



ISSN 2320-3862

JMPS 2016; 4(2): 109-114

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Received: 17-01-2016

Accepted: 19-02-2016

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Dermatophytosis (Qooba) a misnomer infection and its management in modern and unani perspective -A comparative review

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Abstract

Dermatophytosis is a roughness of the surface of the skin, which is associated with itching, scaling, and dryness. Sometime fish like scales may also shed off. It may be black or red in colour. Usually the periphery is red and occasionally there may be oozing of yellowish fluid. All these condition develop according to pathogenic substances. Earlier it was thought that, these organisms are plant, therefore, it is actually a misnomer infection. Its concept and treatment is very well described in Unani medicine. In this review article we made an attempt to discuss the infection in the light of modern and unani perspective and its management in both system of medicines.

Keywords: Dermatophytosis, misnomer infection, unani perspective, infection spreads

Introduction

Worms don't cause ringworm. Rather, this superficial skin infection, also known as tinea, is caused by fungi called dermatophytes. Fungi are microscopic organisms that can live off the dead tissues of your skin, hair, and nails, much like a mushroom can grow on the bark of a tree. Ringworm is characterized by a red ring of small blisters or a red ring of scaly skin that grows outward as the infection spreads. Though children are especially susceptible to catching ringworm, it can affect adults as well ^[1].

In unani literature, qooba is a superficial fungal infection, of keratinised tissues. The infection is commonly designated as Tinea, it is caused by dermatophytes which are a group of taxonomically related fungi belonging to more than 40 closely related species, classified into three genera, viz; Microsporum, trichophyton, and epidermophyton. They are capable of colonising keratinised tissue such as stratum corneum of epidermis, nails, and hair. By their metabolic activities, they evoke inflammatory response in the form of erythema, vesiculation, pustulation, microabscess formation, and scaling. Etc. It has been described by names like Daad, Qooba, Paryun. Various eminent scholar have given a detailed account of this disease. Basically, most of them regard morbid humours as the main culprits. Unani system of medicine is a treasure trove for effective and innocuous drugs and various renowned unani physicians have recommended various drugs and formulations for its treatment Qooba resembles saafa ^[2] especially safa e yabisa. It may be be huzaz but according to some huzaz is the qooba of scalp ^[3].

Views of Ancient Philosophers Regarding Qooba (Ringworm)

As far as the history of Qooba, and ancient unani literature is concerned, it was Hippocrates, the father of medicine, who gave an ample space and new direction to medical thoughts with his humourol theory.

The first recorded reference to a dermatophyte infection is attributed to Aulus Cornelius Celsus, the roman encyclopaedist, who in the treatise *De Re Medicina* written around 30- A.D. described a suppurative infection of the scalp that came to be known as the Kerion of Celsus ^[4]. Dioscorides in 60 A.D. gave the description of Qooba in children's and its treatment in *De Materia Indica* ^[5].

Jalinoos (Galen of Pergamon, 129-200 A.D.) considered to be the most distinguished physician of antiquity after Hippocrates, described qooba, its cause and treatment and classified it into acute and chronic in his book *Mayameer* ^[5].

Rabban Tabri (810-895 A.D.) in his book *Firdaus ul hikmat*, has made a mention of qooba, its causes and treatment based on humoual theory.

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He classified qooba into three types viz; Qooba damwi- which occurs due to fasad and ratubat e fasida, Qooba ratubi- which occur due to fasad e ratubi and ufunat (infection) and Qooba saudawi- which occur due to khilt e sauda [6]
Zakariya Razi (850-923 A.D.), the author of *Al hawi fit tib*, described qooba quite broadly and classified it into Qooba ratab and Qooba yabis. Besides, he also gave various regimens, for its treatment. he also mentioned that application of oil is beneficial in the treatment of Qooba [5]

Dermatophytes Classification

Trichophyton. – This genus contains 22 species. The important ones are *T. Rubrum*, *T. Mentagrophyte*, and *T. Violaceum*. This genus includes both human and animal species. It affects the hair, the glabrous skin, and the nails [7].

Microsporum – this genus contains 17 species, the important one being *M. Audouinii* and *M. Canis*, they mainly affect the hair and less commonly the glabrous skin. Nails are usually not affected [7].

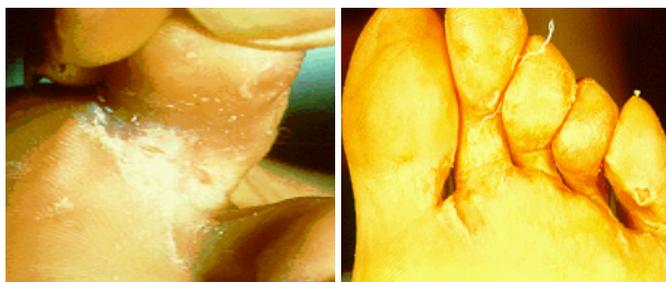
Epidermophyton - this genus has two known species, of which only *E. floccosum* is pathogenic. It affects the human skin and the nails sparing the hair [7].

Season Which Predisposes Dermatophytosis

It is a disease of *fasl e kharif* (rainy season) [2]. Majority of Dermatophytosis are seen during the rainy season. The frequency of fungal infection varies with seasons. The highest numbers of tinea pedis and cruris occurred in summer while tinea capitis, corporis, and unguium occurred in spring and winter months [8]

Tinea Pedis

Infections by anthropophilic dermatophytes are usually caused by the shedding of skin scales containing viable infectious hyphal elements [arthroconidia] of the fungus. Desquamated skin scales may remain infectious in the environment for months or years. Therefore transmission may take place by indirect contact long after the infective debris has been shed. It is important to recognise that the toe web spaces are the major reservoir on the human body for these fungi and therefore it is not practical to treat infections at other sites without concomitant treatment of the toe web spaces. This is essential if a "cure" is to be achieved. It should also be recognised that individuals with chronic or subclinical toe web infections are carriers and represent a public health risk to the general population, in that they are constantly shedding infectious skin scales [9].



Tinea pedis caused by *T. rubrum*. Sub-clinical infection (left) showing mild maceration under the little toe and more severe infection showing extensive maceration of all toe web spaces [9]

Tinea Unguium (Dermatophyte Onychomycosis)

Trichophyton rubrum and *T. interdigitale* are the dominant dermatophyte species involved. As the name suggests, lateral subungual onychomycosis begins at the lateral edge of the nail

and often spreads to involve the entire nail bed and nail plate. In proximal subungual onychomycosis, the fungus invades under the cuticle and infects the proximal rather than the distal nail bed causing yellowish-white spots which slowly invade the lunula and then the nail plate [9].



Tinea of the nails caused by *T. Rubrum* [9]

Tinea Corporis

Tinea corporis refers to dermatophytosis of the glabrous skin and may be caused by anthropophilic species such as *T. rubrum* usually by spread from another body site or by geophilic and zoophilic species such as *M. gypseum* and *M. canis* following contact with either contaminated soil or an animal host [9].



(A)

(B)

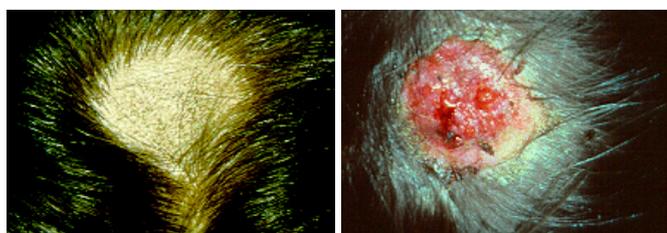
(A)- *Tinea corporis* caused by *T. rubrum* in Australian Aborigines living near Darwin in the Northern Territory [9].

(B)- *Tinea corporis* caused by *M. canis* following contact with infectious kittens [9]

Tinea Capitis [9].

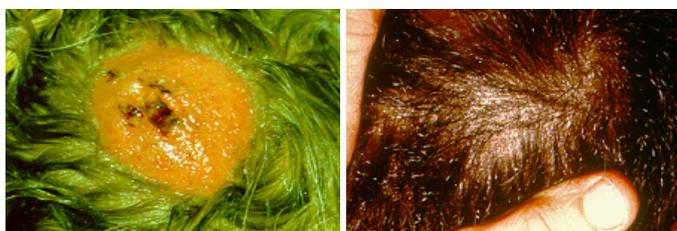
Tinea capitis refers to dermatophytosis of the scalp. Three types of in vivo hair invasion are recognised:

1. Ectothrix invasion is characterised by the development of arthroconidia on the outside of the hair shaft. The cuticle of the hair is destroyed and infected hairs usually fluoresce a bright greenish yellow colour under Wood's ultraviolet light. Common agents include *M. canis*, *M. gypseum*, *T. equinum* and *T. verrucosum*.
2. Endothrix hair invasion is characterised by the development of arthroconidia within the hair shaft only. The cuticle of the hair remains intact and infected hairs do not fluoresce under Wood's ultraviolet light. All endothrix producing agents are anthropophilic eg *T. tonsurans* and *T. violaceum*.
3. Favus usually caused by *T. schoenleinii*, produces favus-like crusts or scutula and corresponding hair loss.



(A)

(B)



(A)

(B)

(A)- *Tinea capitis* showing extensive hair loss caused by *M. Canis* [9].

(B)- "Kerion" lesion caused by *M. Canis* [9].

(C)- "Kerion" lesion caused by *T. verrucosum* following contact with cattle [9].

(D)- *Endothrix tinea capitis* (left) caused by *T. Tonsurans* [9]

Tinea Faciei

It is the dermatophyte infection of the face apart from the moustache and beard area. It is commonly caused by *T. Rubrum*. And *T. mentagrophytes*. it usually presents as erythematous, slightly scaling, pruritic lesion with indistinct borders. It is associated with photosensitivity.



Tinea faciei- inflamed papule [11]

Laboratory Diagnosis [12, 13]

Clinical material- Skin Scrapings, nail scrapings and epilated hairs. For a laboratory diagnosis, clinicians should be aware of the need to generate an adequate amount of suitable clinical material. In patients with suspected dermatophytosis of skin [tinea or ringworm] any ointments or other local applications present should first be removed. In cases of vesicular tinea pedis, the tops of any fresh vesicles should be removed as the fungus is often plentiful in the roof of the vesicle. In patients with suspected dermatophytosis of nails [onychomycosis] the nail should be pared and scraped using a blunt scalpel until the crumbling white degenerating portion is reached. It must be stressed that up to 30% of suspicious material collected from nail specimens may be negative by either direct microscopy or culture. A positive microscopy result showing fungal hyphae and/or arthroconidia is generally sufficient for the diagnosis of dermatophytosis, but gives no indication as to the species of fungus involved. Culture is often more reliable and permits the species of fungus involved to be accurately identified.

Direct microscopy- Skin Scrapings, nail scrapings and epilated hairs should be examined using 10% KOH and Parker ink or calcofluor white mounts.

Culture- Specimens should be inoculated onto primary isolation media, like Sabouraud's dextrose agar containing cycloheximide (actidione) and incubated at 26-28C for 4 weeks. The growth of any dermatophyte is significant.

Serology- Not required for diagnosis.

Management (Modern Medicines) [12, 13]

Treatment of dermatophytosis is often dependant on the clinical setting. For instance uncomplicated single cutaneous lesions can be adequately treated with a topical antifungal agent, however topical treatment of scalp and nail infections is often ineffective and systemic therapy is usually needed to cure these conditions. Chronic or widespread dermatophyte infections, acute inflammatory tinea and "Moccasin" or dry type *T. rubrum* infection involving the sole and dorsum of the foot usually also require systemic therapy. Ideally, mycological confirmation of the clinical diagnosis should be gained before systemic antifungal treatment is commenced. Oral treatment options for dermatophytosis are listed below.

Table 1: Oral treatment options for cutaneous fungal infections [12].

Infection	Recommended	Alternative
Tinea unguium [Onychomycosis]	Terbinafine 250 mg/day 6 weeks for finger nails, 12 weeks for toe nails.	Itraconazole 200 mg/day/3-5 months or 400 mg/day for one week per month for 3-4 consecutive months. Fluconazole 150-300 mg/ wk until cure [6-12 months]. Griseofulvin 500-1000 mg/day until cure [12-18 months].
Tinea capitis	Griseofulvin 500mg/day [not less than 10 mg/kg/day] until cure [6-8 weeks].	Terbinafine 250 mg/day/4 wks. Itraconazole 100 mg/day/4wks. Fluconazole 100 mg/day/4 wks
Tinea corporis	Griseofulvin 500 mg/day until cure [4-6 weeks], often combined with a topical imidazole agent.	Terbinafine 250 mg/day for 2-4 weeks. Itraconazole 100 mg/day for 15 days or 200 mg/day for 1week. Fluconazole 150-300 mg/week for 4 weeks.
Tinea cruris	Griseofulvin 500 mg/day until cure [4-6 weeks].	Terbinafine 250 mg/day for 2-4 weeks. Itraconazole 100 mg/day for 15 days or 200 mg/day for 1week. Fluconazole 150-300 mg/week for 4 weeks.
Tinea pedis	Griseofulvin 500mg/day until cure [4-6 weeks].	Terbinafine 250 mg/day for 2-4 weeks. Itraconazole 100 mg/day for 15 days or 200 mg/day for 1week. Fluconazole 150-300 mg/week for 4 weeks.
Chronic and/or widespread non-responsive tinea.	Terbinafine 250 mg/day for 4-6 weeks.	Itraconazole 200 mg/day for 4-6 weeks. Griseofulvin 500-1000 mg/day until cure [3-6 months].

Unani Management

In unani system of medicine the management of qooba is according to the causative agent i.e. akhlat (humorous), severity of the disease, duration of the disease, clinical manifestations etc. as we know, unani system of medicine is usually based on the tanqiya e badan which in turn is a step taken after nuzaj wa istigraaf. As the basic cause of qooba is disarrangement in sauda, so the mainstay of treatment is based on the removal of sauda from the body. Galeez madda (thick morbid matter) is eliminated by using the drugs which have the property of tahleel, taqti, talteef, etc. And for the removal of hot and thin morbid matter those drugs are used which possesses the property of taskeen and tarteeb [2]. In spite of oral drugs, there are many topical applications which are frequently advised for the same. Apart from this, some kind of regimental therapy are being in use for this disease. Ibn e sina has recommended, leeching, bathing, and alteration in dietary habits and providing moist and wet environment, avoiding dryness. Etc. Ibn e sina held leeching as the best therapy for qooba. Hammam is also a good option for treatment of qooba as per ibn e sina sayings [2]. Leeching also advised by various other scholars like Zakariya Razi [5, 14]. As a prophylaxis as well as treatment luk e maghsool and sibr (aloe) along with matbookh rehani (decoction) can be used². Application of warm and luke warm water is also beneficial. Fasd (venesection) and hijamat bil shurt (wet cupping) has also been found beneficial by unani scholars [15, 16].

Management According To Dominating Humour

Jins-e-damwi: venesection is done at the nearest possible site, for the removal of morbid matters, detergent (ghassal) drugs should be applied locally.

Tila: the following drug combinations in the form of topical application are advised.

Kharapza, ushna, arad baqla, and nakhood etc.

Samagh arabi, samagh farsi, ushq, vinegar.

Mazu, vinegar.

Application of roghan e gandum is also indicated [5, 6, 17].

Leeching can be done if these regimens fails [6]

Jins e ratubi: matbookh aftimoon and ayarij fiqra for the removal of morbid fluid is used [6].

Gargle: decoction of maveezaj, Aqarqarha in honey water [6].

Tila: the following drug combinations in the form of topical application are advised [6].

Aqlimia zahab, and hartal should be ground in gulnar and gul e surkh, mixed into vinegar

Aspand, kandash, and turbud, ground and mixed with vinegaer.

Grounded asafoetida root mixed with vinegar can be massaged over the affected area. Also a saliva and the tartar of a fasting person may be applied locally [6].

Jins e saudawi: this is the worst among all types of qooba, and it does not respond easily. Therefore removal of morbid saudawi matter is essential. Use of matbookh aftimoon and logazia, with aab e halela siyah and zabeeb is indicated for the same. Vanesection of basilica vein is also indicated [6].

Tila: wax, fats of ducks and cocks should be applied locally and regularly [6].

Treatment Depending On the Morphology of the Disease

If the disease is acute, superficial, and localised, local application is usually enough. Roghan gandum, roghan e als,

roghan e badam talkh, roghan e narjil, butter and ghee etc. Wax mixwd with kateera and sibr, can also be used as tila [14, 15, 17, 18].

If the disease is at a stage where it has penetrated beyond the skin into the muscles, then relatively more potent drug like ushq, mixed with vinegar should be applied after leeching [17, 18]

If the disease is chronic and situated in the deeper tissues, then the management is started with the removal of morbid saudawi matters from the body by venesection and ishaal using decoction of aftimoon and maul jubn. For local application very potent drugs which are haad and muhammadir like hartal and khardal, are used until fresh bleeding occurs. After this healing is facilitated by using appropriate drugs [17, 19, 20, 21]. Hijamat bil shurt (wet cupping) over the lesion and hammam are also indicated in this stage [15].

Some formulations for local application by unani scholars are as follows:

- Vinegar+ seeds^[19]/rasot/murmuki/asafoetida/hummas/samagh arabi/zaravand mudahrij/roghan e badam talkh [22] ushq/reddish
- Vinegar+ roghan e gandum+ zaravand+ zarnikh+ ushq+ mukil+khardal+ zaj [23]
- Vinegar+ cinnamon+ honey [22]
- Honey+ chukandar/water/garlic/suddab [22]
- Ushq+nakchakni+henna [19]
- Ushq+vinegar+lemon juice [17]
- Lemon juice+roghan e gul [22, 26]
- Sulphur+kundur+zaj+sibr+samagh arbi [2]
- Sulphur+tukhm e shadnaj/ilakul batan [22]
- Sulphur+kaat safed+sugar+opium [21]
- Curd+sabus gandum+olive oil [22]
- Tukhm e panwar+mercury [21]
- Zaft e romi+mom zard [22]

Some compound drugs for local application with specific names are;

- Habb e qooba [22]
- Habb e tila [22]
- Habb e dad [22]
- Zimad dad [22]
- Marham e dad [25]
- Marham e zararih [19]
- Marham e qooba [26]
- Roghan e qooba [27]

Azadirachta Indica (Neem) Antifungal Property

The pharmacological action of neem pertaining to Qooba is Daaf-e-amraz-e-saudawi (Melanogogue) [28], Daaf-e-jarasim (antimicrobial) [28], Mubarrid (refrigerant) [29], Mudammil (cicatrizant) [32], Muhammil (antiinflammatory) [28, 30, 31, 32], Mulattif (emollient) [33, 34], Maqami muharrik (locally stimulant) [29], Musaff e khoon (blood purifier [29]) [30, 31, 32], Musakkin (anodyne) [28, 30], etc.

Persons of saudawi Mizaj (malencholic temperament) are more afflicted by the disease. According to Ibn e Sina, the disease is mainly caused by sauda, but some type of Qooba may be damwi also [2]. He has also mentioned that, some (yabis/dry) types may even occur due to istehala and ehtraq balgham- e- shor, which ultimately convert into sauda, making it dry [2]. Itching is the cardinal symptom of Dermatophytosis, the severity of itching is directly proportional to abnormal khilt e raqiq, although both treatment are equally effective but in a study which is done to compare the therapeutic effect of the two as mentioned above i.e. flucanazole and neem, it was found

that, the response of neem in relieving itching started earlier. The effect might be due to, musakkin (anodyne), and musaffi e khoon (blood purifier) effect of neem. In some patient itching is associated with burning and pricking sensation and this may be relieved due to mubarrid (refrigerant) and mulattif (emollient) action of neem. Its direct role in itching has also been mentioned in khaza e nul advia.

Erythema is an important sign of qooba, although erythema is relieved significantly by both the drugs but statistical study as mentioned above revealed that, neem is a better option. The response is due to muhallil (anti-inflammatory) action of neem. In a pharmacological study, sodium nimbinate, a soluble salt of alkaloid nimbin, showed anti-inflammatory activity [35]. Neem oil and its constituents- sodium nimbinate, and nimbidol showed considerable anti-inflammatory activity comparable to cortisone [36].

The overall efficacy of neem can be explained on the basis of daf e amraz saudawi (melanogogue) [28]. Property and most of the times, qooba occurs due to sauda. Therefore tanqiya (elimination) of sauda is required, and this can be accomplished by neem due to the said property. Above all, the most challenging property of neem is that, it is daf e jarasim (antimicrobial). Its antifungal activity has been proved by various scientific studies. Various unani physicians used to prescribe roghan e neem (neem oil) to the patient of qooba. Leaf extract has also been found to have antidermatophytic activity [37].

Other Medicinal Herbs and Propolis Which Have Antifungal Activity against Fungal Pathogen Associated with Dermatophytosis

The suppressor activity of alcoholic extract of some herbal drugs (*Thymus daenensis*, *Satureja bachtiarica*, *Althaea officinalis*) and Propolis on some strains of fungal dermatophytes (*Trichophyton mentagrophytes*, *Trichophyton verrucosum* and *Microsporum gypseum*) which is an important agent of human and animal's pathogens. Propolis extract suppressed the growth of all fungi with different degrees. Also among used herbal plants, a high dose of *Satureja bachtiarica* suppressed the growth of *Trichophyton mentagrophyte* and *Trichophyton verrucosum*. It can be concluded that instead of chemical drugs, these natural substances can be used widely in pharmaceutical and health care industries for control of fungal diseases [38]. Propolis is a complex mixture of several resinous substances known as a safe natural bee product and has been used in folk medicine. Propolis can be used to treat *Candida* and *Malassezia* infections. The most susceptible species to Propolis are *Microsporum gypseum*, *Trichophyton mentagrophytes*, and *Trichophyton rubrum*. *Candida albicans*, *C. glabrata*, *Trichosporon spp.*, and *Rhodotorula spp.* are susceptible to low concentrations of Propolis, the latter showing a higher susceptibility. Interestingly, in all three fungi, Propolis has more inhibitory effect than griseofulvin. The ethanolic extract of *S. bachtiarica* had a limited effect on *Trichophyton mentagrophytes* and *Trichophyton verrucosum* growth. At any concentration, *Thymus daenensis* and *Althaea officinalis* had no effect in fungi growth. The essential oils of *Thymus daenensis* had the moderate activity against some fungi (*Fusarium oxysporum*, *Aspergillus flavus* and *Alternaria alternata*) in comparison with the other plants' essential oils [38].

Discussion / Conclusion

Dermatophytosis is very well documented in ancient classical manuscripts. Although it does not lead to mortality, even now and then the condition may become extremely pesky and at times may become abashing too. Even with the too much

advances in the field of medicine, the prevalence of infection is high that poses notable morbidity. In this paper we reviewed the concepts of Dermatophytosis in unani and modern terms. As we know, the incidence of cutaneous fungal infection have steady rise, and the available therapeutic drugs although have effectiveness for the same condition with some adverse effects too and this required a better alternative treatment as well to avoid treatment failure and relapses by modern drugs at some instances. In the recent decades, the interest in evaluating therapeutic effects of plants and animal products has increased dramatically as 80% of the world's people rely on complementary and alternative medicine for their health care needs. The use of synthetic drugs accompany with side effects, so we decided to review the effect of some herbal extract and propolis on dermatophytosis. From our review comparative study, we found that, Unani medicines asserts to serve the purpose by providing an ample amount of drugs. Further review and clinical trial should be done so that the complete cure for the disease can be achieved. The results of this study indicate the antifungal activity of ethanolic extract of above mentioned medicinal herbs and roghan e neem and leaf extract of neem and propolis in Dermatophytosis caused by different species of fungi. The strong antifungal activity of Iranian Propolis may be due to high total phenolic and flavonoid contents and can be used in treatment of dermatomycosis in human and animals. There are numerous questions yet to be answered concerning chemical compositions and antibacterial properties of Iranian Propolis and further research is required for clarification.

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