

# Management of Athlete's foot with topical Zinc Sulphate (15%) Solution versus Clotrimazole (1%) Solution

Saad D Hameed  (CABMS)<sup>1</sup> , Sarmad Y Abbood (FICMS)<sup>2</sup> ,  
Attaa A Alhajji (CABMS)<sup>3</sup>  
<sup>1,2,3</sup> Baquba Teaching hospital, Diyala , Iraq

## Abstract

### OPEN ACCESS

**Correspondence Address:** Saad D Hameed  
Baquba Teaching hospital, Diyala , Iraq

**Email:** [Sum\\_sum112233@yahoo.com](mailto:Sum_sum112233@yahoo.com)

**Copyright:** ©Authors, 2023, College of Medicine, University of Diyala. This is an open access article under the CC BY 4.0 license

(<http://creativecommons.org/licenses/by/4.0/>)

**Website:**

<https://djm.uodiyala.edu.iq/index.php/djm>

**Received:** 2 April 2023

**Accepted:** 6 August 2023

**Published:** 25 December 2023

**Background:** Athlete's foot (tinea pedis) is by far the commonest fungal infections of the integument in the developed world that usually begins between the toes. Multiple drugs were used for the treatment of athlete's foot and including both; topical and systemic agents. Zinc sulphate has been used as topical antifungal agent.

**Objective:** Comparison the efficacy of 15% zinc sulphate solution topically in the management of tinea pedis with topical clotrimazole solution.

**Patients and Methods:** A therapeutic, single blind, comparative, study of Zinc Sulphate solution (15%) in the management of tinea pedis in comparison with clotrimazole solution (both topically), that conducted in the Unit of Dermatology and Venereology ,Baquba Teaching Hospital, extended from March 2020- July 2021 . Fifty patients, 31 males and 19 females with tinea pedis were registered in this study. Divided to 2 groups of patients included in the study:

Group A: Use the topical zinc sulphate solution 15%.

Group B: Use the topical 1% Clotrimazole solution.

A complete history with examination clinically were done for all patients with tinea pedis involving all the relevant points. All patients were used the medicine twice daily for 30 days, and follow there to be seen every 14 days during the course of treatment and then follow up for two months. The patients were examined clinically; also the scoring of feet odor was done at each visit.

**Results:** Group A: Twenty five patients 9 (36%) females and 16 (64%) males were included in this group were treated by Zinc Sulphate solution , and their ages ranged between 27-73(47.8±12.18) years. and the duration of that illness was ranged from 1-120(43±46.61) months. Clinical response after one month of the treatment was 10(40%) patients with complete clearance, 5(20%) patients had partial clearance while 10(40%) patients showed no response.

Group B: Twenty five patients treated by clotrimazole solution, and their ages ranged from 24-65(43.2±11.83) years, and the duration of the illness was ranged from 1-180(30.24±44.9) months. Clinical response after four weeks of treatment was 19(76%) patients with complete response, 2(8%) patients had partial response, while 4(16%) patients have no response.

There was no statistical significance difference at two weeks in comparison between group A and B (chi square 5.37 P value =0.07) but was slightly significant at four weeks (chi square 6.65, P value =0.04). Side effects of treatment were mild which included itching and burning sensation in 4(16%) patients of group A and in 1(4%) patients of group B. These side effects did not require discontinuation of the treatment.

**Conclusion:** Clotrimazole solution was superior to 15% Zinc sulphate solution as effective as topical treatment for Athlete's foot.

**Keywords:** Tinea pedis, topical zinc sulphate, clotrimazole

## Introduction

Athlete's foot or tinea pedis is one of the commonest fungi that infect the skin in the humans being. Also its common superficial fungal infection in developed countries. The most frequent dermatophytes that cause it *Trichophyton rubrum* (the most common and the most stubborn). *T. mentagrophytes* var. *interdigitale* and less by *Epidermophyton floccosum*, and the most cases are caused by that one of three organisms. The infected individual acts as a carrier, since when the infection occur, the organism may lasting as long as in the host [1]. Athlete's foot is more common in the adult than in children and more in males than women. The infection with tinea pedis occurs by the contact directly with arthroconidia (that produced by the filaments of dermatophyt), wearing of the tightly-fitting shoes also enhance the infection and it's spreading (spores in occlusive footwear encourage relapses) [2]. The sharing of wash places, like the swimming pools, gymnasias, changing rooms of sports clubs and the public showers predisposes to infection [3]. Athlete's foot considered as chronic fungul infection that often with remission with treatment and relapse thereafter, so the management is consider usually not so easy. There are many systemic drugs and include; terbinafin,, itraconazole, and fluconazole. Topical antifungal medications like, allylamine,

azole, ciclopirox, tolnaftate and undecenoic acid have been used in the treatment of Athlete's feet [4]. Many of the drugs are used as antifungal drugs (azoles group and allylamines) that used currently in general practice for treatment of Athlete's foot have been shown to be less than satisfaction in eliminating the disease, even with good compliance from the treated patient. Azoles group that act as 14 $\alpha$ -demethylase inhibitor of fungi and prevent the synthesis of the ergosterol; however, azoles group also inhibit the cytochrome P450 enzymes of mammalian. Allylamines prevent the formation of squalene epoxidase, that enzyme is crucial for the formation the cell membrane of the fungi, and have no effect on the mammalian cytochrome P450-dependent enzymes [5, 6].

Odor in the Athlete's feet which is a common socio-medical issue, that could be caused either by the fungi of tinea pedis itself or by the associate microorganism like *Brevibacteria* (most one important for feet odor), as these microorganisms take the dead corneocytes on the feet and produce a cheesy odor and the sulfuric aroma, by the process that produce methanethiol from an amino acid (methionine). While *Propionibacteria* which present in the sebaceous glands ducts of the adolescent and adult it has vinegar-like odor as a result of propionic acid which result

from the breakdown product of amino acids. Another microorganism that contributes to the feet odor is the *Staphylococcus epidermidis* that produce isovaleric acid by the degradation of the leucine that present in the sweat and give a strong cheesy odor [7, 8].

Zinc is an important micronutrient that is an essential component for more than 300 metalloenzymes that involved in a variety in metabolic pathways and cellular functions, that include the antioxidant enzymes, superoxide dismutase and affects their stability, conformity, and activity [9]. Zinc sulphate was effective in the treatment of many skin diseases, where it used in the topical, intralesional or systemic formula, like *acne vulgaris* [10], recurrent oral aphthous [11], cutaneous leishmaniasis [12,13], many form of viral warts like plane warts [14], other viral infections [15,16], Tinea versicolor [17], and dermatophytes fungal infections [18]. The action of zinc sulphate by the different mechanism of action that may be as antioxidant, immunomodulator, antiviral, anti-fungal, astringent, while it is cytotoxic in high concentration [19].

So, objective of the study is to compare the efficacy of topical 15% zinc sulphate solution in the management of Athlete's feet in versus the topical clotrimazole solution.

## Patients and Methods

### Study protocol

The single-blind, comparative therapeutic study using topical 15% zinc sulphate solution with 1% clotrimazole solution for the management of tinea pedis was executed in the Unit of Dermatology, Baquba Teaching Hospital between March 2020- July

2021. Fifty patients, 31 males and 19 females with tinea pedis were involved in this work.

### Study design

The chief complaint is the tinea pedis (interdigital type) in all patients that attending to the Unit of Dermatology were only included regardless the age and sex. Full history were including: age of patients, sex, marital status, residence, social status, job, and history of the disease itself, including the duration, complaint of the patient, duration, associated with odor, family history, any seasonal variations and what is the aggravating factors. A socks type that been used, frequency of changes per day and type of the shoes also asked to all patients. In addition to history of drug intake that associated with sweating including aspirin, fluoxetine and insulin.

The assessment of severity of the disease in all cases was performed including: clinical examination to the lesion, and address the site, any changing in color, presence any of the dry scales, wet scales, maceration, erythema and skin scraping test. Also the associated feet odor was assessed and scored. Evaluation of the patients was done every two weeks for one month and follow up was carried out. Photo for all lesions of the patients were taken by a digital camera (Sony: Cyber shoot with resolution 9 mega pixels), as a first visit (baseline) and then every other 14 days, in the same circumstances (place with fixed illumination and distance).

### Study population

Exclusion criteria: patients were received no therapy for tinea pedis in the last two months prior the study. Patients with diabetes mellitus or atherosclerosis that may cause

complications in the feet; deformity and malformation of the feet and immunosuppressant conditions were also excluded from the study.

### Preparations

Fifteen percent of the zinc sulphate solution 15% (W/V) was produced by thawing zinc sulphate crystals ( $ZnSO_4 \cdot 7H_2O=287.54$  It is manufactured by: Thomas Bekar India), 15 grams in 100 ml of Distilled Water, and kept in cleaned container at the room temperature of hospital and Clotrimazole(1% )solution is obtained from MEDICO LABS \_SYRIA.

### Clinical response score

No clearance: - If there is no any response while clinically examine and no change in scoring of feet odor.

Partial clearance: - If there is some clinical improvement,like change of wet scales into dry scales, absence in scales and change in feet odor.

Complete clearance: - There is complete clearance of rash and odor

### Scoring of feet odor

The scoring system had been used to assess the patients with bared feet and any odor and to evaluate the odor intensity in that case and involve four points:

**Score 0:** No any odor.

**Score1:** mild; the odor is smell only when the patient's finger put between the toe webs of his sole.

**Score2:** Moderate; when the doctor in close to the patient can smell the odor.

**Score 3:** Severe; the surrounding people can smell the odor.

### Statistical Analysis

It done by Excell 2010, SPSS version 20 statistical program.P\_value is considered

significant when less than 0.05, It done by Excell 2010, SPSS version 20 statistical program.

### Results

Group A: Twenty five patients 16 (64%) males, 9 (36%) females involved in this group, with ages ranged from 27-73 and a mean± SD of  $47.8 \pm 12.18$  years. While the disease duration ranged between 1-120 and a mean± SD of  $43 \pm 46.61$  months. Also repeated foot washing ranged from 2-10 with a mean± SD of  $5.24 \pm 2.66$  times/day. Twenty four (96%) patients had a feet odor and the manner of feet odor was cheesy odor in 20 (80%) patients and vinegar odor in 4 (16%) cases while 8 (32%) patients had itching. 17 (68%) of cases presented with seasonal variation with tinea pedis that worsened during the summer time, while 16(64%) of patients had associated with plantar hyperhidrosis.While 10 (40%) cases madet drying of foot after the washing as a habit while others were not.

The socks types were nylon in 17(68%), cotton 6(24%) and wool 1(4%) patient. Frequency of socks changes around the day of was presented in 15(60%) patients. The shoes types of were leather 9(36%), sandal 10(40%), and rubber 6(24%) patients. Histories of drugs were aspirin in 5(20%) patients while 7 (28%) patients presented with positive family history of tinea pedis. The factors that aggravating of tinea pedis were the hyperhidrosis present in 7(28%), occlusive the feet wear in 10(40%) and nylon socks 8(32%) patients Table (1).

Scoring of feet odor before treatment was Score 0: in 1(4%) patients, Score 1: 20(80%) patients and Score 2: 4(16%) patients Table (2).

Group B: Twenty five patients presented with tinea pedis were involved in this study, 10(40%) females and 15 (60%) males. The ages were ranged from 24-65 with a mean± SD of 43.2±11.83 years, and the disease duration were ranged from 1-180 months, and the mean± SD of 30.24±44.9 months. Also repeated foot washing ranged from 1-10 and the mean± SD of 4.84±2.15 times/day.

Twenty (80%) of patients had feet odor and also the tinea pedis, while 8 (32%) patients reported a positive family history of tinea pedis, itching was found in 9 (36%) patients. The quality of odor was cheesy odor in 20 (80%) patients and vinegar odor in 2 (8%) patients. While 12 (48%) of cases had history of variation around the seasons with worse odor during the summer time, and 19(76%) of patients had associated with plantar hyperhidrosis, and 12 (48%) patients had drying habit to the feet after washing while others were not.

Types of the socks that used by patients were nylon in 10(40%) patients, cotton 6(24%) and wool 4(16%) patients. Daily changed frequency of the socks were presented in 10(40%) patients and others not. Types of the shoes were: leather 10(40%), sandal 12(48%) and rubber 3(12%) patients. History of drugs was: aspirin in 2(8%) patients.

Factors that may aggravate of the feet odor were occlusive feet wear 10(40%) , hyperhidrosis in 10(40%) patients, and nylon socks 5(20%) patients Table (1).

Scoring of the odor before starting the therapy was Score 0: in 3 (12%) cases, Score 1: in 20 (80%) cases and Score 2: in 2 (8%) cases Table (3)

### The clinical assessment among tinea pedis patients

Group A: Clinical scoring of the odor in the tinea pedis after 2 weeks of treatment was Score 0: 1 (4%) patient. Score 1: 20 (80%) patients that changed into score 0 in 10(50%) patients, and not changed in 10(50%) patients. Score 2: 4 (16%) patients changed into score 0 in 2(50%) patients, and not changed 2(50%).

Scoring of the Athlete's feet odor after one month of treatment was:

**Score 0:** 1 (4%) patient. **Score 1:** 20 (80%) patients changed into **score 0** in 12(60%) patients, and not changed in 8(40%) patients. **Score 2:** 4 (16%) of patients that changed into **score 0** in 2(50%) patients, and **score 1** in 1(25%) patient and no change 1(25%) Table (2).

After two weeks of treatment, 2(8%) patients showed complete clearance, 9(36%) patients had partial of clearance and 14(56%) patients that showed no response Table (4).

While clinical response after four weeks of the treatment was 10(40%) patients was complete clearance, 5(20%) patients had partial clearance and 10(40%) patients showed no response.

The clinical response in that patients have the difference between two weeks and four weeks and was significant (chi square 7.14 P value =0.03).

Itching and burning sensation in 4(16%) patients on treatment were mild side effects and these did not require discontinuation of the drugs.

**Group B:** Scoring of the odor in tinea pedis foot after 2 weeks of treatment was

**Score 0:** 3 (12%) patients. **Score 1:** 20 (80%) patients that changed into the **score 0** in 15

(75%) patient, and there is no clinical difference in 5 (25%) of cases. **Score2:** 2 (8%) patients changed into **score 1** in 1 (50%) patient and no difference in 1 (50%).

Scoring of the odor of feet after one month of treatment was:

Score 1: 20 (80%) patients changed into score 0 in 17 (85%) of the cases, and no change in 3 (15%) patients. **Score2:** 2 (8%) changed into score 1 in 2 (100%) patients Table (3).

After two weeks of beginning of the treatment, 4 (16%) patients showed complete clearance, 15 (60%) patients had partial clearance and 6 (24%) patients with no response Table (4).

While clinical response after four weeks from the treatment was 19 (76%) patients was

complete response, 2 (8%) patients had partially responded, and 4 (16%) patients showed no response Table (4).

The clinical response was also significant (chi square 20.12 P value =0.000043) in that patients between two weeks and four weeks of treatment.

Side effects of treatment were mild which included itching and burning sensation in 1 (4%) patient. These side effects did not require discontinuation of the medicine.

There was no significant difference statistically in two weeks (chi square 5.37 P value =0.07) in the comparison between group A and B, but was slightly significant at four weeks (chi square 6.65, P value =0.04).

**Table (1): Study groups description the (tinea pedis)**

|                                    | Group (A) |     | Group (B) |     |
|------------------------------------|-----------|-----|-----------|-----|
|                                    | Number    | (%) | Number    | (%) |
| <b>1- Family history</b>           | 7         | 28  | 8         | 32  |
| <b>2-Itching</b>                   | 8         | 32  | 9         | 36  |
| <b>4-Type of odor</b>              |           |     |           |     |
| --Cheesy odor                      | 20        | 80  | 20        | 80  |
| - Vinegar odor                     | 4         | 16  | 2         | 8   |
| <b>5- Associated with sweating</b> | 17        | 68  | 19        | 76  |
| <b>6-Season variation</b>          | 16        | 60  | 12        | 48  |
| <b>7-Drying of feet</b>            | 10        | 40  | 12        | 48  |
| <b>8-Types of socks</b>            |           |     |           |     |
| -Nylon                             | 17        | 68  | 10        | 40  |
| -Cotton                            | 6         | 24  | 6         | 24  |
| -Wool                              | 1         | 4   | 4         | 16  |
| -Daily changing                    | 15        | 60  | 10        | 40  |
| <b>9-Types of shoes</b>            |           |     |           |     |
| - Leather                          | 9         | 36  | 10        | 40  |
| -Sandal                            | 10        | 40  | 12        | 48  |
| -Rubber                            | 6         | 24  | 3         | 12  |
| <b>10-Drugs history</b>            |           |     |           |     |
| -Aspirin                           | 5         | 20  | 2         | 8   |
| <b>11-Aggravating factors</b>      |           |     |           |     |
| -Hyperhidrosis                     | 7         | 28  | 10        | 40  |
| -Occlusive footwear                | 10        | 40  | 10        | 40  |
| -Nylon socks                       | 8         | 32  | 5         | 20  |

**Table (2):** Feet odor scoring of (Group A) after 1 month of therapy

| Scoring before therapy | Scoring | Score 0 (1 pt) | %   | Score1 (2 pt) | %  | Score2(4) pt | %  | total | %  |
|------------------------|---------|----------------|-----|---------------|----|--------------|----|-------|----|
| Scoring after Therapy  | Score0  | 1              | 100 | 15            | 75 | 2            | 50 | 18    | 72 |
|                        | Score1  | 0              | 0   | 5             | 25 | 1            | 25 | 6     | 24 |
|                        | Score2  | 0              | 0   | 0             | 0  | 1            | 25 | 1     | 4  |

\*p value=0.0000001

**Table (3):** Feet odor scoring of the (Group B) after one month of treatment

| Scoring before treatment | Scoring | Score 0 (3 pt) | %   | Score1(2 0) pt | %  | Score2 (2) pt | %   | total | %  |
|--------------------------|---------|----------------|-----|----------------|----|---------------|-----|-------|----|
| Scoring after Therapy    | Score0  | 3              | 100 | 17             | 85 | 0             | 0   | 20    | 80 |
|                          | Score1  | 0              | 0   | 3              | 15 | 2             | 100 | 5     | 20 |
|                          | Score2  | 0              | 0   | 0              | 0  | 0             | 0   | 0     | 0  |

**Table (4):** Clinical response among patients with tinea pedis

|         | At two weeks |    |                   |    |                    |    | At four weeks |    |                   |    |                    |    |
|---------|--------------|----|-------------------|----|--------------------|----|---------------|----|-------------------|----|--------------------|----|
|         | No clearance |    | Partial clearance |    | Complete clearance |    | No clearance  |    | Partial clearance |    | Complete clearance |    |
|         | n.           | %  | n.                | %  | n.                 | %  | n.            | %  | n.                | %  | n.                 | %  |
| Group A | 14           | 56 | 9                 | 36 | 2                  | 8  | 10            | 40 | 5                 | 20 | 10                 | 40 |
| Group B | 6            | 24 | 15                | 60 | 4                  | 16 | 4             | 16 | 2                 | 8  | 19                 | 76 |



**Figure (1A):** Tinea pedis(interdigital type) before 15% topical zinc sulfate solution application



**Figure (1B):** Same patient above after one month of 15% topical zinc sulfate solution application

## Discussion

Athlete's foot considers the commonest form of dermatophyt skin infection in the North America, United Kingdom, and probably throughout the developed world [20]. It is common in adults than more in children, but may also occur in children younger age 6years or more [21]. The chance for presenting with tinea pedis in adult males probably about 20%, while among women to become chronically infected with tinea pedis only about 5% [ 21]. It is a common problem seen among males and housewives, in Iraqi patients it accounted about (4.3%), with a mean age of 29 years and ranged from 17-53 years [22].

Three species of fungi are together responsible for the vast majority of cases of Athlete's foot throughout the world, *Trichophyton rubrum*, *Trichophyton mentagrophytes* var. *interdigitale*, and also *Epidermophyton floccose*. The *Trichophyton rubrum* is consider the most common pathogen that associated with stubborn and chronic Athlete's foot [1].

Trauma, with the excessive moisture, and occlusive shoes, and also the frequent usage of public showers and pools these factors that might contribute to increase risk of infection: [23].

There are generale measurement in treatment of tinea pedis like wash of feet daily with drying thoroughly, avoid tight footwear, especially in the summer and avoid walking barefoot in the public areas, wear cotton socks and change them frequently and also wearing the plastic shoes or other of the footwear that do not allow sweat to be evaporate easily best to be avoided [24].

Many of the systemic drugs like terbinafine,, itraconazole, and fluconazole, also topical antifungal drugs like, allylamine, azole, ciclopirox, benzylamine, tolnaftate and undecenoic acid have been used to treated the tinea pedis [4].

Feet odor is common sociomedical problem among males and it's etiology and pathogenesis is not well understood but there are multifactorial agents that play a role like weather,sweating,with bacterial, and fungal

infections, wearing closed shoes and socks [7].

The study showed that zinc sulfate was good agent in clearance of feet odor and probably work through its antibacterial and antifungal actions.

Zinc is an essential trace element that has direct anti-dermatophytes action in vivo and vitro [25], and had been shown to be an effective remedy in the treatment of pityriasis versicolor. Sharquie et al observed complete clinical and mycological clearance after 3 weeks treatment with 15% of zinc sulphate in the treatment of tinea versicolor [17], and other superficial fungal infection [18]. Sharquie et al in a single blinded placebo controlled therapeutic trial studied the efficacy of 15% zinc sulphate solution for the treatment of foot odor [27].

### Conclusions

Topical solution of 15% zinc sulphate was an effective treatment for tinea pedis and clearance of feet odor.

### Recommendations

Our knowledge To be better, the study that carried out and were observe the Zinc sulphate is an effective mode of treatment that used in the management of tinea pedis as 40% of patients had complete clearance but it was less superior than clotrimazole solution which gave 76% clearance rate.

To increase the effectiveness of topical zinc sulphate a higher concentration like 25% is recommended [26].

**Source of funding:** The current study was funded by our charges with no any other funding sources elsewhere.

**Ethical clearance:** Ethical approval was obtained from the College of Medicine /

University of Diyala ethical committee for this study.

**Conflict of interest:** Nil

### References

- [1] Leyden JL. Tinea pedis: Pathophysiology and treatment. *J Am Acad Dermatol* 1994; 31 (3 Pt 2): S31-S33
- [2] Odom RB. Pathophysiology of dermatophyte infections. *J Am Acad Dermatol* 1993; 28 Suppl.: S2-S7
- [3] Raboobee N, Aboobaker J, Peer AK. Tinea pedis et unguium in the Muslim community of Durban, South Africa. *Int J Dermatol* 1998; 37: 759-65
- [4] Shannon Verma, Michael P. Heffernan. Superficial Fungal Infection, In: Fitzpatrick's Dermatology in General Medicine. Wolff, Klaus; Goldsmith, Lowell A.; Katz, Stephen I.; Gilchrist, Barbara A.; Paller, Amy S.; Leffell, David J. 7th ed. By McGraw-hill companies, Inc. 2008; 188:1808-1828.
- [5] Petranyi G, Ryder NS, Stütz A. Allylamine derivatives: New class of synthetic antifungal agents inhibiting fungal squalene epoxidase. *Science* 1984; 224: 1239-41
- [6] Birnbaum JE. Pharmacology of the allylamines. *J Am Acad Dermatol* 1990; 23: 782-5.
- [7] Kanda, F, Yagi, E, Fukuda, M, Knakajima, Ohta, T and Nakata, O. Elucidation of chemical compounds responsible for foot malodor. *Br J Dermatol*. 1990, 122, 771-776.
- [8] Arake, Hama M, Akibas, Koike K, Okisaka K, Hagurat, Kamiya T, Tomita F. Foot odor due to microbial metabolism and its control. *Can J Microbiol*. 2006 Apr; 52(4):357-64

- [9] Ananda S, Prasad. Zinc, the biology and therapeutic of an ion. *Annals of Internal Medicine*. 1996; 125(2): 142-143.
- [10] Sharquie KE, Noaimi AA, Al-Salih MM. Topical therapy of acne vulgaris using 2% tea lotion in comparison with 5% zinc sulphate solution. *Saudi Med J* 2008; 29: 1757-1761.
- [11] Sharquie KE, Najim RA, Al-Hayani RK, Al-Nuaimy AA, Maroof DM. The therapeutic and prophylactic role of oral zinc sulphate in management of recurrent aphthous stomatitis (RAS) in comparison with dapsone. *Saudi Med J* 2008; 29(5): 734-8.
- [12] Sharquie KE, Al-Azzawi K. Intralesional therapy of cutaneous leishmaniasis with 2% zinc sulphate solution. *J Pan-Arab League Dermatologists*. 1996; 7: 41-46.
- [13] Sharquie KE, Najim RA, Al-Timimi DJ, Farjou IB. Oral zinc sulphate in the treatment of acute cutaneous leishmaniasis. *Clin Exp Dermatol* 2001; 26: 21-26.
- [14] Sharquie KE, Khorsheed AA, Al-Nuaimy AA. Topical zinc sulphate solution for treatment of viral warts. *Saudi Med J* 2007; 28(9): 1418-21.
- [15] Sharquie KE, Al-Nuaimy AA. Treatment of viral warts by intralesional injection of zinc sulphate. *Annals Saudi Med* 2002; 22(1-2): 26-28.
- [16] Al-Gurairi F, Al-Waiz M, Sharquie KE. Oral zinc sulphate in the treatment of recalcitrant viral warts: Randomized placebo controlled trial. *Br J Dermatol* 2002; 146: 423-31.
- [17] Sharquie KE, Al-Dori WS, Sharquie IK and Noaimi AA. Treatment of pityriasis versicolor with topical 15% zinc sulphate solution. In: *Iraqi Journal of Community Medicine* 2008; 21(1): 61-62.
- [18] Al-Tereihi IG. Topical 10% zinc sulphate solution in the treatment of superficial fungal infections. A thesis submitted to the Iraqi Board for Medical Specializations, Dermatology and Venereology, 2006.
- [19] Sharquie KE, Noaimi AA, Kadir NO. Topical therapy of xeroderma pigmentosa with 20% zinc sulphate solution. *Iraqi Postgraduate Medical Journal* 2008; 7(3): 231-236.
- [20] Rothman S, Knox G, Windhorst D. Tinea pedis: a source of infection in the family. *Arch Dermatol* 1957; 75: 270-1.
- [21] Jones HE, Reinhardt JH, Rinaldi MG. A clinical, mycological and immunological survey of dermatophytes. *Arch Dermatol* 1973; 108: 61-8.705-7.
- [22] Mawlud AO & Sharquie KE. A Survey of Superficial Fungal Infections of Skin. In the journal of the Iraqi Medical Association 1993;42:177-183.
- [23] Rinaldi MG. Dermatophytosis: epidemiological and microbiological update. *J Am Acad Dermatol*. 2000;43:S120-S124
- [24] Kardjeva V, Summerbell R, Kantardjiev T et al. Forty eight hour diagnosis of onychomycosis with subtyping of strains of *Trichophyton rubrum* strains. *J Clin Microbiol* 2006; 44: 1419-27.
- [25] Al-Janabi SJ. Dermatophytes infections in Baghdad: Clinical and laboratory study. PhD Thesis in Microbiology and Mycology, College of Education – University of Baghdad, 2006.
- [26] Sharquie KE, Al-Mashhadani SA, Noaimi AA, Hassan AA. Topical zinc sulphate (25%) solution: A new therapy for

actinic keratosis. *J cutaneous and anesthetic surgery* 2012;1(5).

[27] Sharquie EE, Noaimi AA, Hameed SD. Topical 15% zinc sulphate solution is an

effective therapy for feet odor. *Journal of Cosmetic , Dermatological Sciences and Applications*. 2013;3:203\_208.

## دراسة منفردة التعمية مقارنة لعلاج سعفة القدم بسلفات الزنك 15% مقارنة بمحلول الكلوتريمازول 1%

سعد ظاهر حميد<sup>1</sup>, سرمد يحيى عبود<sup>2</sup>, عطاء اكرم قدوري<sup>3</sup>

### الملخص

**خلفية الدراسة:** سعفة القدم هو عدوى فطرية جلدية تبدأ بين اصابع القدمين عادة وهي شائعة لدى الاشخاص الذين تصبح اقدامهم شديدة التعرق اثناء انحشارها داخل الاحذية الضيقة.

**اهداف الدراسة:** لتقييم فعالية سلفات الزنك 15% في علاج سعفة القدم بالمقارنة مع محلول الكلوتريمازول 1% .  
**المرضى والطرائق:** تجربة منفردة التعمية ومقارنة املاح سلفات الزنك 15% مقارنة ب الكلوتريمازول 1%, في مستشفى بعقوبة التعليمي, قسم المرضى ال مجموعتين, مجموعة (ا) عولجت بسلفات الزنك 15% مرتين يوميا , مجموعة (ب) عولجت بمحلول الكلوتريمازول 1% مرتين يوميا. مع المتابعة كل اسبوعين.

**النتائج:** مجموعة (ا) 25 مريض مدة المرض 1-120 شهر عولجت بسلفات الزنك وبعد المتابعة باربعة اسابيع من العلاج كان الشفاء التام 40% و 40% لم يستجيبوا للعلاج , ومجموعة (ب) 25 مريض علاجها بمحلول الكلوتريمازول وكانت مدة المرض بين 1-180 شهر , وبعد اربعة اسابيع من العلاج كان الشفاء التام 76% و 16% لم يستجيبوا للعلاج.  
**الاستنتاجات:** املاح سلفات الزنك 15% فعالة في علاج سعفة القدم , لكن الكلوتريمازول فعال اكثر.

**الكلمات المفتاحية:** سعفة القدم، كيربتات الزنك الموضعية، كلوتريمازول

البريد الالكتروني: [Sum\\_sum112233@yahoo.com](mailto:Sum_sum112233@yahoo.com)

تاريخ استلام البحث: 2 نيسان 2023

تاريخ قبول البحث: 6 آب 2023

1,2,3, مستشفى بعقوبة التعليمي - ديالى- العراق