.29</b>	<b>23</b>	<b>32.86</b>	<b>2</b>	<b>2.86</b>	<b>70</b>

Chi-square=48.4180 p=0.0001\*

**11. ASSOCIATION BETWEEN KOEBNER’S PHENOMENON AND CLINICAL MORPHOLOGY**

The feature of Koebner’s phenomenon shows significant statistical correlation in its occurrence in cases of Lichen Planus.(p<0.05)

Also, the occurrence of KP was notably more in CLP 64% (25/39), HLP 30% (3/10) and CLP+HLP 77% (7/9) variants of LP

**Table 11 -**

<b>Diagnosis</b>	<b>Koebner’s Phenomenon Absent</b>	<b>%</b>	<b>Koebner’s Phenomenon Present</b>	<b>%</b>	<b>Total</b>
Actinic lichen planus (ALP)	2	100.00	0	0.00	2
Classical lichen planus (CLP)	14	35.90	25	64.10	39
CLP+HLP	2	22.22	7	77.78	9
Hypertrophic lichen planus	7	70.00	3	30.00	10
Linear lichen planus	1	100.00	0	0.00	1
Lichen planus pigmentosus	7	100.00	0	0.00	7
Lichen plano pilaris	2	100.00	0	0.00	2
Total	35	50.00	35	50.00	70
Chi-square	19.4800				
P-value	0.0020*				

## 12. ASSOCIATION BETWEEN CLINICAL VARIANTS OF LP AND VASCULAR FEATURES

From the table 12 we observe that finding of red dots is significantly associated with lesions of lichen planus. ( $p < 0.05$ ) Red dots were commonly seen in the active CLP+HLP 88% (8/9) followed by CLP 79% (31/39). Linear LP, lichen plano pilaris cases in our study showed absence of red dots.

Red lines were not significantly associated with diagnosis. However; it was a consistent feature in actinic LP 100% (2/2), linear LP 100% (1/1) and lichen plano pilaris 100% (1/1). Also it was observed in more than 50% cases of CLP and HLP, though in our study it failed to show a significant statistical correlation.

**Table 12 -**

Diagnosis	Red dots	%	Red lines	%	Total
Actinic lichen planus (ALP)	1	50.00	2	100.00	2
Classical lichen planus (CLP)	31	79.49	22	56.41	39
CLP+HLP	8	88.89	6	66.67	9
Hypertrophic lichen planus	6	60.00	5	50.00	10
Linear lichen planus	0	0.00	1	100.00	1
Lichen planus pigmentosus	2	28.57	1	14.29	7
Lichen plano pilaris	0	0.00	2	100.00	2
Total	48	68.57	39	55.71	70
Chi-square	16.284		9.421		
P-value	0.0120*		0.1510		

**13. ASSOCIATION BETWEEN CLINICAL VARIANTS OF LP AND NON VASCULAR FINDINGS**

Lichen planus lesions were significantly associated with occurrence of non vascular features (comedones like opening and grey blue dots)  $p < 0.05$ .

Comedone like openings was significantly seen in CLP+HLP 100% (9/9) and HLP 80% (8/10)

Grey blue dots was most commonly associated with CLP+HLP 88% (8/9), HLP 40% (4/10) and CLP 25% (10/39).

**Table 13 -**

<b>Diagnosis</b>	<b>Comedone like opening (only +)</b>	<b>%</b>	<b>Grey blue dots (only +)</b>	<b>%</b>	<b>Total</b>
Actinic lichen planus (ALP)	0	0.00	0	0.00	2
Classical lichen planus (CLP)	5	12.82	10	25.64	39
CLP+HLP	9	100.00	8	88.89	9
Hypertrophic lichen planus	8	80.00	4	40.00	10
Linear lichen planus	0	0.00	0	0.00	1
Lichen planus pigmentosus	0	0.00	0	0.00	7
Lichen plano pilaris	0	0.00	0	0.00	2
Total	22	31.43	22	31.43	70
Chi-square	42.3490		20.2350		
P-value	0.0001*		0.0010*		

**14. ASSOCIATION BETWEEN WICKHAM'S STRIAE AND NON VASCULAR FINDINGS**

From table 14, we observed that Wickham's striae was significantly associated with comedone like openings, whereas Wickham's striae did not show significant association with grey blue dots.

**Table 14 -**

WICKHAM STRIAE	COME DONE LIKE OPENING		P-VALUE	GREY BLUE DOTS		P-VALUE
	ABSENT	PRESENT		ABSENT	PRESENT	
ABSENT	10	0	0.0148*	9	1	0.0662
1	14	6		15	5	
2	7	9		9	7	
3	3	0		3	0	
4	2	0		1	1	
5	4	0		4	0	
7	2	0		1	1	
1,2	1	1		1	1	
1,4	1	0		0	1	
1,5	1	0		0	1	
1,6	1	1		1	1	
2,4	1	2		3	0	
4,7	0	1		0	1	
1,2,6	0	1		0	1	
1,3,4	1	0		0	1	
2,4,5	0	1	1	0		
TOTAL	48	22	-	48	22	-

**15. ASSOCIATION BETWEEN CLINICAL VARIANTS OF LP AND PIGMENTORY FINDINGS (BROWN GLOBULES AND PEPPER LIKE PIGMENTATION)**

From table 15 we observed that brown globules and pepper like pigmentation was significantly associated with lesions of lichen planus( $p < 0.05$ )

Brown globules was associated mostly with ALP 100% (2/2), LLP 100% (1/1), followed by HLP 80% (8/10) and least in CLP+HLP 22% (2/9)

Pepper like pigmentation was mostly associated with LLP 100% (1/1), followed by CLP 64% (25/39) and least in HLP 22% (2/10) and absent in LPP and LPp

**Table 15 -**

<b>Diagnosis</b>	<b>Brown globules (only +)</b>	<b>%</b>	<b>Pepper pigmentation (only +)</b>	<b>%</b>	<b>Total</b>
Actinic lichen planus (ALP)	2	100.00	1	50.00	2
Classical lichen planus (CLP)	12	30.77	25	64.10	39
CLP+HLP	2	22.22	5	55.56	9
Hypertrophic lichen planus	8	80.00	2	20.00	10
Linear lichen planus (LLP)	1	100.00	1	100.00	1
Lichen planus pigmentosus(LPp)	2	28.57	0	0.00	7
Lichen plano pilaris(LPP)	1	50.00	0	0.00	2
<b>Total</b>	<b>28</b>	<b>40.00</b>	<b>34</b>	<b>48.57</b>	<b>70</b>
<b>Chi-square</b>	<b>14.2010</b>		<b>16.770</b>		
<b>P-value</b>	<b>0.0247*</b>		<b>0.0100*</b>		

**16. ASSOCIATION BETWEEN CLINICAL VARIANTS OF LP AND PIGMENTORY FINDINGS (PERIFOLLICULAR AND RETICULATE PIGMENTATION)**

From table 16, we observed that perifollicular pigmentation and reticulate pigmentation was significantly associated with clinical variants of lichen planus( $p<0.05$ ).

Perifollicular pigmentation was associated with LPP 100% (2/2) respectively, followed by LPP14%(1/7) and absent in other variants.

Reticulate pigmentation was associated with LPP 86% (6/7) respectively, followed by LPP 50%(1/2) and absent in other variants.

<b>Diagnosis</b>	<b>Perifollicular pigmentation</b>	<b>%</b>	<b>Reticulate pigmentation</b>	<b>%</b>	<b>Total</b>
Actinic lichen planus (ALP)	0	0.00	0	0.00	2
Classical lichen planus (CLP)	0	0.00	0	0.00	39
CLP+HLP	0	0.00	0	0.00	9
Hypertrophic lichen planus	0	0.00	0	0.00	10
Linear lichen planus	0	0.00	0	0.00	1
Lichen planus pigmentosus (LPP)	1	14.29	6	85.71	7
Lichen plano pilaris (LPP)	2	100.00	1	50.00	2
Total	3	4.29	7	10.00	70
Chi-square	49.104		54.9210		
P-value	0.0001*		0.0001*		

**17.P-VALUE TABLE FOR TESTING ASSOCIATION BETWEEN DIFFERENT FACTORS**

- From Table 17, using fisher exact test, we concluded that the sex, duration (months), itching, site, Koebner Phenomenon and diagnosis were showed significant association with the reticulate pigmentation.
- Also, the lesions of lichen planus were significantly associated with the red dots, Wickham's striae, comedone like opening, grey blue dots, brown globules, pepper pigmentation and reticulate pigmentation.
- The itching was significantly associated with the findings of red dots and pepper pigmentation.
- Lesions over the upper and lower limbs were significantly associated with features of red dots and grey blue dots.
- By the use of chi-square test, we concluded that there was significant association between Koebner Phenomenon and red dots.

**Table 17 -**

		<b>DERMOSCOPY</b>								
		<b>Red dots</b>	<b>Red lines</b>	<b>Wickham's striae</b>	<b>Comedone like opening</b>	<b>Grey blue dots</b>	<b>Brown globules</b>	<b>Pepper</b>	<b>Perifollicular</b>	<b>Reticulate</b>
<b>CLINICAL</b>	<b>ITCHING</b>	0.010	0.099	0.061	0.179	0.143	0.539	0.024	1.000	0.000
	<b>SITE</b>	0.006	0.607	0.180	0.350	0.042	0.816	0.061	0.489	0.008
	<b>KP</b>	0.005	0.139	0.140	0.797	0.072	0.807	0.232	0.493	0.011
	<b>CLINICAL VARIANTS</b>	0.030	0.606	0.002	0.000	0.001	0.020	0.004	0.066	0.000

## DISCUSSION

The present study is a hospital-based observational study conducted from 1st January 2018 to 31st December 2018 in Department of Dermatology, Venereology and Leprosy in a tertiary care hospital. A total of 70 cases of lichen planus who met the inclusion criteria were included in the study.

The present study showed that different WS, pigment, and vascular patterns can be seen according to the LP variants, location of lesions and disease duration.

In our study, 31% (22/70) of patients were in the age group of 31- 40 years, 27% (19/70) patients were in 41 - 50 years and least 7% (5/70) in age group of 21 - 30 years (mean 40.33, range 11- 70 years). In a study by Cheng T et al,<sup>[91]</sup> 32 years was mean age group of the subjects with LP. In a study conducted by Güngör S et al.<sup>[102]</sup>, mean age of subjects with LP was 38 years. The study by Garg P et al.<sup>[107]</sup> showed majority of subjects (66%) belonged to 20 - 59 years of age group with mean age of 38 years. Thus the age distribution observed in the present study was similar to observations made in other studies as mentioned above.

In the present study, out of 70 patients we observed that 35 were males and 35 were females (M:F-1:1), showing an equal preponderance. In a study conducted by Francisco Vazquez-Lopez et al,<sup>[92]</sup> out of 25 patients there were 15 females and 10 males. The study by Garg P et al,<sup>[107]</sup> the ratio of males to females was 0.43:1 showing female preponderance.

In our study, majority of subjects presented to us within a duration of 1-6 months (53/70) 75% and about 10% (7/70) after the 7-12 months of onset of the

disease (mean 8.13 months). In a study by Madhumita B et al,<sup>[15]</sup> two third of subjects presented within less than one year duration and others presented with duration varying from two years or more. In a study conducted by O P Singh et al,<sup>[108]</sup> most of the disease presented within a duration of less than one year (74%) and 12% over 12 months of duration. Thus the findings of our study were similar to findings of Madhumita B and Singh et al. where majority of cases presented in less than a year of onset of disease. Of the total subjects studied by us , 75% were those who had less lesion of less than six months duration. Hence our study showed similar findings as above mentioned studies.

In our study majority of the subjects had mild itching 54.29% (38/70) followed by moderate itching 32.86% (23/70), only 2.86%(2/70) had severe itching and absent in 10% (7/70). Itching was significantly associated ( $p < 0.05$ ) with cases having lesions of classical lichen planus and hypertrophic lichen planus. Sehgal et al.<sup>[20]</sup> reported moderate to severe degree of itching in 95.91% cases in their study. In study conducted by Kachhawa et al.<sup>[13]</sup>, 72% of cases had moderate to severe itching. In a study conducted by Madhumita B et al.<sup>[15]</sup> 79.3% of subjects had LP associated with itching and severely associated in HLP. In our study there was mild itching in majority of cases unlike other studies which showed their patients to have moderate to severe itching. Itching was significantly associated ( $p < 0.05$ ) with the features of red dots and pepper like pigmentation dermoscopy in our study and this association was not studied in other studies.

In our study, we observed that most of the lesions were located over the lower extremities 68% (48/70), followed by upper extremities 58% (41/70) and least over the palms and soles 5% (4/70) which was similar to observation by study by Sehgal et

al,<sup>[20]</sup>, who observed that lower extremities were involved more than the upper extremities and 10% had generalized involvement. In the study by Madhumita B et al.<sup>[15]</sup> the most common site involved was flexors of extremities and lower back (47.4%) and three patients showed involvement of palms and soles. Our findings were similar to the above mentioned studies.

In our study Koebner's phenomenon (KP) was seen in 50% (35/70) patients of the cases, mostly seen over the trauma prone areas and areas accessible for scratching, as observed by Boyd et al<sup>[9]</sup> and Sehgal et al,<sup>[20]</sup> similarly in study by Madhumita B et al<sup>[15]</sup>. KP was present in 51% of cases with CLP and absent in ALP. Our study findings were similar to above mentioned studies.

In our study we observed that 12% (9/70) of patients had diabetes mellitus, 11% (8/70) were with hypertension and 2% (2/70) had thyroid disorder. However, none of them had any associated cutaneous disorder in our study. Boyd et al.<sup>[9]</sup> reported that lichen planus was associated with autoimmune disorders and malignancy and observed diabetes mellitus in 1.6% of patients. In the study by Madhumita B et al.<sup>[15]</sup> along with LP other cutaneous conditions like alopecia (9.1%), lichen sclerosus et atrophicus (1.7%), vitiligo (0.9%), discoid lupus erythematosus (DLE) (0.9%), tinea cruris (0.9%) and systemic conditions like hypertension (HTN) (4.3%), DM (1.3%) both HTN and DM (0.9%) were seen. In a study by Garg P et al.<sup>[107]</sup> along with lichenoid lesions one patient had HCV positivity, one patient was positive for HIV, one patient had hypothyroidism and two patients had vitiligo. The findings in our study were similar to study by Madhumita B et al and near similar to Garg P et al and Boyd et al.

In our study out of 70 cases, classical lichen planus accounted for 55%(39/70) of cases, followed by 14% (10/70) of hypertrophic LP, 12% (9/70) case of both classical and hypertrophic LP, 10%(7/70) case of lichen planus pigmentosus and the least number of cases with 1.43% (1/70) by linear LP. In a study by Madhumita et al<sup>[15]</sup>, CLP was the commonest presentation(47.4%), followed by HLP(14.2%), ALP (11%), LLP (4%). Garg P et al.<sup>[107]</sup> showed 30% subjects of CLP, 20% of HLP, 14% of lichen planus pigmentosus, 4% of actinic LP and 4% of lichen plano pilaris. In all the studies, classical LP was there most common clinical variant encountered and was similar to findings in the above mentioned other studies.

In our study, vascular findings using dermoscopy in both polarized and non-polarized modes showed red dots representing normal papillary vessels and red lines representing deeper ectatic horizontal sub papillary capillaries. We observed red dots in 48 patients 68%(48/70) and red lines in 39 55%(39/70) patients. Red dots were mostly seen in the patient with CLP+ HLP 88%(8/9), followed by CLP 79%(31/39), HLP 60%(6/10) and absent in cases of lichen plano pilaris and lichen planus pigmentosus. In study conducted by Francisco Vazquez-Lopez et al.<sup>[92]</sup> the vascular features namely the red-lines 3(12%) and dotted vessels 20(80%) were more frequently found in CLP. In a study by GÜNGÖR S et al.<sup>[102]</sup> among 170 CLP lesions, vascular patterns were observed in 46 lesions (27%). These were sub-grouped as red dots in 27 lesions (15.9%) and radial linear vessels in 19 lesions (11.1%). 15 lesions of lichen plano pilaris were observed in their study and only 3 (20%) lesions showed red dots. Further, in cases of actinic LP and lichen planus pigmentosus no vascular finding were seen on dermoscopy in their study. Garg P et al.<sup>[107]</sup> study of fifty patients showed that 15 cases of CLP lesions 3 cases showed (20%) red dots and 2(13.3%) showed red globules, of the 10 lesions of HLP showed 2(20%) red dots and

1(10%) red globules and lesions of actinic LP and lichen planus pigmentosus showed no vascular findings. Red lines were seen in patient of ALP(100%), LLP(100%), LPP 100%, followed by CLP+HLP 66%, CLP 56%. The findings were similar to the other studies mentioned. Red dots were significantly associated ( $p=0.012$ ) with the lesions of lichen planus in our study, but red lines were not significantly associated with lichen planus lesions as they were consistently present in all the cases.

In our study we observed that amongst the total subjects, Wickham's Striae in lesions of lichen planus was seen in a total of 60/70 (86%) subjects and absent in 10/70 (14%) subjects. The proportion of lesions showing presence of Wickham's striae was significantly more than absence of Wickham's striae in the LP lesions ( $p<0.0001$ ). Majority 40%(28/70) of subjects had reticulate pattern of Wickham's striae in the lesions of lichen planus followed by radial streaming pattern of WS 32%(23/70), the rosette pattern 13%(9/70) and linear pattern 8%(6/70). Also, in 13 subjects, WS was observed in multiple or overlapping patterns in the same patients. In a study by A. Lallas et al.<sup>[93]</sup>, white crossing lines (Wickham striae) were seen exclusively in LP in 24 out of 25 patients (96%) and showed significant p value. In a study by Güngör S et al.<sup>[102]</sup> showed WS in 89.4 % of CLP followed by 40% of lichen plano pilaris and absent in LPP and ALP. Garg P et al.<sup>[107]</sup> studied a cohort of fifty patients where Wickham's striae was seen in 14 CLP cases (93.3%), 9 HLP cases (90%), 2 ALP cases (50%) and absent in lichen planus pigmentosus (LPP). Most common pattern of WS observed by them was the reticulate pattern (64.7%) followed by linear (7.6%), radial (5.2%), annular pattern (1.1%) and combination was observed in 1.7 %. In our study we came across a rosette / petaloid pattern of WS, which has not been mentioned till date in the literature. This pattern was also present in combination with

other patterns of WS in the same patients. The findings in our study were similar to the above mentioned studies.

In our study, comedone like opening was seen in 31.43% (22/70) of patients and most commonly in CLP+HLP100%(9/9) followed by HLP80% (8/10) and 12% (5/39) of CLP. We observed significant association between the HLP and comedone like openings. In the study by Garg P et al,<sup>[107]</sup> comedone like openings were noted in 50% of HLP and 20% of CLP and were significantly associated with the clinical subtypes. The study by Haldar S et al.<sup>[110]</sup> showed comedone like openings to be significantly associated with HLP. In study conducted by Francisco Vazquez-Lopez et al,<sup>[92]</sup> comedone like opening was observed in 4(16%) of CLP. The finding of comedone like opening in HLP were similar to other studies mentioned above.

31.43% (22/70) patients in our study had grey blue dot finding, and was mostly seen in 88% cases of CLP+HLP(8/9) followed by 40% in HLP (4/10) and 25% (10/39) CLP. Francisco Vazquez-Lopez et al.<sup>[92]</sup>, observed 20% of CLP had grey blue dots and absent in other variants. Garg P et al.<sup>[107]</sup> study showed 13% of CLP with grey blue dots and absent in other variants. The findings were near similar to the above mentioned studies.

Wickham striae was significantly associated with comedone like openings in our study whereas Wickham striae was not significantly associated with grey blue dots.

In our study, we observed brown globules in ALP100% (2/2), LLP 100% (1/1), followed by 80% (8/10) in HLP, 50% (1/2) in LPP. It was significantly associated with clinical variants as observed in other studies. In a study by Cheng T et al.<sup>[91]</sup>, brown

globules was observed in 69% of the lichen planus. In a study by Güngör S et al.<sup>[102]</sup> showed brown globules in 100% of ALP and 11.7% of CLP. In Garg P et al.<sup>[107]</sup> study of fifty patients, they observed brown globules in 42.86% of lichen planus pigmentosus and 20% of CLP. The findings were near similar to the above mentioned studies.

In our study we observed pepper like pigmentation in 48.57% (34/70) of the patients, most commonly observed in 64% (25/39) of CLP and 55%(5/9) of CLP+HLP. The study by Cheng T et al.<sup>[91]</sup> showed pepper like pigmentation in 9% of the lichen planus. Garg P et al.<sup>[107]</sup> reported pepper like pigmentation in ALP (100%), LPp (28.57%), CLP and HLP had 20% respectively. Findings were similar to the studies mentioned. The pepper like pigmentation was significantly associated with the clinical subtypes.

In our study we observed perifollicular pigmentation in 4.29% (3/70) of patients and was significantly associated with lichen plano pilaris 100%(2/2). In a study by Güngör S et al.<sup>[102]</sup> showed perifollicular pigmentation in LPp 100% and LPP 53.3%. Friedman et al.<sup>[97]</sup> study also observed in 53% cases of lichen plano pilaris that the perifollicular pigmentation was significantly associated with the diagnosis. The finding of perifollicular pigmentation was similar to above mentioned studies.

In our study we observed reticulate pattern of pigmentation in 10% (7/70) of the patients which was significantly associated with 85.71%(6/7) of LPp patients. The study by Gupta V et al.<sup>[111]</sup> showed accentuation of reticulate pigmentation in the cases of lichen planus pigmentosus(LPp). In the study by Güngör S et al, <sup>[102]</sup> reticulate pattern of pigmentation was seen in 20% LPp and 1.1% of CLP. The finding of reticulate pattern of pigmentation was similar to above mentioned studies.

## **CONCLUSION**

This study demonstrates the variability of dermoscopy patterns in different clinical variants of LP. The use of dermoscopy helps in best visualization of WS, blood vessels and pigmentary changes in cases of LP and aids in reducing unnecessary biopsies required for diagnosing lichen planus

The strength of associations of some dermoscopic features such as red dots, WS, perifollicular pigmentation and reticulate pigmentation have been repeatedly confirmed by several other observational studies.

Based on the findings in this study, the following conclusions were reached:

- 1) Majority of the subjects with LP belonged to age group of “30-60 years”.
- 2) In majority of subjects, lichen planus occurred over both upper and lower limbs whereas site of least occurrence was over the palmoplantar area.
- 3) Majority of the subjects presented with lesions of classical lichen planus, while a lesser number presented with” LLp and LPP”.
- 4) Majority of subjects demonstrated the reticulate pattern of WS on dermoscopy (29%). 34 subjects had pepper like pigmentation (48%).
- 5) A new rosette pattern of WS was observed in 13% (9/70) of subjects in our study which has been not mentioned so far in the literature
- 6) Majority of subjects (>50%) in this study on dermoscopy had red dots and red lines over the lesions.
- 7) Wickham’s striae was found to be significantly associated with comedone like openings.

## **SUMMARY**

Our study was a hospital based observational study of 70 cases of lichen planus. The objective of our study was to establish the correlation between clinical and dermatoscopic features in lichen planus patients attending tertiary care hospital.

It was conducted between 1<sup>st</sup> January 2018- 31<sup>st</sup> December 2018 by the department of Dermatology, Venerology and Leprology. All the treatment naive cases of lichen planus were included in the study and only those subjects with exclusive genital, oral mucosal and nail involvement were excluded.

31% (22/70) of the cases belonged to age range of 31 - 40 years. There was an equal sex preponderance.

The duration of illness was less than 6 months in 75% (53/70) of patients. The lesions were symptomatic in 90% of patients with 54% (38/70) of the patients having mild itching, 32% (23/70) with moderate itching and 3% (2/70) with severe itching.

The lesions commonly involved the extremities i.e. lower limb 68% (48/70), upper limb 58% (41/70) and least in palmo plantar region accounting for 5% (4/70) of the cases. Koebner's phenomenon was seen in 50% of the cases.

Amongst the associated conditions, diabetes mellitus and hypertension were the commonest conditions with lichen planus.

The commonest clinical variant of LP were CLP constituting 55% (39/70), followed by HLP 14% (10/70), CLP + HLP 12% (9/70) and least in LLP 1.4% (1/70), ALP 2.86% (2/70) and LPP 2.86% (2/70)

On dermoscopy, vascular features of red dots were seen in 68% (48/70) of patients and red lines in 55% (39/70) of patients.

Reticulate pattern of WS on dermoscopy was seen in 40% (28/70), radial streaming pattern in 33% (23/70) and rosette pattern in 13% (9/70), and the least common pattern seen was the annular pattern 4% (4/70). The rosette pattern was the new finding we observed in our study which was not mentioned thorough literature search.

The nonvascular findings observed on dermoscopy were comedone like openings and grey blue dots were statistically significant with clinical variants of LP.

Among the pigmentary findings, pepper like pigmentation was mostly seen in the CLP 64% (25/39) and CLP+HLP 55% (5/9) and reticulate pattern was statistically significant in LPp 85% (6/7).

The limitations of our study includes a smaller sample size, hence to conclude the significance of findings on dermoscopy of lichen planus we require larger sample for the study. Another limitation of the study was the exclusion of lesions of lichen planus over the nails, genitals and oral mucosa.

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## ANNEXURE - I

### INFORMED CONSENT FORM

I.D.NO. 

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**Title of the study:** One year hospital based observational study of Clinical and dermatoscopic correlation of lichen planus.

The study is conducted by \_\_\_\_\_, Post Graduate (M.D) student in Dermatology under the guidance of \_\_\_\_\_ Professor, Department of Dermatology, Venereology and Leprosy, JNMC, Belagavi.

*Respected Sir/Madam,*

We invite you to participate in our study as, you are eligible for the same. During the study you will be asked some questions in detail regarding your present complaints.

**Purpose of the study:**

Lichen planus is a chronic inflammatory condition. Hence this study intends to find the clinical and dermatoscopic correlation in lichen planus which will be carried out by brief history, clinical examination and followed by dermatoscopic examination. You are being requested to participate in this research because you have been diagnosed to have lichen planus.

**Procedure and treatment:**

If you choose to participate, you will be asked to give a detailed history of your disease, undergo a physical examination and followed by dermatoscopic examination along with pictographic recording of the relevant clinical and dermatoscopic findings.

**Risks and benefits:**

However all necessary steps and precautions will be taken to ensure your safety. The result of you taking part in this research would help health care providers towards a better understanding of this disease, and thus we will be able to provide improved patient care.

**Alternatives:**

If you decide not to participate in this study, you will still be receiving the usual standard care for your disease.

**Privacy and confidentiality:**

Your privacy will be respected and all information collected about you during the course of this study will be kept confidential. Your identity will remain undisclosed.

**Relations with the Institutional policy:**

The J N Medical College will provide, within the limitations of the laws of the State of Karnataka, facilities and medical attention to patients who suffer injuries as a result of participating in this project.

**Financial incentives:**

You shall not be receiving any payment or any financial incentives for participating in this study.

**Authorization to publish results:**

The results of this study may be published for scientific purpose or presented to a scientific group. Your identity, however, will be maintained confidential at all times.

**Voluntary participation:**

Your participation in this study is voluntary. Your decision whether or not to participate will neither affect the care of your current disease, nor your future relations with the doctor or the hospital. In the event if you suffer any physical injury as the result of your participation in this study, you may contact

In case you need further information regarding your rights as a study participant, you may please contact DR.ROOPA M. BALLAD, Chairman of the ethical committee, J N Medical College, Belagavi.

**STATEMENT OF CONSENT**

**I.D.NO:**

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I Mr/Ms/Mrs ----- volunteer and consent to participate in this study. I have read the consent document or it has been read to me in my vernacular language. I accept to participate in the study. All the information regarding this study is provided to me and I have understood the same. I have been given the opportunity to ask questions and obtain appropriate answers.

**Participant's name:**

Signature or left thumb print of participant:

**Witness name:**

Signature of witness:

**Signature of the investigator:**

Date:

**STATEMENT OF ASSENT**

**I.D.NO:**

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I            Mr/Ms/Mrs            -----  
parent/guardian/ward/ of----- give consent  
to enroll my daughter/son to participate in this study. I have read the consent document  
or it has been read to me in my vernacular language. I give my acceptance on behalf of  
my daughter/son for her/his participation in the study. All the information regarding  
this study is provided to me and I have understood the same. I have been given the  
opportunity to ask questions and obtain appropriate answers.

**Participant's name:**

**Participant's parent/guardian name:**

Signature or left thumb print of parent/guardian of participant:

**Witness name:**

Signature of witness:

**Signature of the investigator:**

Date:

**ANNEXURE-II- ETHICAL CLEARANCE LETTER**



K.J.S.S. UNIVERSITY'S  
**JAWAHARLAL NEHRU MEDICAL COLLEGE,**  
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)  
(Accredited 'A' Grade by NAAC)

Website: <http://www.jnmc.edu>  
E-Mail : [dnmc@jnmc.edu](mailto:dnmc@jnmc.edu)

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Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 28

Date: 22/11/2017

To,  
**REG NO. BT0117001**

Sub : Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled “**ONE YEAR HOSPITAL BASED OBSERVATIONAL STUDY OF CLINICAL AND DERMATOSCOPIC CORRELATION IN LICHEN PLANUS**” is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on human Subjects Research.

(Dr. Arathi Darshan)  
Member Secretary  
JNMC Institutional Ethics Committee  
on Human Subjects Research.  
J.N.Medical College, Belagavi.

(Dr. Roopa M Bellad)  
Chairman,  
JNMC Institutional Ethics Committee  
on Human Subjects Research  
J.N.Medical College, Belagavi.

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**ANNEXURE-III**

**PROFORMA**

**“ONE YEAR HOSPITAL BASED OBSERVATIONAL STUDY OF CLINICAL  
AND DERMATOSCOPIC CORRELATION IN LICHEN PLANUS”**

Case no

OP No-

Date-

Name-

Age-

**DIAGNOSIS:**

Gender-

Occupation-

Address with phone number-

**PRESENTING COMPLAINTS:**

**HISTORY OF PRESENT ILLNESS:**

- |                                   |             |                          |            |                          |
|-----------------------------------|-------------|--------------------------|------------|--------------------------|
| 1. Onset                          | Sudden      | <input type="checkbox"/> | Gradual    | <input type="checkbox"/> |
| 2. Progression                    | Progressive | <input type="checkbox"/> | Stationary | <input type="checkbox"/> |
| 3. H/o itching                    | Present     | <input type="checkbox"/> | Absent     | <input type="checkbox"/> |
| 4. H/o remissions & exacerbations | Present     | <input type="checkbox"/> | Absent     | <input type="checkbox"/> |
| 5. H/o fluid filled lesions       | Present     | <input type="checkbox"/> | Absent     | <input type="checkbox"/> |

**Triggering & modifying factors:**A. Local factors:

- |                               |                                  |                                 |
|-------------------------------|----------------------------------|---------------------------------|
| 1. Trauma                     | Present <input type="checkbox"/> | Absent <input type="checkbox"/> |
| 2. Vaccination of Hepatitis B | Present <input type="checkbox"/> | Absent <input type="checkbox"/> |

B. Seasonal variation(Exacerabation)

- |             |                                  |                                 |
|-------------|----------------------------------|---------------------------------|
| 1. Winter:- | Present <input type="checkbox"/> | Absent <input type="checkbox"/> |
| 2. Summer:- | Present <input type="checkbox"/> | Absent <input type="checkbox"/> |

C. Pregnancy	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
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D. Drug intake	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
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E. Sunlight	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
-------------	----------------------------------	---------------------------------

F. Any other precipitating factors	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
------------------------------------	----------------------------------	---------------------------------

<b>Initial lesion:</b> color -	Violaceous <input type="checkbox"/>	Red <input type="checkbox"/>
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type -	Macule <input type="checkbox"/>	Papule <input type="checkbox"/>
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	Plaque <input type="checkbox"/>	Bulla <input type="checkbox"/>
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**PAST HISTORY:**

K/c/o DM	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
----------	----------------------------------	---------------------------------

K/c/o HTN	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
-----------	----------------------------------	---------------------------------

K/c/o Thyroid diseases	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
------------------------	----------------------------------	---------------------------------

Any other illness(specify)

**FAMILY HISTORY:**

H/o similar complaints in the family	Present <input type="checkbox"/>	Absent <input type="checkbox"/>
--------------------------------------	----------------------------------	---------------------------------

( First blood relatives)

**TREATMENT HISTORY:**

1)Topical Present  Absent

If present,treatment details with duration -

2)Phototherapy Present  Absent

If present,treatment details with duration -

3)Systemic Present  Absent

If present,treatment details with duration -

**MUCOCUTANEOUS EXAMINATION:****A)Types of lesions-**

1)Papules Present  Absent

2)Macules Present  Absent

3)Plaques Present  Absent

4)Vesicles/bulla Present  Absent

**B)Distribution-**

Symmetrical  Asymmetrical

Localised  Generalised

**C)Sites of lesions:**

Scalp Present  Absent

Face Present  Absent

Neck Present  Absent

Back Present  Absent

Trunk Present  Absent

Elbows Present  Absent

Flexor aspect of extremities Present  Absent

Extensor aspect of extremities Present  Absent

Palms Present  Absent

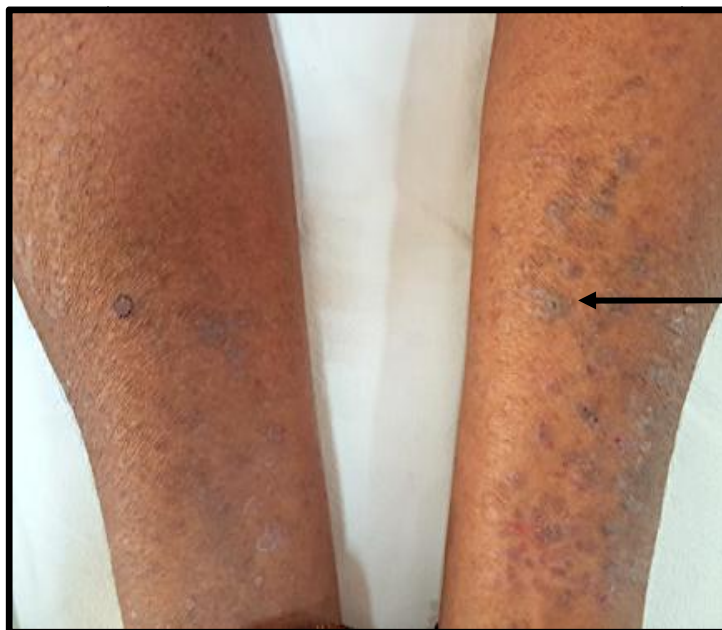
Knees	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
Axillae	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
External genitalia	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
Gluteal region	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
Soles	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
Nails	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
<b>E) scaling:</b>	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
<b>F) Koebner's phenomenon</b>	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
 <b>G) Nail lesions:</b>				
1) Pitting	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
2) Onycholysis	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
4) Pterygium	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
5) Longitudinal ridging	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
6) Trachyonychia	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
 <b>H) Mucosal Examination:</b>				
a) Oral lesion	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>
b) Genital lesion	Present	<input type="checkbox"/>	Absent	<input type="checkbox"/>

<b>Dermoscopic findings</b>	<b>Macule/site/size</b>	<b>Papule/site/size</b>	<b>Plaque/site/size</b>	<b>Bullae/site/size</b>
<b>1) Vascular findings</b>				
<b>Red lines</b>				
<b>Red dots</b>				
<b>Red globules</b>				
<b>Telangiectasia</b>				
<b>2) Non-vascular findings</b>				
<b>A) Wickham's striae type</b>				
<b>Reticular</b>				
<b>Leaf veination</b>				
<b>Radial streaming</b>				
<b>Circular</b>				
<b>Linear</b>				
<b>Annular</b>				
<b>Others, specify</b>				
<b>B) Comedone like openings</b>				
<b>C) Milia like cyst</b>				
<b>3) Pigmentary findings</b>				
<b>Brownish dots</b>				
<b>Grey blue dots</b>				
<b>White globules</b>				
<b>Yellowish globules</b>				
<b>Pepper like dots</b>				
<b>4) Involvement of special sites</b>				
<b>Nail</b>				
<b>Scalp</b>				

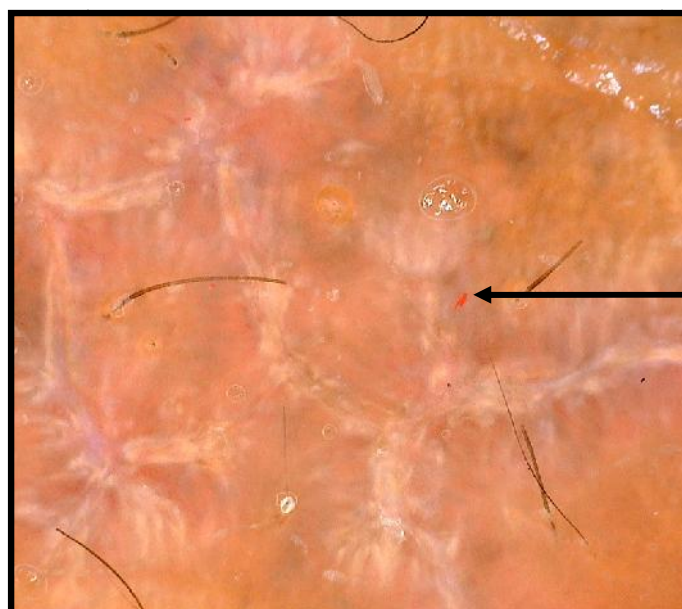
**Signature**

**Guide's signature**

**ANNEXURE IV – FIGURES**



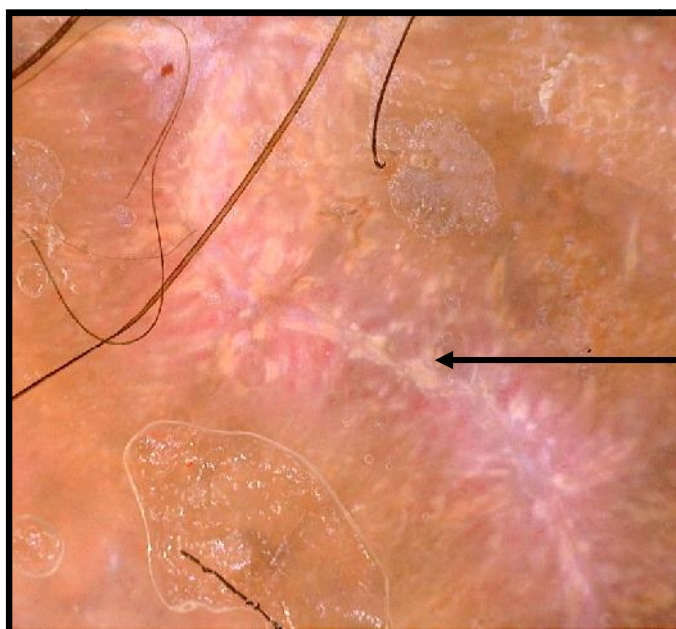
**Figure 1 –Classical lichen planus (CLP)**



**Figure 2- Reticulate pattern of WS on dermoscopy**



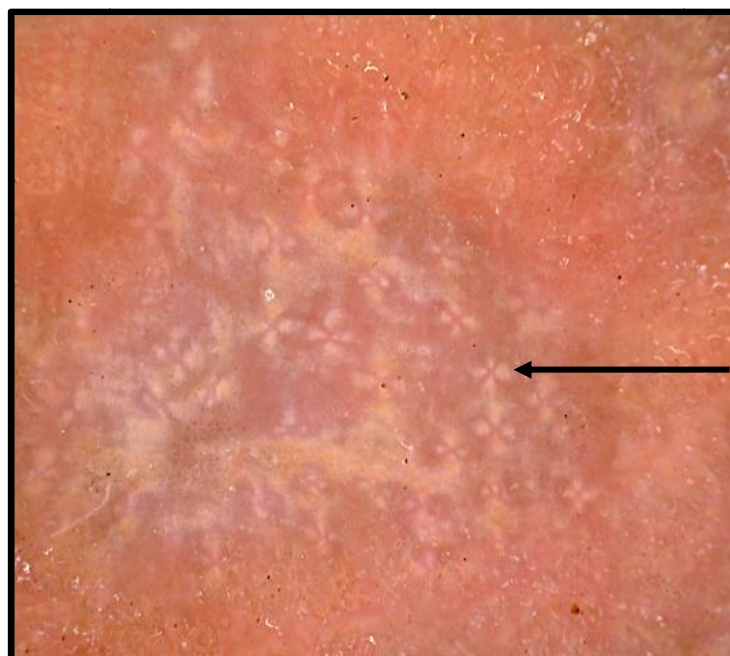
**Figure 3– Actinic lichen planus (ALP)**



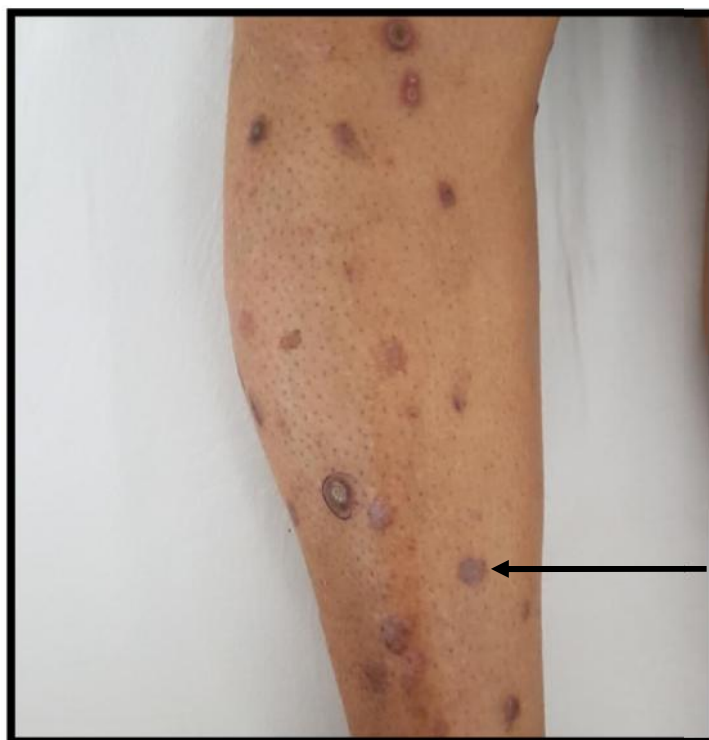
**Figure 4– Veination pattern of WS on dermoscopy**



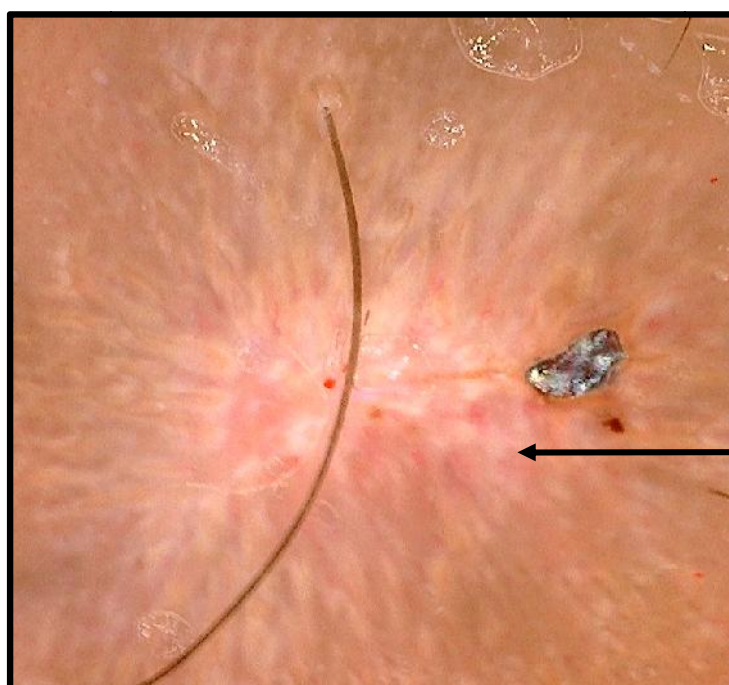
**Figure 5 – Classical lichen planus over wrist**



**Figure 6 – Rosette pattern of WS on dermoscopy**



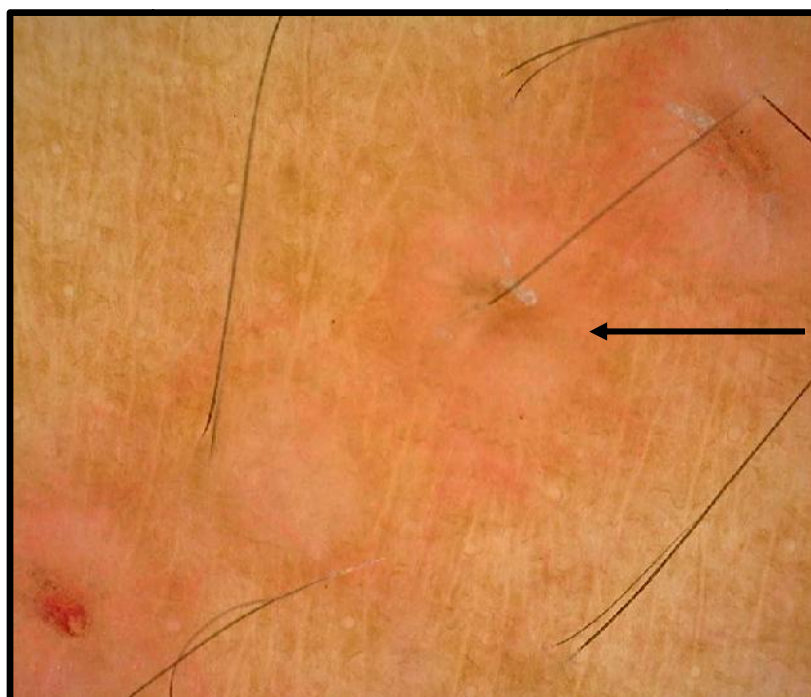
**Figure 7 – Classical lichen planus over lower limb**



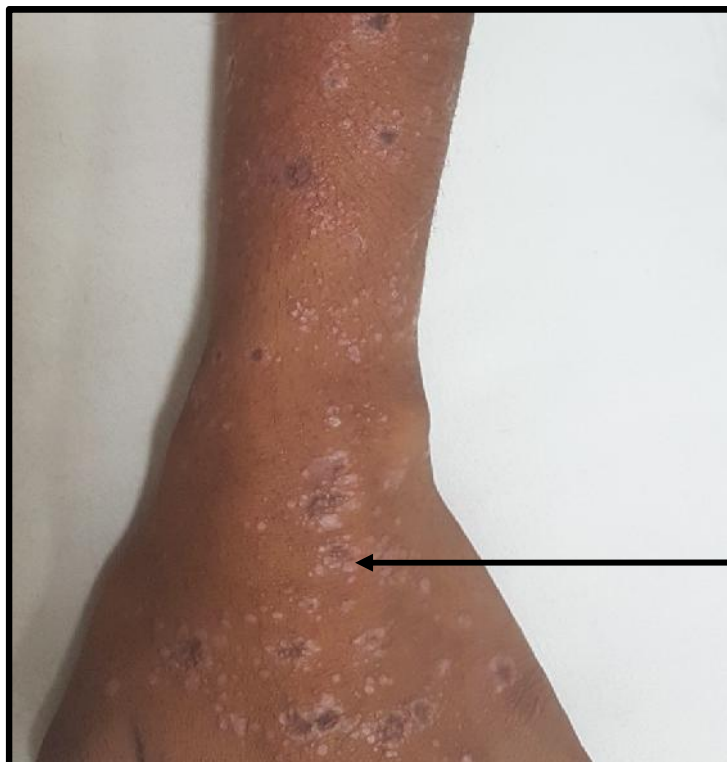
**Figure 8 – Radial streaming pattern of WS on dermoscopy**



**Figure 9 – Clinical Koebner phenomenon**



**Figure 10 – Koebner phenomenon undermoscopy**



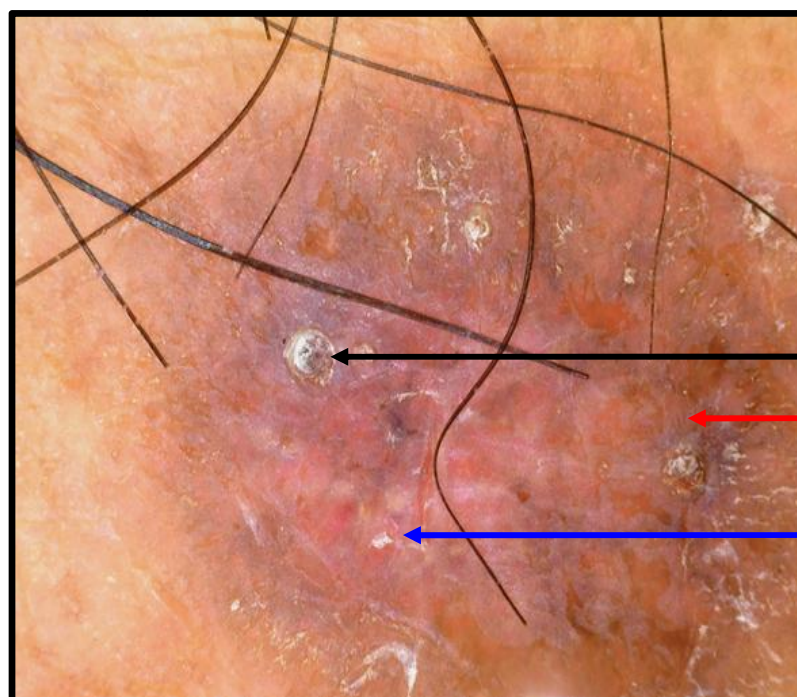
**Figure 11 – Annular lichen planus**



**Figure 12 – Annular pattern of WS on dermoscopy**



**Figure 13 – Hypertrophic lichen planus (HLP)**



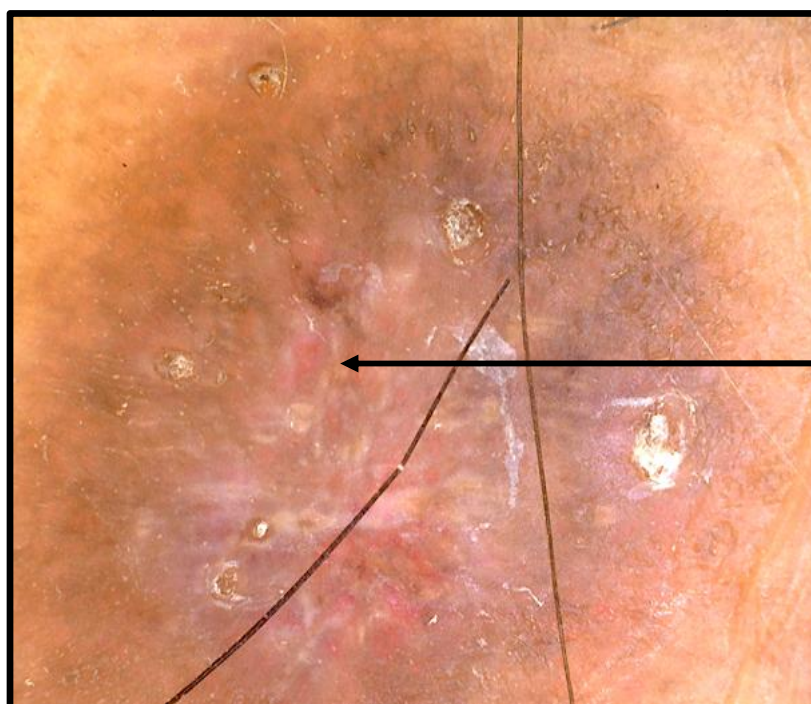
**Figure 14 – Dermoscopy showing comedone like openings (black arrow), brown globules (red arrow), and red dots (blue arrow), in HLP**



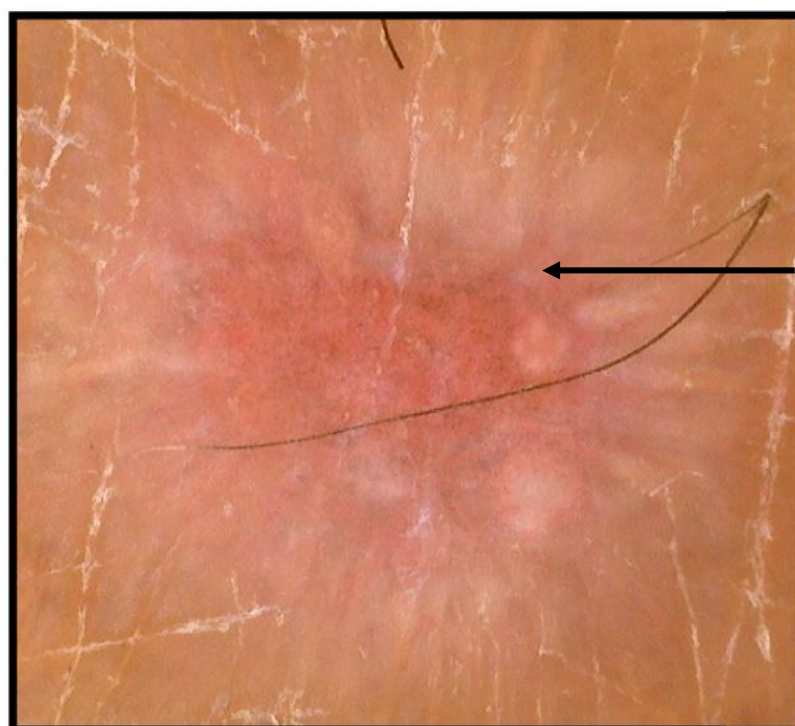
**Figure 15– Plantar lichen planus**



**Figure 16 – Dermoscopy in plantar LP**



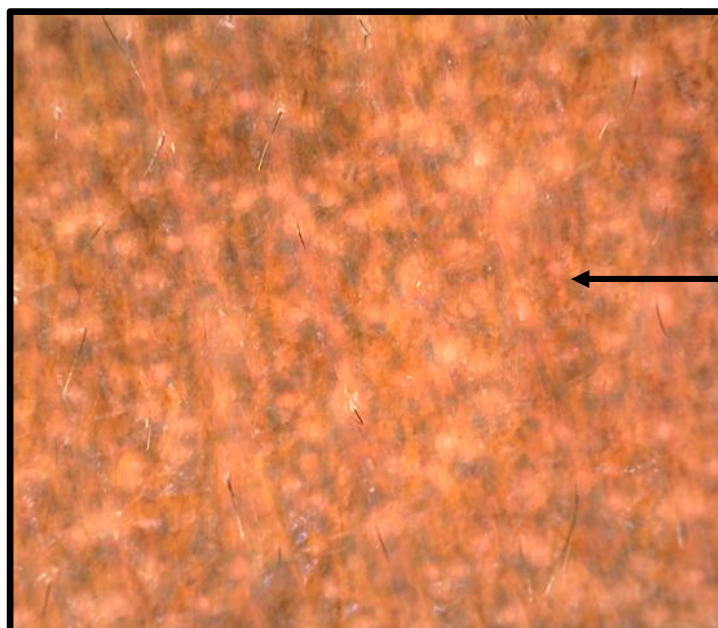
**Figure 17 – Red dots**



**Figure 18 – Pepper like pigmentation**



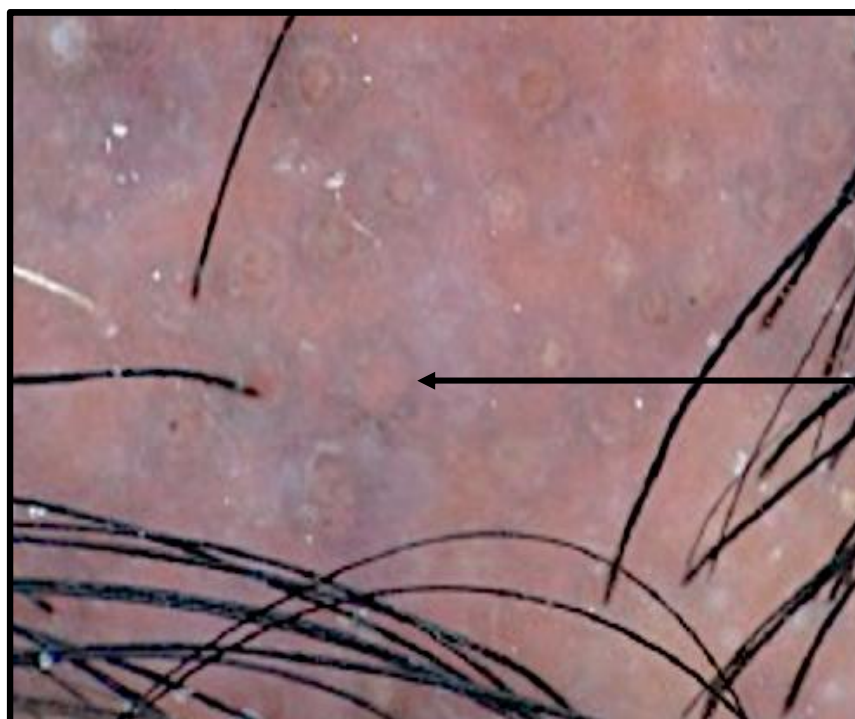
**Figure 19 – Lichen planuspigmentosus (LPp)**



**Figure 20 – Reticulate accentuation of pigment on dermoscopy**



**Figure 21 – Lichen plano pilaris (LPP)**



**Figure 22 – Perifollicular pigmentation in LPP on dermoscopy**

## ANNEXURES V - MASTER CHART

Table 1

Serial no.	Age (yrs)	Sex	Duration (months)	Itching	Site	KP	Asso conditions	Diagnosis	DERMOSCOPY FINDINGS								
									Vascular findings			Non vascular findings			Pigmentary findings		
									red dots	red lines	Wickham's striae	Comedone like opening	Grey blue dots	Brown globules	Pepper pigmentation	Perifollicular pigmentation	Reticulate pigmentation
1	57	F	2	+	T,UL,LL	+	DM,HTN	CLP+HLP	+	-	1	+	+	-	+	-	-
2	35	F	1	++	T,UL,LL	+	-	CLP+HLP	+	+	2	+	+	+	-	-	-
3	13	M	2	++	H,UL	+	-	CLP	+	-	1	-	-	-	+	-	-
4	45	F	6	++	LL,T	+	DM	CLP	-	+	2	-	-	-	+	-	-
5	50	F	6	+	LL	-	-	CLP	+	-	3	-	-	-	-	-	-
6	57	F	8	++	LL,T	+	HTN	HLP	-	+	2	+	-	+	-	-	-
7	49	F	12	++	LL	-	-	HLP	-	+	2	+	-	+	-	-	-
8	46	F	15	+	LL	-	DM,TYD	CLP	+	-	3	-	-	-	+	-	-
9	48	F	4	+	UL,LL	+	-	CLP+HLP	+	-	1	+	-	-	+	-	-
10	22	M	2	++	T,UL,LL	+	-	HLP	+	-	1	+	-	+	-	-	-
11	50	F	36	+	H,UL	-	-	LPp	-	-	-	-	-	+	-	-	+
12	40	F	4	+	T,UL,LL	+	DM	CLP+HLP	+	+	2	+	+	+	-	-	-
13	36	M	7	-	H	-	-	LPp	-	-	-	-	-	-	-	-	+
14	58	F	2	+	T,UL,LL	+	DM,HTN	CLP	+	-	2	-	-	-	+	-	-
15	35	F	36	-	H	-	-	LPp	-	-	-	-	-	-	-	-	+
16	40	M	6	++	UL	+	DM	CLP	+	+	1	+	+	+	+	-	-
17	36	F	3	++	T,UL	+	-	CLP+HLP	+	+	2	+	+	-	+	-	-
18	46	F	6	++	LL	-	-	CLP+HLP	-	+	1	+	+	-	-	-	-
19	53	F	1	+	LL	+	-	CLP	+	+	2,4	-	-	-	+	-	-
20	36	M	48	+	LL	+	-	HLP	+	-	-	-	+	+	-	-	-
21	56	M	2	+++	LL,PP	+	-	CLP	+	-	1	-	-	+	-	-	-
22	35	F	36	-	H	-	-	LPp	-	-	-	-	-	-	-	-	+
23	40	F	4	+	T,UL,LL	-	-	CLP	+	-	1	-	-	+	-	-	-
24	62	M	1	++	LL	+	HTN	CLP	+	-	5	-	-	-	+	-	-
25	20	F	4	+	T,LL	+	-	CLP	+	-	1	-	-	-	+	-	-
26	38	M	4	+	PP,LL	+	DM	CLP	-	+	4	-	-	+	-	-	-
27	56	M	6	+	PP	+	-	CLP	+	-	7	-	+	-	-	-	-
28	53	M	4	+	UL,LL	-	-	CLP	-	+	1,6	+	-	-	+	-	-
29	25	M	36	-	H,UL	-	-	LPp	+	-	-	-	-	-	-	-	+
30	41	M	6	+	UL	+	-	CLP	+	-	1	-	-	-	+	-	-
31	21	F	1	+	H	-	-	LPP	+	-	-	-	-	+	-	+	-
32	32	F	6	++	T,UL	+	-	CLP	+	+	1	-	+	-	-	-	-

33	54	M	1	-	H	-	-	LPp	-	+	-	-	-	-	-	-	+
34	62	M	1	+	LL	+	HTN	CLP	+	-	5	-	-	+	-	-	-
35	45	F	2	++	UL	+	-	CLP	+	-	3	-	-	-	+	-	-
36	40	M	3	+	UL,LL	+	-	CLP+HLP	+	+	4,7	+	+	-	-	-	-
37	38	M	6	-	H	-	-	LPP	-	+	-	-	-	-	-	+	+
38	46	M	3	+	LL	+	-	CLP	-	+	7	-	-	-	+	-	-
39	20	F	2	-	UL	-	-	ALP	-	+	1	-	-	+	-	-	-
40	35	M	4	+	LL	-	-	CLP	-	+	5	-	-	+	+	-	-
41	50	M	3	+	T,UL,LL	-	-	CLP+HLP	+	-	2	+	+	-	+	-	-
42	45	F	6	++	UL,LL	+	-	CLP+HLP	+	+	1,2	+	+	-	+	-	-
43	35	M	7	+	UL,LL	-	-	HLP	+	+	2,4,5	+	-	+	-	-	-
44	59	M	18	+	T,UL,LL	+	-	CLP	+	+	1,2,6	+	+	+	-	-	-
45	14	M	6	+	UL,LL	-	-	CLP	-	+	1	-	-	-	+	-	-
46	60	F	3	++	H	-	-	LPP	-	+	-	-	-	+	-	+	-
47	35	M	6	+	UL,LL	-	-	CLP	-	+	1	-	-	-	+	-	-
48	37	M	6	+	PP,LL	-	-	CLP	-	+	1	+	-	-	+	-	-
49	17	F	1	+	UL,LL	+	-	CLP	+	+	1	-	-	+	+	-	-
50	35	F	9	+	UL,LL	-	-	HLP	+	-	-	-	-	+	-	-	-
51	40	F	1	++	T,UL,LL	+	-	CLP	+	+	1,5	-	+	-	-	-	-
52	43	M	24	+	T,UL,LL	+	-	CLP	+	+	1,6	-	+	-	+	-	-
53	65	M	6	+	H,UL,LL	-	-	ALP	+	+	2	-	-	+	+	-	-
54	49	M	4	++	T,UL,LL	+	DM,HTN	CLP	+	-	1	-	+	+	-	-	-
55	39	F	3	++	H	-	-	LLP	-	+	5	-	-	+	+	-	-
56	21	F	1	+	UL,LL	+	-	CLP	+	+	1,3,4	-	+	-	+	-	-
57	31	F	4	++	T,UL,LL	+	-	CLP	+	+	1,2	-	-	-	+	-	-
58	17	F	8	+	UL,LL	-	-	CLP	+	+	2	-	-	-	+	-	-
59	38	M	24	++	H	-	-	CLP	+	+	2	-	+	+	-	-	-
60	50	F	3	++	T	-	-	CLP	+	+	2	-	-	+	-	-	-
61	29	M	4	+	T,UL,LL	-	-	HLP	+	-	2	+	+	-	+	-	-
62	10	M	48	++	UL,LL	+	-	CLP	+	+	2	-	-	-	+	-	-
63	13	M	2	+	H,UL,LL	-	-	CLP	+	-	1	-	-	-	+	-	-
64	58	M	1	++	UL,LL	-	-	CLP	+	+	2,4	-	-	-	+	-	-
65	42	M	5	+	UL,LL	-	-	HLP	+	-	4	+	+	+	-	-	-
66	42	F	4	+	H	-	-	HLP	-	+	2	+	+	+	-	-	-
67	69	F	1	++	UL,LL	-	DM,HTN	CLP	+	-	1,4	-	+	-	-	-	-
68	14	M	6	+	UL,LL	-	-	HLP	-	+	2	+	-	-	+	-	-
69	45	F	12	+	H	+	TYD	CLP	+	-	1	-	-	+	-	-	-
70	49	M	4	+++	UL,LL	+	HTN, CVD	CLP	+	-	2,4	+	-	-	+	-	-

**ANNEXURE-VI**

**KEY TO MASTER CHART**

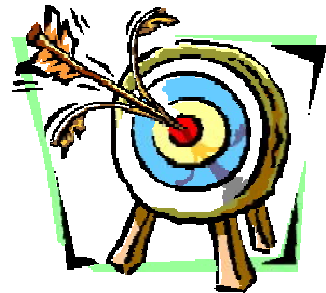
M	-	Male
F	-	Female
+	-	Mild itching
++	-	Moderate itching
+++	-	Severe itching
H	-	Head
T	-	Trunk
U	-	Upperlimb
L	-	Lowerlimb
PP	-	Palmoplantar
DM	-	Diabetes mellitus
HTN	-	Hypertension
THY	-	Thyroid disease
CVD	-	Cardiovascular disease
CLP	-	Classical lichen planus

- HLP - Hypertrophic lichen planus
- LPp - Lichen planus pigmentosus
- LPP - Lichen plano pilaris
- ALP - Actinic lichen planus
- LLP - Linear lichen planus
- 1. - Reticulate pattern of WS
- 2 - Radial streaming pattern of WS
- 3 - Veination pattern of WS
- 4 - Rosette pattern of WS
- 5 - Linear pattern of WS
- 6 - Annular pattern of WS
- 7 - Structureless pattern of WS



# *Introduction*

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# *Objectives*

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# *Review of Literature*

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# *Methodology*

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*Results*

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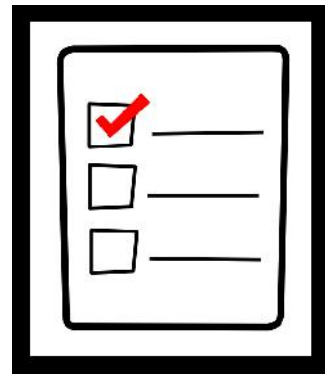
# *Discussion*

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*Conclusion*

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## *Limitations*

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# *Recommendations*

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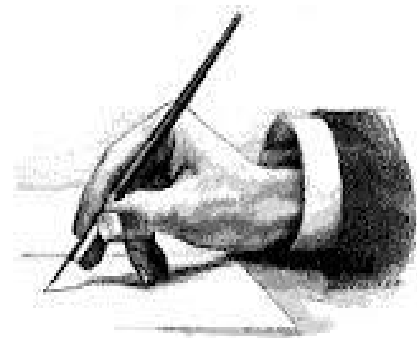
# *Summary*

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# *Bibliography*

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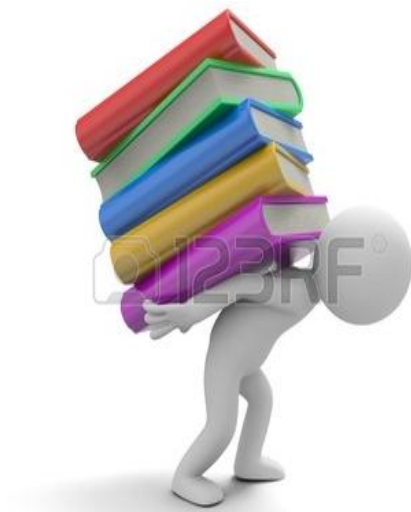
## *Annexure-I*

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## *Annexure-II*

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# *Annexure-III*

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# *Annexure-IV*

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# *Annexure-V*

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