

EPIDEMIOLOGY OF ZOONOTIC DERMATOPHYTES CAUSING SKIN LESIONS IN HUMAN IN KAFRELSHEIKH GOVERNORATE

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ABSTRACT

Current study aimed to evaluate the role of animals rearing in separate and mixed methods on transmission of dermatophytes to humans in Kafrelsheikh governorate.

The samples were collected from skin lesions of humans and animals for isolation and identification of zoonotic dermatophytes using Sabouraud dextrose agar (SDA) media.

*The results indicated that animals reared in separate species had 37 isolates of *Trichophyton verrucosum*; 31 from cattle, (7.65%), 5 from sheep (3.08%) and 1 from goats (1.33%). Nineteen isolates of *T. mentagrophytes* var *mentagrophytes* and 9 isolates of *Microsporum canis* were isolated from rabbits (2.02%). Contact humans recorded 4 isolates of *T. verrucosum*, 3 isolates of *T. mentagrophytes* var. *mentagrophytes* and 2 isolates of *M. canis*. In animals reared in mixed species method, 63 isolates of *T. verrucosum* were isolated. Thirty seven isolates of *T. verrucosum* were also, isolated from humans in contact with these animals (6.85%) but only 9 isolates from humans in contact with separate species reared animals (2.95%) (4 *T. verrucosum*, *T. mentagrophytes* var. *mentagrophytes* and 2 *M. canis*).*

In conclusion the Cattle, sheep, goats and rabbit have significant role in transmission of dermatophytes to humans in contacts, especially animals reared in mixed species.

INTRODUCTION

The skin is the outermost covering of body tissues which also forms the largest organ in the body and it is the main barrier which protects animals and humans from most pathogens to enter the body. However, humans and animals are not completely separated from each other and from the surrounding environment. So, many skin diseases are transmitted from animals and their contaminated environment to humans.

Dermatophytosis, commonly known as Ringworm, was of considerable importance in domestic animals due to its wide host range and zoonotic importance (*Rajesh-Kumar and Rajesh-Khurana, 2005*).

Dermatophytes are a group of morphological and physiologically related molds that cause well defined infection in vertebrates (*Torres et al., 2002*). In the last two decades the incidence of infection caused by dermatophytes and other fungi has increased considerably (*Weitzman and Summerbell, 1995 and Norris et al., 1999*). Moreover, the hazard of zoonotic infection and reduction of animal price gave the ringworm a major attention (*Osman et al., 2002*). The spread of infection may be attributed to the nature of the disease, where, it was highly contagious (*Scott, 1988, Hungerfords, 1990; Radostits et al., 2000 and Smith, 2002*). Over crowding of animals decrease the resistance to infection (*Scott, 1988 and Smith, 2002*). The environmental factors as humid climates with little or no sunlight increased infection. (*Stannard, 1988 and Smith, 2002*).

Dermatophytes transmitted directly by contact with infected animals or indirectly by contact with spores on hide and dermal scales shed by infected animal contaminating the environment and remain viable in shed epithelium for many months even years (*Alawy and El-Tras 2010*).

The aim of current study was to assess the role of separate rearing animals and mixed rearing method on transmission of dermatophytes to humans.

MATERIALS AND METHODS

I. Sampling:

According to *Kelly (1984)*, skin scraping was carried out from the periphery of the active skin lesions from the humans and animals. The scrapped materials used for mycological examination by diving crusts, scales and hair follicles into two parts.

II. Isolation:

1st part of the samples were used for direct culture on Sabouraud dextrose agar (SDA) media by pressing the scales and hairs firmly into culture media.

2nd part was treated with 10% KOH for 30 minutes with heating, then centrifuge and get out 1 drop from the sediment and swab it on a slide for microscopic examination (*Freitas et al., 2008*).

III. Identification:

A. Macroscopic identification (Colonial character):

SDA media incubated aerobically at temperature of 25-30°C for 1-4 weeks. The colonies appear after 1 week, very small and white grey in colour but after 16 days the colonies grew (10-12 mm in diameter) and were better defined with a grey area on the surface of the agar (*Calina et al., 2007*). Positive cultures confirmed by microscopic examination.

B. Microscopic examination:

Swabs from the sediment or from cultured colonies were mixed with 1 drop of lactophenol cotton blue stain and covered with cover slide and examined under microscope lens (40 x) for detecting of fungal

elements hyphae and/or arthropores (specialized fungal spores). Infected hairs appear swollen, irregular in outline and normal structure of the hair was lost.

For further identification of the species of dermatophytes. The prepared samples were subcultured on special media to enhance the growth of macro and microconidia which help in differentiation of dermatophytes species. *T. verrucosum* appeared as long chains of pears of densely compacted chlamydospores present with broad irregular hyphae. *M. canis* macroconidia were spindle-shaped, with rough and thick walls with a distinct beak at tip and cells numerous (more than six). *T. mentagrophytes* var *mentagrophytes* macroconidia were cigar shaped with thin smooth microconidia and were rare to numerous round to pyriform often with coiled or spiral hyphae.

RESULTS AND DISCUSSION

The sites and characters of skin lesions of apparently examined animals and human contacts:

1. In animals:

It was detected from cattle, sheep, goats and rabbits. The most regions of affection include head, neck, chest, belly, back and buttocks. Lesions were elevated, indurated, well defined annual crust and gray having a great tendency for generalization with crusty alopecia.

2. In humans:

It was detected from 46 human cases directly contacted with different animal species. Sites of lesions are 5 on the scalp (*Tinea capitis*), 15 on the chin (*Tinea barbae*) and 26 on the arms (*Tinea corporis*). Lesions of *Tinea*

capitis appear as a patchy areas of dandruff-like scaling with scant to considerable hair loss on scalp. Lesions of *Tinea barbae* and *Tinea corporis* appear as a circular lesions which is typically with a well derma-tend border and can be scaly, vesicular (fluid-filled) or pustular (pus-filled).

Table (1): Prevalence of zoonotic dermatophytes in animals suffering from skin lesions in separate rearing method.

Animals species	No. of house holds	No. of animals			Prevalence	Species of isolates
		Total	With skin lesions	Positive with skin lesions		
Cattle	26	405	105	31	7.65	<i>T. verrucosum</i>
Sheep	27	162	56	5	3.08	<i>T. verrucosum</i>
Goat	25	75	47	1	1.33	<i>T. verrucosum</i>
Rabbit	154	1386	611	28	2.02	19 <i>T. mentagrophytes</i> var. <i>mentagrophytes</i> 9 <i>M. canis</i>
Equus	15	20	3	0	0	-

Table 1, showed the prevalence of dermatophytes species in suspected animals had skin lesions and rearing in separate species method. *T. verrucosum* was isolated from cattle, sheep and goats while *T. mentagrophytes* var *mentagrophytes* and *M. canis* was found in rabbits ,dermatophytes not isolated from Equus. The obtained result agree with *Fraser (1991)*, *Matthews (1991)*, *Smith and Sherman (1994)*, *Smith (2002)* and *Nassif and Osman (2003)*.

Table (2): Prevalence of zoonotic dermatophytes in humans suffering from skin lesions and in contact with separate animal species.

Animals species	No. of house holds	No. of human in contact			Prevalence	Species of isolates
		Total	With skin lesions	Positive with skin lesions		
Cattle	26	38	13	2	5.26	<i>T. verrucosum</i>
Sheep	27	27	14	1	3.70	<i>T. verrucosum</i>
Goat	25	25	11	1	4	<i>T. verrucosum</i>
Rabbit	154	200	65	5	2.5	3 <i>T. mentagrophytes</i> var. <i>mentagrophytes</i> 2 <i>M. canis</i>
Equus	15	15	3	0	0	-

Table 2, explained the prevalence of dermatophytes species in suspected humans had skin lesions and in contact with separate animal species. *T. verrucosum* was isolated from humans in contact with cattle, sheep and goats while *T. mentagrophytes* var *mentagrophytes* and *M. canis* were found in humans in contact with rabbits. Regarding to the obtained results in table 1 and table 2, the host specificity of the isolates were confirmed. The zoonotic value also was established where the same isolates were isolated from the animal species and its human contact (**Rajesh-Kumar and Rajesh-Khurana, 2005**).

Table (3): Prevalence of zoonotic dermatophytes in animals suffering from skin lesions in mixed rearing method.

Animal species		No. of house holds	No. of animals			Prevalence	Species of isolates
			Total	With skin lesions	Positive with skin lesions		
Group 1	Cattle	98	122	27	14	11.47	All isolates <i>T. verrucosum</i>
	Sheep		131	66	7	5.34	
	Goat		96	53	3	3.12	
	Equus		98	5	0	0.00	
Group 2	Cattle	87	113	37	11	9.73	All isolates <i>T. verrucosum</i>
	Sheep		168	68	7	4.16	
	Equus		87	12	0	0.00	
Group 3	Cattle	70	85	24	7	8.23	All isolates <i>T. verrucosum</i>
	Goat		136	59	4	2.94	
	Equus		70	9	0	0.00	
Group 4	Sheep	85	167	72	7	4.19	All isolates <i>T. verrucosum</i>
	Goat		134	63	3	2.23	

Table 3, indicated the prevalence of dermatophytes species in suspected animals had skin lesions and rearing in mixed rearing method. Regarding to table 1, the prevalence of *T. verrucosum* was increased in cattle, sheep and goats in mixed rearing than separate rearing method. These results agree with results reported by **Fraser (1991)**, **Matthews (1991)**, **Smith and Sherman (1994)**, **Smith (2002)** and **Nassif and**

Osman (2003) in which they stated that mixed species rearing increase the prevalence of infection from species to another.

Table (4): Prevalence of zoonotic dermatophytes in humans suffering from skin lesions and in contact with mixed animal species.

Group of animals	No. of households	No. of humans in contact			Prevalence	Species of isolates
		Total	With skin lesions	Positive with skin lesions		
Group 1	98	173	68	14	8.09	All isolates <i>T. verrucosum</i>
Group 2	87	154	57	12	7.79	All isolates <i>T. verrucosum</i>
Group 3	70	77	29	5	6.49	All isolates <i>T. verrucosum</i>
Group 4	85	136	47	6	4.41	All isolates <i>T. verrucosum</i>
Total	340	540	201	37		
Average					6.85	

Table 4, showed the prevalence of dermatophytes species in suspected humans had skin lesions and in contact with mixed animals rearing. Regarding to table 2, the prevalence of *T. verrucosum* was increased in humans in contact with animals in mixed rearing than separate method. These results agree with **Samaha et al. (2002) and Nassif and Osman (2003)** in which they reported that humans trap the infection more when they contact animals in mixed species than when they contact animals in separate species.

CONCLUSION

Cattle, sheep, goats and rabbits play an important role in transmission of zoonotic dermatophytes especially animals reared in mixed species and in contact with humans. The descending order of isolation of dermatophytes from animals were cattle, sheep, goats then rabbits but no isolates were obtained from equus (horse, donkey). The most frequent isolates species were *T. verrucosum*, then *T. mentagrophytes* var. *mentagrophytes* and the lowest one was *Microsporum canis*.

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وبائية القراع كمرض مشترك ومسبب للإصابة الجلدية فى الإنسان بمحافظة كفر الشيخ

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استهدف البحث دراسة مدى وبائية مرض القراع كمرض مشترك بين الإنسان والحيوان وكمسبب للإصابات الجلدية فيهما. وتم تطبيق هذه الدراسة على نوعين من التربية المنزلية للحيوانات ؛ النوع الأول كان للتربية المنزلية التى تحتوى على فصيل واحد من الحيوانات والنوع الثانى للمنازل التى تعتمد على التربية المختلطة للفصائل المختلفة للحيوانات. كذلك تم فحص الادميين المخالطين لهذه الحيوانات فى كلا من أنواع التربية وتم اختيار هذه المنازل بشكل عشوائى من أماكن مختلفة من محافظة كفر الشيخ.

تم أخذ العينات من الإصابات الجلدية فى الإنسان والحيوان لعزل الفطر المسبب لمرض القراع وكانت نتائج الفحص الفطري كالتالى:

- فى النوع الأول من التربية المنزلية تم عزل 37 معزولة من التريكوفيتون فيريكوزم كالاتى:
31 معزولة من الأبقار (7.65%) و 5 معزولات من الأغنام (3.08%) ومعزولة واحدة من الماعز (1.33%). وفى الأرناب تم عزل 19 معزولة من التريكوفيتون مينتاجروفيتس فارمينتجروفيتس و 9 معزولات من الميكروسبوريم كانيس بنسبة (2.02%). كذلك تم عزل 4 معزولات تريكوفاييتون فيريكوزم و 3 معزولات مينتاجروفيتس فارمينتجروفيتس ومعزولتان ميكروسبوريم كانيس من البشر المخالطين لهذه الحيوانات بنسبة (2.95%).
- فى النوع الثانى من التربية المنزلية تم عزل 63 معزولة من الحيوانات بنسبة (5.46%) وكانت كلها تريكوفاييتون فيريكوزم. كذلك تم عزل 37 معزولة من البشر المخالطين لهذه الحيوانات بنسبة (6.85%) وكانت كلها تريكوفاييتون فيريكوزم.
- وكان من الواضح أن نسبة عزل الفطر المسبب للقراع مرتفعة فى الحيوانات المرباة فى تربية مختلطة وكذلك الادميين المخالطين لهذه الحيوانات عن نسبة عزل الفطر من الحيوانات المرباة كفصائل منفصلة والادميين المخالطين لها.
- لذا خلصت الدراسة إلى أن تربية الحيوانات كفصائل منفصلة عن بعضها يحد من انتشار هذا المرض فى الحيوانات والادميين المخالطين لها بالمقارنة بالتربية المختلطة.