Research Journal of Medical Sciences 10 (6): 647-652, 2016
ISSN: 1815-9346

Epidemiological Features of Fungal Infections of the Ear and the Eye Clinic Patients Referred to Medical Mycology Laboratory of Kermanshah University of Medical Sciences

[1]Naser Nazari, [1]Ali Mikaeili, [1]Yazdan Hamzavi, [2]Fariba Shaikhi Shoushtari, [3]Shahla Neamati and [4]Sahar Foroughinia
[1]Department of Mycology and Parasitology, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Department of Ophthalmology, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran
[3]Kermanshah University of Medical Sciences, Kermanshah, Iran
[4]Department of Clinical Biochemistry, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

Abstract: Keratomycoses and otomycoses have different risk factors. This research designed to study the epidemiological parameters of fungal infections of eye and ear in referral patients to Kermanshah medical mycology lab during 1993-2011.This research is a descriptive study on referral infected patients to medical mycology lab of special clinic of Kermanshah University of medical sciences. In these study epidemiological parameters such as age, sex, job, infected season, anatomical site of infection, habitant place and diseases in all infected fungal infections of eye and ear were collected. In all admitted patients, 54 cases have mycoses in ear site, that more frequent age group are 0-9 and student are most infection was dermatofitosis. 38 persons were infected to mycoses of eye site that 0 -9 age group and student are most infected of mycoticdiseases. Child age groups have most fungal infections of eye and ear canal sites, that care of eye and ear canal for prevention of illness for this age group strongly recommended.

Key words: Keratomycosis, otomycosis, epidemiology, Kermanshah, Iran

INTRODUCTION

Ear's fungal infections, has a wide range of infection that include tulips, canals and middle ear regions. Otomkosis is a subacute or chronic superficial fungal infection that accompanied with secretion, inflammation, itching and dry skin (Zayni *et al*., 2003). Ear's fungal infections include variety of infections like eyelids, conjunctiva, cornea and deep parts of eye tissue. Inflammatory that affects the cornea called keratitis. Ear's fungal infections cause eyelids and auricle alopecia. Filamentous saprophytes like Aspergillus and Fusarium causing Yeast fungal infection of the outer ear canal and conjunctiva (Anaissie *et al*., 2003). The aim of this study was to determine epidemiologic features of fungal infections of the ears and eyes on clients who visited special clinic mycology laboratory of Kermanshah University of Medical Sciences from 1993-2011.

MATERIALS AND METHODS

During a descriptive study by using data recorded inthe archives of the mycology laboratory of University, recorded data of clients who were infected with fungal infection of ear and eyes were analyzed special clinic mycology laboratory of Kermanshah University of Medical Sciences from 1993-2011.

RESULTS AND DISCUSSION

Findings of study showed that all of clients that visited the 54 person special clinic mycology laboratory of Kermanshah University of Medical Sciences from 1993 to 2011 were 54 persons that 28 persons 51/85% were male and 26 persons 48/15% were female. Figure 1 shows the age frequency distribution that the most frequent (33%) is in the age group of 0- 9 years and the lowest prevalence (2%) was for the age group of 60-69 and 50-59 year and

Corresponding Author: Ali Mikaeili, Department of Mycology and Parasitology, School of Medicine, Kermanshah University of Medical Sciences, Daneshgah Avenue, P.O. Box 6714869914 Kermanshah, Iran

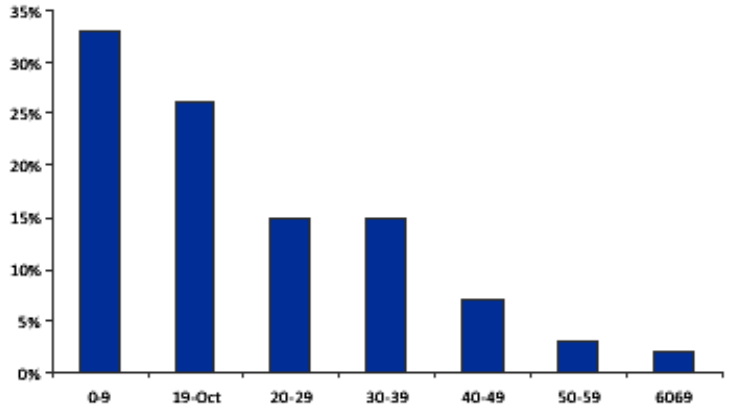

Fig. 1: Age frequency distribution of ear fungal diseases admitted to mycology laboratory from 1993-2011

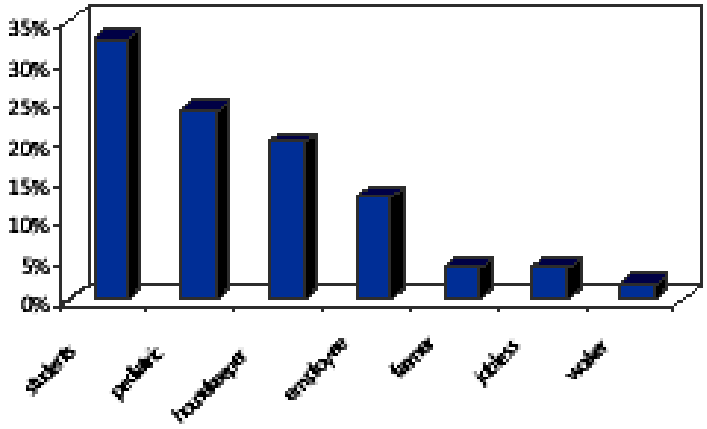

Fig. 2: Job frequency distribution of ear fungal diseases admitted to mycology laboratory from 1993-2011

Table1: Frequency distribution of ear fungal diseases admitted to mycology laboratory from 1993-2011

Season	Frequency	Percentage
Spring	11	20.5
Summer	10	18.5
Autumn	15	28
Winter	18	33
Total	54	100

frequency of clients has declined with grow older. It should be noted that there isn't any client in the age group of 70year and older. Distribution according to season showed that winter visitors (33%) had the highest and Summer with 5/18% had the lowest patients (Table 1).

Job frequency distribution of clients is shown in Fig. 2 and as can be seen students and university students by 33% had the highest frequency and workers with 2% had the lowest frequency (Fig. 2). Living place frequency distribution determines that 4% of patients live in

Table 2: Living place frequency distribution of ear fungal diseases admitted to mycology laboratory from 1993-2011

Place of catching disease	Frequency	Percentage
Kermanshah	40	74
islamabadgharb	2	4
Harsin	1	1.7
Mahidasht	1	1.7
Sarpolezahab	2	4
Ravansar	1	1.7
Javanrood	1	1.7
Guilangharb	1	1.7
Sahne	2	4
Outside of city	3	5.5
Total	54	100

Kermanshah (Table 2). Table 3 shows frequencyof fungal infection is shown based on type of disease that most frequency of disease is for Dermatophytosis (61.11%) and lowest reported frequency was for Demodex+pityriasis (1.85).

Certain infected: Catching this disease is certain because this diagnosis method in enough for proofing

Table 3: Frequency distribution of ear fungal diseases admitted to special mycology laboratory of Kermanshah University of medical science from 1993-2011

Type of disease/ diagnosis method	Dermatophytosis	Pityriasis	Filamentous saprophytic	Candidiasis	Demodexand pityriasis
View	25	3	1	7	1
Culture	-	-	1	1	-
View+ culture	8	-	6	1	-
Total	33	3	8	9	1

Certain infected: catching this disease is certain because this diagnosis method in enough for proofing this disease

Table 4: The frequency of fungal species separated from patients with ear discomfort referred to laboratory of mycology of special clinic of Kermanshah University of Medical Sciences from 1993 to 2011 according to place of separation, diagnosis method and reported disease

Fungal species/ locations	Place of separation	Diagnosis method	Type of disease	Frequency
Aspergillusniger	Ear canal	Direct view+ culture	Otomycosis	13.5
Aspergillusflavus	Ear canal	Direct view+ culture	Otomycosis	6.5
Aspergillus	Ear canal	View and culture	Otomycosis	13.5
Penicillium	Ear canal	View and culture	Otomycosis	6.5
trichophytonmentagrophytes	Auricle	View and culture	Dermatophytosis	13.2
trichophytonverrucosum	Auricle and Behind ears	View and culture	Dermatophytosis	33.5
Trichophyton	Auricle and Behind ears	View and culture	Dermatophytosis	6.5
Candida albicans	Ear canal	Culture		6.5
Total				15

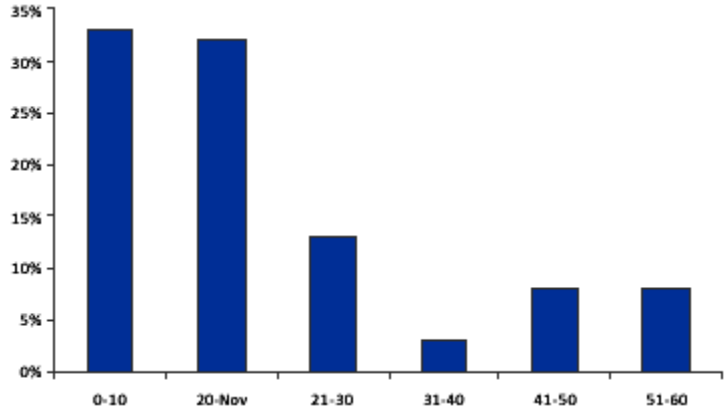

Fig. 3: Age frequency distribution of patients with fungal diseases of the eye zone referred to mycology laboratory from 1993-2011

this disease. Table 4 shows the prevalence of fungus species that separated according toseparation locations and detection methods and reported disease in patients that according to which six cases of Otomycosis have been reported that the most causative agent was Aspergillusniger (2 cases of 6 cases) and have been reported 8 cases of Dermatophytosis. Results and findings of fungal diseases of the eye zone. The results obtained in this study abouteye also showed that patients withfungal diseases of the eye zone referred to mycology laboratory of special clinics of Kermanshah University of Medical Sciences from 1993-2011, there were 38 cases that 22 patients (9/57) were male and 16 patients (1/42) were female.

Total number of patients was 114 cases that 38 cases have been reported positive. Figure 3 shows the frequency distribution of the age that the highest prevalence (37%) is in the age group of 0-9 years and least prevalence (3%) is in the age group of (30-39) years. It should be noted that in the age group of 60-69 years and above no cases have been recorded. The frequency distribution of patients according to season of admission showed that summer with 34% had highest patient and spring with 19% had lowest patients (Table 5).

Frequency distribution of patients living place indicates 98% of patients live within the province witch 60% of them live in Kermanshah. The 2% of cases have been outside the province. The 98% of patients live within

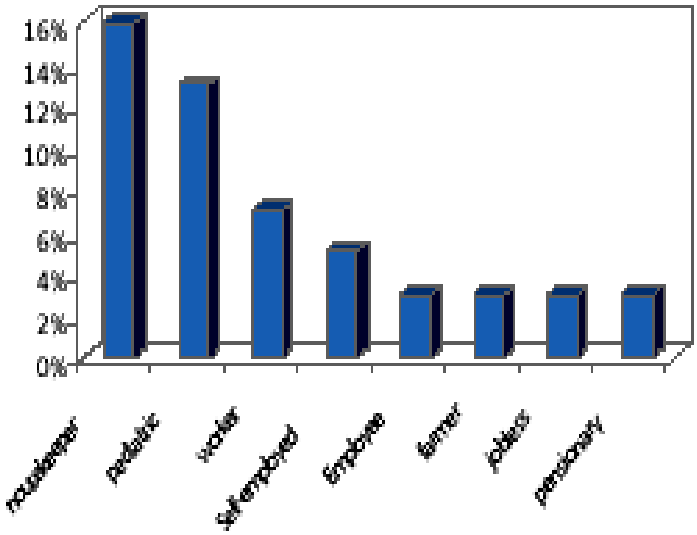

Fig. 4: The job Frequency distribution of patients with fungal eye zone diseases referred to mycology laboratory from 1993-2011

Table 5: The frequency distribution of patients with eye zone fungal diseases referred to mycology laboratory according to season of admission from 1993-2011

Season of admission	Prevalence	Percentage
Spring	7	19
Summer	13	34
Autumn	10	26
Winter	8	21
Total	38	100

Table 6: Frequency distribution of patients with fungal diseases of eye zone referred to mycology laboratory according to Location from 1993-2011

Living place	Prevalence	Percentage
Kermanshah	22	60
Islam abadgharb	1	2
Kangavar	1	2
Harsin	2	5
Mahidasht	1	2
Ravansar	1	2
Javanrood	2	5
Paveh	1	2
Guilangharb	1	2
Village	6	16
outside the province	1	2
Total	38	100

province witch 60% of them live in Kermanshah and (12%) and (5%) have been in village and harsin and javanrood (Table 6). Job Frequency distribution of patients with fungal disease of the eye zone has been shown in Fig. 4 and as you can see students and University student with 47% and the housekeeper with 16% have the highest prevalence and farmers, workers, unemployed and pensioners each of them with 3%have the lowest frequency.

The frequency of type of the disease has been shown In Table 7 that dermatophytosishad the most patients (65%) and least reported is forfilamentous Saprophytic

Table 7: The Frequency distribution of eye zone fungal infections in patients referred to laboratory of mycology based on the type of disease

Infection	Direct view	Culture	View and culture	Total
Dermatophytosis filamentous	22 certain	-	3 certain	25
Saprophytic	-	3	3	6
Candidiasis	2uncertain	4uncertain	1 certain	7
Total	24	7	7	38

*Caching mentioned disease is certain because laboratory diagnosis method is enough to prove the disease; **disease isn't certain and needs physician's clinical assessment

(15%). The Frequency of separated fungi is shown in Table 8 witch based on that the highest percentage is for candidate (46%) and the lowest percentage is for Fusarium species, Mucor is Trichophytonrubrum (5/7%).

In 7 cases(54%) culture and direct view in 5 cases (38%) only culture and just in one case only direct view has been reported. About reported disease, only one case has been reported fungal Keratitis that related to Fusarium species. Patient was a 27year old male, worker and living in Kermanshah and the sample was separatedof the patient's left cornea.

In this study, epidemiological indices of fungal infections (such as age, sex, season of admission, community, jobs and fungal species) were assessed in patients with eye and ear infections referred to Medical Mycology Laboratory of Special clinic of Kermanshah University of Medical Sciences from 1993-2011. In this study 54 cases (40%) of 135 patients referred to mycology laboratory special clinic of Kermanshah University of Medical Sciences had been infected with fungal ear that in doctor Afshari (2005)'s study 57% of cases have been reported positive.

Table 8: The Frequency distribution of fungal species separated from patients with ocular discomfort referred to mycology laboratory of special clinic of Kermanshah University of Medical Sciences during 1993-2011 according to location and lesion and type of reported disease

Fungal species	Separation place	Separation method	Type of reported disease	Frequency
Fusarium	Cornea	Culture	Fungal keratitis	1
Candidate	Conjunctiva	Culture +direct view	Candidiasis	1
Candidate	Conjunctiva	Culture	_	4
Candidate	Conjunctiva	direct view	_	1
Alternaria species	Eyelid and Conjunctiva	Culture +direct view	Fungal infection	2
Mucor species	Eye	Culture +direct view	Mucormycosisrhinocerebral	1
Trichophytonrubrum	Corner of eye	Direct view	Dermatophytosis	1
Trichophytonverrucosum	Eyebrow and eyelid	Culture+ direct view	Dermatophytosis	2
Total				13

The results of this study showed that the most common age of fungal ear infection is in the age group of 0-9 year and lowest prevalence is in the age group with 50 years and older that in other study the age group of 20-30 year (Kazemi and Ghiasi, 2005) and 30-39 year had the most prevalence (Balouchi *et al*., 2006). In Spain also results were in the age group with 30 years old (Burgos *et al*., 1999). In our study 28 cases of patients with ear fungal infection were male and 26 cases were female that in a study in northwest of Iran 64 cases of 89 patients were female and 23 cases were male (Kazemi and Ghiasi, 2005). In a study in Spain 60% of cases were male.

In our study, the most separated fungal species from patient were trichophytonverrucosum (33%) and then were Aspergillusniger (13%) that is different with results of studies in India in 1960. On those years, all cases of Otomycosis have been reported by Aspergillus species and Candida (Pahwa *et al*., 1983; Kaur *et al*., 2000; Kenneth and Kathryn, 2002; Mohammadi *et al*., 2014). In a study in Brazil the most common fungal species were Aspergillus and then Candia albicans (Enweani and Igumbor, 1997). In another study in India Aspergillus had the highest prevalence (Fata *et al*., 2010) Researchers in Nigeria have achieved similar results. (Sefidgar *et al*., 2002)

Most patients with ear fungal infections were infected during winter that was different with other studies. In Baloochi's study most common seasons were Autumn and Winter. Also in a study in Spain most attacks were in summer (57.5%) and then were in Autumn (Burgos *et al*., 1999). In regard to the job in this study, the highest risk was seen in the group of students anduniversitystudents. In the study of Baloochi *et al*., 2000 housekeeper has the most prevalence in ear fungal infections.

In our study the most common age for eye fungal infection was 0-9 year and the lowest prevalence was 30-39 years that in a study in Mashhad the most frequent age was 11-30 year. Fungal keratitis is rare in children under 10 years (Sefidgar *et al*., 2002). And also in our study 22 cases of eye fungal infection were male and 16 cases were female that is totally different with study in New York.That 65% of cases were female and remnants were male. Also in the study that was done by Fatta *et al*., 2010 in Mashhad, 53.3 of cases were female. In study in Sari, 54.5% of cases were male and 45.5% were female (Shokouhi *et al*., 2001).

In our study, patients with eye fungal infections were referred more in summer and autumn that match with other studies. In study in Panta the most referral was in September and October (Kaur *et al*., 2000). In regard to the job in this study, the highest risk for eye fungal infection was seen in the group of students and university students.Also in another study, the most common job for fungal keratitis was farmer (40.9%) and housekeeper (20.5%). In assessment the prevalence of fungal species in eye fungal infections in our study, the highest incidence was from witch Candida species that was different with obtained results in Mashhad that the most common species was Fusarium. In the study that was done by Berenji and Elali (2003) has been reported Aspergillus as the most common agent.

CONCLUSION

Child age groups have most fungal infections of eye and ear canal sites. That care of eye and ear canal for prevention of illness for this age group strongly recommended.

ACKNOWLEDGEMENTS

This study was taken from the dissertation by Shahla Neamati in partial fulfillment of the degree of M.D. from School of Medicine, Kermanshah University of Medical Sciences.

REFERENCES

Afshari, M.A., R. Kachoui and M. Ajalloveyan, 2005. Assessment of prevalence of otomycosis in ENT clinic in Baqiyatallah (AS) Hospital. J. Mil. Med., 7: 121-124.

Anaissie, E.J., M.R. McGinnis and M.A. Pfaller, 2003. Clinical Mycology. 1st Edn., Churchill Livingstone, Philadelphia, PA., pp: 195-225.

Balouchi, M., N. Berjis and S. okhovat, 2006. Investigation of fungal infection in external ear. J. Isfahan Med. Sch. IUMS., 24: 72-75.

Berenji, F. and S. Elahi, 2003. Mycotic keratitis among patients referred to mycology laboratory, Emam Reza Hospital, During 1982-2001. Med. J. Mashhad Univ. Med. Sci., 45: 49-54.

Burgos, S.A., G.M. Menaches, A.J. Gras and S.J. Talavera, 1999. Descriptive study of infectious ear disease in relation to summer. Acta Otorrinolaringologica Esp., 51: 19-24.

Enweani, I.B. and H. Igumbor, 1997. Prevalence of otomycosis in malnourished children in Edo State, Niger. Mycopathologia, 140: 85-87.

Fata, S., A. Derakhshan, A. Bolourian, M. Sedaghat and H. Khakshour*et al*., 2010. Mycotic keratitis, a study on etiologic agents, predisposing factors and the result of treatment among 44 patients. Med. J. Mashhad Univ. Med. Sci., 53: 16-25.

Kaur, R., N. Mittal, M. Kakkar, A.K. Aggarwal and M.D. Mathur, 2000. Otomysis: A clinicomycologic study. Ear Nose Throat J., 79: 606-609.

Kazemi, A. and S. Ghiasi, 2005. Survey of otomycosis in north-western area of Iran 1447-2004. J. Mazandaran Univ. Med. Sci., 15: 112-119.

Kenneth, A. and E. Kathryn, 2002. Manual of Dermatologic Therapextics. 6th Edn., Lippincott Williams & Wilkins, Philadelphia, Pennsylvania, pp: 309-310.

Mohammadi, M., A. Ziapoor, M. Mahboubi, A. Faroukhi and N. Amani, 2014. Performance evaluation of hospitals under supervision of kermanshah medical sciences using pabonlasoty diagram of a five-year period (2008-2012). Life Sci. J., 11: 77-81.

Pahwa, V.K., P.C. Chamiyal and P.N. Suri, 1983. Mycological study in otomycosis. Indian J. Med. Res., 77: 334-338.

Sefidgar, S., K. Kiakojouri, M. Mirzaei and F. Sharifi, 2002. Fungal infections of external ear canal in patients with otomycosis babol: 1991-2000. J. Babol Univ. Med. Sci., 4: 25-29.

Shokouhi, T., M. Ahanjan and A. Kasiri, 2001. Bacteriological and Mycological study of external otitis in-patients referred to ENT clinic of Boo Ali Sina Hospital in Sari in summer 1999. J. Mazandaran Univ. Med. Sci., 11: 1-10.

Zayni, F., M. Amir and M. Emamy, 2003. Comprehensive Medical Mycology. 2nd Edn., Tehran University Press, Iran.