DOI: https://dx.doi.org/10.18203/issn.2455-4529.IntJResDermatol20233176

Original Research Article

Clinico-epidemiological pattern of pityriasis versicolor in Sudanese patients at Khartoum dermatology and venerology hospital, Khartoum State, Sudan, 2012-2013

Otarid Bashir Mohammed[1]*, Khalid Badreldin Fadl Alla[2]

[1]Department of Dermatology, Primary Health Care Cooperation (PHCC), Doha, Qatar
[2]Department of Community Medicine, Faculty of Medicine, Ahfad University of Women, Khartoum, Sudan

Received: 06 August 2023
Revised: 04 September 2023
Accepted: 18 September 2023

***Correspondence:**
Dr. Otarid Bashir Mohammed,
E-mail: otaridbashir2005@gmail.com

ABSTRACT

Background: Pityriasis versicolor is a fungal skin disease, chronic and superficial in the course, characterized by skin pigmentary changes that psychologically impact the patient's quality of life. This paper intended to determine the clinico-epidemiological pattern of the Pityriasis versicolor in patients who attended the outpatient clinic of Khartoum dermatology teaching hospital (KDTH) from June 2012 to February 2013.
Method: This descriptive, analytical, cross-sectional hospital-based study used a quantitative method. A total convenient sample technique enrolled 110 patients during the study period.
Results: The 30.9% of the participants were between 11 and 20 years old, 67.3% were males, and 37.1% were of low socioeconomic status, 47.2% had a family history of the disease, 68.1% had first-degree relatives, 56.4% and 60% had a history of a similar condition in the summer, respectively. 57.3% were originally from a pure Arab tribe, compared to 0.9% from purely African tribes. There were significant associations between being male with a positive family history, the onset of the disease, color of the lesions, and having disease (p=0.02, 0.05, 0.04, respectively). Also, between the age with a history of similar condition and the associated symptoms (p=0.00 and 0.03 respectively).
Conclusions: Most participants were young males who had the disease in the summer with a high recurrence rate. There were multiple significant associations between gender and age with some clinical and epidemiological patterns. Determining any genetic association with pityriasis versicolor, improving counselling, and raising awareness to understand age the predisposing factors were recommended in this paper.

Keywords: Pityriasis versicolor, Skin pigmentary changes, First degree relatives, Arab tribes, Family history, Young age

INTRODUCTION

Pityriasis versicolor is a chronic, superficial fungal skin disease, usually mild and asymptomatic, characterized by skin pigmentary changes due to colonization of the stratum corneum by a dimorphic lipophilic fungus apart of normal skin flora, known as Malassezia furfur, usually resides in the keratin of the skin and hair follicles. Under certain conditions, the commensal yeast transforms into filamentous pathologic forms.[1] Lipophilic yeast is usually not expected in childhood but becomes more common in the late teens, peaking in the early 20s. In tropical countries, the condition is more prominent. Although positive family history is shared, genetic relationship is yet to be determined.[2] There is a particular predisposing factor associated with the disease. e.g., warm season or climate, hyperhidrosis, oily skin, glucocorticoid treatment, immunodeficiency.[3]

Epidemiology

Pityriasis versicolor is a common dermatosis in tropical regions, where high humidity and temperature increase its prevalence. It can affect 40-50% of individuals from specific geographic regions and ethnic groups.[4] In temperate areas, the prevalence may extend up to 3% during summer.[5,6] Although the alteration in skin pigmentation is more apparent in darker-skinned individuals, the incidence of tinea versicolor appears to be the same in all races.[7]

Role of sex in propensity to development of tinea versicolor is still unclear; some studies found that pityriasis versicolor is more common in men than women while few indicated that incidence of this infection is higher in women. Others showed no difference in propensity to develop condition among both sexes.[7- 11]

This disease has variable age distribution, with most cases occurring during adolescence. This may be due to hormonal changes and/or increases in sebum secretion.[12] Moreover, it is rarely seen in older adults.[13,14] Quantitative cultures have shown the most fungi in infants under 1 year and among children in prepuberty.[15]

Problem statement and justification

Pityriasis versicolor is a chronic, commonly occurring skin disease manifested as discoloration of the skin that psychologically impacts the patient's quality of life, especially in those with dark skin color, when a discrepancy in color from normal skin becomes more apparent, also, lack of sufficient knowledge regarding the disease and the most predisposing factors.

Objectives

This paper intended to identify clinic-epidemiological pattern of pityriasis versicolor patients who attended out patient clinic of KDTH from June 2012-February 2013.

METHODS

Study design

The study was a descriptive and analytical cross-sectional, hospital-based study that used a quantitative research method.

Study period

The study was conducted from June 2012 to February 2013.

Study setting

The study was conducted at KDTH, outpatient clinic, Khartoum State, Sudan.

Study population

All Sudanese patients with pityriasis versicolor disease in the outpatient clinic of KDTH during the study period and accepted to participate were enrolled in this study. This study excluded the non-Sudanese patients and the patients who refused to participate in this study.

Sample size and sampling technique

The sample size was 110 patients. A total convenient sample of all patients who attended the dermatology outpatient clinic during the study period with Pityriasis versicolor were interviewed.

Data collection techniques

Direct questionnaire to identify the patient's age, sex, occupation, socioeconomic status, personal hygiene, disease onset, family history, symptoms, duration, and recurrence. Physical examination to identify the lesions, types, color, and sides.

Data analysis

The collected data were analyzed by computer using Microsoft excel 2010. Cross-tabulation was used to present frequencies and percentages.

Ethical approval

Ethical approval and clearance were obtained from the Sudan medical specialization board, the State ministry of health, and Khartoum dermatology and venerology hospital administration. Verbal consent was obtained from each study participant. Justice and human dignity were observed by treating selected participants equally when requesting them to participate in this study. The participants knew that their participation in this study was voluntary, and the information obtained was confidential and would be used only for the study purpose.

RESULTS

Sociodemographic data

The results showed that 73.6% of the participants were below 30 years old (n=81), including 30.91% below who were 20 and below (n=34). In comparison to only four patients between 51-60 years old (3.64%). Seventy-four males (67.3%) and 36 females (32.7%), 70.9% of participants were unmarried (n=78), the students represented 38.2% of participants (n=42), while only 2.7% were professionals (n=3), and the housewife represented 8.18% (n=9). Sixty–point–nine percent were in the middle (n=67), 37.2% were low (n=41), and only 1.8% were in high socioeconomic status (n=2). Seventy-point-nine percent were single (78). For the tribes and roots, 57.3% were from the pure Arab tribe (n=63), while 0.9% were from the pure African tribe (n=1) (Figure 1).

Results indicated that the onset of disease usually occurs in summer; 60% reported they got disease in summer (n=66), including 40% of males (n=44). Also, 30% of disease male participants reported having disease for years (n=33). Analysis showed an association between being male and having disease in summer and duration of disease, respectively p=0.05. Results showed an association between being male and type of lesion; results showed 40.9% of male participants had hypo-pigmented lesions (n=45) in comparison to 11.8% of female participants (n=13) (p=0.04), 84.5% of study participants reported that they did not have a systematic disease such as hypertension, diabetes mellitus, asthma/other (n=93) (Table 1 and 5). In contrast, 30% of participants reported having other dermatological diseases (n=33); of this Figure, 30.3% had acne vulgaris (n=10) (Table 2).

Receiving chronic medications

The 87.3% of study participants reported not receiving regular medication (n= 96), while 12.7% received chronic medicines (Table 2). Regarding duration of disease, 47 of the participants reported they had disease for years (42.7%) and only 16 for weeks (14.5%). For history of similar conditions, 62 yes (56.4%), 48 no (43.6%). Result showed that 49 of interviewed patients asymptomatic as most (44.5%). Regarding types of lesions, 91 participants had patches (42.1%), 67 scaly (31%), and 58 macules lesions (26.9%). Color of lesion was hypo-pigmented in 58 participants (52.7%), hyperpigmented lesion was in 29 participants (26.4%), and mixed (hypo hyper pigmentation) was in 23 participants (20.9%) (Table 3).

Family history of the disease

The results showed that 57.3% of the study participants reported no family history (n=63), while 42.7% reported a family history of the disease (n=47). 68.1% of those with positive family history, 68.1% of their parents were first-degree relatives (n=32). The analysis indicated an association between the family history and having the disease p=0.02], yet no association between the degree of relatives and having the disease (p=0.41) (Table 4).

The analysis showed a significant association between gender, the disease's onset, and the lesions' color. Of these figures, 40% and 40.9% were male; the p=0.05 and 0.04, respectively (Table 4).

Regarding the association between age and clinical characteristics, there was significant association between age and the degree of relatives with a p=0.00; regarding the history of similar conditions, the majority said yes. Also, regarding the associated symptoms, most patients didn't have it, with a p=0.03. Finally, regarding the color of the lesions, the majority of the participants were hypopigmented in all years with the p=0.00 (Table 5-7).

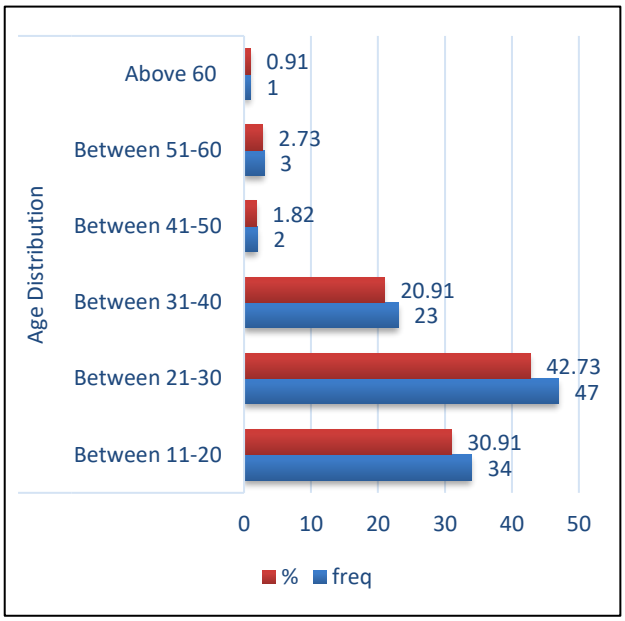

Figure 1: Distribution of study participants according to their age in outpatient clinic at KDTH, Khartoum State, Sudan, June 2012 to Feb 2013.

Table 1: Distribution of the study participants according to the history of the disease in the outpatient clinic at KDTH, Khartoum State, Sudan, June 2012 to Feb 2013.

Variables		N	Percentages (%)
Family history of pityriasis versicolor	**Negative**	63	57.27
	Positive	47	42.73
	Total	110	100
Degree of relatives	**First**	32	68.09
	Second	14	29.79
	Third	1	2.13
	Total	47	100
The onset of the disease	**Summer**	66	60
	Autumn	33	30
	Winter	11	10
	Total	110	100
Having systemic diseases	**No**	93	84.55
	Yes	17	15.45
	Total	110	100

Table 2: Distribution of study participants according to the presence of other dermatological diseases and receiving chronic medication in the outpatient clinic at KDTH, Khartoum State, Sudan, June 2012 to Feb 2013.

Variables		N	Percentages (%)
Association to dermatological diseases	No	77	70
	Yes	33	30
	Total	110	100
Type of dermatological diseases	Acne vulgaris	10	30.30
	Dandruff	5	15.15
	Tenia capitis	2	6.06
	Xerosis	1	3.03
	Tenia corporis	1	3.03
	Scalp folliculitis	1	3.03
	Psudofolliculitis barbae	1	3.03
	Miliaria	1	3.03
	Melasma	1	3.03
	Irritant contact dermatitis	1	3.03
	Impetigo contagiosum	1	3.03
	Genital wart	1	3.03
	Folliculitis keloidalis	1	3.03
	Dandruff and folliculitis	1	3.03
	Dandruff and acne vulgaris	1	3.03
	Chicken pox	1	3.03
	Cheilitis	1	3.03
	Allergic contact dermatitis	1	3.03
	Acne vulgaris and viral wart	1	3.03
	Total	33	100
Receiving chronic medication	No	96	87.27
	Yes	14	12.73
	Total	110	100
Type of chronic medications	Ventolin	5	35.71
	Oral antihyperglycemic drugs	2	14.29
	Antibiotic	2	14.29
	Antacid tabs	2	14.29
	Thyroxine tabs	1	7.14
	Dounil and amlodipine's	1	7.14
	Atenolol	1	7.14
	Total	14	100

Table 3: Distribution of study participants according to duration of disease, similar condition, associated symptoms, and lesions in the outpatient clinic at KDTH, Khartoum State, Sudan, between June 2012 to Feb 2013.

Variables		N	Percentages (%)
Duration of the disease	Years	47	42.73
	Months	47	42.73
	Weeks	16	14.55
	Total	110	100
History of similar condition	Yes	62	56.36
	No	48	43.64
	Total	110	100
Associated symptoms	Asymptomatic	49	44.55
	Mild itching	33	30
	Severe itching	23	20.91
	Moderate itching	5	4.55
	Total	110	100
Types of lesions	Patch	91	82.73
	Macules	1	0.91
	Scaly	18	16.36
	Total	110	100

Continued.

Variables		N	Percentages (%)
Colors of lesions	Hypopigmentation	58	52.73
	Hyperpigmentation	29	26.36
	Hypo + hyper pigmentation	23	20.91
	Total	110	100

Table 4: Correlation of gender with other factors among the study participants in the outpatient clinic at KDTH, Khartoum State, Sudan, in June 2012 to Feb 2013.

Variables		Gender distribution						P value
		Female		Male		Total		
		N	%	N	%	N	%	
Family history	Yes	15	41.67	48	64.86	63	57.27	0.02
	No	21	58.33	26	35.14	47	42.73	
	Total	36	100	74	100	110	100	
Degree of relatives	First	15	71.43	17	65.38	32	68.09	0.41
	Second	5	23.81	9	34.62	14	29.79	
	Third	1	4.76	0	-	1	2.13	
	Total	21	100	26	100	47	100	
Onset of the disease	Summer	22	61.11	44	59.46	66	60.00	0.05
	Autumn	12	33.33	21	28.38	33	30.00	
	Cold season	2	5.56	9	12.16	11	10.00	
	Total	36	100	74	100	110	100	
Duration of the disease	Years	14	38.89	33	44.59	47	42.73	0.05
	Months	18	50.00	29	39.19	47	42.73	
	Weeks	4	11.11	12	16.22	16	14.55	
	Total	36	100	74	100	110	100	
Associated symptoms	Asymptomatic	11	30.56	38	51.35	49	44.55	0.16
	Mild itching	13	36.11	20	27.03	33	30.00	
	Severe itching	9	25.00	14	18.92	23	20.91	
	Moderate itching	3	8.33	2	2.70	5	4.55	
	Total	36	100	74	100	110	100	
Colours of lesions	Hypopigmentation	13	36.11	45	60.81	58	52.73	0.04
	Hyperpigmentation	12	33.33	17	22.97	29	26.36	
	Hypo + hyper pigmentation	11	30.56	12	16.22	23	20.91	
	Total	36	100	74	100	110	100	

P=0.05 or less is considered significant.

Table 5: Correlation between the age with family history, degree of relatives and onset of the disease among the study participants in the outpatient clinic at KDTH, Khartoum State, Sudan between June 2012 to Feb 2013.

Age distribution (In years)		Family history			Degree of relatives				Onset of the disease			
		Negative	Positive	Total	1st	2nd	3rd	Total	Autumn	Winter	Summer	Total
11-20	N	22	12	34	8	4	0	12	9	4	21	34
	%	64.71	35.29	100	66.67	33.33	0	100	26.47	11.76	61.76	100
21-30	N	25	22	47	15	6	1	22	16	3	28	47
	%	53.19	46.81	100	68.18	27.27	4.55	100	34.04	6.38	59.57	100
31-40	N	13	10	23	6	4	0	10	7	4	12	23
	%	56.52	43.48	100	60	40	0	100	30.43	17.39	52.17	100
41-50	N	1	1	2	1	0	0	1	0	0	2	2
	%	50	50	100	100	0	0	100	0	0.00	100	100
51-60	N	1	0	1	0	0	0	0	0	0	1	1
	%	100	0	100	0	0	0	0	0	0.00	100	100
61-70	N	1	2	3	2	0	0	2	1	0	2	3
	%	33.33	66.67	100	100	0	0	100	33.33	0.00	66.67	100
P value		0.764			0				0.894			

Table 6: Correlation between the age, history of similar condition, and associated symptoms among the study participants in the outpatient clinic at KDTH, Khartoum State, Sudan, June 2012 to Feb 2013.

Age distribution (In years)		History of similar conditions, (n=110)			Associated symptoms, (n=110)				
		No	Yes	Total	Asymptomatic	Mild itching	Moderate itching	Severe itching	Total
11-20	N	15	19	34	9	12	2	11	34
	%	44.12	55.88	100	26.47	35.29	5.88	32.35	100
21-30	N	19	28	47	20	16	1	10	47
	%	40.43	59.57	100	42.55	34.04	2.13	21.28	100
31-40	N	13	10	23	16	5	2	0	23
	%	56.52	43.48	100	69.57	21.74	8.70	0.00	100
41-50	N	1	1	2	2	0	0	0	2
	%	50	50	100	100	0.00	0.00	0.00	100
51-60	N	0	1	1	1	0	0	0	1
	%	0	100	100	100	0.00	0.00	0.00	100
61-70	N	0	3	3	1	0	0	2	3
	%	0	100	100	33.33	0.00	0.00	66.67	100
P value		0			0.03				

The p=0.05 or less is considered significant.

Table 7: Correlation between the age, type of lesions, and colors of lesions among the study participants in the outpatient clinic at KDTH, Khartoum State, Sudan, June 2012 to Feb 2013.

Age distribution (In years)		Types of lesions				Colors of lesions			
		Macules	Patch	Scaly	Total	Hyper-pigmented	Hypo and hyperpigmented	Hypo pigmented	Total
11-20	N	0	29	5	34	13	5	16	34
	%	0	85.29	14.71	100	38.24	14.71	47.06	100
21-30	N	0	37	10	47	9	12	26	47
	%	0	78.72	21.28	100	19.15	25.53	55.32	100
31-40	N	1	19	3	23	6	5	12	23
	%	4.35	82.61	13.04	100	26.09	21.74	52.17	100
41-50	N	0	2	0	2	1	1	0	2
	%	0	100	0	100	50	50	0	100
51-60	N	0	1	0	1	0	0	1	1
	%	0	100	0	100	0	0	100	100
61-70	N	0	3	0	3	0	0	3	3
	%	0	100	0	100	0	0	100	100
P value		0.4				0			

The p=0.05 or less is considered significant.

DISCUSSION

Regarding the age majority of the participants were between twenty one and thirty years old with more than one third, which in comparing with Singla et al which agrees with current study have said that most of the patients were aged between twenty one up to thirty years old, regarding the gender majority of the participants were males with more than two thirds which in comparing with Singla which have sad that most of the participants were males which agrees with the current study, regarding the occupational status most of the participants were either students or labourer, which in comparing with and Ghosh et al which agrees with the current study that majority of the participantswere students, regarding the marital status majority of the patients were single with more than two thirds, which in comparing with Ghosh which agrees with the study which has said that most of the patients were single, regarding the tribes and roots most of the participants were from the north, regarding the socioeconomic status majority of the participants were having a middle one, which in comparison with Singla et al which disagree with the current study in most of the patients were either having a high or low socioeconomic status.[16,17]

For the family history of the patients, the majority had an adverse family history. In both studies, Singla et al and Ghosh et al said that the majority of the participants didn't have any family history, while for the ones who had a positive family history, more than two-thirds of them had a first-degree relative.[16,17]

Regarding the onset of the disease, most participants had it in the summer, which any other similar study compared. Regarding the association with systematic disease, the majority of the participants did not have any association, which agrees with the studies done by Singla et al and Ghosh et al who have said that the majority of the participants don't have any systemic diseases.[16,17]

Regarding the type of systematic disease, if they had it, the majority had Asthma or Irritable bowel diseases. These findings disagree with Singla et al and Ghosh et al studies that said diabetes is the most common systemic disease.[16,17]

For the association with dermatological diseases, the majority didn't have it, which also agrees with both studies done by Singla et al and Ghosh et al.[16,17] Who have said that the majority of the participants don't have any association with other diseases, for the type of these diseases' majority were having acne vulgaris with almost one third. Regarding the receiving chronic medication more than two thirds don't receive it, which disagree with both studies were done by Singla et al and Ghosh et al regarding the one who had receiving it majority were having Ventolin for asthma, which disagree with both studies that have said it was diabetes so they were on antihyperglycemic agents as Singla et al and Ghosh et al regarding the duration of the disease most of the participants were having it for years or month with more than two thirds, which disagree with the study were done by Ghosh et al which have said that majority of the participants were having it for 2 weeks up to two years which disagree with our study that majority were having it from months up to years, regarding the history of similar condition most of the participants do have it, which agrees with the study was done by Singla et al that have said they had similar episodes and recurrent attacks, regarding the associated symptoms it was asymptomatic, which disagree with Singla et al who have said that it affect majority of the parts of the body with severe symptoms, and Ghosh et al which agree with the current study in that majority were asymptomatic, regarding the types of the lesions majority were either having patch or scaly, which agrees with both studies Singla et al and Ghosh et al whom have said that most of the lesions were patches, regarding the colours of the lesions majority were having hypopigmentation which agrees with both studies were done by Singla et al and Ghosh et al who have said its hypopigmented.[16,17]

For the correlation between gender and age

Regarding the comparison with the gender for the family history, it showed that the majority were negative for the males. At the same time, the females were positive with a p=0.02, which is significant, while for the degree of relatives, there was no significance with a p=0.41. For the onset of the disease, the majority of the participants had it in the summer for both males and females, with a p=0.05, which is significant; regarding the duration of the disease majority of the participants had it for months for the females, while for the males had it for years with a p=0.05 which is significant, regarding the associated symptoms there was no significant with a p=0.16, regarding the color of the lesions majority had it as hypopigmentation with a p=0.04 which is significant.

For the correlation between being male and having a positive family history of the disease, there was no significance with a p=0.764; regarding the degree of relatives, it showed that the majority of the ages had a first-degree as a family history with a p=0.00 which is significant, regarding the onset of the diseases there was no significance with a p=0.894. Regarding the comparison with the duration of the disease, there was no significance with a p=0.73; regarding the comparison with the history of similar conditions, the majority of the participants had it in all ages with a p=0.00, which is significant. Regarding the comparison with the associated symptoms, the majority of the ages had no signs or were asymptomatic, with a p=0.03, which is significant. Regarding the comparison with the type of lesions, there was no significant association. In contrast, there was significance with the colors of the lesions, and the majority were hypopigmented with a p=0.00.

Limitation

Because of the evident prevalence rate of Pityriasis versicolor in Sudan, applying an appropriate sampling technique to achieve a representative sample size, the evidence in this study is generalized to the whole population demographic.

CONCLUSION

This study has concluded that most of the participants were having a recurrent episode of the disease, the majority of them were young ages, most of them were males, most of the patients have it in the summer (60%), and the majority of the participants had no association with systemic disease (84.5%), there was multiple significance association when correlating gender and age to symptoms and signs in a clinical way. The disease was highly frequent in Arab tribes compared to respondents in pure African tribes. This study recommends conducting a more analytical study on broad ethnic groups in Sudanese patients to determine any genetic association with pityriasis versicolor. Improve the patient's quality of life by improving counselling and raising awareness to understand better and manage the predisposing factors.

ACKNOWLEDGEMENTS

Authors would like to thanks to KDVTH team for their cooperation and support provided to realize this study. Our thankful extended to the participants who showed patients and willingness to provide information.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. KLenk As, Martin AG, Heffernan MP. Yeast infections: candidiasis, pitryasis versicolor. In: Freedberg IM, Eisen AZ, Austen KF, Goldsmith LA, katzsi (editors.) Fitz patricks Dermatology in general Medicine, 6th edition. New York: McGraw-Hill. 2009;18.
2. Savin R. Diagnosis and treatment of tinea versicolor. J Fan Pract. 1996;43:30-35.
3. Klaus W, Richard AJ. Pityriasis Versicolor. In: Klaus W, Richard AJ (editors) Fitzpatricks-color atlas and synopsis of clinical Dermatology, 6th edition. Singapore: McGraw Hill. 2009;732-7.
4. Rivolta S. Dei Parassiti Vegetali come Introduzione allo Studio delle Malattie Parassitarei. E delle Alterazioni dell'alimento degli Aimali Domestici. Torino, Italy: Speir. 1873;469-79.
5. Faergemann J. Tinea versicolor (tinea pityriasis versicolor). In: Demis D (editor) Clinical Dermatology. Philadelphia: Lippincott-Raven. 1995;1-11.
6. Nowicki R, Sadowska E. Mycotic infections in the Gdansk area. Przegl Dermatol. 1993;80:245-50.
7. Tinea versicolor. Available at: http//emedicine.medscape.com/article/1091575/overview#. Accessed on 15 June, 2023.
8. Nakabayashi A, Sei Y, Guillot J. Identification of Malassezia species isolated from patients with seborrhoeic dermatitis, atopic dermatitis, pityriasis versicolor and normal subjects. Med Mycol. 2000;38(5):337-41.
9. Muhammad N, Kamal M, Islam T, Islam N, Shafiquzzaman M. A study to evaluate the efficacy and safety of oral fluconazole in the treatment of tinea versicolor. Mymensingh Med J. 2009;18(1):31-5.
10. Nikpoor N, Leppard B. Fungal disease in Shiraz. Pahlavi Med J. 1978;9(1):27-49.
11. Gupta AK, Bluhm R, Summerbell R. Pityriasis versicolor. J Eur Acad Dermatol Venereol. 2002;16(1):19-36.
12. Akpata LE, Gugnani HC, Utsalo SJ. Pityriasis versicolor in school children in Cross River State of Nigeria. Mycoses. 1990;33(11-12):549-51.
13. Miskeen AK, Kelkar SS, Shroff HJ. Pityriasis versicolor in children. Indian J Dermatol Venereol Leprol. 1984;50:144-6.
14. Rajashekhar N. Oral fluconazole in tinea versicolor. Indian J Dermatol Venereol Leprol. 1997;63(1):166-7.
15. Bergbrant IM, Brobeg A. Pityrosporum ovale culture from the forehead of healthy children. Acta Derm Venereol (Stockh). 1994;74(4):260-61.
16. Singla P, Sharma NR, Mane P, Patil A, Sangwan J, Sharma S. Epidemiological, clinical and mycological characteristics of pityriasis versicolor: Results of a study from a teaching hospital in rural part of Northern India. J Family Med Primary Care. 2022;11(9):5236-40.
17. Ghosh SK, Dey SK, Saha I, Barbhuiya JN, Ghosh A, Roy AK. Pityriasis versicolor: a clinicomycological and epidemiological study from a tertiary care hospital. Indian J Dermatol. 2008;53(4):182-5.

Cite this article as: Mohammed OB, Alla KBF. Clinico-epidemiological pattern of pityriasis versicolor in Sudanese patients at Khartoum dermatology and venerology hospital, Khartoum State, Sudan, 2012-2013. Int J Res Dermatol 2023;9:326-33.