A REVIEW ON OVERALL STUDY OF KERATOSIS PILARIS

Bodkhe Bhakti Narayan, Dongare Ashwini kachru, Kharat Vaishnavi Ramesh, Jadhav Sneha Bhaskar, Kapratwar Komal Dhondiba, Gudup Vaidesh Vaijanath, Gajanan Maharaj College of pharmacy, chh. Sambhajinagar
bodkhebhakti8@gmail.com
Prof.Shubhangi D. Bhojgude(M.pharm),Department of pharmaceutics. Gajanan Maharaj College of pharmacy, chh.Sambhajinagar.

Dr.Kavita Kulkarni(Phd.Mpharm),Department of Quality Assurance, Gajanan Maharaj College of pharmacy, chh.Sambhajinagar.

Abstract

Keratosis pilaris (KP) :a prevalent and benign dermatological condition characterized by the presence of small, rough, folliculocentric keratotic papules, typically appearing on the upper arms, thighs, cheeks, and buttocks. These papules can be skin-colored or reddish and are often surrounded by mild erythema. The condition arises from an abnormal buildup of keratin, a structural protein in the skin, leading to clogged hair follicles. Although the exact etiology remains unclear, genetic predisposition is strongly implicated, with a higher prevalence observed in individuals with a family history of the condition. KP is commonly associated with other skin disorders, such as atopic dermatitis and ichthyosis, and it can be exacerbated by environmental factors, dry skin, and seasonal changes.

Clinically, KP is generally asymptomatic, but some individuals may experience mild itching or discomfort. Diagnosis is primarily based on clinical examination, and in most cases, a biopsy is not necessary. Treatment options focus on symptom management and may include topical exfoliants (such as alpha-hydroxy acids, urea, or salicylic acid), moisturizers, and keratolytics to help reduce keratin buildup. While treatments can improve the appearance of the skin, KP often persists and tends to resolve spontaneously over time.

Despite its benign nature, keratosis pilaris can impact an individual's quality of life, leading to concerns about cosmetic appearance. Education about the condition, its natural course, and treatment options is essential for effective management and to alleviate patient anxiety. Further research is needed to better understand the pathophysiology of KP and to explore more effective therapeutic interventions. Treatment options include topical exfoliants, moisturizers, and keratolytics, although KP typically resolves on its own over time. The condition is often mistaken for other dermatological issues, highlighting the need for accurate diagnosis and management.

Key Words:*1.Atopy 2.Coiled hair 3.Keratosis pilaris 4. Steroid*

Introduction:

Keratosis pilaris is a common benign skin condition of follicular hyperkeratosis. it is a hyperkeratotic disorder that manifests as grouped folliculocentric keratoticpapules with a variable degree of perifollicular erythema.

This is common follicular keratosis. that affects the extensor aspects of the proximal arms, thighs, cheeks, arms and on the buttocks. Kp is a common life- long skin condition that affects approximately 40 % of adults and 50%-80% of adolescents. this condition is more widespread in females than males. it is more exaggrerated at puberty but tends to become less pronounced with increasing age. Seasonal variation is sometimes noted, as in the winter,dry skin becomes more prevalent and can worsen the condition for some patients .In some cases ,the disorder can be

cosmectically deforming and psychologically discomforting.

It is a genetic disorder of keratinization of the hair follicles ,with approximately 30%-50% of patients having a family history .the disease is most often caused by a buildup of keratin,and in the majority of patients having a family history

An excess of skin cells builds up close to individual hair follicles,and the individual papules are a hair being trapped under the excess skin cells and debris ,as they are not able to reach the surface . commonly coiled hair may be visualized under the papule.

In general KP is frequently cosmetically displeasing but medically harmless. The sites of predilection are the extensor surfaces of the upper arms(92%), Thigs(59%),and buttocks (30%). Known associations of KP include atropy(55%), Ichythyosis vulgaris, scarring alopecia, cardio-fascio-cutaneous syndrome, ectodermal dysplasia, KID syndrome, obesity, prolidase deficiency and downs syndrome. Most patients with KP are asymptomatic, and some may be unaware of their condition. However, many patients do seek treatment as they find the condition to be cosmetically disfiguring which can lead to psychological distress and influence quality of life. Various treatment modalities have been trialled on KP, from emollients and exfoliants to laser treatments that have become increasingly more common.

Epidemiology

Keratosis pilaris is overall a very common condition and is present worldwide In India and other countries erythromelanosis follicularis faciei et colli is described. This disorder is an incidental finding on physical examination. A lot of patients with KP are unware about they affected from this disease.

A 1985 survey noted a prevalence of 44% in 155 otherwise unaffected patients. In the adolescent population, its prevalence is postulated to be at least 50%; it is more common in adolescent females than males, seen in up to 80% of adolescent females.

In a survey of 49 British patients aged 2–40 years, incidence was highest in the first decade of life and decreased with age. Notably, this 1994 survey was only conducted in the UK, and further recent studies would need to validate this. Conversely, many report that KP may manifest in an individual at any age and that cases can persist throughout adulthood. In a study of 49 evaluated patients, there was a positive family history of KP in 19 patients (39%), while 27 patients(55%) had no family history of the disorder.

After many report that KP may display in an individual at any age and that cases can continue throughout adulthood. KP can occur more frequently in patients with dry and scaly skin. It can be associated with atopy, obesity, and conditions like ichthyosis vulgaris. From a research and epidemiological perspective, there is limited documentation on the incidence, patterns and seasonal trends of KP

Fig. Epidemiology Keratosis pilaris

Dermoscopic features in keratosis pilaris :

Dermoscopic features	Patient no.(%)
Small Kp Coiled hair Perifollicular erythema Perifollicular scaling	 6(24) 0 0
Large Kp Coiled hair Semicircular hair Looped hair Perifollicular erythema Perifollicular scaling	 10(40) 3(12) 5(20) 11(44) 9(36)

Table1: dermoscopic features in keratosis pilaris

Name of condition	Dermoscopic feature
Keratosis pilaris	Presence of vellus hairs that are frequently coiled, semi-circular, or looped Peri-follicular erythema and peri-pilar casts Hairs emerging in groups of 2 or 3. Vascular ectasias Pigmented structures in healed/late lesions
Follicular psoriasis	White-brown background Morphologically normal looking terminal hairs Perifollicular scales Multiple red dots/dotted vessels, red globules, twisted red loops, and glomerular vessels
Hypovitaminosis-A associated phrynoderm	Follicular papules with translucent spines Perilesional "floret-like" structures
Perforating folliculitis	Bright white clods centered in a structureless grey area surrounded by reticular brown lines
Pityriasis rubra pilaris	White keratotic plugs Yellow peripheral keratotic ring Perifollicular erythema
Pityrosporum folliculitis	Perifollicular papules and pustules with surrounding erythema and dirty-white scaling Keratosis pilaris-like coiled/looped hair follicles with perifollicular erythema and scaling may be seen in around 50% cases Hypopigmentation of the involved hair shaft

Table 2: dermoscopic features of keratosis pilaris and important conditions with similar clinical morphology.

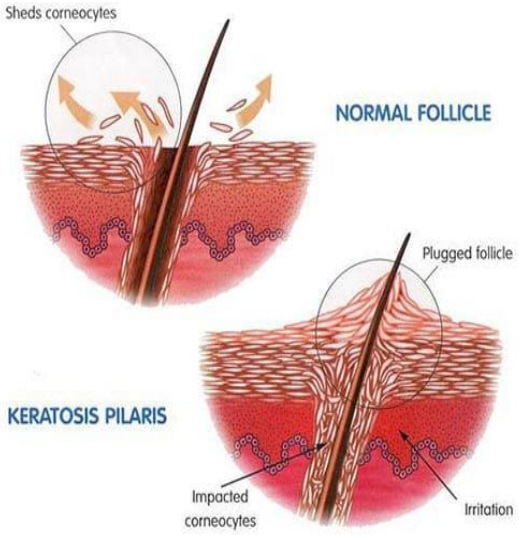
Pathophysiology

KP is thought to arise from excessive accumulation of keratin underneath the hair follicle . It is a common follicular skin disorder that presents as spiny, keratotic papules its an approximately 1mm in size, that often contain fine-coiled, brittle hair.

It manifests as discrete 1mm folliculocentric papules and at times with a small coiled hair under the skin's surface due to the excessive skin formation at the pores. The epithelial cells appear to be excessively adherent and have a low

turnover rate known as hyperkeratinisation or hyperkeratosis.

KP is thought to be inherited in an autosomal dominant pattern with variable penetrance. The most widely accepted theory suggests that the keratotic infundibular plug found in KP is the result of abnormal keratinisation of follicular epithelium. Thomas et al propose that KP is not a primary disorder of keratinocytes but rather a hair shaft disorder. KP occurs when coiled hair shafts rupture the follicular epithelium, causing defective follicular keratinisation and inflammation. This originated when the hair shafts of KP patients extracted with a needle retained their coiled shape even after being removed from the follicle.



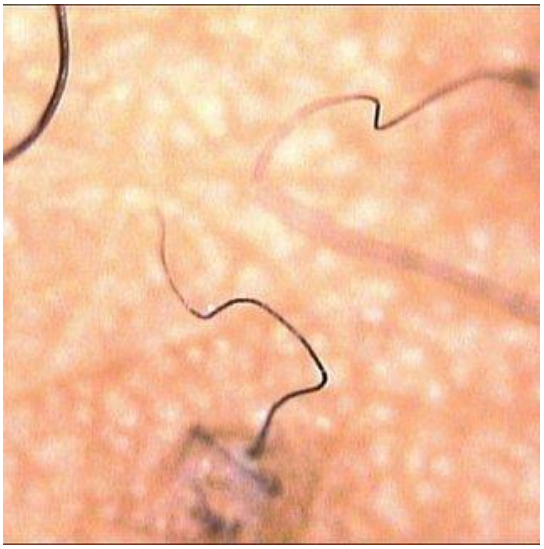


Fig.2: hair shaft retains its coiled nature even After being extracted from the superficial epidermis With a sterile needle

Fig.3: Pathophysiology of keratosis pilaris

Symptoms :

Keratosis pilaris can occur at any age, but it's more common in young children.

- Painless tiny bumps on the upper arms, thighs, cheeks or buttocks
- Dry, rough skin in the areas with bumps
- Worsening when seasonal changes cause low humidity and dry skin
- Sandpaper-like bumps resembling goose flesh

Causes of keratosis pilaris

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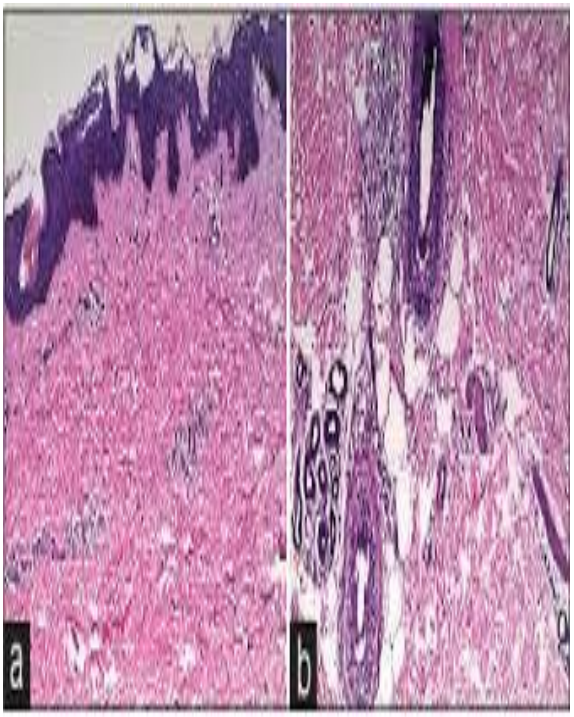
Impact of KP :

Though patients' reactions and tolerance to the rough texture and cosmetic appearance may vary considerably, KP can have a significant social and psychological impact. The psychosocial impact of KP is complex and can be associated with developmental issues of body image, socialisation, and sexuality, particularly in the younger adolescent population.

A randomised clinical trial in Thialand and concurrently found that more than 40% of those with KP have significant effect on self image and quality of life.

This is an identical with an improvement in anxiety, depression and body satisfication after effective and proper treatments.



Fig,4.histopathology from thigh lesion revealing (a) basket weave and lamellated orthokeratosis, and (b) follicular infundibular dilatation and plugging with focal peri-infundibular parakeratosis, and perifollicular lymphocytic

Keratosis pilaris rubra is a common but rarely reported variant, presenting with marked erythema in addition to KP. Similarly, it can be socially disturbing, and

patients tend to trial numerous therapies with limited effectiveness in reducing erythema.

infiltrate confirming the diagnosis of active keratosis pilaris (hematoxylin and eosin, ×100 and ×400

Materials and Methods:

A cross sectional and observational study conducted the dr.mary Thomas on 25 patients who presented to there outpatient department between September 2011 and decmber 2011 and were clinically diagnosed with KP.A clinical history was obtained; examination and dermoscopic evaluation were performed on the lesions of kp.

The dermoscope used was a triple light source, non-contact, videodermoscope (Ultrascan©, Dermaindia) and patients were evaluated using both the white light and polarizing light. Still images of the lesions were shot and later analyzed and correlated with clinical features.

1.*Patients and procedure* : s. A prospective, randomized, and clinical study comparing 10% lactic acid and 5% salicylic cream was carried out at the Institute of Dermatology, Bangkok, Thailand. The protocol was approved by the Ethical Committee of the Institute of Dermatology and written informed consent was obtained from all participants. The patients had a clinical diagnosis of keratosis pilaris, which showed the extensive keratotic follicular papules, almost entirely on the extensor and lateral aspect of proximal extremities, symmetrically. Fifty participants were enrolled in this clinical study. Patients were in good health and free of other skin disease or physical condition that would impair evaluation of treatment areas.

2. *Randomized Treatment Phase*. The patients were enrolled in this study to evaluate the effect of 10% lactic acid versus 5% salicylic acid cream. The vehicle has been controlled by using base cream (8% stearyl alcohol, 4% cetyl alcohol, 18 liquid paraffin, 5.7% propylene glycol, 2% white beeswax, 5.5% sodium lauryl sulfate, and 1% paraben conc.) with active gradient 10% lactic acid or 5% salicylic acid, respectively. They were told to apply the one designated agents twice daily on each of their extensor upper arms by using one hand to apply one test medication to the opposite upper arm and vice versa.

3. *Subjective Self-Assessment*. Self-assessmentswere solicited by questionnaire; study participants were interviewed and questioned regarding therapy benefits.

4. *Investigator Assessment*. Investigators' evaluations were recorded via questionnaires by three independent dermatologists. At the end of treatment and follow-up phase, the change in the signs of papules and post inflammatory pigment alteration were evaluated in the overall disease severity by percent of improvement.

5. *Biophysical Skin Parameters Obtained by Noninvasive Measurements*. High-frequency conductance, which is a parameter for the hydration state of the skin surface, was measured with a skin surface hygrometer (Skicon 200, IBS Ltd., Hamamatsu, Japan)

Role of Acids, Steroids and kinase inhibitors treatment of keratosis Pilaris:

Acid

Acid is a popular component of several acne-fighting products as it can help unclog the pores.

Glycolic Acid : glycolic acid works to break the bonds between the outermost layer of the skin, which consists of dead skin cells, and the dermis. This results in a peeling effect which leads to fewer dead skin cells and oil in the pores, resulting in clearer skin.

glycolic acid is also a very common alpha-hydroxy acid, which works to loosen old and dead skin cells, revealing new skin cells. Scarring is also shown to improve with the use of glycolic acid, setting it up as a good method for treating keratosis pilaris

Salicylic Acid: Salicylic acid is also a well-known ingredient in skin-clearing products and targets keratosis pilaris and other acne disorders by limiting cohesion between keratinocytes . Salicylic acid has been shown to produce the benefits of skin brightening without the risk of extensively damaging pores. It fights acne by dissolving the dead skin cells that are responsible for clogging pores, improving the appearance of the skin. Because salicylic acid is an oil-soluble beta-hydroxy acid, it can penetrate the lipid layers of the skin.

Lactic Acid : . Lactic acid can also be used to treat papules. It has the ability to decompose dead skin cells, opening the clogged pores and giving way for other products, such as salicylic acid, to deeply penetrate the skin. Another acid that can be considered helpful in managing keratosis pilaris and other acne is retinoic acid, which improves the appearance of post-inflammatory hyperpigmentation and reduces atrophic acne scarring .

Azelaic acid: Azelaic acid is a dicarboxylic acid that has also demonstrated effectiveness in combating acne. Azelaic acid, most known for its anti-inflammatory and antioxidant properties, works either in monotherapy or combination therapy to treat post-inflammatory hyperpigmentation.

Kinase Inhibitors:

Kinase inhibitors have also been shown to affect keratosis pilaris and its close variants as they block enzymes known as tyrosine kinases. Because tyrosine kinases help to send growth signals in cells, blocking them stops cell growth and division. Nilotinib is a kinase inhibitor that is responsible for many side effects of alopecia, primarily scarring of the skin.An additional kinase inhibitor of interest is vemurafenib, which is a BRAF inhibitor that is used to treat metastatic melanoma, a skin cancer in which the pigment producing cells of the skin become cancerous.

Steroids:

Steroids are among some of the compounds that affect keratosis pilaris. Topical and systemic steroids help by decreasing inflammation, working directly against acne disorders. According to the studies incorporated in this review, specific examples of steroids that influence acne conditions include triamcinolone, hydrocortisone, mometasone furoate, testosterone, prednisone, methylprednisolone, and clobetasol propionate.

Genetic Acids :

keratosis pilaris is a genetic condition; therefore, some of the genes producing amino acids can have some impact on keratosis pilaris. For example, fibrinogen alpha chain and guanine nucleotide exchange factor 1 genes code for amino acids that create proteins that have an effect on acne and hyperpigmentation.

Importance of concentration and dosage

While acids, steroids and kinase inhibitors affect keratosis pilaris the types vary along with their concentrations and dosages.

A concentrations that is too low would not necessarily bring about the benefits that acid is supposed to create for the skin.This will especially affect patients who have a sensitive skin type. The concentration of acid also depends on the type of acid that is used.

Dosage of steroids and kinase inhibitors

Dosages of steroids are important to discuss for medications as too much or too little can produce unwanted side effects.

For instance, testosterone is administered at 1.1-8 nmol. According to the studies hydrocortisone is administered at 2.5%, triamcinolone at 0.1%, mometasone furoate at 0.1%, and clobetasol propionate at 0.05% Prednisone and methylprednisolone are administered at 20 mg per day and 6 mg per day.

Kinase inhibhitor dosages are also important . According to the studies nilotinib is administered to patients at dosages of either 600 mg or 800 mg .

The concentration of acids, as well as dosages of steroids and kinase inhibitors, are important for those who suffer from skin issues because the effectiveness of skincare products is linked to the concentration of acid of the skincare regimen and how it affects different skin types.

Treatment option for keratosis pilaris

1. Topical Exfoliants

Alpha Hydroxy Acids (AHAs): These include glycolic acid and lactic acid. They help by exfoliating the top layer of dead skin cells and improving skin texture.

Beta Hydroxy Acids (BHAs): Salicylic acid is a common BHA that penetrates deeper into the skin to help unclog hair follicles and reduce bumps.

Urea-based Creams: Urea helps to soften and exfoliate the skin, and is often used in combination with other ingredients to improve rough patches.

Lactic Acid: Lactic acid-containing lotions or creams can hydrate the skin and gently exfoliate to remove keratin buildup.

Examples of products:

AmLactin (lactic acid)

CeraVe SA (salicylic acid)

Urea-based creams (e.g., Eucerin UreaRepair)

2. Topical Retinoids

Retinoid creams (like tretinoin or adapalene) help by speeding up cell turnover and preventing the clogging of hair follicles. Retinoids can reduce the keratin buildup and improve the appearance of KP

Caution: Retinoids can be irritating and may cause dryness, especially when first used, so they should be applied sparingly and gradually introduced into a skincare routine.

Examples:Tretinoin (Retin-A)

Adapalene (Differin)

3**. Moisturizing Regularly**

Hydrating lotions: Keeping the skin moisturized is critical in managing KP. Regular use of thick, emollient moisturizers helps prevent the skin from becoming too dry and further worsening the rough texture.

Look for moisturizers with ingredients like:

Ceramides: Help restore the skin barrier.

Glycerin: Draws moisture into the skin.

Petrolatum: Provides a protective layer over the skin, trapping moisture.

Examples:

CeraVe Moisturizing Cream

Cetaphil Moisturizing Cream,Aquaphor Healing Ointment

4**. Gentle Exfoliation**

Use a gentle exfoliating scrub to remove dead skin cells, but avoid harsh scrubbing as this can irritate the skin and make KP worse.

Exfoliating gloves or sponges can be used, but they should not be too rough on the skin.

5**. Warm Baths and Humidifiers**

Soaking in warm baths with gentle cleansers can help soften the skin and make it easier to exfoliate. Adding oatmeal to the bath may help soothe irritation.

Using a humidifier in dry climates or during winter months can help maintain moisture in the skin and prevent further dryness.

6**. Laser Treatments**

Laser therapy may be considered in more severe cases where topical treatments do not work. Laser treatments target the redness and bumps by reducing inflammation and improving skin texture.

Types of lasers used for KP:

Pulsed-dye lasers (PDL): Target redness and inflammation.

Fractional lasers: Help with skin texture by stimulating collagen production.

7. Lifestyle and Care Tips

Avoid harsh soaps: Use mild, fragrance-free cleansers to avoid irritating the skin.

Do not pick at or scrub the bumps: This can worsen irritation and cause scarring.

Wear loose clothing: Tight clothing can rub against the bumps, causing further irritation.

Stay consistent: KP is a chronic condition that may take time to improve with regular skincare. Maintenance with daily moisturizing and gentle exfoliation is key to managing symptoms.

Conclusion :

Keratosis pilaris (KP) is a common disorder, multifactorial, affecting predominantly the extensor surfaces of the extremities. The cause is not fully understood. It occurs in children, and peaks in adolescence. Keratosis pilaris is usually asymptomatic and associated with a skin conditions like atopic dermatitis. Keratosis pilaris tends to improve with age without

treatment, association between testosterone injection and keratosis pilaris.

According to studies included in this review, it is clear that acid demonstrates both promise and potential for further treatment and knowledge of keratosis pilaris, in addition to the limited potential of steroids and kinase inhibitors. The ability of different types of acids to primarily exfoliate the skin and penetrate deep into the pores, or allow other skincare products to deeply penetrate into the pores, coupled with specific steroids and kinase inhibitors that can reduce the severity of the condition seems to be the root of prospective treatments of keratosis pilaris

Reference:

1: Hwang S, Schwartz RA. Keratosis pilaris: a common follicular hyperkeratosis. Cutis. 2008;82(3):177-80.

2: Thomas M, Khopkar US. Keratosis pilaris revisited: is it more than just a follicular keratosis? Int J Trichology. 2012 Oct;4(4): 255-8

3: Alai NN. Keratosis pilaris. Emedicine. Available from http://emedicine.medscape.com/article/1070651-overview [Last updated on 2012 Mar 23 2012] [Last accessed on 2012 Mar 03].

4: Judge MR, McLean WH, Munro CS. Disorders of keratinization. In:

Burns DA, Breathnach SM, Cox NH, Griffiths CE, editors. Rook's textbook

of dermatology. 7th ed. Oxford, England: Blackwell Publishing; 2004. p. 34. 60-34. 62.

5: Rogers M. Keratosis pilaris and other inflammatory follicular keratotic syndromes. In: Wolff K, Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, editors. Fitzpatrick's dermatology in general medicine. 7th ed. New York: McGraw Hill; 2008. p. 749-53.

6: Arnold AW, Buechner SA. Keratosis pilaris and keratosis pilaris atrophicans faciei [in German]. J Dtsch Dermatol Ges. 2006;4:319-323.

7: Mevorah B, Marazzi A, Frenk E. The prevalence of accentuated palmoplantar markings and keratosis pilaris in atopic dermatitis, autosomal dominant ichthyosis and control dermatological patients. Br J Dermatol.1985;112:679-685.

8: Keratosis pilaris: diagnosis and treatment. (2014). Accessed: October 11, 2021:https://www.aad.org/public/diseases/a-z/keratosis-pilaris-treatment.

9. Hwang S, Schwartz RA: Keratosis pilaris: a common follicular hyperkeratosis . Cutis. 2008, 82:177-80.

10. Mayo Clinic. Laser hair removal . (2020). Accessed: October 11, 2021: https://www.mayoclinic.org/tests-procedures/laser-hair-removal/about/pac-20394555.

11. Baden HP, Byers HR. Clinical findings, cutaneous pathology and response to therapy in 21 patients with keratosis pilaris atrophicans. Arch Dermatol 1994;130:469-75.

12. Poskitt L, Wilkinson JD. Natural history of keratosis pilaris. Br J Dermatol 1994;130:711-3.

13. Thomas M, Khopkar US. Keratosis pilaris revisited: Is it more than just a follicular keratosis? Int J Trichology 2012;4:255-8.

14. Aram H. Acquired ichthyosis and related conditions. Int J Dermatol. 1984;23:458-461.

15. Marks J, Shuster S. Vitamin B12 excretion in patients with various skin diseases. Br Med J. 1970;3:618-621.