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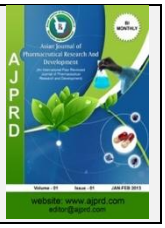

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Review Article

Review on Psoriasis and Their Managments

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A B S T R A C T

Psoriasis (PSO) is a chronic autoimmune skin condition characterized by the rapid and excessive growth of skin cells, which leads to the formation of thick, red, and scaly patches on the surface of the skin. These patches can be itchy and painful, and they may cause discomfort for patients affected by this condition. The pathogenesis of psoriasis includes genetics, environmental factors, lifestyle causes. Diagnosis of psoriasis can be done by self-examination or skin biopsy and in some cases differential diagnosis may be required. Therapies for psoriasis aim to alleviate symptoms, reduce inflammation, and slow down the excessive skin cell growth. Psoriasis cannot be cured but there are effective treatment options available. Attempts have been made in this review to focus on the etiology, pathophysiology, diagnostic methods and treatment options which may be used for psoriasis patients worldwide.

Keywords: Psoriasis, skin, diagnosis, treatment.

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INTRODUCTION

About 2-3% of people worldwide suffer with psoriasis, which is essentially an inflammatory skin disorder characterized by reactive abnormal epidermal differentiation and hyper proliferation. The latest estimate of the number of persons suffering from this condition worldwide is about 125 million. The name of the disease is derived from Greek word “psora” which means “itch”. Psoriasis is regarded as an autoimmune disease in which genetic and environmental factors have significant role. Psoriasis is a non-contagious, dry, inflammatory and ugly skindisorder, which can involve entire system of person. The most commonly affected sites are the scalp, tips of fingers and toes, palms, soles, umbilicus, gluteus, under the breasts and genitals, elbows, knees, shins and sacrum. Psoriasis can also cause inflammation of the joints, which is known as psoriatic arthritis.(1,2)

Types of Psoriasis

There are different types of psoriasis, including (3,4)

A. **Plaque Psoriasis**: The most prevalent type of psoriasis, known as plaque, is characterized by raised, red skin patches coated in silvery-white scales. The patches typically arise on the scalp, trunk, and limbs, particularly the knees and elbows, in a symmetrical pattern.(6,7)

B. **Guttate Psoriasis**: This type frequently affects children and young people and is characterized by tiny red dots that are commonly on the limbs or torso. A common cause of outbreaks is an upper respiratory tract illness like strep throat.(8)

C. **Inverse Psoriasis**:This type shows as red, smooth patches in skin folds, such as those under the breasts, in the crotch, or under the armpits. Sweating and rubbing may exacerbate it. (9,10)

D. **Pustular Psoriasis:** In this type, pus-filled bumps called pustules surrounded by red skin appear. It usually affects the hands and feet, but there is a form that covers most of the body. Symptoms can be triggered by medications, infections, stress, or certain chemicals.(11)

A. **Erythrodermic Psoriasis**: This is a rare but severe form of psoriasis characterized by red, scaly skin over most of the body. It can be caused by taking certain medications, including corticosteroids, or by getting a terrible sunburn. People who have an uncontrolled psoriasis of a different kind frequently develop erythrodermic psoriasis, which can be extremely dangerous. (3,4)

Figure 1: Symptoms of Psoriasis

Etiology of Psoriasis

The most frequent etiological factor for psoriasis is stress, and people who have long-term conditions like Crohn's disease are more susceptible to the condition. Tetracyclines, beta-blockers, lithium, synthetic antimalarials, and nonsteroidal anti-inflammatory medications (NSAIDs) seem to have a strong causative association with psoriasis. Patients who suffer from the severe kind of this illness are more likely to develop cardiac co-morbidities.(4,16)

Pathophysiology of Psoriasis

Immune cell activation and the release of several cytokines are characteristics of the chronic inflammatory illness psoriasis. Antigens and dendritic cells interact to produce stress signals, which in turn trigger keratinocytes and T lymphocytes. These T cells differentiate into Th1 and Th17 effector cells, which release TNF-a, IFN-a, IL-17, and IL-22 among other cytokines. These cytokines promote excessive keratinocyte proliferation and contribute to the formation of psoriatic plaques. IL-23 has a major role in Th17 cell growth as well as the increase of IL-17 and IL-22 expression. Additionally, psoriatic plaques have high levels of vascular endothelial growth factor expression, which encourages angiogenesis and the characteristic bleeding areas that go away after excision. Because it contributes to the accumulation of neutrophils in the skin, IL-8 intensifies the inflammatory response. (16).

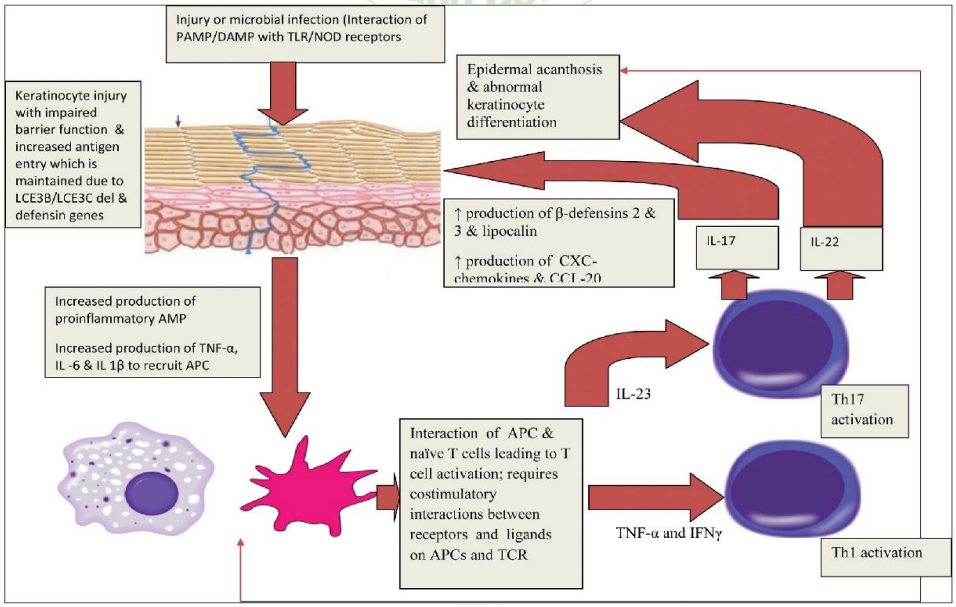

Figure 2 Pathophysiology of Psoriasis

Symptoms of Psoriasis

- Red patches of skin covered with silvery scales
- Dry, cracked skin that may bleed
- Itching, burning, or soreness
- Thickened, pitted, or ridged nails
- Stiff, swollen joints (in some types of psoriasis)
- Small scaling spots (common in children with psoriasis).

Causes of Psoriasis

- **Genetics**: Psoriasis tends to run in families, suggesting a genetic link.
- **Immune System:** An overactive immune response leads to inflammation and skin cell proliferation.(17)
- **Hormonal Changes**: Hormonal fluctuations, such as those during pregnancy or menopause, can affect psoriasis.(22)
- **Skin Trauma**: Skin trauma, also known as the Koebner phenomenon, is a common trigger for psoriasis. It occurs when skin injury or trauma leads to the development of new psoriasis lesions at the site of the injury.(22)
- **Environmental Triggers**: Factors like stress, cold weather, infections and certain medication can trigger psoriasis flare-ups.(21)
- **Lifestyle factors:** Smoking, obesity, and excessive alcohol consumption may contribute to psoriasis development or worsen symptoms.(17, 22-24)

Diagnosis of Psoriasis

- **Physical Examination**:
- Looks for psoriasis-specific symptoms, such as red, scaly areas, on your skin, scalp, and nails. The inspection can be performed visually with the unaided eye or with the use of a dermatoscope, a light-magnifying device.(25,26)
- **Medical History**:
- Review past treatments, family history, and symptoms.
- **Biopsy**:

If the diagnosis is unclear, a tiny piece of skin may be removed and examined under a microscope. In situations where a physical examination is not accurate and more investigation is necessary, a skin biopsy is performed.(26).

Three methods exist for doing a skin biopsy (28)
1. Punch biopsy, where sample is removed with circular tool,
2. Shave biopsy, where sample is removed with razor blade,
3. Excisional biopsy, where sample is removed with scalpel.

- **Psoriasis Severity Assessment**:
  Use scales like the Psoriasis Area and Severity Index (PASI) to assess the extent and severity of your psoriasis. This helps in determining the most appropriate treatment strategy.(30)
  Body surface area (BSA): -The extent to which the body is covered with psoriasis.(29)

- **DLQI (Dermatology life quality index)**
  DLQI measures the extent to which psoriasis has affected the life of patients. It comprises a questionnaire consisting of 10 questions where the patient answers in the provided tick box. DLQI questions are based on following sections. Physical symptoms and feelings; Professional life; Routine activities; Personal life; Lesions DLQI = Sum of all scores
  DLQI score ranges from 0-30. Higher score indicates poor quality of life. (31)
- **Differential Diagnosis**:
  The process of diagnosing psoriasis entails separating it from other skin diseases that share comparable symptoms. Treatments for Psoriasis. (17)

Treatments of psoriasis

There are numerous psoriasis treatment options on the market right now. Finding the right combination might be tricky for the physicians. Based on the type and severity of psoriasis physicians select the best suitable treatment.

Different treatment options for psoriasis

- Psoriasis is a chronic disease and often requires long term treatment.
- Choice of treatment depends upon the severity and different types of psoriasis.

A. Home remedies for Psoriasis

A lot of people think that using home remedies for psoriasis can help lessen flare-ups or symptoms of the condition. As per a study, drinking lots of water can help alleviate the symptoms of psoriasis by hydrating the skin.(32)

Following are some of the home remedies that can be used.

Aloe vera:

a) **Aloe vera gel**- Provides hydration and a moisturizing effect. When administered topically, it lessens skin redness and scaling.(32)
b) **Aloe vera juice**- Aloe Vera juice helps to detoxify the digestive system.

Indigo naturalis: A Chinese traditional remedy. It has a reducing effect on inflammation. useful for treating plaque psoriasis. The origin of Indigo Naturalis was a study conducted by Chang Gung Memorial Hospital's Y.K. Lin, MD. together with his colleagues, of Chang Gung Memorial Hospital in Taiwan. He described an instance of a youngster, eight years old, who had psoriasis. He tried a variety of psoriasis therapies before beginning topically to apply an ointment containing indigo and showed clinical benefits after just eight weeks of therapy. (33)

Tea tree oil (TTO): It is an essential oil extracted from plants by distillation method.(34) Terpene-4-ol, a component of major tea tree oil, has strong anti-inflammatory properties. (35) TTO containing shampoo, used in scalp psoriasis.(32)

Turmeric: It contains antioxidant and anti-inflammatory qualities. Curcuminoid, the active ingredient, inhibits phosphoryl kinase, an enzyme that helps to reduce symptoms. (32)Curcumin, another key ingredient in turmeric, has an antioxidative quality that aids in lessening psoriasis's oxidative stress.(36)

Apple cider vinegar: It contains anti-inflammatory and anti-itching properties. Rinsing with the same amount of water lessens scalp psoriasis itching. (32)

Avocado oil: It lessens the scaling that comes with psoriasis of the scalp. Apply a few drops of cool or lukewarm avocado oil to the scalp, cover it with a shower cap, and let it sit for fifteen to twenty minutes. After that, take it off and give the hair a wash.(37)

Lavender: It is analgesic and anti-inflammatory oil mixed with olive oil and applied liberally to the affected areas.

Chamomile: Applied as a cream, this herb has calming and anti-inflammatory properties.(38)

Herbs to Take Internally for Psoriasis

- **Berberine (barberry, Oregon grape, goldenseal):** Use capsules, teas, or tinctures. Antioxidant, anti-inflammatory, and reputedly prevents toxin format ion in the bowel.
- **Dong quai :** Taking capsules at the onset of an outbreak can lower inflammation.
- **Milk thistle:** Taken as a tea, tincture, or capsules. Anti-inflammatory; supports liver metabolism.
- **Psoralean, bishop's weed, or Angelica**: As a tea, tincture, or capsule form. include psoralens, which prevents skin cell division when paired with UV light. (Will raise the risk of sunburn and sensitize the skin to UV rays).
- **Purslane:** Eat fresh or lightly steamed. It contains significant amounts of selenium, alpha-linolenic acid, vitamins A, C, and E, all of which are beneficial to the health of the skin.(38)

B. Allopathic treatment for Psoriasis

Topical medications, which are administered directly to the skin and include lotions, creams, ointments, and shampoos, are typically the first line of treatment for psoriasis. Topical treatments include moisturizers, topical steroids, and non-steroid topical treatments. These products can be used individually or in combinations.(39)

Table1: Allopathic treatment for psoriasis.

Drug	Mechanism of action	Side Effects
1.Topical treatments **a. Corticosteroids** **Hydrocortisone** **Triamcinolone** **Clobetasole propionate**	It inhibits the generation of pro-inflammatory cytokines through the regulation of gene transcription.	Skin thinning, Stretch marks.
Vitamin D alogues **Calcipotriene, Calcitriol** **Tacalcitol**	Interferes with genes, which causes proliferation of epidermis , inflammation, keratinization .	Skin Irritation, Photosensitivity.
c. Retinoids **Tazarotene**	Alters gene transcription by specifically binding to β and α retinoic acid presented on the cell membrane of keratinocytes.	Hair Thinning, Mood Changes.
d. Keratolytic agents **Urea, Lactic acid** **Salicylic acid**	Acts as adesquamation of corneocytes.	Excessive Skin Peeling, Severe Skin Irritation.
2.Phototherapy(Light Therapy) **PUVA Therapy** **UVB Phototherapy**	Phototherapy involves exposure of skin to UV radiation, which can decrease the appearance of plaque on the skin and related itchiness.	Skin cancer, Premature Skin aging ,Eye damage.
3.Systemic therapy **Methotrexate** **Cyclosporine**	Systemic treatments supress the immune system and are used for moderate to severe psoriasis.(4,18,19)	Liver damage, Bone marrow suppression, kidney damage.

Oral and systemic treatment

● TNF-α

Psoriasis patients contain high levels of Tumor Necrosis Factor Alpha which causes inflammation in psoriasis by producing cytokines. Anti TNF Alpha is used as treatment by blocking TNF alpha. INFLIXIMAB and ETANERCEPT act by neutralizing TNF alpha. ADALIMIMAB is a monoclonal antibody IgG 1 and acts by capturing TNF-alpha.

● Other Anti-cytokine treatments

Interleukin 23 is produced by dendritic cells and macrophages, and this stimulates the synthesis of th17, which in turn causes psoriasis. USTEKINUMAB: Inhibit T cell development into TH1 and TH 17 forms, respectively, to act on interleukin 23 and interleukin 12. Additionally, it decreases the population of interleukin-17, which lessens the role of neutrophils in psoriasis. APILIMOD reduces the production of interleukin 12 and interleukin 23, while increasing the production of the anti-inflammatory interleukin 10. IL17-A and 17F are inhibited by BRODALUMAB. Anti-IL17 A and IL-17F human monoclonal antibody BRODALUMAB. IgG4 antibody IXEKIZUMAB inhibits IL17. It is used to treat both the clinical and pathological signs and symptoms of long-term plaque psoriasis.

● PDE-4 inhibitors

Inflammatory cytokines such as TNF alpha, IFN gamma, and IL 2 are secreted by T cells as a result of phosphodiesterase-induced AMP breakdown. Therefore, PDE 4 inhibitors prevent AMP from being broken down, which prevents the release of pro-inflammatory cytokines. E.g.: APREMILAST.

● Mitogen activated protein kinase (MAPK) Inhibitors

The mitogen-activated protein kinase P 38 molecule aids in the production of inflammatory cytokines such as TNF alpha. Therefore, BMS582949 and other p38 mark inhibitors can be utilized to treat psoriasis.

● Nerve growth factor

Because of emotional stress, psoriatic lesions and plaques have high concentrations of nerve growth factor. NGF stimulates T cells, promotes angiogenesis, and multiplies cutaneous nerves. A nerve growth factor receptor blocker used to treat psoriasis is K 252 A.(40)

C. Flavonoids in treating Psoriasis

Table 2: The main anti-inflammatory effects of selected flavonoids as potential agents in treating psoriasis

Flavonoids	Activity
Amentoflavone	Reduction of skinfold and ear fold thickness, suppression of mRNA expression produced by IMQ, suppression of HaCaT cell proliferation, encouragement of apoptosis, and suppression of the upregulation of NF-κB, IL-17A, and IL-22 expression.
Astilbin	Improved keratinocyte proliferation, increased levels of inflammatory cytokines, and circulating CD4 and CD81 T cells..
Baicalin	Anti-inflammatory activity and keratinocyte differentiation-inducing activity.
Delphinidin	Abrogation of the histological characteristics of psoriasis lesions andgreat reduction of infiltration of neutrophils and macrophages.
Quercetin	Considerable decrease of the granular layer of the epidermis, alteration in epidermal thickness, and orthokeratosis.
Luteolin	Inhibition of human keratinocyte activation and decrease of NF-κBInduction.(41)

Table 3: Recently developed drugs for Psoriasis

Drug	Mode of Action	Uses
1] adalimumab {humira}	It is a subcutaneous injection of an igg1 monoclonal antibody that binds exclusively to tumor necrosis factor-alpha.	It used to treat the skin in case of plaque psoriasis & psoriatic arthritis.
2]infliximab	It is a monoclonal antibody which bind to the soluble &transmembrane forms of tnf-alpha. By binding to tnf- alpha it prevents it from interacting with its receptors.	It is used to treat psoriasis arthritis & chronic plaque psoriasis.
3]etanercept	It is a tnf inhibitor. It acts as a soluble tnf receptor & binds to tnf- alpha & beta and prevents the interactions between tnf and its receptors.	It is used to treat moderate to severe plaque psoriasis.
4]certolizumab {cimizia}	It is an anti- tnf which has affinity towards human tnf- alpha. It binds to human tnf- alpha &neutralizes the inflammation caused by cytokine.	It is used to reduce the pain & swelling caused by inflammatory conditions.(42)

CONCLUSION

Psoriasis is one of the most prevalent non-communicable skin conditions. This review helps to increase the awareness in society about the various natural remedies used in the treatment of psoriasis which is best alternative to allopathic and other therapies and treatment.Treatment of psoriasis with allopathic medication and skin therapies associated with some severe side effects like high potency corticosteroids medication causes skin thinning and UV therapy causes skin cancer. This review explores the knowledge about the alternative naturalremedies which provides some options for increasing safety and efficacy in the management of psoriasis. The condition is becoming more common in India, and its correlation with various comorbidities indicates the need for additional study in this field in order to develop a definitive curative treatment.

REFERENCES

1. Rendon A, Schäkel K. Psoriasis pathogenesis and treatment. International journal of molecular sciences. 2019 Mar 23;20(6):1475.
2. Psoriasis, The Lancet, Prof Christopher E M Griffiths, Prof April W Armstrong, 2021; 397(10281): 1301-1315.
3. Rajguru JP, Maya D, Kumar D, Suri P, Bhardwaj S, Patel ND. Update on psoriasis: A review. Journal of family medicine and primary care. 2020 Jan 1;9(1):20-4.
4. Shah NV, Maheshwari RA, Sailor GU, Aundhia CJ, Chauhan SP, Javia AR. A Review On Etiology, Types And Treatment Of Psoriasis. Pharmacologyonline. 2010;1:159-79.
5. Singh SK, Rajoria K, Insaan S, Kushal A, Gupta K, A randomized open clinical study on the efficacy of Vamana karma, Virechana karma and Parisheka with Siddharthak Snanokta dravya in the management of

Mandal kustha w.s.r. to psoriasis, JOA XIII-2, 2019; 82 – 87, ISSN No. 2321-0435.
6. 7 Types of Psoriasis, Annie Stuart, Reviewed by, Stephanie S. Gardner, 202; 7.
7. What Is Plaque Psoriasis? Stephanie Langmaid, Reviewed by, Debra Jaliman, 2019; 25.
8. Guttate Psoriasis, Dahila Saleh, Sampson Regional Medical Centre, Updated on, 2021; 5.
9. Nancy M. George, PhD, APRN, BC and Karen Nichols, MS, APRN, BC (2007) "Inverse psoriasis: A case report" Ol. March The American Journal for Nurse Practitioners, 2007; 11: 3.
10. 1,2 Menter A, Gottlieb A, et al. "Guidelines of care for the management of psoriasis and psoriatic arthritis, Section 1: Overview of psoriasis and guidelines of care for the treatment of psoriasis with biologics." J Am Acad Dermatol, 2008; 58: 826-850.
11. Jeffrey M. Cohen, Belinda Tan, Susan Burgin (June) "Pustular psoriasis" ICD10CM: L40.1 – Generalized pustular psoriasis SNOMEDCT: 200973000 – Pustular psoriasis, 2018.
12. Santhosh Puthiyakunnon., et al. "Pustular Psoriasis: A Comprehensive Review on Dermatological Diagnosis and Management". EC Microbiology, 2020; 16(3): 01-10.
13. Okoduwa,C.,et al. Erythroderma: Review of a potentially life-threatening dermatosisIndian Journal of Dermatology, 2009; 54(1): 1-6.
14. Sarac G, Koca TT, Baglan T. A brief summary of clinical types of psoriasis. North Clin Istanbul, 2016; 3(1): 79–82.
15. Dogra A, Arora AK. Nail psoriasis: The journey so far. Indian J Dermatol, 2014; 59(4): 319-333.
16. Priyanka Narode, Waghmare S.U, Pravin akolkar, Sanskruti Wagh, Prasad Shelke, Vaishnavi BorhadeUnveiling Psoriasis: A Comprehensive Examination of Etiology, Pathophysiology, Clinical, Presentation, and Management StrategiesInternational Journal of Pharmaceutical Research and Applications2024 May-June 3; 2161-2173
17. Kim WB, Jerome D, Yeung J. Diagnosis and management of psoriasis. Canadian Family Physician. 2017 Apr 1;63(4):278-85.
18. Bakshi H, Nagpal M, Singh M, Dhingra GA, Aggarwal G. Treatment of psoriasis: a comprehensive review of entire therapies. Current drug safety. 2020 Jul 1;15(2):82-104.
19. Rapalli VK, Waghule T, Gorantla S, Dubey SK, Saha RN, Singhvi G. Psoriasis: pathological mechanisms, current pharmacological therapies, and emerging drug delivery systems. Drug Discovery Today. 2020 Dec 1;25(12):2212-26.
20. Francesca Capon "The genetic basis of psoriasis. International journal of molecular sciences", 2017; 18(12): 2526.
21. Rashmi Gupta, Maya G Debbaneh, Wilson Liao "Genetic epidemiology of psoriasis. Current dermatology reports", 2014; 3(1): 61-78.
22. Višnja Milavec-Puretić, Marko Mance, Romana Èeović, Jasna Lipozenčić "Drug induced psoriasis" Acta Dermatovenerologica Croatica 19 (1), 39-42, 2011
23. Erica B Lee, Kevin K Wu, Michael P Lee, Tina Bhutani, Jashin J Wu "Psoriasis risk factors and triggers" Cutis, 2018; 102 (5S): 18-20.
24. Dogra S, Kamat D. Drug-induced psoriasis. Indian J Rheumatol, 2019; 14, S1: 37-43.
25. Shweta Singh, DK Goyal "Critical analysis of life style modification (Diet & Behavioral) in the pathogenesis of Psoriasis." Environment Conservation Journal, 2016; 17(3): 125-127.
26. Diagnosis and management of psoriasis, Whan B. Kim, Dana Jerome, Jensen Yeung Can Fam Physician, 2017; 63(4): 278–285.
27. Cet article est disponible en français: Can Fam Physician, 2017; 63(4): e210–e218.
28. PMCID: PMC5389757.
29. Nischal KC, Khopkar U. Dermoscope. Indian J Dermatol Venereol Leprol, 2005; 71: 300-3. DOI: 10.4103/0378-6323.16633, PMID: 16394450.
30. Skin biopsy, Medline Plus, National Library of Medicine, Updated on Dec, 2020.
31. Psoriasis- Medically reviewed by Debra Jaliman, 2019.
32. What is psoriasis? Symptoms, causes, diagnosis, treatment and prevention. Julie Marks, reviewed by Ross Radusky, 2021.
33. Khushboo Modasia, Aishni Shah, Dhruv Patel, Trisha Patel "Assessment of quality of life in patients of psoriasis" Department of Dermatology, Pramukhswami Medical College and Shree Krishna Hospital, Anand, Gujarat, 2020.
34. Lim WL, How CH, Tan KW. Management of psoriasis in primary care. Singapore Med J, 2021; 62(3): 109-112.
35. Warren R. Heyman "Dyeing for a "new" topical agent for psoriasis? Think indigo." American Academy of Dermatology, 2018.
36. Carson, C. F., et al. Melaleuca alternifolia (tea tree) oil: A review of antimicrobial and other medicinal properties, American Society for Microbiology, 2006; 19: 1, 50-62.
37. Skin Pharmacology & physiology, Nader Pazyar, Reza Yaghoobi "Tea tree oil as a novel anti-psoriasis weapon" Skin Pharmacol Physiol, 2012; 25: 162-163.
38. Di Nardo V., Gianfaldoni S., Tchernev G., Wollina U., Barygina V., Lotti J., Daaboul F., Lotti T. Use of Curcumin in Psoriasis. Open Access Maced. J. Med. Sci, 2018; 6: 218–220.
39. Kuchekar AB, Pujari RR, Kuchekar SB, Dhole SN, Mule PM, Vidyapeeth B, Wadi B. Psoriasis: A comprehensive review. Int J Pharm Life Sci. 2011 Jun;2(6):857-77.
40. Erica Cirino "Treating scalp psoriasis at home, naturally." Healthline, 2018; 7.
41. Mantas Žurauskas, Ronit Barkalifa. Assessing the severity of psoriasis through multivariate analysis of optical images from non-lesional skin, 2020; 10: 9154.
42. Bonesi M, Loizzo MR, Menichini F, Tundis R. Flavonoids in treating psoriasis. InImmunity and inflammation in health and disease 2018 Jan 1 (pp. 281-294). Academic Press.
43. What are the new drugs for the treatment of plaque psoriasis? A review by- Judith Stewart, 2021.