International Journal of Advanced Biotechnology and Research (IJBR)
ISSN 0976-2612, Online ISSN 2278–599X,
Vol-9, Issue-1, 2018, pp1418-1423
http://www.bipublication.com

**Research Article**

# Latest Research on Erythrasma: An Evaluatory Study from Pakistan

## ABSTRACT

Skin infections are very common throughout the world. The prevalence of skin infections has been reported as follows: pyoderma (prevalence range 0.2-35%, 6.935% in Pakistan), tinea capitis (1-19.7%), scabies (0.2-24%, 1.3-17% in Pakistan), viral skin disorders (0.4-9%, mainly molluscum contagiosum), pediculosis capitis (0-57%). Bacterial skin infections are the most common type of skin infections. The most common bacterial skin infections are reported as impetigo, folliculitis, furunculosis and abscesses, cellulitis, scarlet fever, erysipelas, erythrasma, necrotizing fasciitis and some others. In addition to these, etyma, carbunculosis, and mycobacterium skin infections are discussed in this review. The latest research gives us the information on the recent change in the bacterial etiology and treatment of bacterial skin infections. The increase in methicillin-resistant S. aureus (MRSA) in impetigo has recently shown us the necessity of being more careful in regard to its treatment. There are also new measures to prevent skin infections, such as the use of maternal zinc supplementation.

**Objectives:** To investigate the study of erythrasma. To know the reasons of skin infections in the human body and find out the ways of treatment of the disease.

**Materials and Methods:** This cross sectional study is completed in different hospitals of Lahore, Karachi, Islamabad, Peshawar, Gujranwala, Multan, Sialkot, Queta and other cities of Pakistan. . An aggregate of 200 patients were incorporated into this examination, amid the period from February to November– 2017. A detailed set of observations was conducted on the infected patient of erysthrasma.

**Results:** 42 patients out of the total of 300 patients did not adhere to management of the disease. Dissent to management of disease was mostly in the old age victims.Side impressions following treatment and absence of awarenesswas observed to be the common cause of the disease.

**Conclusions:** Treachery was considered to be the most part because of side effects of the medicine and lake of awareness about disease providing the awareness about the different attributes of the erythrasma and a some actions to overcome the dangerous disease.

**Keywords:**Skin infections, bacterial research,Erythrasma,Epidemiology.

## INTRODUCTION

Skin infections are very common throughout the world[1], family physicians, dermatologists and many other specialty doctors treat these infections frequently during their daily practice[2]. The prevalence of these infections may vary from one region to another. Therefore, it can be difficult to single out one of these infections as the most common. According to the report of the World Health Organization on the Epidemiology and Management of Common Skin Diseases in Children in Developing Countries in 2005, the prevalence of skin infections was stated as follows: pyoderma (prevalence range 0.2-35%, 6.9-35% in Pakistan), tinea capitis (1-19.7%), scabies (0.2-24%, 1.3-17% in Pakistan), viral skin disorders (0.4-9%, mainly molluscum contagiosum), pediculosis capitis (0-57%)[3]. This report shows us that the most common skin infection was bacterial, followed by fungal, parasitic and viral infections in children. In another study in which adults were included, fungal infections were the most common presentation (39.0%) and males were more commonly affected than

females[3]. Some of the skin infections may be attributed to poor hygienic conditions, which may be more prevalent in developing countries. However, bacterial, fungal and viral skin infections are common throughout the world even in developed countries with the best hygienic standards. It has been reported that skin infections (bacterial, viral, fungal) make up 42-65% of the total skin morbidity in children in general practice.

This article will summarize the latest information on the epidemiology of bacterial skin infections by giving the data of mostly the last decade on the most common bacterial skin infections and their features in both developing and developed countries.

## BACTERIAL SKIN INFECTIONS

A man presents itself with a lesion on his scalp. That has a thick crust with underlying purulent material. What is the mostprobable diagnosis? These are Ecthyma, Erysipelas, Furunculosis, and Impetigo.

Andrews et al. reported that more than 111 million children in the world are believed to have pyoderma, with many also co-infected with scabies, tinea, or both. There are many kinds of bacterial skin infections[4]. The most common are reported as impetigo, folliculitis, Furunculosis and abscesses, cellulitis, scarlet fever, erysipelas, erythrasma, necrotizing fasciitis and some others. In addition to these, etyma, carbunculosis, and mycobacterium skin infections will be discussed in this section[4].

Ecthyma:- Ecthyma is an ulcerative pyoderma of the skin due to staphylococci or streptococci. Begins as a pustule that later erodes to an ulcer. Clinically suspected of staphylococcal etyma due to the golden color of the pus. The presence of large clusters of gram-positive cocci confirms the diagnosis of Staphylococcus Ecthyma [5].

### The skin diseases

The skin and its annexes constitute the main structural defense barrier of the organism against external agents, being formed by 3 layers: epidermis, truly protective layer, more superficial and avascular; dermis, and subcutaneous cellular tissue (TCS), deeper layers and with blood supply. There is a constant balance between microorganism and host, so that the elimination of this balance can favor the development of infection [6]. Guest defenses. Integrity of the cutaneous barrier (most important factor: atopic dermatitis, chickenpox or wounds, favor the development of infection), saprophyte flora (resident flora, especially coagulase negative Staphylococcus, Propionebacterium or Corynebacterium), fatty acids, immunity[7]. Virulence of the microorganism. Skin colonization by transient flora (skin with continuity solution, contact with colonized people), toxins, etc[8]. Some factors that can alter this balance and favor skin infections are moisture, increased temperature, various diseases or immunosuppression, or the use of antibiotics. In this chapter, unless expressly commented, we are going to refer to children without basic pathology.

PATHOGENY

The cutaneou[9]s manifestations of a bacterial infection can be produced by several fundamental mechanisms. Primary local infection with in situ replication of the bacteria, such as impetigo, Circulating exotoxins: staphylococcal scalded skin syndrome, Immunological mechanisms, such as vasculitis in streptococcal infection, Skin involvement as part of a systemic picture: meningococcal sepsis, Manifestation of disseminated intravascular coagulopathy, as it also occurs in meningococcal sepsis or in some Rickettsia infections[10].

### Erythrasma

Erythrasma is a chronic bacterial infection due to corynebacterium minutissimum[10]. Clinically it affects the interspaces of the toes, the axillary folds and the groin (Figure 8). It is usually diagnosed as a dermatophytic infection.

In Turkey, in patients with interdigital foot lesions, the prevalence of erythrasma is 46.7%. The disease is more prevalent in men[11].

Erythrasma is usually seen in patients with diabetes mellitus. The differential diagnosis of erythrasma includes psoriasis, dermatophytosis, candidiasis and intertrigo. Wood's light examination and bacterial and mycological cultures are used for differentiation purposes. Erythromycin 250 mg four times daily for 14 days is the treatment of choice and other antibacterial include tetracycline and chloramphenicol. Systemic erythromycin treatment demonstrates cure rates as high as 100%. Topical solutions such as clindamycin, Whitfield's ointment, and sodium fusidate ointment and antibacterial soaps may be required for both treatment and prophylaxis[12].

**Summary of latest research on erythrasma**

Topical fusidic acid proved to be the most effective treatment; however, clarithromycin therapy may be an alternative regimen in the treatment of erythrasma because of its efficiency and better patient compliance.[57]

**Figure 1.** Impetigo: Red papules with adherent yellowish squam.

**Figure 2.** Ecthyma: Erythematous, well demarcated border, peripheral hemorrhagic crust and central erosion

**Figure 3.** Folliculitis: Multiple follicular pustules that coalesce

**Figure 4.** Furuncles: Erythematous red nodule with pustules

**Figure 5.** Carbuncle: Necrotic crust on well defined-bordered ulcer surrounded by erythematous plaque

**Figure-**Erysipelas: Erythematous, sharp bordered, shiny macules

**Figure 7.** Cellulitis: Erythematous elevated plaque, with uncertain border

## MATERIALS AND METHODS

The microbiology laboratory must have available to the clinician all the necessary tests for diagnosis and patient care to serve. But not all tests can be performed in the laboratory, therefore it must decide which will be made there, which will be sent to a reference laboratory and which will be that laboratory. The needs of patients will dictate the number and variety of methods that the laboratory will offer. Based on historical and predictive numerical studies of the tests requested, the laboratory can discontinue underused tests that are costly and of poor quality. On the other hand, before deciding to implement a new diagnostic test, it must be previously selected. The knowledge of the population will influence this decision, because a test varies according to its efficiency to detect a positive result in relation to the prevalence of this disease in the population. Generally, performance measures of a test include sensitivity, specificity, and positive and negative predictive values. Inherent in the determination of the sensitivity and specificity of a test, the gold standard or gold standard, is the parameter with which the test is compared.

This is not always possible to perform. There are, for example, new antigen detection tests such as tests for respiratory syncytial virus that may be more sensitive than and just as specific as conventional culture. In such circumstances, the performance of a test against standard methods should not be judged. When the conditions for a comparison with a gold standard are met, the sensitivity and specificity of a method is independent of the population of patients to be analyzed. Thus, laboratories do not need to conduct large studies to evaluate new tests and will use evaluations that were carried out by competent and respected microbiologists that were published in the scientific literature. The choice of a test should be based on the published performance and the utility detected by the laboratory, according to the prevalence perceived from the laboratory of the disease in question.

It is convenient to define at this time the concepts of sensitivity and specificity. The sensitivity of a diagnostic test can have different definitions. It can explain the ability of a test to detect small amounts of what is analyzed (for example, antibodies). Another definition of sensitivity determines that it is the ability of a method to detect positive cases (absence of false negatives). It can also be defined as the probability that a test is positive when the disease is present or the proportion of people with infection that react positively in the diagnostic test performed

### Analysis

A diagnostic test will be more sensitive when it detects a greater number of infected or sick people. The sensitivity of a test is calculated according to the following formula: Positive reagents x 100 Positive reagents + false negatives. The specificity of a test is the ability it has to correctly identify all the negatives (absence of false positives). Another definition is the probability that a test will be negative when the disease is not present or the proportion of people without the infection or disease that react as negative. For example, a test is more specific when it has fewer positive reactions among samples from people who do not have the disease. The specificity is calculated according to the following formula: No Reagents x 100. No Reagents + False positives on the other hand, the effectiveness of a test is the general ability to correctly detect all positives and negatives. It is a combination of sensitivity and specificity and gives an idea of the total effectiveness of a test.

It is necessary to consider that it is not the same to apply a test to a population with a high prevalence of a certain disease than to another population with a low prevalence of it. It is interesting to know the predictive values of these tests. The predictive value is the probability of having the disease determined by the result of the test. There are two types, the positive and the negative.

The positive predictive value is the probability of having the disease if the result of the test is positive and is calculated with the following formula:Positive reagents x 100Positive reagents + false positives. The negative predictive value

is the probability of not having the disease if the result of the test is negative and is calculated with the formula:No Reagents x 100No Reagents + false negatives
The predictive values of the tests are determined by sensitivity,

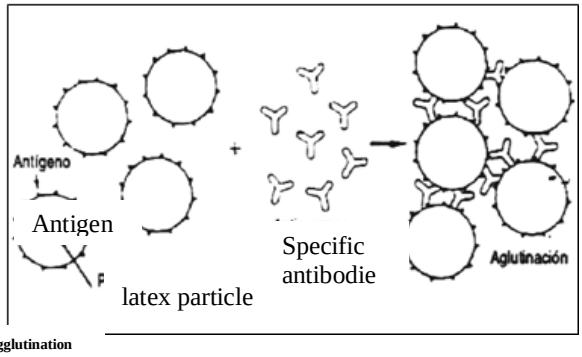
**Methods**

The cultivation and identification of specific pathogens from the materials collected from patients in whom an infection is suspected is the best diagnostic tool available, although not the fastest one. In some situations this study is difficult or even impossible, for example in rickettsiosis and syphilis.
In some cases, serology or other methods may be necessary, either because the conditions necessary for in vitro culture are not known or because of the risks involved in handling these microorganisms.
Today techniques are available to detect and quantify many specific markers of infectious diseases. On the one hand, immunological techniques are used to quantify specific immunoglobulins or detection of antigens in tissues; on the other hand, the introduction of molecular genetics in the clinical laboratory has been a great advance in this respect.

**RESULTS**

These tests are based on the detection of specific antibodies (Ac) that allow to indicate a certain microorganism present in an infection. The other possibility is the detection of soluble antigens (Ag) in the materials to be studied. They are all reactions of type antigen antibody (Ag-Ac).
The specificity of the antisera commonly used in the laboratory is usually very varied. Generally, microorganisms are a mosaic of exposed antigens. According to its specificity we can find three types of immunoglobulins: polyclonal, monospecific and monoclonal. For example, suppose that two bacteria A and B are different; that bacterium A has three different Ag on its surface and that bacterium B has an Ag identical to that of bacteria A, a unique Ag and an Ag that cross-reacts A. A polyclonal antiserum against bacterium A, it will recognize it in all its Ag, but it will also recognize B by the Ag identical to that of A and by the one that has a cross reaction with A. If we think of a monospecific antiserum against Ag in which B has a cross reaction with A, it will also recognize the two bacteria, both by specific recognition, and by cross-reaction. Finally, a monoclonal Ac will only recognize bacteria A, since there is no possibility of cross reaction. It is important to note that generally, all tests improve the specificity and sensitivity with monoclonal Ac, but its use must be assessed together with the needs, costs, etc. Although there are different techniques for the detection of Ag or Ac, all are based on different ways of evidencing an Ag-Ac reaction. The counter-immunoelectrophoresis (CIE) was one of the first techniques to be used. This is based on the negative charge presented by bacterial Ag in an alkaline medium, when subjected to an electric current; however, the Ac remain neutral. This technique is little used at present because it is less sensitive than others that developed later and of greater economic cost.

Schematic representation of an agglutination test.




**Agglutination**

**CONCLUSION**

In conclusion we say that to choose a diagnostic method, in addition to sensitivity and specificity, we must consider operational aspects of the techniques to be used such as the cost, the technical complexity of the test, the volume required and sample preparation, time which requires the process and commercial availability of the reagents of recognized quality. In addition, the level of complexity of the laboratory and the technological availability

and resources required by each technique must be considered.

## REFERENCES


[1] J. M. E. Ariquel and M. A. A. Miralles, "Pterostilbene (pter) for use in the prevention and/or treatment of skin diseases, damages or injuries," ed: Google Patents, 2018.

[2] A. Bonifaz, A. Armas-Vázquez, and A. Tirado-Sánchez, "Fungal Infections in Diabetics," in *Dermatology and Diabetes*, ed: Springer, 2018, pp. 117-132.

[3] D. L. KAPLAN, "Unicentric Castleman Disease," *Consultant*, 2018.

[4] D. L. KAPLAN, "Erythema Ab Igne," *Consultant*, 2018.

[5] J. Q. Del Rosso and S. M. Sachsman, "Oral Antibiotics in Dermatology: A Practical Overview with Clinically Relevant Correlations and Management Suggestions," in *Biologic and Systemic Agents in Dermatology*, ed: Springer, 2018, pp. 531-539.

[6] A. Miceli and K. Krishnamurthy, "Rash," in *Handbook of Outpatient Medicine*, ed: Springer, 2018, pp. 311-330.

[7] D. Hexsel and F. O. Camozzato, "Hyperhidrosis," in *Dermatology in Public Health Environments*, ed: Springer, 2018, pp. 1379-1393.

[8] J. de Avelar Breunig and M. O. R. Couto, "Seborrheic Dermatitis," in *Dermatology in Public Health Environments*, ed: Springer, 2018, pp. 429-447.

[9] E. Sydney, "Key History and Physical Exam," *Handbook of Outpatient Medicine*, p. 283.

[10] K. R. R. Schons, "Cutaneous Manifestations in Diabetes Mellitus," in *Dermatology in Public Health Environments*, ed: Springer, 2018, pp. 719-738.

[11] Y. J. Phulari and V. Kaushik, "Study of cutaneous manifestations of type 2 diabetes mellitus," *International Journal of Research in Dermatology*, 2018.

[12] S. J. Alter, M. B. McDonald, J. Schloemer, R. Simon, and J. Trevino, "Common child and adolescent cutaneous infestations and fungal infections," *Current problems in pediatric and adolescent health care*, vol. 48, pp. 3-25, 2018.