



Designing and Implementing Fuzzy Expert System for Diagnosis of Psoriasis

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ABSTRACT

Introduction: The differential diagnosis of Erythematous-Squamous disease is a very important issue in dermatology. These diseases include dermatitis seborrhea, lichen planus, Pityriasis rosea, Chronic Dermatitis and Pityriasis rubra pilaris. The differential diagnosis of psoriasis need to spend a lot of time and costs and incorrect or delayed diagnosis will lead to risky consequences for the patient. In this regard, a fuzzy expert system was created to diagnose psoriasis at any time and in any place.

Methods: In this study, an expert system is created to diagnose psoriasis based on fuzzy logic and rule-based database using MATLAB software. Also to test system the data from 190 patients with psoriasis was used among which 126 people with psoriasis were selected.

Results: The accuracy, sensitivity and accuracy of the system, was obtained 96%, 97% and 95%, respectively. The area under the ROC curve was obtained 0.97 and that of Kappa test was obtained 0.92 ($P < 0.001$).

Conclusion: Given the importance of early diagnosis of psoriasis, the use of expert systems can play an important role in preventing disease progression, reducing severe pain and costs.

Original Article:

Received: 30 Aug 2015

Accepted: 20 Nov 2015

Published: 07 Dec 2015

Keywords:

Knowledge-Based Expert Systems, Rules-Based Fuzzy Inference System, the Diagnosis of Psoriasis, Diagnosis Erythematous Group, Psoriasis

Introduction

Today the skin diseases due to factors such as bacteria, fungi, bad climatic conditions and exposition to intense sunlight have become prevalent (1). Psoriasis is a common skin disease and approximately one to three percent of the world's population is have this disease (2). The disease has a genetic predisposition and a dominant autosomal inheritance is seen in some families (3). The incidence of diseases is influenced by some environmental factors such as stress and in general we can say that the disease is dependent on environment genetics (4).

This disease is characterized by periods of exacerbation and remission that affects the patient mostly in terms of psycho and demoralizes and reduces the confidence of people and leads them to secrecy and isolation, and consequently inevitable psychological depression and incurable damages happen (2). Psoriasis often starts at a young age, but it can begin at any age, from the time of infancy to the old age. Men and women are almost equally affected by the disease (5). The aggravating factors are those such as infections, psychological factors, physical injuries, certain medications, sunlight hormonal and metabolic factors. England studies show that men and women with the disease die on average by 3.5 and 4.5 years earlier respectively (6).

Theoretical Foundations:

Skin with an area of between 1.2 to 2.2 square meters constitutes the largest organ of the body and serves important tasks such as protecting the body, regulating body temperature, and touching (7) psoriasis is a multi-factorial

chronic skin condition in which Autoimmune responses play a role. The disease occurs when system by sending faulty signals accelerates the growth of skin cells and defects the normal skin (2,4). Clinical signs and symptoms of the disease include redness, scaling, engagement of outer surfaces of the joints (such as knees and elbows), worsening of the injury by being hit, bumps, and sometimes it comes with itch (8,9). Psoriasis diagnosis is primarily a clinical diagnosis based which is done based on clinical findings. The differential diagnosis of psoriasis need to spend a lot of time and cost and incorrect or delayed diagnosis will lead to risky consequences for the patients (9). The patients of this collection are assessed with ten with clinical symptoms (8). Psoriasis is a compositional disease that affects other organs other than skin. In patients with psoriasis, the patient's risk to develop diseases such as arthritis, cardiovascular disease, hypertension, obesity, diabetes and autoimmune disease intensifies (11).

The differential diagnosis of diseases of the erythematous Group is a very important issue in dermatology. The diseases of such group include psoriasis, Seboric Dermatitis, lichen planus, Pityriasis rosea, Chronic Dermatitis and Pityriasis rubra pilaris. The diseases of such group have the same clinical symptoms in terms of redness and scaling (10).

Another disease that is associated with this disease, are those of the arteries and myocardial infarction (12 and 13). In the absence of timely diagnosis and treatment, the risk of severe disease progress and development of the erythroderma (redness all over the skin) and the loss of water and electrolytes, cardiac disorders and kidney and mortality