Isolation and characterization of dermatophytes from human and small ruminants at Nangarhar and Kunar provinces of Afghanistan

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ABSTRACT

Dermatophytosis is a fungal skin infection which can infect various species of animals and human. The infection is also called ringworm and is caused by many types of fungi. In the present study total 633 small ruminants {441 from Noorgal district (188 sheep and 253 goats) and 192 from Goshta district (57 sheep and 135 goats)} and 320 humans in medical hospital were examined for presence of ringworm. Skin lesions of suspected patients were taken and subjected to KOH wet mount and culturing in Sabouraud's dextrose agar (SDA). Overall prevalence in small ruminants according to KOH test was 5.213 per cent and according to SDA culture was 5.529 per cent. In sheep the prevalence as per KOH and SDA culture was 6.93 per cent each. In goat KOH test showed 4.123 per cent and fungal culture showed 4.639 per cent positive. Result of medical hospital revealed that the overall result based on KOH was 4.68 per cent and on culture base was 3.75 per cent. In Goshta and Noorgal districts females were more susceptible to ringworm than the males and old sheep were more susceptible than young. In Goshta young goats were more susceptible whereas in Noorgal old goats were more susceptible. The findings revealed that there was high prevalence of dermatophyte both in human beings and animals in this part of Afghanistan.

Keywords: Dermatophytes; prevalence; human; small ruminants; sheep; goat

INTRODUCTION

Dermatophytes are pathogenic fungi that grow on skin, mucous membranes, hair, nails, feathers and other body surfaces causing ringworm and related diseases which can infect human and different species of animals. The disease gets its name from the appearance of a ring type rash that develops on the skin of the infected person or animal. The disease has nothing to do with worms (Anon 2013).

Based on their occurrence in the nature dermatophytes are divided into three categories viz anthropophilic (human is natural host), zoophilic (animals are natural hosts) and geophilic (soil is the natural habitat). Soil serves as a natural reservoir for both pathogenic and saprophytic fungi. Factors influencing the distribution of keratinophilic fungi have been relatively well recognized in the soil environment (Lanforet et al 1990, Vollekova 1992, Jain and Sharma 2011). The present study records the observation on the fungi isolated from clinical cases of small ruminants (sheep and goats) as well as human from Nangarhar and Kunar provinces of Afghanistan to find the prevalence and types of dermatophytes, seasonal occurrence and the age of animals infected. In addition to this the study was focused to understand the relationship between the animal and human isolates of ringworm to determine zoonotic importance of ringworm in the area.

MATERIAL and METHODS

Total 633 small ruminants {441 from Noorgal district (188 sheep and 253 goats) and 192 from Goshta district (57 sheep and 135 goats)} were examined for

clinical signs out of which 60 clinically suspected cases (20 sheep, 20 goats and 20 humans) clinically showing ringworm lesions were included in the study. During 45 days total 320 (112 male, 208 female) OPD patients from the department of dermatology public hospitals of Nangarhar and Kunar provinces of Afghanistan were examined for presence of ringworm and out of them 20 individuals were selected.

Hair, wool, scabs and skin scraping samples were collected. Annular plaques and hair loss were the criteria of the suspected cases. The suspected samples were collected aseptically and each sample was examined for the presence of dermatophytes using potassium hydroxide preparation (KOH) and inoculated on Sabouraud's dextrose agar (SDA) for isolation of the fungi. Medium was prepared and used as per the manufactures instructions.

The SDA plates containing chloramphenicol (400 mg) and cycloheximide 0.40 g/l were added and thoroughly mixed. SDA without cycloheximide was also used as some of the pathogenic fungi are inhibited by cycloheximide. The plates were incubated at room temperature (25-30°C) and observed daily for fungal growth up to 30 days before considering the samples as negative. From plates showing fungal growth, individual colonies were picked up and the mold was identified on the basis of colony characterization and microscopic morphological features in lactophenole cotton blue mounts as recommended by Ajello et al (1966). The confirmation was done based on colony morphology and microscopic appearance.

Differences in prevalence rates were compared according to age and sex using the SPSS software for Windows (Version 16.0) and statistical significance was studied as described by Snedecor and Cochran (1967).

RESULTS and DISCUSSION

The data given in Table 1 show that overall prevalence of dermatophyte in sheep was 6.93 per cent each based on the KOH test and SDA culture and 4.123 and 4.639 per cent in goats based on the KOH test and SDA culture respectively.

The data given in Table 2 show that the incidence of disease was more in female animals as per the two tests done. The mean incidence was 3.000 and 2.333 per cent in female as compared to 0.333 and 1.000 per cent in male sheep and goats as per culture test and 2.333 and 2.333 per cent in female as compared to 0.333 and 0.666 per cent in male sheep

Table 1. Overall prevalence of ringworm in sheep and goats in Goshta and Noorgal districts

Test	Ringworm			
	Sheep (245)	Percentage	Goats (388)	Percentage
KOH	17/245	6.93	16/388	4.123
Culture	17/245	6.93	18/388	4.639

Table 2. Mean prevalence of dermatophyte in male and female and young and old sheep and goats

Risk factor group	Culture		KOH test	
	Sheep	Goat	Sheep	Goat
Male	0.333 ± 0.333^{b}	1.000 ± 0.000^{b}	0.333 ± 0.333^{b}	0.666 ± 0.333^{b}
Female	3.000 ± 0.000^{a}	2.333 ± 0.333^{a}	2.333 ± 0.333^{a}	2.333 ± 0.333^{a}
Young (1-12 years)	1.333 ± 0.333^{c}	2.666 ± 0.333^{c}	1.000 ± 0.000^{c}	2.333 ± 0.666^{c}
Old (>12 years)	2.000 ± 0.000^{c}	0.666 ± 0.333^{d}	2.000 ± 0.000^{c}	0.666 ± 0.333^{d}

The values in a column carrying similar alphabets (in case of sex and age separately) do not differ significantly at 5% level

and goat as per KOH test respectively. In culture test young goat had higher incidence (2.666%) of dermatophyte as compared to old (0.666%). Similar trend was seen in case of KOH test also as young goat showed higher incidence (2.333%) as compared to old (0.666%).

It can be observed from the data in Table 3 that in Goshta district prevalence was more in female (2.333%) as compared to male (0.333%) sheep.

On culture basis also the prevalence was more in female (3.000%) than male (0.333%) sheep which is evident from Table 4. On the basis of KOH test the female goats had higher (2.333%) disease incidence as compared to male (0.666%) and old goats had lower (0.666%) incidence as compared to young (2.333%) as depicted in Table 5.

In human beings also the males had higher incidence of disease than females and children had more incidence than the young or old persons in Nangarhar and Kunar provinces based on SDA culture (Fig 1) and KOH test (Fig 2).

The study showed that infections with dermatophytes in Afghanistan particularly in the Goshta and Noorgal districts were the main cause of skin lesions in sheep, goats and humans.

The results are in agreement with the observations made by Biswas et al (2015) and

Table 3. Mean prevalence of dermatophyte in male and female and young and old sheep in Goshta district

Risk factor group	Mean prevalence	
	Sex	Age
Male	0.333 ± 0.333^{b}	-
Female	2.333 ± 1.527^{a}	-
Young	-	1.000 ± 0.000^{b}
Old	-	2.000 ± 1.000^{b}

The values in a column carrying similar alphabets do not differ significantly at 5% level

Table 4. Mean prevalence of dermatophyte in male and female and young and old sheep on culture basis

Risk factor group	Mean prevalence	
	Sex	Age
Male	0.333 ± 0.333^{b}	-
Female	3.000 ± 0.577^{a}	-
Young	-	1.333 ± 0.333^{b}
Old	-	2.000 ± 0.577^{b}

The values in a column carrying similar alphabets do not differ significantly at 5% level

Table 5. Mean prevalence of dermatophyte in male and female and young and old goat on the basis of KOH test

Risk factor group	Mean prevalence	
	Sex	Age
Male	0.666 ± 0.333^{b}	-
Female	2.333 ± 0.333^{a}	-
Young	-	2.333 ± 0.666^{a}
Old	-	0.666 ± 0.577^{b}

The values in a column carrying similar alphabets do not differ significantly at 5% level

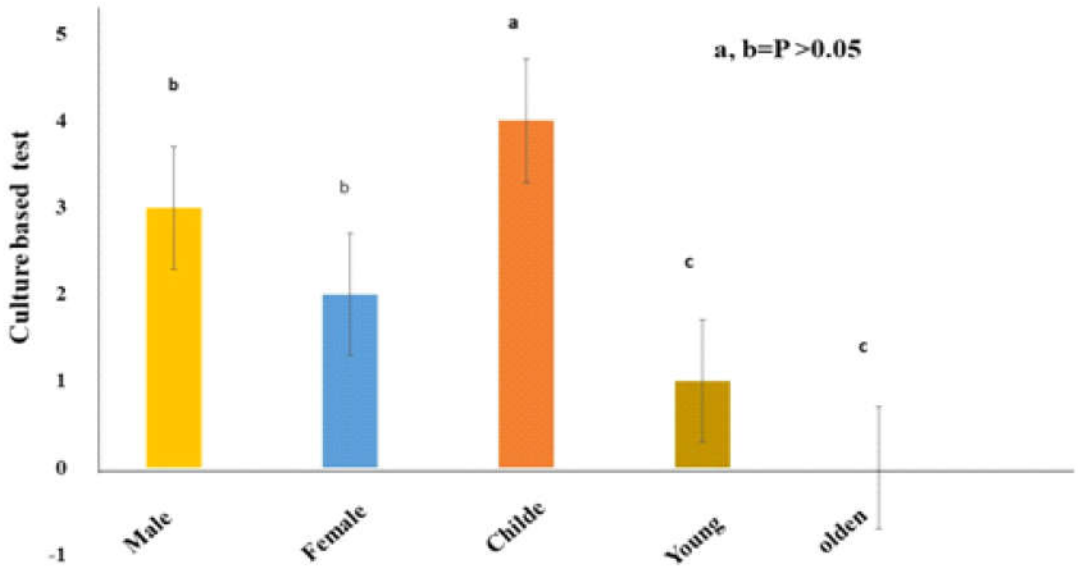

Fig 1. Sex and age-wise occurrence of dermatophyte in humans in Nangarhar and Kunar provinces based on SDA culture

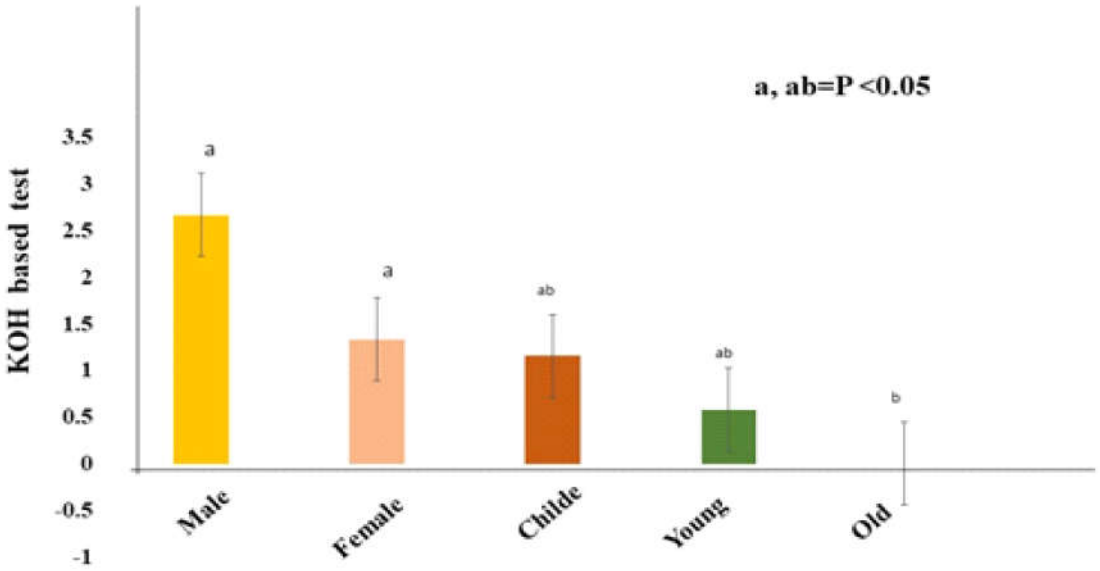

Fig 2. Sex and age-wise occurrence of dermatophyte in humans in Nangarhar and Kunar provinces based on KOH test

Teshome (2016). Similar observations were also made by Abou-Eisha et al (2008) and the Ameh and Okolo (2004).

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