

# Clinico-etiological description of annular skin eruptions

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## Abstract

**Background** Annular skin eruptions are figurate lesions characterized by a ring-like morphology. The lesions may appear as circular or ovoid macules, patches, or plaques with an erythematous periphery and central clearing.

**Objective** The aim of this study is to determine the etiology of annular skin lesions in patients attending to the Dermatology Center/ Baghdad, Iraq.

**Methods** This study was conducted on 242 patients who visited the dermatology department in Baghdad, Iraq, throughout the time period with annular skin eruptions. It is an observational, descriptive, cross-sectional study (from February 2020 to September 2021). If necessary, a thorough history, clinical exams, investigations, and biopsy were performed.

**Results** The sample included 242 patients; there were 95 males and 147 females. Mean age  $\pm$ SD = (31.57 $\pm$ 16.07) years. The disease duration ranged from one week to more than six months. The most common disease was dermatophytes (72%), followed by erythema multiforme (3.8%), annular psoriasis(2.9%), Nummular eczema (2.9%), annular lichen planus (2.4%), while porokeratosis was(2.4%). KOH examination done to all cases suspected to be fungal and it was positive only in 3 cases. Itching was the main symptom in dermatophytosis. There is a statistically significant link between dermatophytosis, gender, and itchiness.

**Conclusion** The annular disease was more common in middle-aged females. The majority of annular lesions were dermatophytosis. Surprisingly three diseases, erythrasma, leishmania, and plane wart, presented as annular lesions in this study.

## Key words

Annular skin eruptions, dermatophytosis.

## Introduction

In dermatology practice, annular skin eruptions are frequently seen. The Latin word "anulus," which means "ringed," is the root of the English word "annular".<sup>1</sup>

The lesions may resemble circular or ovoid

macules with an erythematous perimeter and a clearing in the center. Dermatophytosis is the most frequent cause of annular lesions among adults in underdeveloped countries. Other conditions, though, might show up very similarly.

If the patient has already undergone unsuccessful therapy for dermatophytosis, the practitioner must rule out alternative diseases.<sup>2</sup>

The differential diagnosis of annular skin eruptions is very extensive. This arrangement of lesions is regarded as an infection in terms of its

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etiology. (dermatophytosis, syphilis, leprosy, impetigo, lupus vulgaris),<sup>3-7</sup> inflammatory (urticaria),<sup>8</sup> papulosquamous disorders (psoriasis, lichen planus, porokeratosis),<sup>9-11</sup> vesiculobullous disorders (linear IgA disease, bullous pemphigoid), granulomatous disorder (sarcoidosis, granuloma annulare),<sup>12,13</sup> connective tissue disorder (subacute cutaneous lupus erythematosus, neonatal lupus erythematosus),<sup>14,15</sup> eczematous disorder (nummular eczema),<sup>16</sup> figurate erythema (erythema annulare centrifugum, erythema gyratum repens),<sup>17,18</sup> vascular (purpura annularis telangiectoides),<sup>19</sup> neoplastic (superficial basal cell carcinoma, mycosis fungoides) and drug eruptions (fixed drug eruption, erythema multiforme).<sup>20,21</sup>

They can be a symptom of many different skin conditions, some of which might mimic one another, making a diagnosis challenging and therapy time-consuming.<sup>1</sup>

The aim of this study is to classify and determine the clinical etiology of annular skin lesions in patients attending the Dermatology center/ Baghdad Teaching Hospital.

## Patients and Methods

**Study Design** The study is an observational, descriptive, cross-sectional study that was carried out in the Dermatology center/Baghdad Teaching Hospital, during the period from February 2020 to September 2021.

**Sampling** This study involved 242 patients with annular skin eruptions, regardless of their age or gender. A formal questionnaire was taken from each patient or their parents (in case of children).

Before starting the study, consent was obtained from each patient participating in this study after explaining the objectives of the study.

**The ethical approval** was given by the Scientific Council of Dermatology and Venereology- Iraqi Board for Medical Specializations.

**Data Collection** The diagnosis of annular skin eruption is made on a clinical and histopathological (when needed) basis. Every patient had a thorough medical history taken, including information on their age, occupation, place of residence, the location of their annular skin eruption when it first appeared, how long it lasted, whether they had ever come into contact with animals, and whether they had a family history of lesions of a similar nature. Additionally, details about the usage of any topical or systemic medications were elicited, any further illness that may be present or a history of diabetes.

During the clinical examination, alterations in the oral, ocular, and vaginal mucosa, hair, and nails were also observed, along with changes in the morphology, distribution, extent of involvement, number of lesions, and duration of those lesions. The following procedures were carried out as needed: dermoscopy, wood's light examination, KOH mount of skin scrapings, skin biopsy for histological evaluation. After correlating the clinical, pathological, and mycological aspects, the definitive diagnosis was made.

All cases were photographed with (IPHONE PROMAX 11 camera), almost in the same lightening and distance.

**Statistical analysis** The collected data were organized, tabulated, and statistically analyzed using the statistical package for social sciences (SPSS) version 24. Values were expressed as a number, percentage, and mean.

## Results

**Demographic characteristics** This study

included a total of 242 cases with annular skin lesions. Their ages range from 3 months to 71 years old with mean age for them was (31.57±16.07) years.

Duration of annular skin lesions at the time of presentation ranged from one week to several months with less than 6 months in (81.4%) of patients and more than 6 months in (18.6%) of patients, as shown in **Table 1**.

**Table 1** distribution of the study sample (N=242) according to age group, gender, and duration of symptoms.

**Symptoms and diagnosis** Out of 242 patients, a maximum number of patients (171, 70.7%) presented with itching. Most of cases were dermatophytosis. Erythrasma, leishmania and plane wart presented as annular lesions, the last two diseases were confirmed by histopathological examination, while erythrasma was confirmed by wood's light examination. In our study, KOH examination was done to the cases that were suspected to be dermatophytic infection; it was positive only in 3 cases, skin biopsy was done in 25 patients.

**Table 1** distribution of the study sample (N=242) according to age group, gender, and duration of symptoms

Demographic characteristics	No. of patients (%)
Age group (in years)	
Less than 15	31(12.81)
15-30	38(15.71)
30-45	141(58.26)
More than 45	32 (13.22)
Total	242 (100 )
Gender	
Male	95 (39.2)
Female	147 (60.8)
Total	242 (100)
Duration of symptoms	
Less than 6 months	197 (81.4)
More than 6 months	45 (18.6)
Total	242 (100)

**Table 2** distribution of skin symptoms (N=242) according to annular skin diseases.

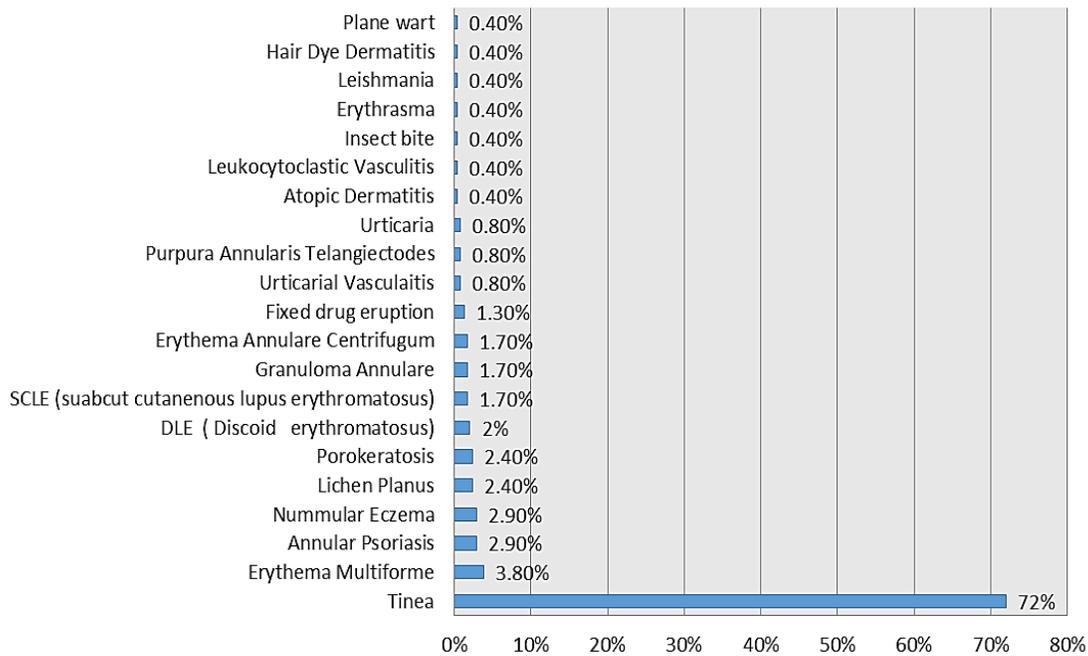
Diagnosis	Asymptomatic (%)	Itching (%)
Dermatophyte infection	39 (22.4)	135 (77.6)
Erythema Multiforme	4 (44.4)	5 (55.6)
Annular Psoriasis	2 (28.5)	5 (71.5)
Nummular Eczema	0 (0)	7 (100)
Annular Lichen Planus	4 (66.6)	2 (33.4)
Porokeratosis	4 (66.6)	2 (33.4)
( Discoid lupus erythematosus)	4 (80)	1 (20)
SCLE (subcutaneous lupus erythematosus)	3 (75)	1 (25)
Granuloma Annulare	3 (75)	1 (25)
Erythema Annulare Centrifugum	3 (75)	1 (25)
Fixed drug eruption	1 (33.4)	2 (66.6)
Urticarial Vasculaitis	0 (0)	2 (100)
Purpura Annularis	2 (100)	0 (0)
Telangiectodes		
Urticaria	0 (0)	2 (100)
Atopic Dermatitis	0 (0)	1 (100)
Leukocytoclastic Vasculitis	0 (0)	1 (100)
Insect bite	0 (0)	1 (100)
Erythrasma	1 (100)	0 (0)
Leishmania	0 (0)	1 (100)
Hair Dye Dermatitis	0 (0)	1 (100)
Plane wart	1 (100)	0 (0)

Fisher exact test showed significant association (p value = 0.001)

**Table 2** showed the number and percentage of patients with or without itchy annular lesions for each diagnosis. The majority of patients were having dermatophytosis. Of them, 135 patients (77.6%) had itchy lesions, while 39 patients (22.4%) had not.

Itchy annular skin lesions were significantly associated with nummular eczema, atopic dermatitis, leukocytoclastic vasculitis, urticaria and urticarial vasculitis each of them (100%), dermatophytosis, annular psoriasis, fixed drug eruption and erythema multiforme (77.6%), (71.5%), (66.6%) and (55.6%) respectively.

## Final diagnosis



**Figure 1** Distribution of the study sample (N=242) according to etiology.

The majority of patients had dermatophytosis. 76 patients (43.6%) were male, while 98 patients (56.4%) were female.

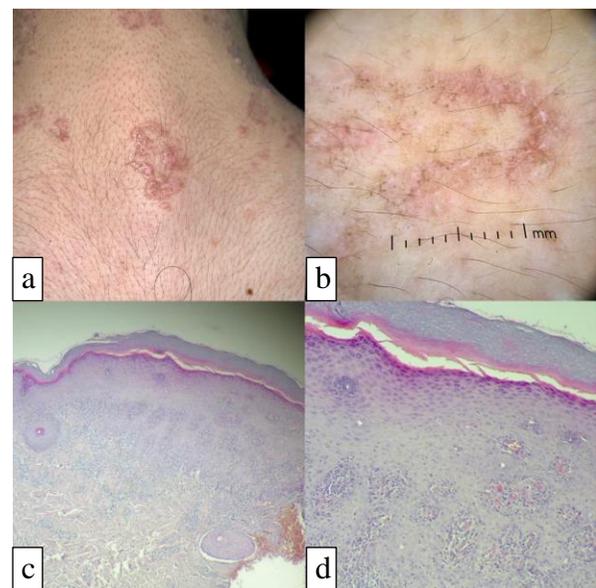
Patients who had annular itching lesions and dermatophytosis had a statistically significant correlation ( $p=0.001$ ).

### Disease characteristics

**Dermatophytosis** In our study 174 cases were diagnosed as dermatophytosis, 98 female patients and 76 males, the minimum age at presentation was 3months, and the maximum age was 71 years.

Two types of dermatophytic infection recognized, annular tinea corporis (73 females, 59 male) and tinea cruris (25 female, 17male). Those two types occur mostly in age groups (30-45 years old). Family history was positive in 40 patients of tinea corporis and 20 patients in tinea cruris. History of animal contact was positive in

33 patients with tinea corporis and 6 patients with tinea cruris.



**Figure 2** a) 21 years old male with annular Lichen planus. Violaceous annular plaques localized on the neck. b) Wickham striae (dermoscopy). c,d) histopathologic features. Hyperkeratosis, focal increase in the granular layer, sawtoothing of the epidermis, and a lichenoid infiltrate



**Figure 3** a,b) Annular psoriasis with well-demarcated red scaly plaque on the trunk. c) regular hyperplasia of epidermis, hypogranulosis parakeratosis with pustule of the kogoj.

Symmetrical distribution of lesions in tinea curis and only two cases with tinea corporis. Erythema multiforme was recorded in 9 cases 7 females, 2 males, itching presented in 5 cases. The most common site of involvement in 48 (36.3%) upper limb, the trunk was involved in 42 (31.8%), lower limb involved in 36 (27.2%), face involved in 6 (4.54%). The lesion distributed symmetrically at distal extremities after a prodrome of fever.

In our investigation, seven cases (2.9%) of psoriasis with an annular arrangement of lesions were discovered. Two males and five females manifested with itchy (in five cases), scaly, circular, raised lesions across the trunk and limbs. Upon examination, erythematous, scaly lesions were seen. Only one case had the clinical diagnosis supported by a biopsy, which revealed psoriasiform epidermal hyperplasia and neutrophils in the top layer of the overlying parakeratotic scales.

Seven cases of nummular eczema were presented during this study period; 3 of them were under the age of 3 years, with itchy lesions over the trunk, upper and lower limbs; those

lesions were multiple scaly erythematous plaques.

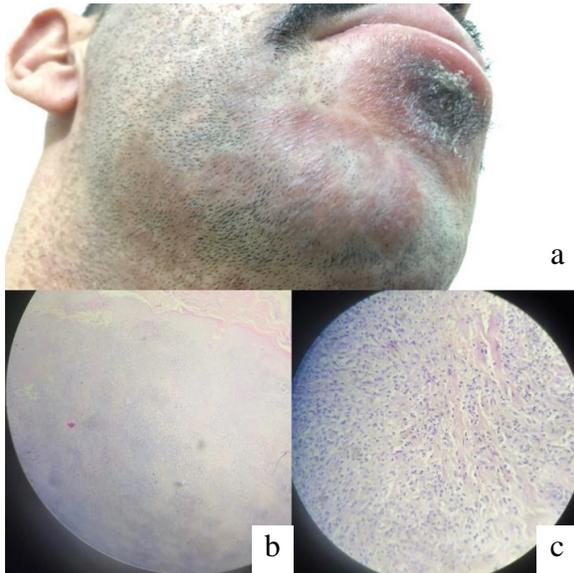
In this study period, 6 cases were diagnosed as lichen planus with an annular arrangement of lesions. The patients, who were in the second to fifth decade of life, had asymptomatic violaceous annular plaques throughout their faces, trunks, and limbs (only two of them had itching). Clinical diagnosis confirmed by dermoscopy (appearance of Wickham striae) and biopsy done in 3 cases revealed hypergranulosis wedged-shaped, irregular acanthosis, liquefaction degeneration of the basal layer, lichenoid lymphocytes in the papillary dermis/ melanin incontinence. In our research, porokeratosis was diagnosed in six patients. The patients were in the third to fifth decade of life and had annular elevated border plaques with brownish hue and normal-looking skin in the core. Only two cases where the itching was evident. Diagnosis confirmed by histopathological examination. Revealed cornoid lamella (a column of parakeratosis under which there is hypogranulosis and dyskeratotic keratinocyte).



**Figure 4** a,b,d) Tinea annular configuration with a scaly raised border and central clearing regions. c) microscopic examination KOH test demonstrate hyphae.



**Figure 5** a) Porokeratosis multiple lesions of disseminated superficial actinic porokeratosis with a peripheral keratotic rim. b) Histopathological features: cornoid lamella.



**Figure 6** Cutaneous leishmaniasis a) annular erythematous plaque at the chin. b,c) histopathological examination granulomatous infiltrate at dermis with LD bodies.

Five cases were DLE, presented with asymptomatic annular plaques with atrophic center at the face; itching presented only in one case. Clinical diagnosis confirmed by histopathological examination in 3 cases revealed follicular plugging, basal liquefactive degeneration, melanin incontinence, periadnexal inflammatory infiltrate.

Four cases diagnosed as SCLE clinically presented with asymptomatic (itching presented at one case) scaly erythematous plaques distributed on upper trunks and arms.

In our study, granuloma annulare was diagnosed in 4 cases, including 2 elderly women who had plaques across both hands and 2 young infants who had a single plaque over the little finger. Four cases were diagnosed as Erythema annulare centrifugum presented as multiple erythematous plaques with trailing scale at second and third decade.

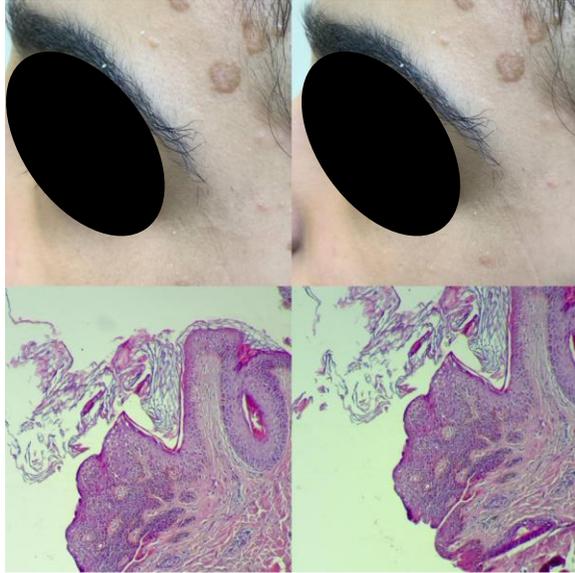
Three cases were diagnosed as fixed drug eruption, presented with annular violaceous color, a plaque with a history of NSAID consumption. One case of those was confirmed by biopsy (as this case prior to biopsy diagnosed as Lyme disease).

Two cases were diagnosed as urticarial vasculitis, presented as multiple itchy annular plaques distributed over the trunk and extremities with a hyperpigmented area of previous lesion .clinical diagnosis confirmed by biopsy in both cases.

Two cases were diagnosed as purpura annularis telangiectodes, presented as multiple erythematous to brownish colored plaques asymptomatic distributed at the lower limbs, clinical diagnosis confirmed by biopsy at one case.

2 cases were diagnosed as urticaria, presented with multiple erythematous annular itchy plaques lasting less than 24 hours.

One case diagnosed as atopic dermatitis was 11 years old child presented by multiple itchy erythematous to brownish color plaques all over the body. Clinical diagnosis was confirmed by biopsy.



**Figure 7** a,b) plane wart with multiple brown annular plaques on the forehead. c,d) Hx: papillomatosis, acanthosis, hypergranulosis, and koilocytosis.

One case diagnosed as leukocytoclastic vasculitis (confirmed by biopsy) presented at a male in his third decade with multiple erythematous itchy annular plaques at lower limbs.

One case was diagnosed as an insect bite presented at a 10 years old girl as an itchy annular erythematous plaque with central punctum.

One case was diagnosed as leishmania (confirmed by biopsy) presented as itchy erythematous annular plaques at the chin in a third-decade males.

One case was diagnosed as erythrasma in a third-decade male presented as annular scaly plaques at right cubital fossa 1 month duration asymptomatic, wood's light examination revealed coral red fluorescence.

One case was diagnosed as hair dye dermatitis (biopsy done) at 50 years old female with severely itchy erythematous scaly annular

plaques at both hands.

One case was diagnosed as plane wart at 11 years old boy presented with asymptomatic annular plaques at the face, asymptomatic. Clinical diagnosis confirmed by histopathological examination.

## Discussion

Annular lesions are very prevalent, have a striking look, but they can also be deceptive. The term "annular" (referring to a ring-shaped lesion) denotes that the edge of the lesion is different from the center, either by being raised, scaly, or having a different color (e.g., granuloma annulare, tinea, and erythema annulare centrifugum).<sup>22</sup>

Few reports have dealt with this subject, so we did this study to find out the causes of annular lesions for patients who came to dermatology practice. An early diagnosis is necessary to serve as a path for the start of an early and efficient course of treatment. From this current study and daily clinical practice, dermatophytosis was considered the commonest cause of annular skin lesions.

This study showed that annular lesions in females were more common than males, with a ratio of 1.5:1 while Syed *et al.* found that males were more commonly affected than females with a ratio of 2.4:1. These differences in gender distribution can be attributed to the racial differences as this study was mainly among Arab while the previous study was among Indians or due to other diseases not encountered in Iraq. The mean age of onset in patients of the present study was (31.57±16.07) years which is considered the same.<sup>1</sup>

Dermatophytosis was identified as the most frequent diagnosis of annular lesions in this study's adult population, and it is frequently

correctly diagnosed (174, 72% of the time). Syed *et al.* came at the same outcome.<sup>1</sup>

Tinea dermatophytosis can start and spread due to environmental conditions. tinea dermatophytosis is more common in hot climates like those of Iraq, especially in the summer. The increased degree of physical activity in this particular age range could cause excessive sweating, which would favor the formation of dermatophytes. This could explain the age preference (30-45 years) in patients with dermatophytosis. This is in consistent with the findings of Surendran *et al.*<sup>23</sup>

The youngest patient in the current study who had superficial dermatophytosis was a three-month-old infant, while the oldest patient was 71 years old. This finding is consistent with Avinash *et al.* that widespread dermatophytic infections affect people of all ages.<sup>24</sup>

In this study, 95 subjects with annular skin lesions were men; from them, 76 patients (80%) had dermatophytic infections. Oppositely, 147 subjects with annular skin lesions were women; from them, 98 patients (66.6%) had dermatophytic infections. Students made up the majority of the individuals who had dermatophytes when they were diagnosed. 72% of them had superficial dermatophytic infections, which is a sign of both health-seeking behavior and a propensity for perspiration brought on by wearing tight clothing. Unskilled employees were the second largest category to be impacted, which is indicative of their low socioeconomic level, unsanitary living circumstances, lack of understanding of health issues, high cost of care, and poor adherence to treatment. The similar outcome was found by Narvaez *et al.*<sup>25</sup> In this research, other dermatophytes infections also appeared. The most frequent clinical pattern was tinea corporis (75.6%), followed by tinea cruris (24.2%). Both

tinea corporis and tinea cruris were more prevalent in females than in males, which was contrary to the findings of Surendran *et al.*, who found that Tinea corporis was more common in males and tinea cruris was more prevalent in females. The prevalence of tinea corporis rises in hot, humid areas.

In this study, only one case of tinea cruris was recorded in 3 months old child, indicating tinea cruris less common in children. Fernandes *et al.* found the same result.<sup>26</sup>

Patients who presented with itchy annular skin lesions and superficial dermatophytosis were statistically significantly correlated. These findings imply that the first differential diagnosis for patients presenting with itchy annular skin lesions should be superficial dermatophytosis, which is consistent with previous reports in the medical literature.<sup>27</sup>

The results of this study revealed six cases of annular parakeratosis and annular lichen planus; there were similarities in clinical features between parakeratosis and annular lichen planus, especially atrophic annular type, so a biopsy is important to differentiate between them.<sup>28</sup> This issue is critical inpatient management given the potential premalignant nature of parakeratosis. Atypical annular presentation of leishmania found in this study at the third decade of a male the lesion was on his face and biopsy confirmed the diagnosis. This result is consistent with Meireles *et al.* study.<sup>29</sup>

## **Conclusion**

The majority of annular lesions were dermatophytosis, and the itching was the main presenting symptom. So the presentation of itchy annular skin lesions made dermatophytosis the first differential diagnosis.

In the majority of dermatophytosis, KOH was negative because of topical drug usage.

Three diseases: erythrasma, leishmania, and plane wart, presented as annular lesions; the last two diseases were confirmed by histopathological examination, while erythrasma was confirmed by wood's light examination.

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