

KITIBHA KUSHTHA (PSORIASIS): AYURVEDIC PERSPECTIVES AND MANAGEMENT APPROACHES

Chaitrali L. Latam^{*1}, Savita C. Samleti², S. M. Lahankar³

¹P.G. Scholar, Department of *Agadatantra*, *Vyvahar Ayurveda* and *Vidhivaidyaka*, R.A. Podar Medical College [Ayu.], Worli, Mumbai- 18.

²Assistant Professor, Department of *Agadatantra*, *Vyvahar Ayurveda* and *Vidhivaidyaka*, R.A. Podar Medical College [Ayu.], Worli, Mumbai- 18.

³Professor and HOD, Department of *Agadatantra*, *Vyvahar Ayurveda* and *Vidhivaidyaka*, R.A. Podar Medical College [Ayu.], Worli, Mumbai- 18.

Article Received on 04 Feb. 2026,
Article Revised on 24 Feb. 2026,
Article Published on 01 March 2026,

<https://doi.org/10.5281/zenodo.18813842>

*Corresponding Author

Chaitrali L. Latam

P.G. Scholar, Department of
Agadatantra, *Vyvahar Ayurveda* and
Vidhivaidyaka, R.A. Podar Medical
College [Ayu.], Worli, Mumbai- 18.



How to cite this Article: Chaitrali L. Latam^{*1}, Savita C. Samleti², S. M. Lahankar³ (2026). *Kitibha Kushtha (Psoriasis): Ayurvedic Perspectives And Management Approaches*. World Journal of Pharmaceutical Research, 15(5), 1196-1207.

This work is licensed under Creative Commons Attribution 4.0 International license.

ABSTRACT

The skin, the largest organ of the human body, plays a vital role in maintaining overall health by providing insulation, regulating body temperature, enabling sensation, synthesizing vitamins such as D and B, and protecting the body from harmful pathogens. Skin disorders like psoriasis can significantly affect physical well-being and often lead to emotional distress and social discomfort. In Ayurveda, skin diseases are broadly categorized under *Kustha*, which is further divided into *Mahakustha* and *Kshudrakustha*. Among the conditions classified under *Kshudrakustha*, *Kitibha Kustha* closely resembles plaque psoriasis, presenting with symptoms such as erythematous, dry lesions covered with silvery scales, severe itching, and reduced or absent sweating. Ayurvedic management of *Kitibha Kustha* includes a comprehensive approach involving the identification and classification of

medicinal herbs, classical formulations, and therapeutic procedures. Clinical evaluations and comparative studies have explored the safety and efficacy of these treatments in relation to conventional therapies. Research has also examined the pathophysiology of *Kitibha Kustha* and psoriasis from both modern biomedical and Ayurvedic perspectives. Findings from various studies suggest that Ayurvedic interventions may help alleviate

symptoms such as itching, scaling, and redness, while promoting overall skin health and regeneration. Psoriasis is a chronic dermatological condition that requires lifelong management. Although conventional treatments can provide symptomatic relief, they are often associated with limitations and potential adverse effects, including hepatotoxicity and renal complications. Consequently, there is growing interest in Ayurvedic medicine, which emphasizes a holistic, individualized, and regenerative approach. Ayurvedic therapies for *Kitibha Kushtha* and psoriasis appear to offer a promising alternative, potentially providing safer and more sustainable long-term management.

KEYWORDS: Kitibha Kushtha, Kshudra Kushtha, Twak Rog, Shodhana Chikitsa, Psoriasis, Chronic skin disorder, Plaque Psoriasis.

INTRODUCTION

The skin is a highly intricate organ that serves not only as a protective covering for the body but also contributes significantly to mental and emotional well-being. Recognized in Ayurveda as one of the five sensory organs, it is responsible for the perception of touch, referred to as *Sparsa Gyan*. When healthy and intact, the skin functions as a natural defensive barrier, shielding the body from harmful pathogens and environmental hazards. However, any disruption or damage to this protective layer can increase susceptibility to a range of health concerns, particularly various dermatological disorders.

In Ayurveda, skin diseases are collectively referred to as "*Kushtha*."^[1] These are classified into two major categories: *Mahakushtha* (major or severe skin diseases) and *Kshudrakushtha* (minor skin disorders).^[2] Ayurvedic classics explain *Kushtha* by detailing its clinical features, the underlying imbalance of the three *Doshas*—*Vata*, *Pitta*, and *Kapha*—and the extent or severity of the condition. Management is tailored according to the dominant *Dosha* involvement and the stage of the disease, ensuring an individualized and holistic approach to treatment.

One of the important conditions classified under *Kushtha* is *Kitibha Kushtha*, which closely resembles plaque psoriasis in its clinical presentation. It is predominantly associated with the aggravation of *Vata* and *Kapha* *Doshas*. The characteristic features of *Kitibha Kushtha* include dry, rough, and scaly skin lesions that may produce a distinctive sound on scratching. The affected skin often appears dark or blackish in discoloration and is commonly accompanied by severe itching.^[3] In modern medicine, the severity of psoriasis is commonly

assessed using the Psoriasis Area and Severity Index (PASI). This standardized scoring system evaluates the intensity of key clinical features—erythema (redness), induration (thickness), and scaling—along with the extent of body surface area involved. The PASI score ranges from 0 to 72, with higher scores reflecting greater disease severity and extent.^[4]

The PASI score is calculated

- 1. Intensity:** The intensity of redness, thickness, and scaling is assessed for each body region (head and neck, upper limbs, trunk, lower limbs) and rated from 0 (none) to 4 (very severe).
- 2. Area:** The percentage of the body affected by psoriasis is evaluated for each region and scored from 0 (no involvement) to 6 (90-100% involvement).
- 3. Calculation:** The intensity scores for each region are added up, and then multiplied by the area scores and the body surface area represented by that region. The final PASI score is the sum of these calculations.

In Ayurveda, the formation of *Twacha* (skin) is vividly illustrated by Sushruta, who compares it to the delicate layer of cream that forms on the surface of boiled milk, highlighting its subtle and superficial emergence after fertilization. Acharya Vagbhata further emphasizes this concept, describing *Twacha* as part of *Matruja Bhava*, an essential element in fetal development.

According to him, the skin develops through the *Paka* (maturation) of *Rakta Dhatu* (blood tissue), under the guidance of *Dhatwagni*, the metabolic fire responsible for tissue transformation. By the sixth month of gestation, this process completes, resulting in the skin's final structure through the maturation and drying of *Rakta Dhatu*.

This understanding reflects Ayurveda's holistic view of fetal development, highlighting the critical role of *Dhatwagni* in shaping bodily tissues and illustrating the interdependent maturation of various *Dhatus*, which collectively contribute to the formation of integrated physiological structures like the skin.

Relation between *Twacha* and *Dosha-Dushya*

Vata - *Sparanendriya* is the *Adhishtana* of *Vata* and the *Adhishtana* of *Samana Vata* includes *Swedavaha Srotas* which in turn is present in *Twacha* of *Kapha Dosha*.

Pitta - *Bhrajaka Pitta* is present in *Twacha*.

Kapha – Although direct references to the presence or *Adhishtana* (seat) of *Kapha* in the skin are not explicitly mentioned, the softness (*Mardavata*) and unctuousness (*Snighdhata*) of *Twacha* can be understood as manifestations of *Kapha*'s influence.

Rasa – The quality of *Rasa Sara Purusha* can be assessed through skin texture. Dryness (*Rukshta*) of the skin indicates depletion (*Kshaya*) of *Rasa*, while coldness (*Shaitya*) reflects an increase (*Vruddhi*) in *Rasa*.

Rakta – The functions of *Rakta Dhatu* include perception of touch (*Sparsa Jnana*) and skin complexion enhancement (*Varna Prasadana*). Since the seat of *Rakta Dushti* disorders, such as *Kushta*, *Neelika*, and *Visarpa*, is the skin, a clear relationship exists between *Twacha* and *Rakta Dhatu*.

Mamsa – The six layers of skin are formed from the refined portion (*Prasada Bhaga*) of *Mamsa Dhatu*.

Sweda – The role of sweat (*Sweda*) includes maintaining bodily moisture (*Shareera Ardrata*) and the softness and delicacy of the skin (*Twak Sukumaryata*). Any increase or decrease (*Vruddhi* or *Kshaya*) in *Sweda* manifests visibly in the skin.

This highlights the interconnectedness of *Doshas*, *Dhatu*s, and skin, demonstrating how physiological imbalances are reflected in *Twacha*.

Kushta

According to *Amarakosha*, the term *Kushta* is derived from the root “*Kush*,” meaning “originating from the inner part.”

This interpretation is reflected in the appearance of the affected *Twacha*, which results from the vitiation of factors such as *Rakta*, *Lasika*, *Ambu*, and the *Tridoshas*.

Shabdakalpadruma defines *Kushta* as a condition that evokes disdain or contempt.

Acharya Vagbhata describes *Kushta Roga* as a disease that causes discoloration (*Vaivarnya*) and impairment (*Dushti*) of the skin. Regarding *Kitibha*, *Shabdakalpadruma* explains the term as “*Kesa Keeta*,” while Monier-Williams translates it into English as “louse,” referring to a parasitic insect that infests human hair and skin and can transmit various diseases.

Nidana

The Ayurvedic classics do not provide specific *Nidana* (causative factors) for *Kitibha Kushta*. Therefore, the general *Nidana* described for *Kushta Roga* (*Samanya Kushta Roga Nidana*) is considered applicable. Studying these causative factors is essential for planning effective treatment and for contextualizing them in contemporary research. The *Nidana* can be broadly categorized as follows.^[5]

Aharaja Nidana

- *Mithyahara Vihara*
- *Adhika Madhu, Dadhi, Snigdha Padartha Sevana*
- *Adhika Madhura, Amla, Lavana Sevana, Tila Sevana*
- *Chilichima Matsya along with Dugdha*
- *Paya Sevana after Amla Sevana*
- *Phanita*
- *Atimatrahara* etc.

Viharaja Nidana

- *Diwaswapna*
- *Maithuna*
- *Vyayama*
- *Vyavaya after Ahitasana*
- *Chardi Vegadharana*
- *Sheetodaka Sevana after Bhaya, Shrama,*
- *Santapa*

Lakshana

Lakshana refers to the characteristic features or manifestations of a *Roga* (disease), with *Rupa* and *Linga* being synonymous terms. These features typically become apparent during the fifth stage of *Kriyakala*, known as the *Vyakta* stage. The *Lakshanas* of *Kitibha Kushta* are described in various Ayurvedic texts and can be summarized as follows.^[6]

- *Shyava Varna* - because of *Vata Dosha*
- *Khartwam* - *Vata Dosha*,
- *Karkasha Sparsha* will be present.

- **Parusham** - *Rukshata* of the *Twacha* will be present; again, it shows the involvement of *Vata Dosh*.
- **Krishna Varna** - *Aruna Varna*
- **Snigdha** - This is a contradictory statement given by *Acharya Sushruta*. This can be understood as *Snigdha Sparsa* when there is an excessive *Kleda Guna* is present. Also, when there is predominance of *Kapha Dosh* in *Kitibha* this may be observed.
- **Srava** - *Pitta*
- **Ugrakandu** - *Kapha Dosh*
- **Vridhi** - increase in the size of the lesion
- **Guru/Dhrudam/Ghana** - indicates the thickness of *Vrana Sthana (Kina)*
- **Prashanthani Cha Puna Punarutpadhyante / Vartate Cha Samutpnnam** - the disease reoccurs after its complete disappearance

The *Lakshanas* of *Kitibhakushta* mentioned by *Acharya Charaka* is as following, *Shyava Varna*, *Kharasparsha* and *Parushata*.

Acharya Sushruta, *Madhavanidana*, *Vagbhata*, *Yogaratanakara*, *Kasyapa* has been followed the same as that of *Charaka*.

Samprapti

Samprapti refers to the pathogenesis of a disease, beginning with the vitiation of Doshas due to specific Nidanas, and culminating in the full manifestation of the disorder through the interaction (Sammurchana) of Dosh and Dushya. Understanding Samprapti allows the physician to identify the specific features of a disease, including the involvement of particular Doshas, Agni, and other factors, and is essential for effective treatment planning (Chikitsa). Without consideration of the Samprapti Ghatakas, therapy is considered incomplete.

Since a detailed Samprapti for *Kitibha Kushta* is not explicitly described in Ayurvedic texts, it can be inferred from the general pathogenesis of *Kushta Roga*. *Kushta* is a *Tridoshaja Vyadhi*, meaning it arises from the simultaneous vitiation of multiple Doshas rather than a single one. Its classification is based on the division (*Amshamshakalpana*) of Doshas. The seven causative substances (*Sapta Dravyas*) of *Kushta* include the three Doshas, along with *Twak* (skin), *Rakta* (blood), *Mamsa* (muscle), and *Ambu* (bodily fluids). According to *Acharya Charaka*, the intake of causative factors (*Nidana Sevana*) leads to the aggravation (*Prakopa*) of the *Tridoshas*, which then take residence (*Ashraya*) in *Twak*, *Rakta*, *Mamsa*, and *Ambu*,

causing deterioration (Shaithalyatha) in these tissues and resulting in the manifestation of Kushta Roga. Further, in Chikitsasthana, it is explained that vitiated Vata and other Doshas damage these tissues, giving rise to the seven types of Mahakushta and eleven types of Kshudrakushta.^[7]

Samprapti Ghatak

- ***Dosha - Tridosha Pradhan***
- ***Dushya - Twak, Rakta, Mansa, Lasika***
- ***Srotas – Raktvahsrotas***
- ***Rogamarga - Bahiyarogmarga***
- ***Adhithana - Twak & Mansa***
- ***Shrotodushti – Sanga***
- ***Savabhava - Chirkari (Chronic)***
- ***Upsarga - Raktaj Krimi***

Sadhyasadhyata

The concept of *Sadhyasadhyata* (treatability) of *Kushta* is discussed in Ayurvedic classics; however, a specific explanation for *Kitibha Kushta* is not provided separately. Before describing treatment (*Chikitsa*), the Acharyas outline the principles of *Sadhya* (curable) and *Asadhya* (incurable) conditions of a disease, offering physicians a valuable guideline for planning appropriate therapy.^[8]

Sadhya Kushta – In cases where there is predominance of a single *Dosha* or mainly *Vata-Kapha* involvement affecting only *Twak, Rakta, and Mamsa*, the condition generally has a favorable prognosis with a good chance of recovery.^[9]

Kruchra Sadhya Kushta – In this condition, the possibility of cure is achievable but requires significant effort, particularly when the disease involves *Kapha-Pitta* mixture, *Vata-Pitta*, or *Pitta* alone.

Yapya Kushta – If the vitiated *Doshas* are localized in *Medo Dhatu* and the patient adheres to appropriate medications (*Bheshaja*) along with a proper dietary and lifestyle regimen (*Pathya*), complete relief from the disease can be achieved. However, discontinuation of treatment and indulgence in inappropriate habits (*Apathya*) may lead to a relapse of the condition.

Asadhya Kushata – The presence of features such as *Sarva Lingayukta* (all characteristic symptoms), weakness (*Abala*), excessive thirst (*Trushna*), burning sensation (*Daha*), impaired digestive fire (*Santhagni*), infection (*Jantu*), or involvement of *Doshas* in deeper tissues like *Asthi*, *Majja*, and *Shukra Dhatus* are regarded as indicators of *Asadhya Kushta* (incurable or difficult-to-treat *Kushta*).

Upadrava

Upadravas may arise either after the full manifestation of the disease or during its progression. The complications associated with *Kushta* include the following.

- Prasaravana
- Angabheda
- Patana Anyangavayavanam
- Trushna
- Jwar
- Atisara
- Daha
- Dourbalya
- Arochaka
- Avipaka

Pathya-Apathya^[8]

Pathya - *Laghu Anna*, *Tikta Shaka*, *Bhallataka*, *Triphala*, *Nimbayukta Anna* and *Ghrita*, *Purana Dhanya*, *Jangala Mamsa*, *Mudga*, *Patola*.

For *Pana*, *Snana* and *Parisheka Khadira Kashaya* is advised.

Apathya

According to *Acharya Sushruta*, *Mamsa*, *Vasa*, *Dugdha*, *Dadhi*, *Taila*, *Kulatha*, *Masha*, *Nishpava*, *Ikshu*, *Amla*, *Virudha Ahara*, *Adhyasana*, *Ajeerna*, *Vidahi* and *Abhishyandi* are said as *Varjya*.

Acharya Charaka says *Guru*, *Amla*, *Payas*, *Dadhi*, *Anupamamsa*, *Matsya*, *Guda*, *Tila* as *Apathya*.

Chikitsa

Skin diseases are often chronic, difficult to treat, and require prolonged periods of patient care. *Kushta Roga* develops only when the *Tridoshas* become imbalanced. Since its origin lies in *Nidana* (causative factors), the primary approach to management emphasizes *Nidana Parivarjana*—avoiding causative agents to prevent further aggravation of the *Doshas*. The therapeutic process aimed at complete elimination of the underlying pathogenic factors is called *Samshodhana* (purification therapy). *Acharya Sharangadhara* explains that *Kushta Roga* arises due to the predominance (*Bahulyata*) of *Doshas*, which are often *Tiryagami* (aggressive and vagrant) and difficult to control with *Shamana Aushadhi* (pacifying medicines). *Acharya Vagbhata* recommends the administration of *Snehapana* (internal oleation) to the patient during the *Purvarupa* (early or prodromal) stage of the disease.^[9]

Acharya Charaka advises that in *Vata*-dominant *Kushta*, *Virechana* (therapeutic purgation) should be performed first, followed by *Niruha Basti* using *Madhuphaladi Siddha Taila*. Since *Kushta* is a *Tridoshajanya Vyadhi*, treatment should initially target the predominant *Doshas* before addressing the secondary or associated (*Anubandha*) *Doshas*. The frequency and choice of *Panchakarma* procedures reflect the extent of *Dosha* involvement in the disease. *Shodhana* therapies are recommended in cases of *Bahudoshaavastha* (severe *Dosha* aggravation). For *Kapha*-predominant or *Dosha-otklesha Kushta*, *Vamana Karma* (therapeutic emesis) is prescribed as per *Charaka Chikitsasthana*,^[10] while *Raktamokshana* (bloodletting) is performed every six months, *Virechana* monthly, and *Vamana* every fifteen days.

Shamana therapy is an essential aspect of *Kushta* management, especially following the completion of *Shodhana Karma*, as it aids in pacifying any residual *Doshas* and maintaining the balance achieved through purification.

In today's fast-paced lifestyle, where dedicating time to *Shodhana* therapy may be challenging, *Shamana* therapy offers a practical and effective alternative. *Charaka* recommends the use of *Tikta* and *Kashaya* substances in *Shamana* therapy, which are particularly beneficial when applied after *Samshodhana*. External therapies also play a vital role in managing *Kushta Roga*, as the skin (*Twacha*) is both the site of disease involvement (*Sthanasamasraya*) and its visible expression (*Vyaktasthana*). The importance of external applications is further emphasized in classical texts through numerous references to *Lepa Yoga* formulations.

DISCUSSION

Skin diseases recognized in modern medicine can be closely associated with *Kushtha Roga* in Ayurveda, a chronic condition that is often challenging to manage. Its pathogenesis is influenced by multiple factors, including diet, lifestyle, environmental exposures, genetic predisposition, and immune system dysregulation, with psoriasis serving as a prominent example. Psoriasis is a persistent, complex, inflammatory disorder characterized by hyperproliferation of keratinocytes, resulting in rapid turnover of epidermal cells. It commonly affects areas such as the elbows, knees, scalp, lumbosacral region, intergluteal folds, and glans penis, and approximately 30% of patients may also experience joint involvement. From an Ayurvedic perspective, an imbalance in *Kapha Dosha* is believed to trigger immunological changes that contribute to psoriasis development. *Kushtha Roga* is further classified into various subtypes, including psoriasis, eczema, and leprosy, based on severity and clinical features. Psoriasis, marked by scaling, inflammation, and itching, is closely associated with disturbances in *Vata* and *Kapha Doshas*, where *Vata* promotes dryness and scaling, and *Kapha* leads to accumulation and thickening of the skin.

Ayurvedic treatment aims at restoring the balance of the *Doshas*, particularly *Kapha*, through detoxification therapies such as *Panchakarma*, along with dietary regulation and the use of medicinal herbs. Anti-inflammatory herbs like Turmeric (*Curcuma longa*), Guduchi (*Tinospora cordifolia*), and Guggulu (*Commiphora wightii*) are frequently employed to alleviate symptoms and mitigate the severity of the condition.

In modern medicine, psoriasis is managed using a range of approaches, including topical therapies, systemic medications, phototherapy, and biologic agents.

These treatments work to reduce inflammation, regulate the excessive proliferation of skin cells, and modulate the immune system's involvement in psoriasis. The interplay of environmental and genetic factors underscores the complexity of the disease, which, although manageable, often requires lifelong care. Psychological stress is also recognized as a major trigger or aggravating factor, a concept that aligns with modern observations. Similarly, in Ayurveda, the mind (*Mana*) is closely linked to overall health, and disturbances in mental or emotional balance can manifest as physical disorders, including skin conditions such as psoriasis.

A comprehensive understanding of psoriasis from both modern medical and Ayurvedic perspectives enables a holistic approach to treatment, addressing not only the physical symptoms but also the mental and emotional well-being of the patient, which is essential for managing this chronic condition.

CONCLUSION

Kushtha is one of the oldest known diseases and is regarded as a chronic and persistent condition in Ayurveda. The skin's role in sensory perception, communication, and its connection to mental health (*Mana*) underscores the close interrelationship between physical and psychological well-being in Ayurvedic thought. Ayurvedic treatments employ a combination of pharmacological and non-pharmacological approaches, integrating herbal formulations, lifestyle modifications, and stress management techniques to enhance immunity and support skin health. This holistic approach aims to restore harmony between the mind and body while addressing the underlying causes of dermatological disorders. By focusing on stress reduction and immune strengthening, Ayurveda provides a natural and often safer alternative for managing skin conditions, frequently with fewer side effects than conventional therapies.

REFERENCES

1. Panda M, Deshmukh S and Thakre T. Case Report: Management of Dadru Kushtha (Tinea Corporis) by Shamana Chikits [version 1; peer review: 2 approved with reservations, 1 not approved]. *F1000Research*, 2024; 13: 26. [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
2. Kaushik H, Singh Tomar B, Kumar Chawla S, Role of Gandhak Rasayan in Kshudra Kushtha - A Review Article. *J Ayu Int Med Sci*, 2024; 9(3): 168-172. [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
3. Akshatha K. Shirwar, Ashwinikumar S. Bharati, An Ayurvedic Management of Kitibha Kushta (Plaque Psoriasis) - A Case study. *J Ayu Int Med Sci*, 2022; 7(6): 194-199 [[Crossref](#)][[PubMed](#)][[Google Scholar](#)]
4. Christopher E. M. Griffiths, Psoriasis: future research needs and goals for the twenty-first century, *Dermatologic Clinics*, 2004; 22(4): 493-499, ISSN 0733-8635, <https://doi.org/10.1016/j.det.2003.12.001> [[Crossref](#)][[PubMed](#)] [[Google Scholar](#)]

5. Rozy Sharma, Manjunatha Adiga. Review on the disease Kustha and its management in Ayurvedic literature. *J Ayurveda Integr Med Sci.*, 2021; 2: 59-64. [*Crossref*][*PubMed*][*Google Scholar*]
6. PS Berbi, Sourabha S Kokatnur, Ayurvedic management of Kitibha Kushta - A Case Study. *J Ayu Int Med Sci.*, 2022; 7(1): 390-398. [*Crossref*] [*PubMed*][*Google Scholar*]
7. PS Berbi, Sourabha S Kokatnur, Ayurvedic management of Kitibha Kushta - A Case Study. *J Ayu Int Med Sci.*, 2022; 7(1): 390-398. [*Crossref*] [*PubMed*][*Google Scholar*]
8. Kuldeep, Sheetal Verma, Sakshi Awasthi, Vikas, An overview of Kustha and its management approaches in Ayurvedic texts. *J Ayu Int Med Sci.*, 2023; 8(6): 93-96. [*Crossref*][*PubMed*][*Google Scholar*]
9. Rozy Sharma, Manjunatha Adiga. Review on the disease Kustha and its management in Ayurvedic literature. *J Ayurveda Integr Med Sci.*, 2021; 2: 59-64. [*Crossref*][*PubMed*][*Google Scholar*]
10. Lee HJ, Kim M. Challenges and Future Trends in the Treatment of Psoriasis. *Int J Mol Sci.*, 2023 Aug 28; 24(17): 13313. doi: 10.3390/ijms241713313. PMID: 37686119; PMCID: PMC10487560 [*Crossref*] [*PubMed*][*Google Scholar*]