

Judham, Baras, Wadah, Bahaq and Quwaba': A Study of Term and Concepts in "Al Qanun Fit Tib" of Ibn-Sina

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Summary

Judham and *Baras* were confused at a very early time before Islam, and this confusion is still widespread to the present day. On the other hand, *Baras* was also confused with other terms and concepts, like *Wadah* and *Bahaq* in Arabic medical literature, which stigmatized these terms as being related to *Judham*. Western scholars tend to consider that all these terms indicate leprotic lesions or different types and stages of leprosy. Some of them include also other descriptive terms such as: *Bayadh*, *Barash*, *Raqash*, *Sala'*, *Baqa'*, *Raqat*, and *Quwaba'*, even if they were used to describe other skin disorders. In this study the meaning of these terms as described in *Al Qanun of Ibn-Sina* was elucidated according to the contemporary scientific medical knowledge.

Key words: Al Qanun fit Tib, Ibn-Sina, leprosy.

The Old Testament described a skin disorder "*Zara'ath*, *Sara'at*, *Tsara'ath*" associated with uncleanness, religious and moral impurity, and considered it to be a Divine punishment. The OT prescribed isolation of the afflicted away from societies, and no one is allowed back unless the Cohen declares his cure and the patient undergoes rituals of cleansing which includes several sacrifices. Most biblical scholars agree that *Zara'ath* does not indicate leprosy, and that it was confused with Vitiligo, Psoriasis, Favus, Scabies, Impetigo, and other skin disorders.(1)

Zara'ath was translated into the Greek word *Lep-ra*¹ in the New Testament, which became later the term used to name Leprosy in Latin and all European languages. The New Testament did not describe *Lep-ra* like the Old Testament, but it became loaded with all ambiguity, uncleanness and ritual impurity of the old biblical word *Zara'ath*.

Greek and Latin physicians followed these concepts about leprosy, condemned lepers with moral

impurity, intense irresistible sexual desires, and believed that leprosy is highly contagious and patients should be avoided and isolated away from societies (2).

Thus, religious and medical basis for establishing the inhuman and cruel laws against lepers during middle ages in Europe which included moral, and social stigmatization, isolation and persecution of patients depriving them from all civil, religious and personal rights.

Zara'ath was also translated to the Arabic word *Baras* which became also confused with *Judham* (Leprosy) in pre-Islamic societies.

Baras was the only disease mentioned in Quran in relation to the miracles of Jesus Christ, without elucidating its meaning or providing any description of the disease.

Judham and *Baras* were mentioned in several prophetic sayings (Hadith), and they were later con-

¹ Lepra means "the scaly disease"; an unknown disease described by Hippocrates.

fused in religious literature of Quran interpretation and Islamic legal texts (Fiqh).

The degree of confusion between *Judham* and *Baras* was very variable over a wide range of spectrum, so that both words were almost synonymous especially in the concepts and writings of Arab Christians, probably due to the influence of the biblical concepts of the Old and New Testaments. On the other end of the spectrum *Judham* and *Baras* were completely separated and distinguished from each other, with variable degrees of confusion in between the two extremes. Confusion between *Judham* and *Baras* was maintained in Arabic medical literature in addition to other related words like *Bahaq* and *Wadah*, probably due to the dominance of religious concepts on the minds of Arab physicians. Middle Ages are known to Europeans as dark ages, but to the Arabic and Islamic world it was the age of enlightenment and renaissance. This was started towards the end of the eighth century with the translation of Greek and Latin sciences and medicine to Arabic, and reached its summit during the reign of al Khalifa al Ma'mun who built *Bayt al-Hikma* (House of Wisdom: a type of academy), encouraged and sponsored translation of foreign sciences by huge sums of money.

The age of translation and assimilation of Greek and Latin medicine was followed by independent thought with compilation of Arabic medical textbooks and encyclopedias that were started at about the middle of the ninth century.(3)

Nearly every Arabic physician writer wrote about Leprosy either in special letters or books or in their famous encyclopedic works with "*Firdaws al-Hikma*" (The Paradise of Wisdom) being the first one, and written by Ali ibn Sahl ibn Rabban al Tabari in the middle of the ninth century. Michel Dols reviewed all Arabic medical chapters on Leprosy (*Judham*), *Baras* and related disorders systematically in chronological order, including Yuhanna ibn Massawayh, Ali ibn sahl al Tabary, Abu Ya'aqub al kindy, Thabet ibn qurra, Mohammed ibn Zakareya al Razey, Yuhanna ibn Serabiuon, Ali ibn Al Abbas al Majusy, Abu Ali al Husein Ibn-Sina, Abu Marwan ibn Zuhr, Abul Qasem al Zahrawi, and ibn al Quff (4). Abu Ali al-Husein Ibn-Sina wrote the most detailed description of *Judham*, *Baras* and related disorders in Arabic

medical literature in his famous medical compendium "*al-Qanun Fi t-Tib*" (The Organon of Medicine, or The Law in Medicine), which remained as a bible of medicine all over the world for about 500 years, almost to the seventeenth century.

I will review in detail the description of leprosy and related disorders in al-Qanun as a paradigm of Arabic medical literature, in addition to being the most important and most common and influential among them East and West.

Judham in Al-Qanun

Ibn-Sina wrote a "Chapter on Nature and Causes of *Judham*", covering first its theoretical side, then a "Chapter on Signs", describing its symptoms and signs, followed by a larger "Chapter on Treatment".

Starting with the theoretical part we come with the following conclusions:

"Judham is a bad illness caused by the diffusion of black bile in the whole body, corrupting the temperament of organs, their structure and shape, and may later destroy their connection so that organs are eaten up and fall out resulting in ulceration ." (6:56/18)

Like previous medical writers he called it "*Da' al-Asad*" (the Leonine Disease), because it commonly affects lions, or because the patient's face looks like a lion or because the illness kills its patient like a lion do with its prey, and considered it also to be both hereditary and contagious (6). He describes also environmental factors which may help contracting leprosy, i.e., Predisposing factors, including bad air, contact with lepers, hot climate, bad types of diet like fish, dried meat, heavy meats, donkey meat, and lentils (6). Ibn-Sina also followed Galen and other Latin and Arab authors in relating leprosy to cancer:

"If cancer, which is Judham of a single organ, is incurable, what you could then say about Judham, which is a cancer of the whole body?"(6).

Ibn-Sina differentiated three types of leprosy, namely:

"The type produced by heaviness of the blood is safer, milder and do not ulcerate",

"The type produced by choleric (yellowish) black bile is more irritant, more malicious, more difficult in

symptoms, more burning and more ulcerating, but it is more liable to treatment."

"And the type resulting from burnt black bile is similar to the choleric (yellowish) type in its symptoms, but is less liable to treatment." (6)

This means that the first is the "melancholic" type, i.e.; due to excess of crude black bile, producing heaviness and turbidity of the blood, and the second is the "choleric" caused by yellow bile transformed into black bile, and the third is due burning of black bile.

It is apparent, however that the second and third types are similar to a great extent and almost equal to the second type of *Judham* described by Al Majusy, except that Ibn-Sina made one of them more liable to treatment than the other. Michael Dols and Tawfeeq Hanna Bachour concluded that the first type refers to tuberculoid leprosy and the second to lepromatous leprosy (4, 5).

Onset, progress, and spread of *Judham* was also clearly elucidated as follows:

"It starts first in the extremities and soft organs, and there, hair becomes dispersed and organs change in color, and may lead to ulceration, then it creeps slowly and progressively to the whole body", "until it reaches the main organs, and there it kills" (6).

The next part of this chapter was about signs of the disease, and it presents an excellent, clear, detailed and comprehensive description of the symptoms, signs and complications of *Judham*, as follows: The early symptoms of *Judham* in the face, eyes and upper respiratory tract are thus described: *"When Judham starts, color begins to redden; a redness to black color, and eyes become dark to red in color", "Respiration becomes difficult with hoarseness of voice", "Sneezing becomes frequent with nasal tone".*

The changes of hair and nails were described as follows: *"Hair starts to become thin and less dense", "Dispersion of hairs, with thinning and fall out specially that of the face and its sides. Even the location of hairs in the skin may be plucked out, and nails are cracked".*

Ulcerations and mutilations of the extremities and changes of facies were also clearly described: *"The*

appearance becomes featureless, and face becomes dull, and color blackens", "Lips are thickened and color blackens", "The cartilage of the nose is eaten up, the nose and extremities fall down, and fetid pus runs down".

Cutaneous and subcutaneous nodules which appear in different parts of the body were described as "Glandular Appendages" (*Zawayed*), and some psychiatric symptoms were also mentioned: *"Melancholic tempers appear with pride and derision, and melancholic dreams become more frequent" (6).*

From these descriptions of *Judham* we can conclude almost certainly that Ibn-Sina was describing Lepromatous Leprosy clearly and excellently, almost as we know it today to be an infectious disease caused by *Mycobacterium leprae*. Moreover, we can also conclude that the term "*Judham*" was restricted exclusively to lepromatous leprosy, and unlike other terms was never used to describe any other disease.

It should be noted, however, that Ibn-Sina - like all other previous medical authors- did not mention the neurological signs of leprosy, and this proves that most of medical knowledge was derived from books and relied on the highly praised wisdom of the ancients, not on the experience derived from clinical observations. However, this problem is still as relevant to our present day practice as it was to old generations.

Abul Qasem Khalaf al-Zahrawi, who lived in Cordoba in Andalusia, was the first physician to give a high priority to surgery and practiced it himself and described many surgical instruments and operations, and was the first to incorporate medicine and surgery in one discipline and considered both of them to be the two faces of a single coin. Al-Zahrawi wrote a long chapter on leprosy in his great medical and surgical textbook "*Al Tasreef*", and described for the first time the neurological signs and loss of sensations of the extremities (4), and that was just a short time before Ibn-Sina wrote his book *al-Qanun*. Communications between Eastern and Western parts of Islamic countries was not possible at that time, and neurological signs and symptoms did not appear in the Eastern Arabic medical books except in *Al-Omda fi al-Giraha* (The Dependable in Surgery) of Ibn- al-

Quff (4), in the thirteenth century, almost 200 years since the era of Ibn-Sina.

To return to the chapter on *Judham* of Ibn-Sina, we note also that there is no indications what so ever to the early stages of leprosy, tuberculoid leprosy, polymorphic types of leprotic skin lesions, which are very difficult to diagnose even today.

Al Majusy and Ibn-Sina described two types of leprosy, one producing amputation of extremities and is no doubt lepromatous leprosy, and the other type is more benign and causes no amputation of extremities. Dols and Bachour concluded that the latter is tuberculoid leprosy. This could be reasonable, and may even satisfy our bride, but the descriptions provided by old Arab physician writers are purely hypothetical and related to the type of humors that were changed within the body and caused each of them. The descriptions are not clinical or practical, so that we can prove that they conform with the symptoms and sign of tuberculoid leprosy as we know today. Failure to point out to loss of sensations in the extremities or in the affected skin patches is a strong argument against their suggestion. In addition, tuberculoid leprosy is not always benign, and it can cause amputations and deformities of the extremities in a way not much different from that of lepromatous leprosy.

Bahaq, Wadah and Baras in *Al-Qanun*

It was mentioned previously that *Judham* was confused with *Baras*. On the other hand, *Baras* was also confused with *Wadah* and *Bahaq*.

This confusion, however, does not allow us to accept the very simplistic view which suggests that all these words and others were always indicating one type of leprosy or the other, or to refer always to early or some type of specific leprotic skin lesions.

Manfred Ullmann, the famous orientalist, historian, and specialist in linguistics, considers that leprosy was known as *Judham*, *Baras*, or *Wadah*.(3).

Michael Dols considers that these terms and other descriptive words used in non medical sources such as *Barash*, *Bahaq*, *Bayadh*, *Raqash*, *Sala'*, *Baqa'*, *Raqat*, in addition to *Quwaba'* and *Qawabi* are also indicating leprosy. Although he raises several objec-

tions against these generalizations especially with the Arabic words indicating "whiteness", which is never a sign of leprosy, yet he decided to consider all these words to be indicative of leprosy because of uncertainty of their meanings and because they were discussed together in Arabic medical literature (4). These arguments are not convincing, because we can actually find out the predominant meaning of most of these words as they were actually used.

Ibn-Sina wrote "A Chapter in *Bahaq*, *Wadah*, and *Baras*", which in contrast to the previous chapter on *Judham*, is lacking clarity of concepts, with confusion of terms, lack of definitions and order, inadequate descriptions, and difficult style of expression, so that it is incomprehensible even to the native Arabic speaker. These difficulties, however, does not preclude a serious study of this chapter with exclusion of its redundant parts, advancing some of the phrases, with reorganization of the pertinent facts in a new order to make it more comprehensible. Here we come with the first group of conclusions, concerning the theoretical side of the causes and nature and classification of these disorders: *Baras* and *Bahaq* are distinct from each other; as *Bahaq* is superficial on the surface of the body or only of a very shallow depth, unlike *Baras*, which is deep and penetrating into the skin, flesh and bone. Both *Baras* and *bahaq* are due to corruption of blood by an excess of phlegm. When phlegm is thin and the pushing power is strong it reaches the superficial skin layers producing *bahaq*. In contrast, when phlegm is thick and the pushing power is weak, its internal movement is slow so that it penetrates organs and stuck there, corrupting their temperaments (6).

Sheikh Ibn-Sina classified each of *Baras* and *bahaq* into two types according to their color, so that we have four diseases, namely; *Baras Abyadh* (White *Baras*), *Baras Aswad* (Black *Baras*), *Bahaq Abyadh* (white *bahaq*), *Bahaq Aswad* (black *bahaq*).

He states that : "the difference between the two types of *bahaq* is that one of them is produced by a melancholic material, while the other is due to a crude phlegmatic material."(6). This means that white *bahaq* is due to a crude or original phlegm, while black *bahaq* is due to a melancholic material transformed into a phlegmatic material.

The second group of conclusions from this chapter are dealing with the practical matters, i.e., with clinical findings and descriptions of these diseases, which are more important than the previous hypothetical group, because they could be applied for the recognition of these diseases according to the present state of medical scientific knowledge.

1. Black *Baras*:

Sheikh Ibn-Sina gives a very accurate description of this disease:

"Black Baras is a genus of disease opposing in meaning to that of white baras, because black baras is itself that disease known as al quwaba' u al muta-qashsheru, and it is a procelainization of the skin, with severe roughness, and shedding of scales like those of fishes with itching." Then he adds the following hypothetical sentence: *"It is a precursor of leprosy and as bad as it is, and similarly its chronic form is incurable"* (6).

The first sentence is definitely clear in stating that black *baras* is quite different disease, and unrelated to white *baras*, and is classified in a different group of diseases, that of "al qwabi". Moreover, it defines its specific subtype as "al quwaba' al mutaqashsher".

The second phrase is, however, problematic and is the source of all confusion and misconceptions about black *baras*, and is most probably the cause that led most of Western scholars to consider black *baras* a type of leprosy. The key for understanding the contradiction between these two phrases is in estimation of the relative weight and importance of each of them in relation to each other, and in relation to the present state of knowledge. The second phrase is completely theoretical, without any evidence to support the possibility of its occurrence, or indication to the future complications and it leaves us without any means to verify its validity, in addition to being in distinct contradiction to the first phrase. It is incomprehensible how black *baras* is quite different from white *baras*, or opposing to it in meaning, and to be at the same time a precursor of leprosy, the more fearful and serious disease.

The first phrase, however, is practical and offers an accurate clinical description of skin changes, that we can rely upon for the identification of the disease it describes.

Accordingly, Black *Baras* is hard cutaneous spots like porcelain severe roughness of their surface and formation of scales which desquamates like those of fishes with itching.

Therefore, if we ignore the hypothetical second phrase, we can conclude that the description of these skin changes is almost certainly consistent with *Psoriasis* as we know it today.

Ibn-Sina kept black *baras* within this group of diseases for purely theoretical reasons related to the nature of philosophical medicine and its reliance on the humeral theory in the explanation of the causes of diseases.

Cyril Elgood, however, interpreted Black *Baras* to be definitely leprosy, probably depending on the assertions of the second phrase of Ibn-Sina, and he added that it could also describe Pellagra and Ichthyosis (4). I believe that the latter two diseases could be accepted in the list of differential diagnosis of black *baras*, remembering that both of them are quite rare, but I disagree that it could indicate leprosy, which we know very well that procelainization, desquamation and scale formation, are not among its characteristic signs. Even if one of these signs or the other occur in one of the polymorphic types of leprosy, I don't think that all these signs could gather in the same way as they do in psoriasis. Perhaps, we should finally remember that the biblical word "*Zara'ath*" was confused with Psoriasis and Vitiligo in particular, in spite of the fact that it was also confused with other skin disorders.

2. Black *Bahaq*:

No description of black *bahaq* is given, but Ash-Sheikh Ar-Raies gives us many clues to extract its meaning and clinical description as follows:

"As regards black bahaq, it presents no problem",

"The difference between black bahaq and black baras is desquamation, scale formation, and procelainization which do not occur in black bahaq", "*Black*

baras is also variable, with a rough and a smooth type", "The smooth type of the two blacks is good because it is *bahaq*, which may be far different from the color of the body, or very close to its color, and this is safer" (6).

From these statements we conclude first, that black *bahaq* is a very well known skin disease that needs no special description except in differentiating it from black *baras*; the disease to which it is related by name only but not in appearance.

Second, we can extract the clinical description of black *bahaq* as: superficial smooth soft spots without hardening of the skin, desquamation or scale formation, and their color is variable from dark color to pale whitish close to the normal skin color.

Stettler-Schar concluded that black *bahaq* could be identified as scleroderma circumscripta, or spotted-shaped lesions of leprosy (4).

Cyril Elgood, however, did not believe that black *bahaq* referred to leprosy lesions, but he interpreted it as Addison's disease or chronic malaria (4). I agree with the first part of Elgood's conclusion, but the explanations he offered are not reasonable because Addison's disease is very rare, and chronic malaria produces non-specific diffuse skin pigmentations, and both are incompatible with the description of a very common skin disease like black *bahaq*. If we depend on the description of black *bahaq* that we have just concluded from the description of Ibn-Sina, we can see that it is quite consistent with *Tinea versicolor*, which is one of the commonest superficial skin fungus infections.

Another proof supporting this explanation is that *Tinea versicolor* is still to the present day known publicly as *bahaq* in many Arab countries including Yemen, Iraq and Sudan. Most people in these countries recognize *bahaq* to be a very benign skin pigmentation unrelated to any serious disease like leprosy, and many patients even do not bother themselves to seek treatment.

3. White *Bahaq* & *Wadah*

Ibn-Sina introduced the word "*Wadah*" as a medical term for the first time in Arabic medical literatu-

re, although it was popular and in common usage since early pre-Islamic period, and he also used the euphemistic word "*Barash*" as a synonym of *Baras*. Ibn-Sina did not present any description of white *bahaq*, but he states that:

"The problem is in differentiating *Wadah*, which is itself white *bahaq*, from *Bad baras* (*al baras al ra-dea*')." (6).

We conclude first, that *Wadah* and White *Bahaq* are synonymous describing a single skin disorder. This means, in our view, that Ibn-Sina did not introduce the word *Wadah* as a new medical term to clarify confused meanings and concepts. Rather he introduced it as a descriptive word to record the fact that the skin disorder *wadah* which people know very well, is itself the same disease that physicians know by the medical term white *bahaq*. The text also indicates that *wadah* is very well known to everyone and needs no further description or explanation except in differentiating it from white *Baras*.

Then he describes the signs which could differentiate the two diseases, and these signs were also mentioned by most of the previous medical writers, as follows:

"One of the differences between them is that hair arises on *Wadah* in the same color of hair; black it was or blond and it arises on *Baras* exclusively white."

"The skin is more depressed on it (*Baras*) than the skin of other areas of the body, and this may also occur in *Wadah*, but it is very little."

"Also, pricking with needles cause blood to come out from *Wadah*, but from *Baras* non -blood comes out, only a watery fluid, and this is incurable".

"Also, spots which become reddened by massaging are more hopeful and more probable to be *Bahaq*, but lesions which did not redden on massaging are bad".(6).

We can easily extract clinical description *Wadah* or white *Bahaq* from the above statements as: superficial, soft, glistening white spots, not depressed below the surface of the skin or only very slightly depressed, and hair arising from them retains its original color, black it was or blond. The skin is otherwise healthy in all other aspects. According to the present

state of knowledge this description is almost typical for vitiligo, and more specifically its generalized type, which is characterized by destruction of melanocytes in the superficial skin layers and associated with autoimmune disorders.

Elgood, however, concludes that white *bahaq* could be an early stage of white *Baras* which could be leprosy, but white *Baras* could equally refer to vitiligo (leukoderma), and scleroderma.⁽⁴⁾ Michel Dols was less conservative, and considered *wadah*, white *bahaq*, and *Baras* are referring specifically to tubercloid leprosy (4, 7).

In my belief, there is no confusion between *Bahaq* and *Wadah* on one hand and leprosy or Judham on the other hand, but there was confusion between these words and the word *Baras* which is really confused with *Judham*.

Last, but not least, *Bahaq* is still to the present day the word used by lay people to indicate *vitiligo* in most Arab countries. As I mentioned above, this word *Bahaq* is also used by people to mean *T. versicolor*.

It was always perplexing to me how people in Arab countries use the word *bahaq* to mean both vitiligo and *tinea versicolor* at the same time though it is clear that they differentiate between them clearly, and I used to simply explain this contradiction by confusion and ignorance. I realize now that it is not a matter of mistake or confusion, but it is part of their folklore medical heritage of these words and concepts, and that people actually mean white *bahaq* and black *bahaq* when they speak of vitiligo and *Tinea versicolor* respectively. People, however, do not specify the type or color of *bahaq*, because it is usually clear from the context of the case they are talking about. The tendency of people everywhere and in different cultures for abbreviation and omitting obvious words that could be understood through context is common, probably as being considered unnecessary details.

I believe that the persistence of these words with their meaning and concepts to the present day is a very strong historical linguistic evidence to support my conclusions, which should be taken with a very

high level of trust and significance not less than, and may even be superior to, written documents.

4- White *Baras*:

We come lastly to the most ambiguous and most confused word with Judham; i.e., *Baras* or white *Baras*. The first thing to be noted from the text provided by Ibn-Sina is that any reader of this part will come out with an impression that true white *baras* or bad *baras* is a whiteness of the skin very similar to white *bahaq* (vitiligo), but is more serious and incurable.

Ibn-Sina, however, did not mention why bad *baras* is serious, and did not indicate that it is a precursor of leprosy and did not connect it directly or even implicitly with leprosy, or refer to the complications which may develop in future time. In addition,

This means that the relation between bad *baras* and leprosy is no more than an impression in the mind of the reader produced by the ambiguity of the text, and the prejudice arising from his previous knowledge of the confusion between *baras* and *judam*. The unclarity of the text is, in my view, due to the lack of a clear vision in the minds of old Arab physicians, and to confusion of words and concepts in the minds of Ibn-Sina and other medical writers under the influence of the divine books of the three Semitic religions over a very long period of time. Overcoming these difficulties was certainly impossible. In addition, Ibn-Sina described one of the causes of secondary vitiligo which follows cupping, and certainly, this type of *Baras* or whiteness is not related to leprosy.

Second, we can also extract the clinical description of white bad *baras* to be: superficial shining white, smooth skin spots and the color of hair arising from them is always white. They could be slightly depressed below skin surface and are abnormal in such a way that they are not reddened by massaging and exude only a colorless fluid when pricked by needles¹.

Elgood concluded that White *baras* could be leprosy, but it could equally refer to vitiligo (leukoderma) and scleroderma (4). I agree with Elgood that white *ba-*

² - This may be due to decreased blood and nerve supply

ras could refer to both leprosy and vitiligo, but not equally as he stated. Rather, white *baras* was predominantly used to refer to vitiligo in the vast majority of cases, and only occasionally did it indicated leprosy.

Dols, suggests that the whiteness of the skin in the Arabic description of *Baras* and *bahaq*, *Wadah* may have referred to scaling or hypopigmentation occurring in the early stages of dimorphous leprosy, or the macular and infiltrative lesions of tuberculoid leprosy (4). Undoubtedly, very early lesions of vitiligo could be hypopigmented, and may be mistaken for tuberculoid leprosy for sometime, but the shining white spots indicated by the words *wadah*, white *bahaq*, and white *Baras* are very difficult to be mistaken with leprotic lesions, particularly those slightly hypopigmented, pale, anesthetic patches of tuberculoid leprosy.

In the light of present scientific medical knowledge, it is evident that ancient physicians followed biblical inscriptions blindly, and gave more significance to the color of hair in the affected areas, considering whiteness of hair a bad sign that could differentiate benign white *Baras* or *Wadah* from a more serious form of the disease.

Ibn Sina himself, however, did not mention whiteness of hair among the signs of *Judham*. We know today that leukotrichea, as well as shiny whiteness, are signs of vitiligo, and could never be signs of leprosy, which produces thinning, dispersion and loss of hair. Leukotrichea occurs in many patients with the generalized type of vitiligo that is associated with autoimmune disorders, but it almost always occur in the segmental type of vitiligo, which is associated with dysfunction of the sympathetic nerve supply in the affected segment.

This means in our view that segmental vitiligo first, and generalized vitiligo that caused leukotrichea second, are the appropriate interpretation in the vast majority of patients of white *baras*.

However, this interpretation does not explain the other signs provided by Ibn-Sina and most of classic authors, namely; depression of the spots under skin surface, non-reddening of the affected areas by massaging and exudation of whitish fluid, not blood, when pricked by needles.

These signs cannot be, of course, explained on the basis of vitiligo that we know leaves the skin completely normal in all aspect apart from loss of melanocytes in the affected areas. These signs could be consistent, however, with certain stages of lepromatous leprosy, in which changes of the superficial skin layers occurs due to necrosis and loss of nerve and blood supply, before the stage of ulceration, gangrene, and amputation is established.

Therefore, another explanation of white *baras* could be thought of when all the four signs of Ibn-Sina are collectively present, namely, vitiligo associated with early stages of lepromatous leprosy.

I believe that these interpretations are not only reasonable, but also could explain the difficulties that ancient physicians were facing in the diagnosis and differential diagnosis of these diseases, which led to the confusion of terminology and concepts and much of the unclarity and ambiguity of their descriptions. This confusion in concepts and terms and mistakes in diagnosis is, however, not peculiar to ancient physicians, but is still common today in many fields of medicine. The association between vitiligo and lepromatous leprosy is unknown in ancient times, and probably could never be known, but a recent study had proved the association between these two diseases, and this supports our interpretation of white bad *baras*. This study came from the Islands of Martinique in West Indies, where the researchers found vitiligo in 11 of 101 patients with lepromatous leprosy (10.9%), in comparison with none among 364 patients with tuberculoid leprosy (0%), and a prevalence rate of vitiligo of 0.34% among general population. This difference, suggested the authors, can be explained by the immune disturbances which occur in both vitiligo and lepromatous leprosy (8).

Lastly, I must point to the fact that physicians in old ages, until the establishment of clinical medicine in the late eighteenth century, did not used to do a bedside physical examination as we do today. The physician may listen to the patient for a while in silence and wisdom, observing him at distance, and may then palpate the pulse and look at the urine flask, before prescribing treatment and medications. Even, the mere exposure of the patient's body or just touching him may be considered impolite, or unethical in most instances.

Therefore, I doubt very much that they were actually testing patients of white bad *baras* by pricking their skins with needles to verify whether blood comes out or a colorless fluid, for if they were actually doing that they would have discovered loss of sensations in the affected lesions and extremities at a much earlier time. To recapitulate, white *baras* in the vast majority of cases was vitiligo associated with leukotrichia in the segmental type, or the more common generalized variety. In the remaining small minority of cases white bad *baras* is vitiligo associated with lepromatous leprosy.

Al Quwaba' and Al Qawaby

These words are said to be confused with leprotic lesions, or may indicate leprosy in the writing of some scholars including Manfred Ullmann, Michel Dols and Paul Richter. Richter, for example, interpreted *quwaba'* as ulceration of lepromatous nodules (4). These words, however, were never confused with the other words presented in the title of this study and discussed above, neither among ancient nor contemporary Arabs. The cause of this confusion is evident as *al qawaby* were discussed in one chapter with those disorders like *bahaq* and *baras* by old Arab medical authors.

This did not mean, however, that these diseases were confused with *quwaba'* or they have a similar appearance. It means only that these diseases were theoretically related to each other, as explained by the humoral theory which formed the basis of philosophical medicine at that time.

These diseases were discussed together due to the nature of philosophical medicine which was based on the doctrine of four humors, and attributes different diseases to changes in the nature of one of the internal body humors (blood, phlegm, yellow bile, and black bile), or their balance or changes in the different forces acting on them like transforming force, pushing force, attracting force, or to a combination of these factors. The resultant disease is a final manifestation or a net result to the multiple different possible combinations of the effects of these factors.

Ibn-Sina, like all other Arabic medical writers, also related these disorders to each other and explained them by the changes in the internal bodily environment: "*Black bile could rush to one organ producing hardness or scirrhous³ or a cancer according to its nature, and if it was thin it produces Aakila⁴, and if it was rushed to the surface of the skin it produces what is known of barash, Black Bahaq, Al-Quwaba', and the like*" (6).

Ibn-Sina, however, discussed *Al Sa'afa* and *Al-Quwaba'*, in separate chapters, though he related them to each other to the extent of considering them different manifestations of one and single disease:

"*Quwaba' is not distant from Sa'afa, It is only different by a hidden thing*", "*Dry Sa'afa is similar to a more bad and malignant Quwaba'.*" , "*And the cause of Quwaba' is near to the cause of Sa'afa*". (6).

It is evident that there is confusion here between *Sa'afa* and *Quwaba'*, but not between any of them and the different diseases discussed previously, particularly leprosy. In addition, Ibn-Sina described *Sa'afa*, but in the next chapter about *Al-Quwaba'*, he only enumerated the types of *qawabi*, and this could be understood that the description of *Sa'afa* is also applicable to *Quwaba'*, and it comes as clear as this:

"*Sa'afa is one of the group of ulcerating eruptions*", "*It starts as well-formed eruptions, light and scattered in several locations, then ulcerate with necrotizing ulcers, being reddish in color, and pus may run down from them*" (6).

Ibn-Sina then enumerates their different types; like humid (sanguineous or non-sanguineous), dry, ulcerating, desquamating (like black *baras*), necrotizing (gangrenous), recent (acute), chronic, progressive, and stable.

This description is clearly consistent with *Al-Quwaba'*, as we know it today as Impetigo, the bacterial skin infection caused by several types of bacteria, the commonest of which is streptococcus and staphylococcus.

In conclusion, *judham*, *baras*, *wadah* and *bahaq* have been confused in Arabic medical literature, but

³ A type of carcinoma

⁴ Itching and ulceration spreading in depth eating its way out. It could probably be the locally- malignant Basal Cell Carcinoma.

I find no justification to include *quwaba'* and *qawabi*, between these confused terms and concepts.

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