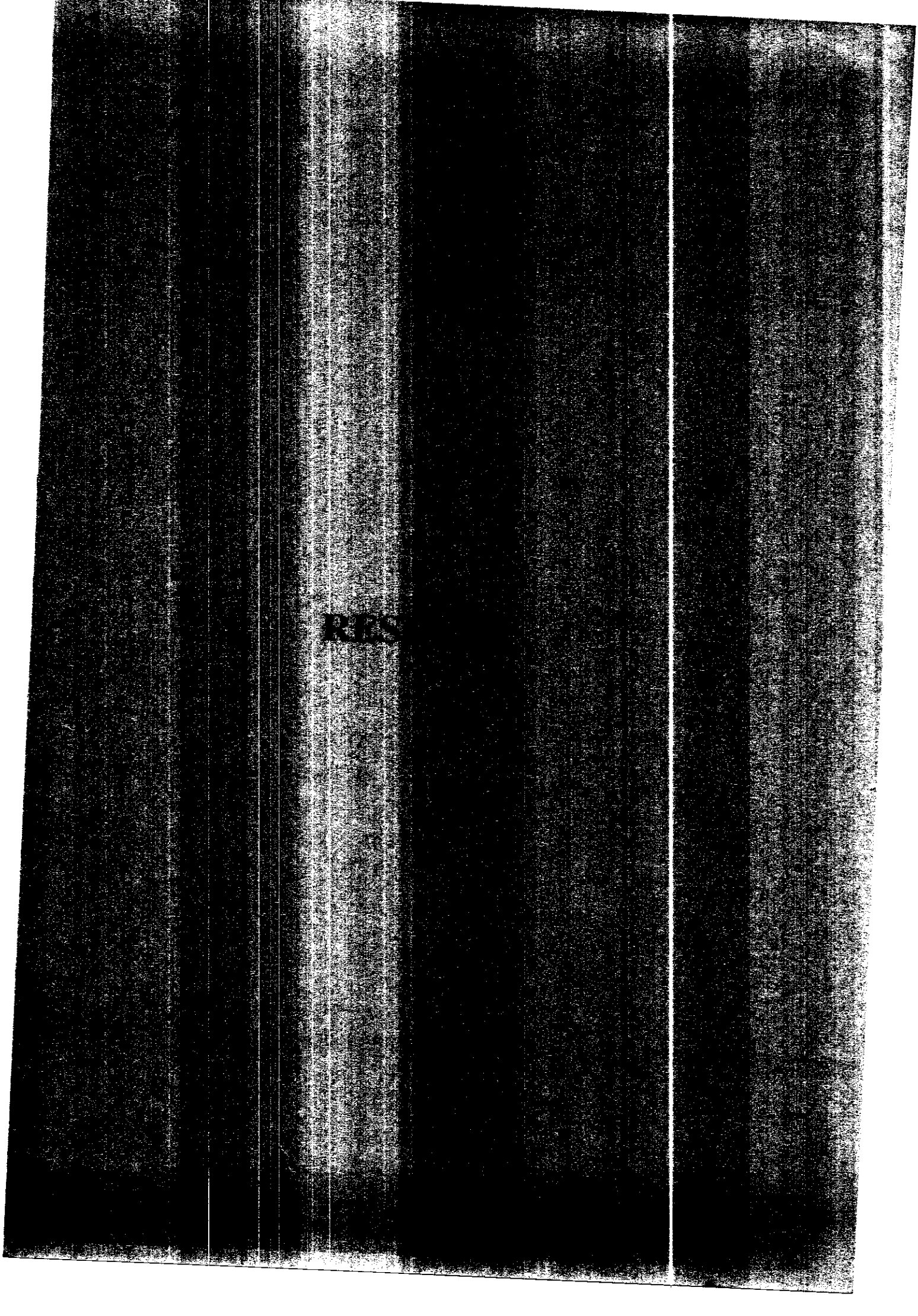


RESULTS

This study was carried out during the period from December 1991 to August 1992 on 60 patients selected from Dermatology and Venereology Out Patient Clinic of Benha University Hospitals. 32 female and 28 male their ages ranged from 2-62. They were suffering from dermatophytosis. Clinically, they were 14 patients with Tinea capitis, 15 with Tinea circinata, 9 with Tinea pedis, 7 with Tinea cruris, 6 with Tinea manuum, 3 with Tinea barbae and 6 with Onychomycosis.

Table (1) : **Incidence of dermatophytes species isolated by culture on Dermatosel agar and sabouraud's glucose cyclohexiimide chloramphenicol agar.**

Species of dermatophytes	*No*	*%*
- Trichophyton rubrum	24	40
- Trichophyton violaceum	16	27
- Trichophyton mentagrophytes	9	15
- Microsporum canis	4	6.5
- Trichophyton schoenleinii	3	5
- Epidermophyton floccosum	1	1.5
- Negative (no grwoth)	3	5
	60	100%

As shown from table (1), Trichophyton rubrum was the most prevalent dermatophyte isolated (24) (40%) followed by trichophyton violaceum (16) (27%), trichophyton mentagrophytes (9) (15%), Microsporum canis (4) (6.5%), trichophyton schoenleinii (3) (5%) and Epidermophyton floccosum (1) (1.5%).

Table (2) : The distribution of different types of dermatophytosis in relation to age.

Type of Dermato-phytosis / age in years	Tinea capitis		Tinea circinata		Tinea pedis		Tinea cruris		Tinea manuum		Tinea barbae		onycho-mycosis		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2 - 12	12	20	-	-	-	-	-	-	-	-	-	-	-	-	12	20
12 - 23	2	3.33	3	5	-	-	2	3.33	-	-	1	1.66	2	3.33	10	16.66
23 - 34	-	-	7	11.66	5	8.33	4	6.66	2	3.33	1	1.66	2	3.33	21	35
34 - 45	-	-	4	6.66	2	3.33	1	1.66	4	6.66	-	-	1	1.66	12	20
45 - 56	-	-	-	-	1	1.66	-	-	-	-	-	-	1	1.66	2	3.33
56 - 62	-	-	1	1.66	1	1.66	-	-	-	-	1	1.66	-	-	3	5
Total	14	23.3	15	25	9	15	7	11.66	6	10	3	5	6	10	60	100

It can be seen from table (2) that the highest incidence of dermatophytosis (35%) was in the age between 23-34 years old, while lowest incidence was in the age between 45-56 years old (3.33%). Tinea capitis was the disease of childhood, 12 cases (20%) were below 12 years and only 2 cases (3.33%) were above 12 years old. But tinea manuum, tinea pedis, tinea circinata, tinea cruris and tinea barbae were the disease of adult age, most of these cases were between 23-45 years old.

Table (3) : **The distribution of different types of dermatophytosis according to sex.**

Type of dermatophytosis	*Male*		*Female*		*Total*	
	No	%	No	%	No	%
- Tinea capitis	9	15	5	8.33	14	23.33
- Tinea circinata	6	10	9	15	15	25
- Tinea pedis	3	5	6	10	9	15
- Tinea cruris	3	5	4	6.66	7	11.66
- Tinea manuum	1	1.66	5	8.33	6	10
- Tinea barbae	3	5	--	--	3	5
- Onychomycosis	3	5	3	5	6	10
Total	28	46.66	32	53.33	60	100%

It can be seen from the table (3) that tinea capitis was common among male (15%) and female was (8.33%) while tinea manum, tinea pedis, tinea circinata and tinea cruris were more common among female (8.33%, 10%, 15%, 6.66% respectively) and male were (1.66%, 5%, 10%, 5% respectively). The table also shows that all cases of tinea barbae were male (5%). As regard to onychomycosis, it was equally distributed among female and male (5% for each).

Table (4) : Results of microscopic and cultural examination on Dermatophyte test media (DTM) and Dermatosel agar in 60 clinically suspected cases.

	Positive		*Negative*	
	No	%	No	%
- Microscopic examination	49	81.66	11	18.33
- Culture on (DTM)	60	100	--	--
- Culture on dermatosel agar	57	95.00	3	5.00

As shown from table (4), direct microscopic examination, 49 cases (81.66%) were positive and 11 cases (18.33%) were negative. By culture on DTM, all cases gave change in color of the medium from yellow to red which indicate the presence of dermatophytes, while by culture on Dermatosel ager 57 cases (95%) were positive and 3 cases (5%) gave no growth on the media.

Table (5) : Incidence of different species of dermatophytes isolated from different clinical cases of dermatophytosis.

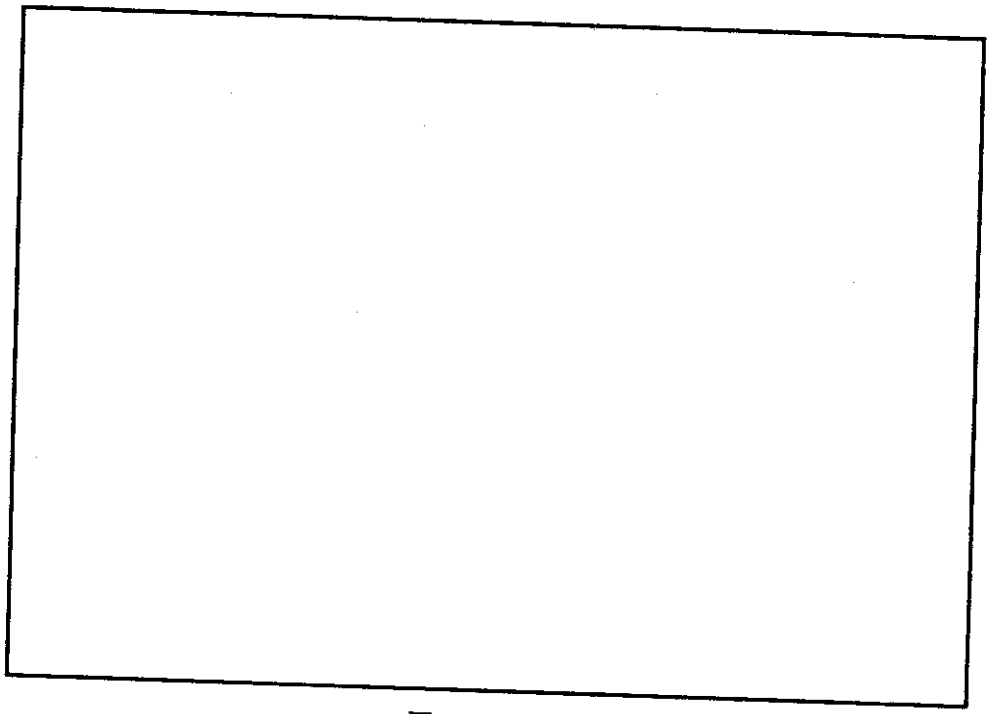
Clinically suspected cases	No of cases	Species of dermatophytes						
		T. rubrum	T. violaceum	T. mentagrophytes	M. canis	T. schoenleinii	E. floccosum	No growth
T. capits	14	--	10		1	3		
T. circinata	15	7	3	3			1	1
T. pedis	9	6		2				1
T. cruris	7	3	2	2				
T. manuum	6	4	1	1				
T. Barbae	3	1			2			
onychomycosis.	6	3		1	1			1
Total	60	24	16	9	4	3	1	3

Table (5) shows that Trichophyton rubrum was isolated from 24 cases (40%) : 7 cases (11.66%) of tinea cricinata, 6 cases (10%) of tinea pedis, 3 cases (5%) of tinea cruris, 4 cases (6.66%) of tinea manuum, 1 case (1.66%) of tinea barbae and 3 cases (5%) of onychomycosis.

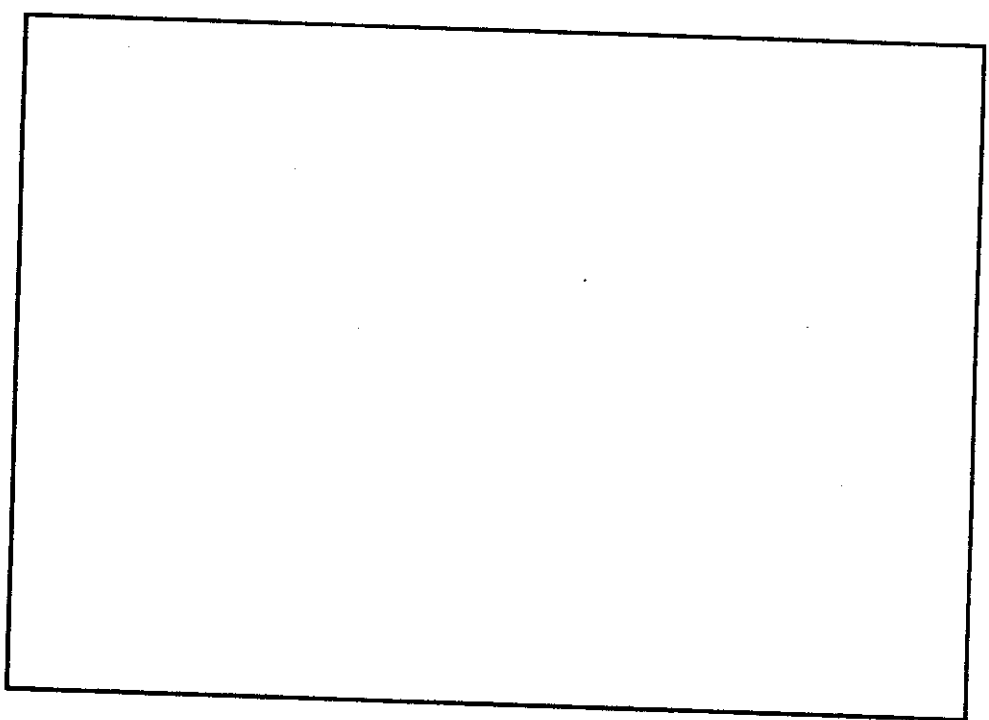
Tichophyton violaceum was isolated from 16 cases (26.66%) : 10 cases (16.66%) of Tinea capitis, 3 cases (5%) of Tinea circinata, 2 cases (3.33%) of Tinea cruris and 1 case (1.66%) of Tinea manuum. Trichophyton mentagraphytes was isolated from 9 cases (15%) : 3 cases (5%) of Tinea circinata, 2 cases (3.33%) of Tinea pedis, 2 cases (3.33%) of Tinea cruris, 1 case (1.66%) of Tinea manuum and 1 case (1.66%) of onychomycosis. Microsporum canis was isolated from 4 cases (6.66%) : 1 case (1.66%) of Tinea capitis, 2 cases (3.33%) of Tinea barbae and 1 case (1.66%) of Onychomycosis. Trichophyton schoenleinii was isolated from 3 cases (5%) of Tinea capitis. Epidermophyton floccosum was isolated from 1 case (1.66%) of Tinea circinata. No growth was in 3 cases (5%) : 1 case (1.66%) of Tinea circinata, 1 case (1.66%) of Tinea pedis and 1 case (1.66%) of Onychomycosis.

Immunological Resutls :

This study aimed to evaluate the degree of cell mediated immunity (CM1) in patients with dermatophytosis. T-lymphoctes were separated as described before and counted by E. Rosette method. Lymphocyte blast transformation using phytohemagglutinin (PHA) as a mitogen has been found to be useful in evaluating CM1 in patients with dermatophytosis. Both tests were carried out on both studied groups i.e. case group which included 60 patients who complained from different clinical types of dermatophytosis and control group which include 30 normal subjects free from any dermatological or immunological disorders.



E. rosette



Lymphocyte blast transformation

Table (6) : **The statistical analysis of E. Rosette % for control and different clinical types of dermatophytosis.**

	Number	Arthomatic mean	Standard diviation	t.	P.
Control	30	54.7	± 6.93		
Tinea capitis	14	54.85	± 7.2	0.06	> 0.05
Tinea circinata	15	55.26	± 6.0	0.28	> 0.05
Tinea pedis	9	52.55	± 4.6	1.06	> 0.05
Tinea cruris	7	53.28	± 4.98	0.62	> 0.05
Tinea manum	6	54.00	± 6.77	0.01	> 0.05
Tinea barbae	3	56.00	± 5.29	0.39	> 0.05
Onychomycosis	6	51.66	± 7.31	0.93	> 0.05

Table (6) showed that there were no statistically significant difference between percentage of T. lymphocytes count from controls and infected patients.

Table (7) : The statistical analysis of E. Rosette % for controls and patients infected by different species of dermatophytosis.

	Number	Arthomatic mean	Standard diviation	t.	P.
Control	30	54.7	± 6.93		
Trichophyton rubrum	24	54.32	± 6.9	0.21	> 0.05
Trichophyton violaceum	16	57.81	± 4.36	1.86	> 0.05
Trichophyton mentagrophytes	9	52.50	± 4.60	1.21	> 0.05
Microsporum canis.	4	50.00	± 7.48	1.18	> 0.05
Trichophyton schoenleinii	3	44.33	± 4.04	3.90	< 0.001
No growth	3	54.00	± 5.65	0.16	> 0.05

Table (7) showed the statistical analysis of the resutls of E. Rosette % in controls and infected patients with different species of dermatophytes. From table (7) it

clear that there were no statistically significant difference between percentage of T. lymphocytes count in controls group or infected patients by different species of dermatophytes except in patients infected by trichophyton schoenleinii whose showed a significant difference t. 3.9 $p < 0.001$.

Table (8) : **Comparison between E. Rosette % results for both groups (control and case)**

	Number	Range	Arthamatic mean	Standard deviation	t.	P.
Control	30	46-69	54.70	± 6.93		
Case	60	40-67	54.15	± 6.08	0.36	>0.05

Table (8) shows a comparison of E. Rosette results between control subjects and infected cases. Table (8) show that the maximum value of E. Rosette % in controls group was 69% and maximum value in cases group was 67% the lowest value in control group was 46% while in cases group was 40%. It is also shown that there was no significant diference between both groups.

Table (9) : The statistical analysis of lymphocytes blast transformation results for control and case groups (different clinical types of dermatophytosis).

	Number	Arthomatic mean	Standard diviation	t.	P.
Control	30	53.5	± 6.52		
Tinea capitis	14	53.57	± 4.55	0.04	> 0.05
Tinea circinata	15	55.66	± 5.9	1.08	> 0.05
Tinea pedis	9	49.77	± 4.17	2.03	> 0.05
Tinea cruris	7	50.88	± 4.63	1.02	> 0.05
Tinea manuum	6	53.00	± 6.54	0.17	> 0.05
Tinea barbae	3	54.33	± 4.04	0.31	> 0.05
Onychomycosis	6	49.33	± 5.16	1.70	> 0.05

Table (9) shows the resutls of lymphocytes transformation for controls group and different clinical types of dermatophytosis. It can be seen from table (9) that there were no statistically significant difference between the results of lymphocytes transformation using PHA in both control individuals and infectd patients.

Table (10) : The statistical analysis of lymphocytes blast transformation results for control individuals and infected patients with different species of dermatophytes.

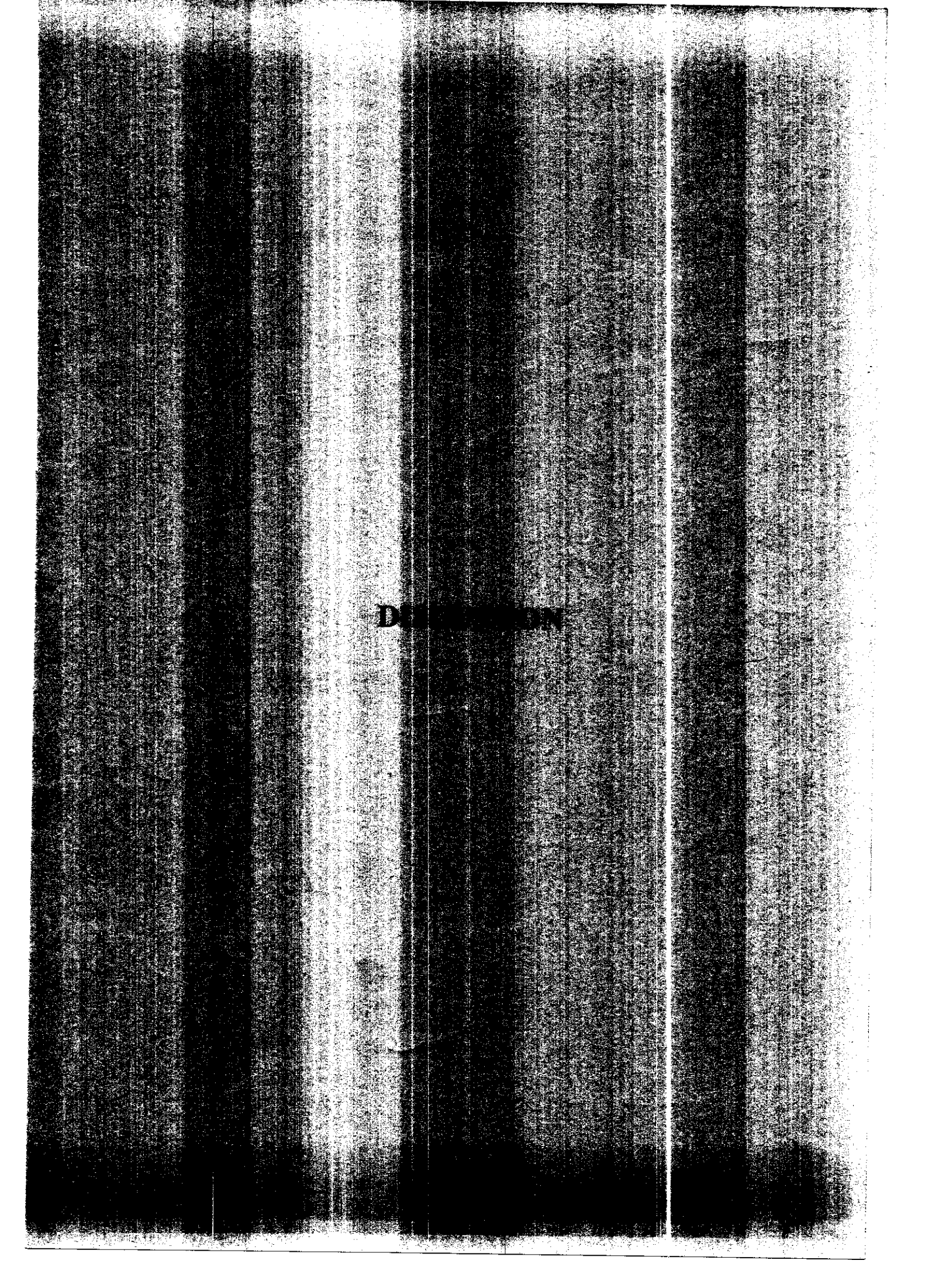
	Number	Arthomatic mean	Standard diviation	t.	P.
Control	30	53.5	± 6.52		
Trichophyton rubrum	24	52.64	± 6.6	0.48	> 0.05
Trichophyton violaceum	16	55.12	± 4.30	1.01	> 0.05
Trichophyton mentagrophytes	9	51.10	± 3.92	1.39	> 0.05
Microsporum canis.	4	50.25	± 4.64	1.24	> 0.05
Trichophyton schoenleinii	3	49.66	± 2.08	2.26	< 0.05
No growth	3	54.00	± 5.65	0.16	> 0.05

Table (10) showed the statistical analysis of lymphocytes transformation results for both control and patients infected with different species of dermatophytes. It can be seen from table (10) that there were no statistically significant difference between the results of transformation using PHA in both control individuals and infected patients except in patients infected by trichophyton schoenleinii whose showed a significant difference (t. 2.26 , P. < 0.05).

Table (11) : **REULTS OF LYMPHOCYTE PLAST TRANSFORMATION IN BOTH GROUPS STUDIED**

	Number	Range	Arthamatic mean	Standard deviation	t.	P.
Control	30	44-68	53.50	± 6.52		
Case	60	38-66	52.75	± 4.51	0.54	>0.05

Table (11) show a comparison of lymphocytes blast transformation results between control subjects and all infected patients. We can notice that the maximum value of lymphocytes blast transformation test using PHA in control group was 68% while in infected patients was 66% and the lowest value among control individuals was 44% and among infected patients was 38%, also it shows that there were no statistically significant difference between the results of both groups.



DISCUSSION

Dermatophytosis are worldwide in distribution and has a significant health problem, for example, Tinea capitis may affect up to 20% of the population during epidemics (Rudolph et al., 1982). The natural habitant of dermatophytes in human is usually the keratinized layers of the epidermis, hairs and nails. The fungus do not usually invade living tissues, although some of them occasionally cause profound suppurative inflammation as in kerion celsi after entering the dermis through a break in the follicular wall (Hironaga et al., 1983).

The human body defends itself against infection by dermatophytic fungi by non specific as well as specific immunity. The non specific factors include epidermal proliferation, serum factors, complement, macrophages and polymorphonuclear leukocytes. The specific host response includes the cell mediated immunity which is the major specific mechanism of host defence against dermatophyte infections and the humoral immunity which is generally weak (Dahl, 1987).

The aim of the present study was to evaluate the T-cell function in healthy persons and in patients with mycotic infections caused by various dermatophytes.

The work was achieved through the study of 60 patients with different clinical types of dermatophyte infections : (14 cases) Tinea capitis (23.33%), (15 cases) Tinea circinata (25%), (9 cases) Tinea pedis (15%), (7 cases) Tinea cruris (11.66%),(6 cases) Tinea manuum (10%), (3 cases) Tinea barbae (5%) and (6 cases) Onychomycosis (10%). After careful history taking, clinical dermatological examination and mycological examination for each case.

Trichophyton rubrum was the most prevalent dermatophyte isolated from positive cases (40%) followed by Trichophyton violaceum (27%), T. mentagrophytes (15%), Microsporum canis (6.66%), T. schoenlenii (5%) and Epidermophyton floccosum (1.66%). These results could be supported by the reports of Svejgaard et al. (1984) who reported that, Trichophyton rubrum is the most frequently cultured dermatophyte in the mycological laboratories. In Egypt, El-Mofty et al. (1975) reported that in general T. violaceum is the commonest pathogen isolated in cases of dermatophytosis in Egypt followed by T. rubrum , T. mentagrophytes , T. schoenleinii, Microsporum canis and Epidermophyton floccosum. Trichophyton rubrum was found to be the commonest isolate in cases of Tinea corporis and Tinea cruris. El-Shiemy et al. (1981) reported that Trichophyton rubrum was the most commonly isolated organism in Abu Dhabi. Furthermore, El-Bassioni (1986) reported that T. rubrum was the commonest pathogen isolated in cases of Tinea corporis in Dakahlia

governorate, followed by Trichophyton violaceum, Trichophyton mentagrophytes. Epidermophyton floccosum, Trichophyton schoenleinii, Trichophyton verrucosum and Microsporum canis.

Trichophyton violaceum was the most prevalent dermatophyte isolated from cases of Tinea capits as described by El-Mofty et al. (1975) and this supporting our results.

Trichophyton mentagrophytes was isolated from 3 cases of T. circinata, 2 cases of T. pedis, 1 case of T. cruris, 1 case of T. manuum and 1 case of Onychomycosis. Davis, (1972) found that Tinea pedis and Tinea manuum caused mainly by T. mentagraphytes and T. rubrum. Rippon (1982) found that Tinea circinata may be caused by any species of all known dermatophytes, probably, the most universally species is T.rubrum followed in frequency by T. mentagrophytes.

Microsporum canis was isolated from one case of T. capits, two cases of T. barbae and one case of Onychomycosis although, it rarely affected nails, but it may be due to contamination of the nail itself Caprilli et al. (1980) reported that the prevalence of M. canis may differ with socio, economic and hygienic conditions and also contact with animals as cats and dogs.

Trichophyton schoenleinii was isolated from 3 cases of Tinea capitis. This parallels the ideas of Rippon (1982) who stated that the most common dermatophyte producing Favus is T. schoenlenii.

Epidermophyton floccosum was isolated from one cases of Tinea circinata, Findlay (1979) reported that the site of E. floccosum infection in order of thier clinical importance are : the groin, the feet, hands and the nail.

As regards the sex and age incidence of the studied cases, it was shown that the incidence of the male cases was higher in Tinea capitis and represented all the cases of Tinea barbae as it occurs only in men. It has been suggested on an anatomic basis that shortly cut hair of males would facilitate access of fungus spores to the scalp surface (Lewis et al., 1958). Habits of sharing items as caps and hair brushes were also suggested by (Raubitschek, 1959). Also, contaminated barber's instruments may transmit the disease readily (Moschella et al., 1975).

The incidence of female cases was higher in Tinea cruris and Tinea circinata in this study and could be related to the prevalence of obesity among Egyptian females with the pendulous abdomen and full thighs leads to more occlusive conditions on the groin in females. This results was different from that obtained by Abdalla, (1971) who found that lesion of Tinea cruris is more common in males than in females due to continuous firiction between the scrotum and the medial side of the thigh. Also, the incidence of female was higher in cases with Tinea manuum and Tinea pedis as the female are more exposed to water and various detergents. As the rate of infection with Tinea pedis is increased in

individuals using communal baths or pools (Goslen and Kabayashi, 1987). This is contributed to the bad habits of our female farmers of keeping in contact with channels.

The age of most studied cases ranged from 12-45 years except most of cases of Tinea capitis whom were at an age ranged from 2-12 years. Similarly, Philpot (1977) stated that most of Tinea capitis patients were children between the ages of 4-14 years. The alternation in fatty acid composition of sebum at puberty has been proposed as a possible explanation for the spontaneous improvement seen in scalp ringworm at this time (Abraham, 1975). The absence of children from the other types of Tinea in this study could be related to the views of Goslen and Kabayashi (1987), who stated that when other types of Tinea (tinea pedis, tinea cruris) were considered, children appeared to be less susciptible.

At the ages up to 23 years the incidence of male cases with Tinea pedis, Tinea manuum, Tinea circinata and Onychomycosis was higher. This could be supported by the findings of Blank (1974) who found that there was more overt anthropophilic infection in male because of their more frequent exposure to an environmental conditions conductive to the spread of the organism (atheletic organizations and military service). At the higher ages ranged from more than 23-45 years the incidence of female cases with those types of Tinea was higher and this could be coincidental with the stress of

child bearing period and the more exposure to occupational hazards (Water and detergents) after marriage.

The direct microscopic examination by KOH preparation was positive in 49 cases (81.66%). While on culture, positive culture was found in 57 cases (95%). This is parallel to the results of El-Mofty et al., 1975 who reported that out of the examined cases of tinea corporis 90.5% yielded positive fungus cultures. Negative cultures cases could be due to the scanty of organism in the lesions or due to over growth of saprophytic fungi inspite of the use of actidione in the media. Negative microscopy may be due to misdiagnosis of the identification of the fungal elements or its total absence in the scales used for direct mircroscopy.

The percentage of T. cells as demonstrated by E. Rosette test in our study showed that the mean value among control group was 54.7% ± 6.93%, while the mean value of T. cells count among patient group was 54.15% ± 6.05%, no statistical significant difference between both groups ($p > 0.05$). However, in patients who had tinea capitis caused by Trichophyton schoenlenii, there were statistical significant difference as mean value of T. cells count was 44.33% ± 4.04% and $p < 0.001$. This results agreed with the results reported by Hay and Shennan (1982), they found that there were no statistically significant difference between percentage or total T and B lymphocytes count from normal subject and infected person with dermatophytosis.

As regards lymphocyte transformation results, analysis of variance in the two studied groups (control and patient) revealed no statistically significant difference, the mean value of control was 53.5% ± 6.52% and the mean value of case group was 52.75 ± 5.41% $p > 0.05$. Again, in patients who had tinea capitis caused by T. schoenlenii, there were a significant difference between this group and control group 49.66% ± 2.08 and $p < 0.05$. This results agreed with the results reported by Ahmed, (1982), who stated that there were no differences in response to T. cell mitogen like PHA in control subjects and in both acutely and chronically infected subjects. Svejgaard, (1982) had done a follow up study, using lymphocte blast transformation, invitro, in acute dermatophytosis, these patients were studied before, during and after treatment for 6 months. She used several mitogens including PHA. The patients in all studies showed normal immunes responses compared with a control group with no statistically significant differences.

While, Hanifien et al. (1974) and Hay (1985) reported that chronic infection with dermatophytosis, have been associated in their studies with poor, in vitro, lymphocytes function. They also reported that the patient's immune response may vary according to the site of infection and the species of invading organisms.