



Epidemiological Indices of Gynecological Fungal Infections Referred to the Mycology Laboratory of Kermanshah

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Abstract

Introduction: Candidiasis vaginitis, Tinea cruris and Erythrasma are the most common fungal and *Corynebacterium* infections in women. Favourable conditions, socio-economic status and age and occupation in different regions play a role in the frequency and severity of these diseases. Given that women make up half of the population of any society, knowing the frequency of fungal diseases of this genus and the severity of the disease their values are of great importance.

Methods: In a descriptive study, it was decided to evaluate the frequency, variety and conditions of fungal infections in women referred to the Medical Mycology Laboratory of Kermanshah University of Medical Sciences from the beginning of 1994 to the end of 2014. Considering that the mycology laboratory is the only specialized mycology laboratory in Kermanshah province, this study will be able to show us comprehensive information about the status of mycoses of women groin. In this study types and agents of mycoses and conditions such as age, job, season and place that predisposing factor role for infection were collected.

Results: The highest prevalence of groin dermatophytosis is in the age group of 40-49 years with % 28 and the lowest is in the age group of 0-9 years and more than 70 years with % 1. The present study shows that the highest prevalence of fungal species was in the years 1994-1998 and gradually declined and had the lowest prevalence in recent years. In this study, the most common fungal species of tinea cruris was *Epidermophyton floccosum* with a prevalence of % 40 and the lowest was related to *Trichophyton rubrum* and *Microsporum gypsum* with a prevalence of 4, 0.4 percent. The most common agents of candidiasis were *Candida albicans*. The most common job of patients was Housewife and most common patient's place was Kermanshah.

Conclusion: The most important factor in preventing fungal infections is public health. For example, dry yourself carefully after taking a bath, don't sit in a wet bath, and change your clothes after sweating in hot seasons. Tinea cruris is contagious. Be sure to prevent the spread of disease in gyms and swimming pools.

Keywords: Dermatophytosis; Erythrasma; Pityriasis Versicolor; Candidiasis

Introduction

There is a wide range of fungal infections in women. *Candida* vaginitis, tinea cruris and erythrasma are the most common fungal and *Corynebacterium* infections in women.

Candida albicans and dermatophytes such as *Epidermophyton floccosum* and *Corynebacterium minutissimum* are the most common causes of fungal and *Corynebacterium* infections in women [1,2]. Most fungal infections under favourable conditions such as: pregnancy, use of birth control pills,

diabetes and AIDS, socioeconomic status, age and occupation in different regions has different frequencies and intensities [3-6]. Dermatophytosis or fungal infections of the skin include a wide range of diseases that affect the skin, hair and nails. The causes of these diseases are a group of filamentous fungi called dermatophytes. These infections are limited to stratum corneum epidermis layer [7]. One of the forms of dermatophytosis is tinea cruris, the prevalence of which in different regions of the world is 1.3 to 1.5 compared to total dermatophytosis. Lesions in the groin area with discoloration, definite borders, and dry scales with raised margins sometimes accompanied by papules and pustules and itching [8].

It is estimated that 75% of women develop vaginal candidiasis at least once during their reproductive years about 13 million vulvovaginal candidiasis are reported annually in the United States, plus reports indicate that the incidence of the disease has increased over the past decade in the United States and Europe [9]. In a study conducted by Namazi, et al. [10] in Tabriz investigates the risk factors for candidiasis infections. History of diseases, vaginal pH, number of intercourses per week, number of deliveries, number of vaginal deliveries, lactation status, type of last delivery, contraceptive method are risk factors for vaginal candidiasis. In a study conducted by Imran, et al. [11] in women referred to the clinic of Shahid Rajaei Hospital in Tonekabon on vaginal candidiasis-causing species, it was shown that 80% of the cause of vaginal candidiasis is *Candida albicans* [11]. In a cross-sectional study conducted by Mohammadi, et al. [12] investigate the identification of *Candida* species in Kashan, the age group of 31-40 years had the highest and the age group of 11-20 years had the lowest cases of *Candida albicans* [12].

In a descriptive-analytical study conducted by Tabatabai Malazi, et al. [13] with the aim of examining candida vaginitis in diabetic women during 2002-2005 in Dr. Shariati Hospital. There was a statistically significant difference between the mean fasting blood sugar and vaginal infectious culture. Positive culture of vaginal candidiasis was not related to age, blood sugar control status, history of allergies, genital health status, occupation, education, and type of diet, method of treatment or duration of diabetes. In a study conducted by Kariman, et al. [14] in health centers affiliated to Shahid Beheshti University of Medical Sciences with the aim of comparing the effect of fluconazole and clotrimazole in the treatment of *Candida albicans* vulvovaginitis. Regarding some symptoms such as subcutaneous pain, vaginal burning, burning and frequent urination, the rate of treatment and the speed of recovery of symptoms and complaints in the fluconazole group were numerically higher than the clotrimazole group. The result of positive treatment was 77.1% in the fluconazole group and 74.2% in the

clotrimazole group. In a study conducted by Mousavi, et al. [15] in Sari the use of self-medication and antifungal drugs in chronic vulvovaginal symptoms not only delays the diagnosis and proper treatment of the disease, but also contributes to the development of resistant and chronic conditions of the disease. In a descriptive study, Tirtgartabari, et al. [16] performed on women who referred to dermatology and gynecology clinics of Shahid YahyaNejad Hospital in Babol from the beginning of winter 2006 to the end of autumn 2007. The most common cause of groin itching in all seasons is ages and BMI divisions. Tinea cruris was 47.8%. The mean age of the subjects was 41.2 years with an age range of 15-57 years.

In a study by Alizade, et al. [17] conducted in Gilan with the aim of investigating different types of alopecia. Tinea cruris was the most common with 47.2%. The major cause of tinea cruris was Trichophyton mentagrophytes. The prevalence of Tinea cruris was higher in warm seasons than in cold seasons. Occupational activity (agriculture) and the type of clothing worn by women in the north of the country may play a role in the high prevalence of this type of alopecia, especially in women. In a preliminary study, the most common cause of Tinea cruris was *Epidermophyton floccosum* [18]. In the study of farming et al, obesity has been mentioned as an effective factor in the development of groin infections [19]. In a study by Novel, et al. [20] Erythrasma was seen in 33% of women aged 65-99 years [20].

In a study by Famili, et al. [21] conducted in Mashhad with the aim of comparing the effect of fluconazole with griseofulvin in groin. 80% of patients with fluconazole and 4.48% of patients with griseofulvin improved. Vaginal symptoms may impact quality of life, and clinicians are challenged in the evaluation and management of other disease [22]. The prevalence of superficial mycotic infection worldwide is 20-25% of which dermatophytes are the most common agents [23].

There is a wide range of fungal infections in women. Candidiasis vaginitis, Tinea cruris and Erythrasma are the most common fungal and *Corynebacterium* infections in women. Favourable conditions, socio-economic status and age and occupation in different regions play a role in the frequency and severity of these diseases. Given that women make up half of the population of any society, knowing the frequency of fungal diseases of this genus and the severity of the disease their values are of great importance. Therefore, in a descriptive and prospective study, it was decided to investigate the frequency, variety and conditions of fungal infections in women referred to the Medical Mycology Laboratory of the Special Clinic of Kermanshah University of Medical Sciences from the beginning of 1994 to the end of 2014.

Research Methods

In this retrospective descriptive cross-sectional study from April 1994 to March 2014, all information related to demographic characteristics, time of referral, place of infection, smear and culture results and other complementary diagnoses of patients referred to the Medical Mycology Laboratory of the University Special Clinic Kermanshah medical sciences have been studied and in this regard, an attempt has been made to observe all ethical considerations in terms of information about patients. In this study, by referring to the laboratory registry offices, information and results related to direct microscopic vision and culture (fungal infection and isolated fungal species) obtained from all female patients with suspected fungal disease in the genital and groin area of patients who referred to the laboratory were extracted. The sample size is the total number of women who referred to the laboratory during these 20 years. For patients referred in 2014, more information was obtained, including: duration of illness, previous treatment history, underlying disease, use of infected places and history of addiction, etc. After extracting the variables, their frequency distribution was determined and the extracted results were evaluated by tables and statistical graphs and then presented.

The statistical population of this retrospective study consists of patients with groin skin problems referred to the Medical Mycology Laboratory of the Special Clinic of Kermanshah University of Medical Sciences from the beginning of 1994 to the end of 2014. After filling out

a questionnaire, patients were sampled. The face was disinfected using alcohol-soaked cotton. Patients' skin lesions were then gently collected using a sterile blade and the collected sample was reconstructed for direct microscopic vision. In addition to the results of direct microscopic examination, culture was also performed. Other patient information was collected using a questionnaire and interviews with patients.

All patients referred to the Medical Mycology Laboratory of the Special Clinic of the University have specifications registered in special offices. These characteristics include age, sex, and occupation, season of referral, location, lesion, microscopic direct vision result and culture result.

After extracting the information used for this study, the results were analyzed by statistical tables and graphs.

Results

During the study, a total of 895 women with groin and vaginal infections referred to the medical mycology laboratory of the university's special clinic. The frequency distribution of the type of fungus among the patients referred to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014) by age, occupation, season, and place are presented (Table 1).

Variables	Dermatophytosis	Candidiasis Groin	Candidiasis Vagina	Erythrasma	Pityriasis	Negative	Total
Age (y)							
9- 0	3	3	1	0	0	29	36
19 - 10	20	14	1	15	2	49	101
29 - 20	61	35	9	36	10	65	216
39 - 30	68	34	15	67	2	59	245
49 - 40	78	15	8	50	0	36	187
59 - 50	40	9	0	19	0	15	83
69 - 60	5	6	0	4	0	6	21
70 >	3	3	0	0	0	0	6
Job							
Housewife	198	76	19	147	11	145	596
Employee	34	18	8	19	1	22	102
Student	26	20	4	16	2	60	128
Therapy	6	1	0	2	0	4	13
No Job	7	1	1	1	0	24	34

Freelance	4	1	2	3	0	2	12
Retired	3	2	0	3	0	2	10
Season							
Spring	66	35	9	47	3	47	207
Summer	59	33	10	44	3	62	211
Fall	85	20	7	59	2	74	247
winter	68	31	8	41	6	76	230
Place							
Kermanshah	256	103	30	175	14	221	799
Songor	0	1	0	1	0	1	3
Paveh	0	1	1	0	0	1	3
Sahneh	2	0	0	1	0	1	4
Gilan G.	1	2	1	0	0	0	4
Qasr Shirin	3	1	0	0	0	3	7
Hersin	0	1	0	0	0	2	3
Sarpol	1	1	0	1	0	2	5
Ravansar	2	1	0	0	0	2	5
Kangavar	0	1	0	2	0	1	4
Kerand	0	1	0	1	0	1	3
Biston	0	0	0	0	0	0	0
Islam Abad	2	1	1	3	0	5	12
Mahidasht	1	4	0	0	0	0	5
Javanrood	1	1	0	0	0	0	2
Village	0	0	1	2	0	3	6
Others	9	0	0	5	0	16	30
Total	278	119	34	191	14	259	895

Table 1: Frequency distribution of fungal species among patients referred to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014) by some variables.

The frequency of fungal types according to the types of diagnostic methods among the patients referred to the mycology laboratory of the special clinic of Kermanshah

University of Medical Sciences (from the beginning of 1994 to the end of 2014) is shown (Table 2).

Detection method	Dermato phytosis	Candidiasis Groin	Candidiasis Vagina	Erythrasma	Pityriasis	Total
Direct vision	160	48	6	191	14	207
Cultivation	4	21	17	0	0	42
Both methods	114	50	11	0	0	175
Total	278	119	34	191	14	636

Table 2: Frequency distribution of fungal species according to different diagnostic methods among patients referred to the mycology laboratory of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014).

The frequency of fungal species among those referred to the mycology laboratory of the special clinic of Kermanshah

University of Medical Sciences (from the beginning of 1994 to the end of 2014) by year is shown (Table 3).

Year	T.ver	T.ment	T.sch	T.rub	M.can	M.gyps	C.sp	C.albi	E.flo	Total
1998-1994	1	1	4	1	1	0	15	30	28	81
2003- 1999	2	5	2	0	0	1	2	10	40	62
2008- 2004	2	1	1	0	1	0	10	15	12	42
2014- 2009	0	1	3	0	0	0	9	12	7	32
Total	5	8	10	1	2	1	36	67	87	217

Table 3: Frequency of fungal species among those referred to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014) by year.

In 2014, in addition to the above variables, a number of variables were added to the questionnaire, which includes the underlying disease, duration of disease, arbitrary use of corticosteroids, addiction, etc.

In 2014, there were a total of 11 patients who had 4 cases of underlying disease (36.3) of which 4 cases were reported negative and the other three were positive. Underlying diseases included Parkinson's, hyperlipidemia, hypothyroidism, and breast cancer. None of the people were smoking or addicted. The duration of infection was from 2 months to one year. 4 cases had prolonged contact with water. Also, 2 cases had arbitrary corticosteroids [18].

The highest prevalence is in the age group of 30-39 years (.3 36.3) and the lowest prevalence is in the age group of 40-49 years (% 9). 7 cases are housewives (% 63.6). Of these 11 cases, 6 were positive and only 2 had positive culture. One case of *Trichophyton mentagrophytes* and one case of *Candida albicans* of the groin have been reported. The highest prevalence was in summer and autumn and no cases were reported in spring. There were also 9 residents of Kermanshah (81.8) and 2 residents of Sahne (% 18.1). The type of detergent most people use is soap.

Discussion

In this study, epidemiological indicators of groin dermatophytosis and candidiasis (groin and vagina), including age, occupation, place of residence, reference season and fungal species in women referred to the mycology laboratory of Kermanshah University of Medical Sciences (from the beginning From 1994 to the end of 2014) was tested and studied that due to the high volume of the test sample can be better clinical judgments of the community.

In this study, which was performed on 895 women referring to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014), the results were obtained. The highest groin dermatophytosis is in the age group of 40-49 years with 28 % and the lowest rate is in the age group of 0-9 years and more than 70 years with % 1. In

a descriptive study, Tirtgartabari, et al. [16] performed on women who had referred to the dermatology and gynecology clinics of Shahid Hayi Nejad Hospital in Babol from the beginning of winter 2006 to the end of autumn 2007. The most common cause of groin itching in all seasons, ages and BMI divisions was 8. The mean age of the subjects was 41.2 years with an age range of 15-57 years.

In the present study, among women with groin candidiasis, the age group of 20-29 years had the highest frequency with 29.4 and the age groups of 0-9 years and over 70 years had the lowest frequency with % 1. Also, the age group of 30-39 years has the highest frequency of vaginal candidiasis with 44.1 and the lowest frequency in the age groups of 50-59, 60-69 and over 70 years with % 0. In a cross-sectional study conducted by Mohammadi, et al. [12] investigate the identification of *Candida* species in Kashan, the age group of 31-40 years had the highest and the age group of 11-20 years had the lowest cases of *Candida albicans*.

The results of the present study also showed that groin erythema was observed in 35% of women in the age group of 30-39. In the study of the novel and his colleagues, Erythrasma was seen in 33% of women aged 65-99 years [20].

The total number of negative cases in this study was seen in the age group of 20-29 years. In general, it had the most clients in the age group of 30-30 years with 27.3. The lowest number of clients was observed over 70 years. The results show that the most people referred in this study are housewives with 66.5 and the least number of retirees with % 1.1. This is probably due to the fact that the largest population referring to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences is housewives. Also, this widespread prevalence in housewives can be due to their high contact with water and humid environments. In a study conducted by Alizadeh, et al. [17] in Gilan with the aim of examining the types of *Tinea cruris* *Tinea* had the highest prevalence with 47.2%. In the high prevalence of this type of dermatophytosis, especially in women, there may be a role for occupational activity (agriculture) and the type of clothing worn by women in the north of the country.

In this study, the highest number of patients referred to the mycology laboratory of the special clinic of Kermanshah University of Medical Sciences (from the beginning of 1994 to the end of 2014) living in Kermanshah with 89.2 and the lowest number of patients referred to Biston with zero percent. The high frequency in this study in Kermanshah city is due to easier access and the existence of a central medical center in this city. Of course, the high population of this city compared to other cities in the province should not be ignored. In this study, the highest number of patients is in autumn (% 27.5) and the lowest number is in spring (% 23.1). In a study conducted by Alizadeh, et al. [17] in Gilan with the aim of examining the type's *Tinea cruris*, dermatophytosis had the highest prevalence with 47.2%. The prevalence of *Tinea cruris* was higher in hot seasons than in cold seasons.

Based on the results obtained in this study, the use of direct vision has the highest diagnosis of groin dermatophytosis with 57.5 and culture with the lowest diagnosis with 41.4. Diagnosis of erythrasma and pityriasis versicolor has been made using direct microscopic vision only. The highest rate of diagnosis in this study was by direct microscopic vision with 65.8. The present study shows that the highest prevalence of fungal species was in the years 1994-1998 and gradually declined and had the lowest prevalence in recent years. Probably the reason for the decline is the public awareness of fungal infections and the general increase and recent advances in medical science in the diagnosis and treatment of diseases. In this study, the most common fungal species of *Tinea cruris* was *Epidermophyton floccosum* with a prevalence of % 40 and the lowest was related to *Trichophyton rubrum* and *Microsporum gypsum* with a prevalence of 0.4. In the previous study, the most common cause of *Tinea cruris* was the *Epidermophyton floccosum* [18].

In a study conducted by Alizadeh, et al. [17] in Gilan with the aim of investigating the types of dermatophytosis, *Tinea cruris* was the most common with 47.2%. The main cause of *Tinea cruris* was *Trichophyton mentagrophytes*.

Conclusion

The most important factor in preventing fungal infections is public health. For example, dry yourself carefully after taking a bath, don't sit in a wet bath, and change your clothes after sweating in hot seasons. *Tinea cruris* is contagious. Be sure to prevent the spread of disease in gyms and swimming pools.

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